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## Table of Contents

IJPES International Journal of Psychology and Educational Studies
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# Analysis of Science-Based Entrepreneurship Skills and Parents' Academic Achievement Pressure and Support of Primary School Students

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ABSTRACT

This study aims to examine whether there is a relationship between the academic achievement pressure and support of parents and students' science-based entrepreneurship and how these variables change in terms of parents' activities with their children. For this purpose, one of the quantitative research approaches, the discriptive survey method, was used in the study. 142 students from 3 different primary schools in Erzurum province participated in the study, using the appropriate sampling method. Demographic information questionnaire, Parental Academic Success Pressure and Support Scale (PASPSS), and Science-Based Entrepreneurship Scale (SBES) were used as data collection tools in the study. The data obtained from the participants were analyzed with the SPSS 26.0 package program. As a result, the science-based entrepreneurship levels of the students change in terms of the length of time the parents study with their children and participate in social sports activities. The pressure on their children's academic success is enhancing in terms of parents' children spending time in the digital environment while studying. On the contrary, the higher their children's educational expectations, the more they support their academic success. Finally, weak and intermediate relationships were determined regarding students' science-based entrepreneurship, parental academic achievement pressures, and support.

Keywords:
Entrepreneurship, parental success pressure, parental success support, primary school students

## 1. Introduction

In the 21st Century, the development indicators of the countries are measured by the power in the field of production, innovation, communication industry, and knowledge. In this context, entrepreneurship is the most important trigger of these factors (Pan & Akay, 2015). Because labor, capital, raw materials and entrepreneurship are the basis of the factors of production that play the role of the determinant of economic indicators. Considering that today there is a transition from the industrial age to the information age, the effects of the physical efforts of individuals on the economy are decreasing, while the effects of thoughts and ideas are increasing rapidly. Entrepreneurship is also at the basis of these activities in terms of thought and idea (Balaban & Özdemir, 2008).

In the literature, two different views are dominant in defining entrepreneurship and placing it within a certain framework. The first of these is to introduce new products and technology to the market by discovering, making and living, producing, where economic factors are at the forefront. The second is an entrepreneurship definition that is evaluated in terms of education. Here, it is evaluated as a set of behaviors that take risks, approach knowledge and derivatives with a creative eye, and value orientation and the individual's attachment (Kapu, 2004). If the educational dimension of entrepreneurship is emphasized, this acquisition has started to show its effect in the last training programs in the last 15-20 years (Khan, 2011). The population

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throughout the world is constantly increasing. In this respect, it is observed that there is an increase in the unemployment rate, especially in a country where the a continuous upward trend in the proportion of young population like Turkey. TSI (2020), the number of unemployed in Turkey was announced as 4 million 362 thousand according to the report. Considering this number, the importance of gaining the entrepreneurship factor that comes to the fore in contemporary education becomes evident (Oganisjana, 2011). Because this skill can be gained in the educational environment (Azizi, 2003), this acquisition requires that economists not only focus on this issue in other fields (European Commission, 2013). In this respect, training on entrepreneurship in education and training programs has gained importance and this type of skill has been included in programs (Ministry of National Education [MoNE], 2013; 2017).

Curth (2011) categorized entrepreneurship-related traits under two headings: characteristics that include knowledge and skills and affective behavioral characteristics. The characteristics that include knowledge and skills are (i) defining activities and taking advantage of opportunities, (ii) analyzing resources, (iii) making and managing projects, (iv) taking risks when necessary, (v) effective communication skills and the like. Behavioral and affective characteristics: (ı) being fond of freedom, (ii) motivation for success, (iii) taking responsibility, (iv) being determined in their work, (v) high level of motivation, (vı) being ambitious, (vii) cooperating and so on. On the other hand, Yılmaz and Sünbül (2009) should have characteristics such as courage, original thinking, openness to change, cooperation in their work, willingness to work, and flexibility for an individual to be a successful entrepreneur. Considering that the focus is on students' success in educational settings, these characteristics that entrepreneurship will bring to the individual help the individual develop and be successful in multiple ways (Arıkan, 2002).

The most important social environment of the children is the school environment and their parents. In this respect, children tend to behave like them when they spend with their parents and resemble their parents' beliefs (Freedman et sl., 2003). Parents play an important role in eating habits, science, music, cinema, and sports (Öztürk, 1998). The effects of parents, who are pioneers in shaping their children, during their teaching activities are also very important. Parents' helping their children with science homework and questions, studying together, and encouraging them to learn the lesson are factors that increase success (Çakır et .al. 2007). Similarly, the success of international students in the PISA assessment program in Turkey is due to the demographic characteristics of parents, one of the issues that affect students' academic performance in the private sector (Anıl, 2009).Most parents desire the success of their children in educational settings. In this respect, they try different ways for their children to be successful. In this respect, they can sometimes support their children while they pressure them. Parents' desire for their children to work more, compare them with their friends, and find their success insufficient may have negative consequences. In this table, these behaviors exhibited by parents are defined as parental success pressure (Kapıkıran, 2016). When their children perceive this pressure created by parents, academic success decreases (Campbell & Verna, 2007; Ma, 2003). On the other hand, the parents of the children; support their work, use positive reinforcers in their success, and have confidence in their abilities and the support of parents for success.These supports have a positive effect on students' learning motivation and performance (Gonzalez-DeHass et al., 2005; Kapıkıran & Özgüngör, 2009; Kim & Park, 2006). The most important practice that parents have done to help their children in their home environment is homework. In this process, parents help their children to reinforce their knowledge and increase their performance by asking various questions (Xu, 2010; Xu et al., 2017). However, in these practices, which parents think are supportive of their children, unwittingly or unintentionally, aids can turn into pressure, resulting in negative consequences (Hill & Tyson, 2009).

Considering all the mentioned situations, entrepreneurship and parents' pressure and support on their children play an important role in education and training environments. This study tried to determine whether there is a relationship between the academic success pressure and support of parents and students' science-based entrepreneurship and how these variables change in terms of parents' activities with their children. This study is an original study with the variables investigated and its findings. Accordingly, the problem set of the study is the extent to which the relationship between academic achievement pressure and parental support of elementary students and their science-based entrepreneurship and how these variables change with respect to parental practices as determined. Research questions guiding the research consistent with the problem statement:Primary school students;

- Do PASPS and SBES scores differ from students' parents in terms of daily study time?

- Do PASPS and SBES scores differ in terms of the time students spend with their parents on social and sports activities?
- - Does the amount of time parents spend in digital environments while their children are in university affect PASPS and SBES scores?Does the level of parents' expectation from their children's education life have an effect on PASPS and SBES scores?
- Is there a relationship between students' PASPS and SBES scores?

## 2. Methodology

### 2.1.Research Model

This study used a survey method based on a descriptive model from quantitative research approaches. Survey method is an appropriate method in terms of determining and interpreting the characteristics of the sampling (Büyüköztürk et al., 2008). In addition, this method ensures that healthy comparisons between groups are made, and the relationship levels between variables are determined (Cohen et al., 2005; Karasar, 2013).

### 2.2. Research Sample

The study sample consisted of 142 students studying in three primary schools in Yakutiye district of Erzurum province. In the study, an appropriate sampling method was used, in which the principle of easy accessibility was considered. In this respect, students studying in these schools were reached after obtaining the necessary permissions from the relevant district's National Education Directorate. Other demographic characteristics of the sample are presented in Table 1.

**Table 1.** *Demographic Information about the Sample*

| Daily study times with their parents | Frequency | Percent (%) |
|---|---|---|
| Nothing | 54 | 38.0 |
| 0-30 minute | 26 | 18.3 |
| 30 minute-1 hour | 25 | 17.6 |
| 1-2 hours | 23 | 16.2 |
| 2 hours and over | 14 | 9.9 |
| Weekly time allocated to sports and cultural activities with parents | | |
| Nothing | 46 | 32.4 |
| 2-3 hours | 18 | 12.7 |
| 3 hours and over | 78 | 54.9 |
| Students 'parents' spending time on TV or digital media while studying disrupts their concentration | | |
| Yes | 46 | 32.4 |
| Partly | 43 | 30.3 |
| No | 53 | 37.3 |
| Parents' expectation from their children's education life | | |
| High school graduate | 5 | 3.5 |
| University degree | 45 | 31.7 |
| Post graduate | 92 | 64.8 |
| Total | 142 | 100 |

### 2.3. Data Collection Tools

#### 2.3.1. Demographic Information Questionnaire

The demographic information survey prepared by the researcher aimed to determine some characteristics of the parents in terms of some variables. In this context, students were asked about daily study time with their parents, time spent with their parents on sports and social activities, whether their parents spend time on TV or digital media while studying, which affects their concentration, and their children's expectations of educational life. It was aimed to give reliable answers to the questions posed to the students by making the necessary explanations that the answers they gave to the students would be confidential.

### 2.3.2. Parental Academic Success Pressure and Support Scale

The Parental Academic Achievement Pressure and Support Scale (PASPSS) developed by Kapıkıran (2016) aims to measure the success pressures and support of parents of middle school and high school students. Measuring two sub-dimensions, namely academic success pressure (10 items) and support (5 items) of parents, the scale consists of 15 items. The fit indices obtained as a result of the confirmatory factor analysis for secondary school students were reported as RMSEA = .06, SRMR = .06, CFI = .96 and GFI = .94. The five-point Likert type (1- I totally disagree, 5- I totally agree) scale's internal consistency coefficients are the academic success of the parents; edition, .71 for support, .82 for all items. In this study, 3 language experts, 1 scale developer and 2 classroom teachers were presented to determine whether the items on the scale were understandable by primary school students. In addition, the scale was read to 7 primary school students, and the places they did not understand were asked. In this process, there was a consensus that the scale was suitable for the students' level and that it was understandable. Afterward, the scale was applied to 191 primary school students different from the main study. Confirmatory factor analysis was performed based on the answers received and the fit indices were determined as follows: $\chi 2$ / df = 61 ($p < .01$), RMSEA = 0.07, S-RMR = 0.08, AGFI = 0.87, GFI = 0, 95, IFI = 0.81 and CFI = 0.84. The internal consistency coefficients performed within the scope of this study are as follows: parents' academic success; pressure sub-dimension was calculated as .83, support dimension as .80, and the Cronbach alpha value for all items was calculated as .84. In addition, it was determined that the scale scores of the students in the upper and lower 27% slice were statistically significant ($p < .05$). These findings are an indication that the scale is reliable and valid.

### 2.3.3. Science-Based Entrepreneurship Scale

Science-Based Entrepreneurship Scale (SBES), developed by Deveci (2018), consists of 13 items with a five-point Likert structure (1-Strongly disagree, 5-Strongly agree) Scale; It includes the sub-dimensions of risk taking, need for success, teamwork and effective communication. The values obtained from the confirmatory factor analysis were stated as RMSEA = .059, CFI = .95, S-RMR = .047, NNFI = .94, GFI = .95. These values indicate that fit indices support the factor structure. The researcher calculated the internal consistency coefficient for the items in the scale as .83. Within the scope of this study, 3 language experts, 1 scale developer and 2 classroom teachers were asked to determine whether the scale items were understandable by primary school students. In addition, the scale was read to 7 primary school students, and the places they did not understand were asked. In this process, there was a consensus that the scale was suitable for the students' level and that it was understandable. Afterward, the scale was applied to 177 primary school students different from the main study. Confirmatory factor analysis was performed on the answers received, and fit indices were determined as follows: $\chi 2$ / df = 56 ($p < .01$), RMSEA = 0.07, S-RMR = 0.05, AGFI = 0.91, GFI = 0, 92, IFI = 0.80 and CFI = 0.82. In addition, the Cronbach's alpha of the items supporting the values found by the researcher in this study was calculated to be .77. In addition, it was found that the scale scores of the students in the top and bottom 27% slices were statistically significant ($p < .05$). These results are an indication that the scale is reliable and valid.Findings

Firstly, the indicators stated by Pallant (2016) were taken as a reference to determine whether the answers given by the students to the scales were normally distributed. In this respect, it was determined that the kurtosis and skewness values of the responses given to both PASPSS and SBES were between +/- 2 values, the Kolmogrov-Smirnov test results were $p > .05$, and the histogram and detrended graphics were close to normal distribution. In this respect, it was concluded that parametric tests and correlation tests are appropriate.

### 2.4. Ethical

The data of the study were collected in 2019. Necessary permissions were obtained to use data collection tools applied within the scope of the research. Data collection tools were administered to the participants to be used in the research, and no additional information that would not be used in the research was included.

## 3. Findings

### 3.1. Findings Regarding the First Research Question

Do PASPS, PASSS, and SBES scores differ from the students' parents in terms of their daily study time? A one-way ANOVA test was used to access the findings for the question.

One-way ANOVA test results, which determine how the mean scores of the PASPSS and SBES differ in terms of the duration of studying with the parents, are presented in Table 2.

**Table 2.** *One-way ANOVA Test Results Determining How The Mean Scores of PASPSS and SBES Differ in Terms of Duration of Studying with Parents*

| Variable | Source of Variance | Sum of Squares | df | Mean Square | F | p | Difference |
|---|---|---|---|---|---|---|---|
| PASPS mean scores | Between groups | 11.26 | 4 | 2.81 | 3.43 | .01 | Nothing>1-2 hours |
| | Within groups | 112.30 | 137 | .82 | | | |
| PASSS mean scores | Between groups | 6.84 | 4 | 1.71 | 2.38 | .05 | - |
| | Within groups | 98.20 | 137 | .72 | | | |
| SBES mean scores | Between groups | 6.28 | 4 | 1,57 | 4.35 | .00 | 2 hours and above>Nothing |
| | Within groups | 49.37 | 137 | .36 | | | |

When Table 2 is analyzed, while the duration of studying with their children and parents made a significant difference in terms of mean scores of PASPS and SBES, it did not make a significant difference in terms of mean scores of PASSS. In other words, students who never studied with their parents had more parental pressure than students who studied with their parents for 1-2 hours. On the other hand, there is no difference in terms of parental support and study duration with students' parents. Finally, the science-based entrepreneurship levels of students who study with their parents for 2 hours or more are significantly higher than those who have never studied. Although there is a difference between the other groups in favor of 2 hours or more, these differences are not significant.

### 3.2. Findings Regarding the Second Research Question

Do PASPS, PASSS, and SBES mean scores differ on the amount of time students spend with their parents on social and sports activities? A one-sided ANOVA test was used to obtain the results for the question.The findings obtained from the analysis are presented in Table 3.

**Table 3.** *One-way ANOVA Test Results Determining How The Mean Scores of PASPSS and SBES Differ in Terms of Time Spent on Social and Sports Activities with Parents*

| Variable | Source of Variance | Sum of Squares | df | Mean Square | F | p | Difference |
|---|---|---|---|---|---|---|---|
| PASPS mean scores | Between groups | 14.40 | 2 | 7.20 | 9.17 | .00 | Nothing>2-3 hours |
| | Within groups | 109.16 | 139 | .78 | | | Nothing>3 hours and above |
| PASSS mean scores | Between groups | 17.67 | 2 | 8.83 | 14.05 | .00 | 2-3 hours>Nothing |
| | Within groups | 87.37 | 139 | .63 | | | 3 hours and above>Nothing |
| SBES mean scores | Between groups | 3.54 | 2 | 1,77 | 8.39 | .00 | 2-3 hours and above>Nothing |
| | Within groups | 29.37 | 139 | .21 | | | 3 hours and above>Nothing |

When Table 3 is examined, as the time that parents spend with their children for social sports activities increases, the pressure of success decreases, and the support of parents increases. In this respect, the parental success pressure on children who participate in social sports activities with their parents for at least 2-3 hours is decreasing. On the other hand, students' science-based entrepreneurship levels also differ regarding their participation in social sports activities with their parents. The science-based entrepreneurship levels of students who devote more time to social sports activities with their parents are increasing.

### 3.3. Findings Regarding the Third Research Question

Does the amount of time parents spend in digital environments while their children are in university affect PASPS, PASSS, and SBES scores?One-way ANOVA test was used to access the findings for the question. The findings obtained from the analysis are presented in Table 4.

**Table 4.** *One-way ANOVA Test Results Determining How Parents' Mean Scores of PASPSS and SBES Differ in Terms of The Time Their Children Spend on Digital Media While Studying*

| Variable | Source of Variance | Sum of Squares | df | Mean Square | F | p | Difference |
|---|---|---|---|---|---|---|---|
| PASPS mean scores | Between groups | 10.39 | 2 | 5.19 | 6.38 | .00 | Yes>No |
| | Within groups | 113.18 | 139 | .81 | | | |
| PASSS mean scores | Between groups | 2.73 | 2 | 1.36 | 1.85 | .16 | - |
| | Within groups | 102.31 | 139 | .74 | | | |
| SBES mean scores | Between groups | .42 | 2 | .21 | .90 | .41 | - |
| | Within groups | 32.49 | 139 | .23 | | | |

When Table 4 is examined, it is seen that parents whose children spend time on TV or digital media while studying distract their children more and their academic achievement pressure levels are higher. On the other hand, parents whose children spend or do not spend time in digital environments while studying, do not make a difference on their children's academic success and science-based entrepreneurship scores.

### 3.3. Findings Regarding the Fourth Research Question

Does the level of parents' expectation from their children's education life affect the PASPS, PASSS, and SBES scores? One-way ANOVA test was used to assess the findings for the question.

**Table 5.** *One-way ANOVA Test Results Determining How Parents' Mean Scores of PASPSS and SBES Differ in Terms of The Expectation Level of Their Children from Education Life*

| Variable | Source of Variance | Sum of Squares | df | Mean Square | F | p | Difference |
|---|---|---|---|---|---|---|---|
| PASPS mean scores | Between groups | .26 | 2 | .13 | .15 | .86 | - |
| | Within groups | 123.30 | 139 | .89 | | | |
| PASSS mean scores | Between groups | 6.03 | 2 | 3.01 | 4.23 | .02 | Post graduate>High school |
| | Within groups | 99.01 | 139 | .71 | | | University > High school |
| SBES mean scores | Between groups | .1.27 | 2 | .63 | .2.79 | .06 | - |
| | Within groups | 31.64 | 139 | .23 | | | |

When Table 5 is examined, as the expectation level of the parents from their children's education life increases, their academic achievement support for their children increases significantly. Especially parents who want their children to study at the graduate and undergraduate levels provide more support to their children. On the other hand, the academic success pressure of parents and science-based entrepreneurship levels of students do not change in terms of parents' expectations of their children's educational life.

### 3.3. Findings Regarding the Fifth Research Question

Is there a relationship between students' PASPS, PASSS, and SBES scores? Pearson correlation test was conducted to assess the findings regarding the question. Cohen (1988) standards were used to compare relationship levels. In this respect, the correlation value between .10-.29 indicates a weak relationship between .30-.49, and a strong relationship between .50 and above.

Within the scope of this study, the relationship levels between PASPS, PASSS and SBES are given in Table 6.

**Table 6.** *Relationship Between Students' Mean Scores of PASPS, PASSS and SBES*

| | | PASPS | PASSS | SBES |
|---|---|---|---|---|
| PASPS | Pearson Correlation | 1 | | |
| | Sig. (2-tailed) | | | |
| PASSS | Pearson Correlation | -.37** | 1 | |
| | Sig. (2-tailed) | .00 | | .00 |
| SBES | Pearson Correlation | -.13 | .24** | 1 |
| | Sig. (2-tailed) | .13 | .00 | |

*0.05 **0.01 level (2-tailed).

When the table is examined, it is seen that there is a moderate negative relationship between the academic achievement pressure of parents and academic achievement support. A weak relationship was found between

science-based entrepreneurship skills and parents' academic achievement pressure and support. All of these determined relationships are statistically significant ($p < .05$).

## 4. Conclusion and Discussion

This study tried to determine whether there is a relationship between the academic achievement pressure and support of parents and students' science-based entrepreneurship and how these variables change in terms of parents' activities with their children. When the findings obtained from the research were evaluated, the following results were obtained.

- Parents who have never studied with their children put more academic success pressure on their children. On the other hand, it was determined that the children of parents who study with their children for 2 hours or more per day have more entrepreneurial skills (See Table 2). In line with these findings, parents helping their children with their lessons enables them to have more entrepreneurial skills. It can be said that parents who do not help their children's lessons at all are more judgmental and put pressure on their children by blaming them.
- Parents who devote more time to social sports activities with their children give more support to their children's academic success. In addition, this situation increases the entrepreneurship level of the students (See Table 3).
- Parents whose children spend time in the digital environment while studying put academic success pressure on their children (See Table 4). This reveals that while students are studying, parents should not spend time on digital media such as TV and the internet.
- As the level of parents' expectations from their child's education increases, their support for their children's academic success increases. In this respect, parents who expect their children to have a high-level education life tend to give them all kinds of support, although they say they will be successful and trust their children. However, parents' expectations for their children's education did not affect their academic achievement pressure or entrepreneurship.
- Finally, while there is a moderate negative relationship between academic achievement pressure and the support of parents, there is a weak relationship between the other variables. In other words, parents who state that they would be successful and congratulate their children on their successes avoid behaviors such as constant warning and comparing the child with their friends and siblings.

Although entrepreneurship guides the economic programs of countries, it has also been addressed in social platforms recently. Turkey also included entrepreneurial skills to create in the curriculum, so the effect is given with emphasis on entrepreneurial skills. In this context, recent studies to determine entrepreneurial skills in schools, particularly in Turkey, has increased (Deveciler 2018; Deveciler & Çepni, 2014; Pan & Akay, 2015; Wolf & Bay, 2019). On the other hand, it has been determined that parents' interests in the educational process of their children and their academic success expectations are effective on success (Phillipson & Phillipson, 2012). It is very important for parents to talk about the school situation of their children, help them with homework, and make their children feel their expectations (Wilder, 2014; You, Lim Sun, No & Dang, 2016).

Parental influence is an important factor affecting students' academic achievement. In this respect, the discussion of science-based entrepreneurship with the success pressure and support of parents in terms of demographic variables determined over the general condition of the parents will make significant contributions to the literature. When the relevant literature was examined, Kurt and Bayar (2019) examined the relationship between science-based entrepreneurship and self-efficacy in their study. They examined how the entrepreneurship levels of students affect the educational status of parents. As a result, it was determined that as the parents' education level increased, their children's entrepreneurship level increased. Studies indicate that parents' interaction with their children affects their children's entrepreneurship levels (Fitzsimmons & Douglas, 2011; Obschonka & Stuetzer, 2017). In these studies, it was emphasized that the personality structures of parents are effective on their children's entrepreneurship levels. Although the entrepreneurship levels of parents are not examined within the scope of this study, ultimately, their views and behaviors about their children's academic life affect the students' entrepreneurship.

It is possible to come across studies examining the relationship between the socioeconomic status of parents and the entrepreneurship levels of students. While Bhandri (2006) stated that the socioeconomic status of parents did not have an impact on their children's entrepreneurship, Hurst and Lusardi (2004) emphasized

the existence of a strong relationship between socioeconomic status and entrepreneurship. Similarly, the effect of entrepreneurship on learning outcomes (Johansen, Skålholt & Schanke, 2008), the effect of entrepreneurship training given to university students on their tendency to become a businessperson (Lautenschläger & Haase, 2011), students' motivation (Oosterbeek, van Praag & Ijsselstein) and perceptions. (Peterman & Kennedy, 2003) It is possible to come across studies examining its effect on it. This study provides a different perspective to the literature in determining how primary school students' entrepreneurship has changed in terms of the quality of time they spend with their parents.

Another subject that this study investigates is parental characteristics that affect the academic success pressure and support of parents. Many studies indicate that parents are effective on students' academic achievement (Cheng, 2009; Çelenk, 2003; Davis-Kean, 2005; Driessen et al., 2005; Topor et al., 2010; McNeal, 2014) . In these studies, it is stated that parents' interest in their children's lessons and their efforts increase their success. In this context, this study contributes to the literature by determining the factors that affect the pressure and support strategies that trigger the parents' desire for success.

Limitations and recommendations for further study are as follows: This study was limited to studying in Turkey's three primary schools in one province, and 142 students received data. In this context, the data obtained from different sample groups and from this study can be tested. In addition, by using different demographic variables that affect students' entrepreneurship levels and parental support, the reasons affecting these variables can be explained in a broader framework. The methods of obtaining this skill can be explained by conducting an experimental study to obtain students' entrepreneurial skills, which are considered high-level skills. In addition, by conducting a similar study on elementary and high school students, it can be determined if the variables that influence entrepreneurship and the pressure to succeed and support from parents have changed.

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# Investigating the Relationship Between Emotional Intelligence and Social Anxiety Levels of University Students

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ABSTRACT

This study investigates the relationship between emotional intelligence and social anxiety levels of university students. The study data consisted of a total of 212 university students, 64% female (N=136) and 36% (N=76) male and data were collected from a state university in the west of Turkey. The relational model, one of the general models, was used in the research. The "Schutte Emotional Intelligence Scale" was used to determine the emotional intelligence levels of the students, and the "Social Anxiety Scale" was used to determine the social anxiety problems experienced by university students. SPSS 23.0 package program was used for the analyzes. Research findings revealed the positive effects of emotional intelligence in reducing the social anxiety levels of university students. In addition, it was concluded that emotional intelligence predicts social anxiety in university students in a statistically significant way. It was observed that the subscales of optimism, use of emotions and evaluation of emotions which constitute emotional intelligence in university students significantly predicted social anxiety together.

Keywords:
Emotional intelligence, social anxiety, university students

## 1. Introduction

Humankind is positioned at the highest level among living things in the universe with the ability to think, reason, judge and draw conclusions from all these. For this reason, academic intelligence comes to mind most of the time when it comes to intelligence. However, this perception has gradually changed from the past to the present, and academic intelligence (IQ) has begun to share its top place with emotional intelligence (EQ). The importance of emotional intelligence is increasing day by day, as people are more than a robot or machine that solves their problems by using all their cognitive abilities appropriately (Kılıç et al., 2007). Therefore, in the 1940s, Weschler (1949) stated that an intelligence scale that does not contain emotional aspects would not be functional. A study that supports this argument has emerged with Gardner's suggestion of interpersonal intelligence. Although Payne (1985) published a thesis on emotional intelligence in the following years, Daniel Goleman is the first name that comes to mind when it comes to emotional intelligence. Goleman (1995) introduced the concept of emotional intelligence to the world through his book. Goleman (1995) emphasized that academic intelligence cannot work efficiently without emotional intelligence, and these two types of intelligence will develop as they accompany each other. The ability to use emotions as the capacity to develop thinking and reason refers to emotional intelligence. The abilities related to recognizing and perceiving the emotions of one's own and others, accessing emotions to improve thinking and regulating emotions reflectively by making sense of emotional information include emotional intelligence capacity (Mayer et al., 2004). Emotional intelligence; it is about the capacity to recognize the emergence of emotion, understand the

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meaning expressed by emotion, manage emotions, and reason and solve problems based on these (Salovey et al., 2004).

In the four-branched model of emotional intelligence developed by Mayer and Salovey (1997), the individual is aware of the emotions of himself and others, uses emotions to develop thinking, makes sense of emotions, and manages his emotions. Perceiving emotions is related to being aware of what you are feeling. For example, when the individual has a pleasant time with his family, he may describe the changes in his body and feelings as happiness or realize that the tension in another person's face, tremor means anger. Understanding the deep meanings of emotions is important for an individual's relationship with himself and with others. The awareness of emotions step also provides an important starting point for reaching deep emotions (Elfenbein & MacCann, 2017). Emotional responses are reactions that grab our attention and make us think. For example, an individual with a good sensory input system also can directly think about important issues. In other words, emotions literally enter the cognitive system and guide thoughts. Thus, the capacity for thinking through emotions is enhanced. Almost all emotions have a message that they want to convey to us. For example, information may indicateindicating that I am being blocked, restricted, and stuck under the anger I feel.

For this reason, it is very important to understand the message conveyed by each emotion. The answer to the questions of what this emotion is trying to tell me or what makes me feel this emotion helps us to make sense of emotions. Thus, understanding the message conveyed by the emotion makes it possible to manage emotions (Davis et al., 2020; Salovey et al., 2004). We can think of this whole process, which includes the components of emotional intelligence, as a ladder. Realizing the emotion I'm feeling, I take the first step up the ladder by giving it a name. In the second step, I have to connect feelings and thoughts and add emotions to cognition. Being able to understand the message conveyed to me by the emotion that I realize and use to develop thinking allows me to take the third step. The last step that brings me to my destination and to my destination comes with the regulation and management of emotions.

Studies (Cobb & Mayer, 2000; Joseph et al., 2015; Mayer et al., 2004; Mayer et al., 2008) show that the emotional intelligence levels of individuals with wide social ties and high social support capacity that it is high. Individuals with high emotional intelligence scores tend to have higher other intelligence domains as well. Emotional intelligence levels of individuals who turn to professions that require social skills such as teaching and psychological counseling are higher than others. These individuals have better mental health and show higher success in the professional field. Problematic behaviors, such as being aggressive or prone to violence, are less common in individuals with high emotional intelligence. In fact, all these features can be improved, so the level of emotional intelligence can be increased. Emotional intelligence is an important building block for dealing with emotionally challenging periods and complex emotions. For example, the whole world has experienced difficult economic, political and psychological processes due to the COVID-19 virus that emerged in Wuhan, China in December 2019 (Hui et al., 2020). Such epidemics or even less severe diseases cause individuals' anxiety, anger, and depression (Alkhamees et al., 2020; Browning et al., 2021; Dai et al., 2020; Ho et al. 2020; Paulino et al., 2021).

To manage such a psychological crisis, it is necessary first to maintain the emotional stability of the person and then develop their coping skills by revealing their anxiety and fears (Zhang et al., 2020). Since the provision of all these steps is related to improving emotional intelligence, emotional intelligence appears as a protective factor even during the pandemic process (Moroń & Biolik-Moroń, 2021). It has also been determined that emotional intelligence has a positive effect on preventing emotional manipulation at work, coping with stress and providing a better performance (Gooty et al., 2014; Hyde et al., 2020; O'Boyle et al., 2011). In a study conducted with 94 undergraduate and graduate students in India, it has been shown that students get away from boredom and depressive thoughts by using their emotional intelligence skills, thus they try to cope with the negative effects of the current pandemic situation (Chandra, 2020). The concept of academic buoyancy, which expresses the successful coping of students with academic problems and difficulties, is in a positive relationship with emotional intelligence (Thomas & Allen, 2021). In addition, emotional intelligence appears as a protective factor in mental health problems such as stress, anxiety and depression (Mahmoud et al., 2012; Moeller et al., 2020; Selkie et al., 2015).

Another mental health problem commonly experienced by university students is social anxiety (Karasu, 2020; Ürün & Öztürk, 2020). In its most general definition, social anxiety is defined as avoiding entering a social

environment. The individual feels constantly alert in these environments. He is afraid that others will ridicule him and be humiliated. These thoughts cause him to avoid social environments, thus the social development of the person is also interrupted (Heydrick, 2008). A person entering these environments may show physical reactions such as sweating, palpitations in the chest, tremor, rapid breathing, and facial flushing (Heimberg et al., 2014). As can be seen, social anxiety is a multifaceted phenomenon that is affected by genetic and environmental factors that occur both physically and mentally (Aslan et al., 2020). Social anxiety is an intense and persistent fear that prevents an individual from growing socially (Inam et al., 2014). Our emotions play a key role for social functioning (Inam et al., 2014). The self-confidence levels of individuals who can regulate their emotions also increase, indirectly affecting social anxiety (Fernandez-Berocal et al., 2006). When individuals cannot use their emotional intelligence skills, their social anxiety levels may increase, which may lead to a decrease in their positive moods such as subjective well-being, life satisfaction, and happiness (Doğan, 2016; Tezelli, 2019). In addition to preventing the individual from feeling good and happy, social anxiety can bring many negativities with it, for example, the increase of social anxiety also increases the incentive to use alcohol, individuals become prone to alcohol while experiencing social anxiety (Buckner et al., 2020; Buckner & Heimberg, 2010). In addition, studies have found that there is a negative and significant relationship between prospective teachers' emotional intelligence and levels of social anxiety (Tezelli & Dilmaç, 2021), while a weak positive correlation has been found between emotional intelligence and total social anxiety scores of individuals in young adulthood (Gençiri, 2020).Due to the contrast between these research findings, it is thought that it is important to carry out new studies. Age, family environment and gender are the most important factors affecting the development of emotional intelligence (Tuğrul, 1999). Although there are studies which show that emotional intelligence differs according to age (Sevindik et al., 2012), there are also studies that claim the opposite (İsmen, 2004). It is important to investigate the emotional intelligence levels of students according to age and gender, because the concept of age and gender is important for emotional intelligence and because of the controversial results in the literature. Similarly, there are controversial findings in social anxiety in terms of gender and age variables (Kocaoğlu & Çekiç, 2021; Ümmet, 2007). It is thought that revealing new findings that will help to understand this controversial situation will contribute to the literature.

Young people who come to university age enter into a brand new social environment that they have not experienced before. This environment requires them to engage and interact with many new individuals. However, university students with social anxiety may lack healthy relationships and communication. To prevent this, the emotional intelligence skills of the students, which include the ability to notice, make sense and organize their emotions, come to the fore. In light of all these mentioned, this study aims to investigate the relationship between the emotional intelligence and social anxiety levels of university students. The problem statements created based on this can be listed as follows:

- Is there a significant relationship between emotional intelligence and social anxiety levels of the participants?
- Is there a significant difference between the participants' emotional intelligence and social anxiety sub-dimensions according to gender?
- Is there a significant difference between the participants' emotional intelligence and social anxiety subscales according to age?
- Do emotional intelligence total scores and subscales significantly predict the participants' social anxiety levels?

## 2. Method

### 2.1. Research Model

In this study, which investigates the relationship between emotional intelligence and social anxiety levels of university students, the relational model, one of the quantitative research methods, was used. In relational models, the existence and degree of change between two or more variables are determined (Cohen et al., 2000).

### 2.2. Research Sample

212 university students selected from a state university in western Turkey constituted the research group. The sample consisted of 136 participants (64.15%) who were women and 76 (35.85%) who were men. 55 of the participants (25.94%) were between 18 and 20 years old, 79 of them (37.25%) were between 20 and 22 years old, 29 of them (13.68%) were between 24 and 26 years old, and 49 of them (23.11%) were between 22 and 24 years old. The sample was randomly selected and participants were enrolled in the study on a voluntary basis.

### 2.3. Data Collection Tools

*Schutte Emotional Intelligence Scale:* This scale was developed by Shutte et al. (1998) and used by Austin et al. (2004) to determine emotional intelligence levels of the university students. The adaptation study of the scale into Turkish was carried out by Tatar et al. (2011). The scale consists of 41 items with 3 subscales and answered in 5-point Likert type. The first of the subscales is called optimism and mood regulation, the second subscale is the evaluation of emotions, and the third subscale is the use of emotions. The Emotional Intelligence Scale, which measures the students' emotional intelligence levels, had an alpha internal consistency coefficient of .80.

*Social Anxiety Scale:* Social Anxiety Scale that was developed by Özbay and Palancı (2001) was used to determine the social anxiety levels of university students. The scale consists of 30 items with 3 subscales and answered in a 5-point Likert type. As the score obtained from the scale increases, the social anxiety level of the person also increases. The first of the subscales, social avoidance, measures the person's hesitation to communicate and unwillingness to interact. The second subscale, anxiety about being criticized, measures the individual's effort to control himself because of fear of misbehavior. The third subscale, the individual's feeling of worthlessness, also aims to measure the extent to which the individual feels worthless. The three subscales explain 32.9% of the total variance. The internal consistency coefficient Cronbach's alpha of the scale was calculated to be .89.

### 2.4. Data Analysis

Analyzes SPSS 23.0 package program was used and analyzed at .05 significance level. The data were analyzed with Pearson correlation, independent samples t-test, one way ANOVA and regression model. In addition, the normality analysis of the data was examined by the Kolmogorov-Smirnov test and it was determined that it showed normal distribution.

### 2.5. Ethical

The data of the study were collected in 2019. Necessary permissions were obtained to use data collection tools applied within the scope of the research. Data collection tools were administered to the participants to be used in the research, and no additional information that would not be used in the research was included. Within the scope of the confidentiality of the research, the identity information of the students other than the general information was not taken, they were only numbered according to the order of filling the forms.

## 3. Findings

Pearson correlation analysis was computed to establish the relationship between the participants' emotional intelligence (Optimism and mood regulation, use of emotions and evaluation of emotions) and Social Anxiety (Social avoidance, being critized and worthlessness). The results obtained are presented in Table 1.

As seen in Table 1, the result of the Pearson correlation test, a moderately negative significant relationship was found between emotional intelligence and social anxiety total scores ($r = -.303$, $p < .05$). Similarly, a moderately negative significant correlation was found between social anxiety total scores and the evaluation of emotions, one of the emotional intelligence subscales ($r = -.329$, $p < .05$). A weakly negative significant relationship was found between the social anxiety total scores and the other subscales of the emotional intelligence scale, optimism and mood regulation ($r = -.242$, $p < .05$) and use of emotions ($r = -.158$, $p < .05$). Based on these findings, it can be said that as emotional intelligence increases, a significant decrease is observed in the level of social anxiety.

**Table 1.** *Correlation Analysis Results Between Emotional Intelligence and Social Anxiety*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Social anxiety total | 1 | .945* | .906* | .877* | -.303* | -.242* | -.158* | -.329 |
| Social avoidance | | 1 | .776* | .756* | -.301* | -.256* | -.159* | -.304* |
| Being critized | | | 1 | .697* | -.209* | -.169* | -.068 | -.266* |
| Worthlessness | | | | 1 | -.362* | -.261* | -.255* | -.352* |
| Emotional intelligence total | | | | | 1 | .784* | .637* | .785 |
| Optimism and mood regulation | | | | | | 1 | .302* | .458* |
| Use of emotions | | | | | | | 1 | .408* |
| Evaluation of emotions | | | | | | | | 1 |

* $p$<.05: *Note.* 1. Social anxiety total, 2. Social avoidance, 3. Being critized, 4. Worthlessness, 5. Emotional intelligence total, 6. Optimism and mood regulation, 7. Use of emotions, 8. Evaluation of emotions.

When the relationships between the subscales of the scales were imvestigated, a moderately negative significant relationship was found between the evaluation of emotions subscale and social avoidance (r=-.304, $p$<.05) and worthlessness (r=-.352, $p$<.05). In order to determine whether there is a difference between emotional intelligence and social anxiety subscales according to gender, independent samples t-test was performed and the results obtained are presented in Table 2. A weakly negative significant correlation was found with critical anxiety (r =-.266, p<.05). Based on this finding, it can be said that the evaluation of emotions subscale has a negative relationship with all dimensions of the social anxiety scale. While there was a weakly negative and significant relationship between the use of emotions subscale and social avoidance (r=-.159, p<.05) and worthlessness (r=-.255, p<.05), being critized (r=-.068, p>.05) was not found to be a statistically significant relationship. A weakly negative and significant relationship between optimism and social avoidance (r=-.256, p<.05), worthlessness (r=-.261, p<.05), and being critized (r=-.169, p<.05). Based on this finding, it can be said that the optimism subscale has a negative relationship with all dimensions of the social anxiety scale and also it can be said that emotional intelligence has a positive effect on reducing social anxiety.

**Table 2.** *T-Test Analysis Results Between Emotional Intelligence and Social Anxiety*

| Variables | | n | $\bar{x}$ | sd | df | $t$ | $p$ |
|---|---|---|---|---|---|---|---|
| Social anxiety total | Female | 136 | 69.71 | 19.05 | | | |
| | Male | 76 | 73.91 | 20.90 | 210 | -1.448 | .150 |
| Social avoidance | Female | 136 | 27.62 | 8.81 | | | |
| | Male | 74 | 29.78 | 9.05 | 208 | -1.672 | .097 |
| Being critized | Female | 136 | 24.96 | 6.65 | | | |
| | Male | 76 | 25.92 | 7.54 | 210 | -.924 | .357 |
| Wortlessness | Female | 136 | 17.13 | 5.56 | | | |
| | Male | 76 | 18.58 | 5.75 | 210 | -1.785 | .076 |
| Emotional intelligence total | Female | 135 | 147.05 | 15.42 | | | |
| | Male | 75 | 139.00 | 17.18 | 208 | 3.372 | .001 |
| Optimism and mood regulation | Female | 136 | 45.28 | 6.21 | | | |
| | Male | 76 | 43.24 | 5.63 | 210 | 2.438 | .056 |
| Use of emotions | Female | 136 | 20.54 | 3.65 | | | |
| | Male | 76 | 19.30 | 3.27 | 210 | 2.539 | .052 |
| Evaluation of emotions | Female | 136 | 34.43 | 4.23 | | | |
| | Male | 75 | 32.40 | 5.87 | 209 | 2.643 | .009 |

As the result of the t-test, social anxiety total scores were determined for ($\bar{x}$= 69.71) females and ($\bar{x}$=73.91) males as [$t$(-1.448)=.150, $p$>.05] and social avoidance subscale for ($\bar{x}$=27.62) females and ($\bar{x}$=29.78) males as [$t$(-1.672)=.097, $p$>.05]. Being critized subscale scores were determined for ($\bar{x}$=24.96) females and ($\bar{x}$= 25.92) males as [$t$(-.924) =.357, $p$>.05]. Worthlessness subscale scores were determined for ($\bar{x}$=17.13) females and ($\bar{x}$=18.58) males as [$t$(-1.785)=.076, $p$>.05]. The results indicate that social anxiety total scores and subscales do not differ according to gender.

On the other hand, total emotional intelligence scores were determined for ($\bar{x}$=147.05) females and ($\bar{x}$=139.00) males as [$t$(3.372)=.001,$p$<.05]. Optimism subscale scores were determined for ($\bar{x}$ =45.28) females ($\bar{x}$=43.24) males [$t$(2.438)=.056, $p$<.05]. Use of emotions subscale scores were determined as [$t$(2.539) = .052, $p$<.05) for ($\bar{x}$=20.54) females and ($\bar{x}$= 19.30) males. The difference between the total scores of the evaluation subscale of females ($\bar{x}$=34.43) and males ($\bar{x}$=32.40) was found to be statistically significant [$t$(2.643)=.009, $p$<.05]. This finding shows that emotional intelligence total scores and subscales differ in favor of females. In summary, it can be said that while social anxiety does not show a significant difference according to gender, emotional intelligence levels are higher in female students.

One-way analysis of variance (ANOVA) was applied to determine whether the total scores and subscales of social anxiety differ according to age. The data obtained are presented in Table 3.

**Table 3**. *Variance Analysis (ANOVA) Results Between Social Anxiety Subdimensions*

| | Sum of Squares | sd | Mean of Squares | *F* | *p* |
|---|---|---|---|---|---|
| | 3078.309 | 3 | 1026.103 | 2.683 | .048 |
| Social anxiety total | 79561.139 | 208 | 382.505 | | |
| | 82639.448 | 211 | | | |
| | 431.655 | 3 | 143.885 | 1.823 | .144 |
| Social avoidance | 16257.869 | 206 | 78.922 | | |
| | 16689.524 | 209 | | | |
| | 484.871 | 3 | 161.624 | 3.425 | .058 |
| Being critized | 9814.200 | 208 | 47.184 | | |
| | 10299.071 | 211 | | | |
| | 201.783 | 3 | 67.261 | 2.132 | .097 |
| Wortlessness | 6562.684 | 208 | 31.551 | | |
| | 6764.467 | 211 | | | |

As can be seen in Table 3, ANOVA results that in terms of age show that social anxiety total scores [F(3-211)=2.683, $p$<.05] and being critized subscale [F(3-211)=3.425, $p$<.05] had a significant difference. To determine the source of this difference between the groups, the Tukey HSD test was applied and the results obtained are presented in Table 4.

**Table 4**. *Tukey HSD Results Between Social Anxiety Total Score and Being Critized*

| | (I) age | (J) age | Mean Dif. (I-J) | Std. Err. | *p* |
|---|---|---|---|---|---|
| Social anxiety total | | 18-20 | 2.832 | 3.435 | .843 |
| | 20-22 | 22-24 | 10.025* | 3.556 | .027 |
| | | 24-26 | 3.622 | 4.246 | .829 |
| Being critized | | 18-20 | 1.437 | 1.206 | .633 |
| | 20-22 | 22-24 | 3.975* | 1.249 | .009 |
| | | 24-26 | 2.051 | 1.491 | .533 |

* $p$<.05

As shown in Table 4, social anxiety total scores of 20-22 years old (x = 74.76) and 22-24 years old ($\bar{x}$=64.73) had a significant difference. Similarly, the being critized subscale shows that the total scores of the age 20-22 ($\bar{x}$=26.87) are higher than the age 22-24 ($\bar{x}$=22.90) and this difference is also significant ($p$<.05). Accordingly, there is a significant difference in favor of the participants in the 20-22 age range. It can be said that those in this age range have higher levels of social anxiety than others. A one-way analysis of variance (ANOVA) was performed to determine whether the total scores and the subscales of emotional intelligence differed according to age. The data obtained are presented in Table 5.

As can be seen in Table 5, the results of ANOVA, show that the total emotional intelligence scores [F(3-209)=11.039, p <.05[, the optimism subscale scores [F(3-211)=5.789, p <.05], the dealing with emotions subscale scores [F (3-211)=6.369, p <.05], and the rating emotions subscale scores [F (3-210)=5.871, p <.05] have a significant difference in relation to age.

**Table 5**. *Variance Analysis (ANOVA) Results Between Emotional Intelligence Subdimensions*

| | Sum of Squares | sd | Mean of Squares | *F* | *p* |
|---|---|---|---|---|---|
| | 7875.484 | 3 | 2625.161 | 11.039 | .000 |
| Emotinal Int. | 48988.997 | 206 | 237.811 | | |
| | 56864.481 | 209 | | | |
| | 600.986 | 3 | 200.329 | 5.789 | .001 |
| Optimism | 7197.543 | 208 | 34.604 | | |
| | 7798.528 | 211 | | | |
| | 225.392 | 3 | 75.131 | 6.369 | .000 |
| Use of Emotions | 2453.528 | 208 | 11.796 | | |
| | 2678.920 | 211 | | | |
| | 405.843 | 3 | 135.281 | 5.871 | .001 |
| Evaluation of Emo. | 4769.522 | 207 | 23.041 | | |
| | 5175.365 | 210 | | | |

To determine the cause of this difference between groups, Tukey HSD test was applied. The results are presented in Table 6.

**Table 6**. *Tukey HSD Results Emotional Intelligence Subdimensions*

| | (I) age | (J) age | Mean Dif. (I-J) | Std. Err. | *p* |
|---|---|---|---|---|---|
| | | 20-22 | 10.280* | 2.723 | .001 |
| Emotinal int. total | 18-20 | 22-24 | 13.930* | 3.043 | .000 |
| | | 24-26 | 17.935* | 3.591 | .000 |
| | | 20-22 | 2.809* | 1.033 | .035 |
| Optimism | 18-20 | 22-24 | 4.531* | 1.156 | .001 |
| | | 24-26 | 3.819* | 1.350 | .026 |
| | | 20-22 | 1.496 | .603 | .066 |
| Use of emotions | 18-20 | 22-24 | 1.693 | .675 | .061 |
| | | 24-26 | 3.371* | .788 | .000 |
| | | 20-22 | 2.319* | .843 | .033 |
| Evaluation of emotions | 18-20 | 22-24 | 2.800* | .943 | .057 |
| | | 24-26 | 4.300* | 1.114 | .001 |

As can be seen in Table 6, according to the Tukey HSD results, emotional intelligence total scores of the age 18-20 years old ($\bar{x}$=153.69) are higher than the others and this difference is significant ($p$<.05). Similarly, the optimism subscale shows that the total scores of the age 18-20 years old ($\bar{x}$=47.16) are higher than the others and this difference is also significant ($p$<.05). Similarly, the use of the emotions subscale shows that the total scores of the age 18-20 years old ($\bar{x}$=21.51) are higher than the 24-26 years old ($\bar{x}$=18.14) and this difference is significant too ($p$<.05). Finally, the evaluation of the emotions subscale shows that the total scores of the age 18-20 years old ($\bar{x}$=35.80) are higher than the others and this difference is also significant ($p$<.05). Accordingly, there is a statistical significant difference in favor of the participants in the 18-20 age range. It can be said that those in this age range have higher levels of emotional intelligence than all other students. The regression analysis results applied to determine the predictive power of the emotional intelligence total scores presented in Table 7.

**Table 7**. *Regression Analysis Results*

| Variables | B | S.E. | Beta | *t* | *p* | Tol. | VIF | R | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| Emotional int. total | -.365 | .080 | -.303 | -4.586 | .000* | 1.000 | 1.000 | .303 | .092 |
| Optimism | -.363 | .241 | -.112 | -1.506 | .134 | .774 | 1.292 | .345 | .119 |
| Use of emotions | -.083 | .401 | -.055 | -.207 | .836 | .816 | 1.225 | .345 | .119 |
| Evaluation of emotions | -1.086 | .409 | -.272 | -3.512 | .001* | .711 | 1.407 | .345 | .119 |

* $p$<.05, *Note.* Predictor Variable: Emotional Intelligence Total Score And Subdimensions, Predicted Variable: Social Anxiety.

As seen in Table 7, considering the regression analysis performed to predict social anxiety by emotional intelligence total scores, it was concluded that emotional intelligence significantly predicted social anxiety (F=21.033, R=.303, $R^2$=.092, $p$<.05). This result shows that as the participants' emotional intelligence increases,

their social anxiety decreases. It was found that all subscales of the emotional intelligence scale together explained %12 of the total variance in social anxiety. This result shows that as participants' emotional intelligence increases, their social anxiety decreases.

**4. Discussion, Conclusion and Recommendations**

In this study, the relationship between emotional intelligence and social anxiety was first examined. A negative relationship revealed the effect of variables on each other. According to the findings of a study conducted with teacher candidates, there is a negative and significant relationship between emotional intelligence and social anxiety levels and this finding supports the current research results (Tezelli, 2019). When examining the literature, there are also contrary results to this finding (Gençiri, 2020). The presence of contradictory and negative correlations and results indicates the need to replicate emotional intelligence and social anxiety in different settings with different study groups. Emotional intelligence is defined as the ability of an individual to act despite obstacles, regulate his mood, control his impulses, and empathize. Thus, the development of emotional intelligence appears as both a protective and a preventive factor on social anxiety. Studies in which anxiety and depression are related to emotional intelligence also support this finding (Russo et al.,2012). Individuals with high emotional intelligence can provide self-control, self-motivation, be determined and patient, and thus reduce social anxiety by guiding their feelings. Emotional intelligence can play a functional role in replacing negative emotions such as anxiety and stress with positive emotions. It has been stated that emotional intelligence develops during the interaction of individuals. These individuals have strong intuitions, can understand non-verbal rules, adapt to social life, and continue their lives more actively (Goleman, 2003). Having an effect on individuals' emotions is a sign that they are healthy. However, in the case of social anxiety, emotions dominate the person and the person loses control. The socially anxious individual, who is worried about the experience of all these fears and anxieties, starts to avoid social environments. Thoughts develop about whether he will be criticized and judged by those around him. The feeling of shyness and anxiety that the person feels prevents individual from showing the behaviors he/she wants to do. With the high level of emotional intelligence, it is thought that the person can regulate their emotions brought by unrealistic thoughts and control their emotions that cause social anxiety. Another important point of the study is related to the gender variable. Social anxiety does not show a significant difference according to gender. Studies conducted support this finding (Gençiri, 2020). When emotional intelligence was examined by gender, it was seen that female students had higher emotional intelligence levels than male students. In addition to studies that are in line with the research results, there are also opposite results (Eraslan, 2016; Gür et al., 2019; Yılmaz & Zembat, 2019). Emotional differences can be observed between the genders, as parents raise their boys and girls in different emotional styles. While researching the concept of emotional intelligence, which is thought to be related to the upbringing style, attention should be paid to the region's socio-cultural characteristics and gender roles.

People with advanced emotional intelligence can understand and express themselves effectively, establish good relationships with other people, use effective coping methods against difficulties and obstacles, recognize their strengths and weaknesses, constructively express their opinions, cooperative, constructive and satisfying relationships can establish (Bar-On, 2006). In order for an individual to do all of these, must use emotions for own benefit, be sufficiently optimistic and adjust own motivation level (Bar-On, 2006). It is thought that the social anxiety of the individual who can do these will decrease with the development of relationships and communication. One of the study's important findings is related to the age variable. There are few studies on Turkish literature on emotional intelligence, social anxiety, and age variables. In this respect, it is thought that the current study will contribute to the literature. The findings show that university students between the ages of 20-22 have high criticism anxiety and social anxiety. It was found that the emotional intelligence abilities of university students between the ages of 18-20 were higher in optimism, utilization of emotions and appraisal of emotions. Emotional intelligence as a type of intelligence (Gardner, 1993; Sternberg, 1988; Wechsler, 1958) is the body's responses to a certain stimulus and the ability to regulate these responses can be increased depending on the individual (Gross, 1998; Gross & Thompson, 2007). While basic emotions such as being happy, sad, angry are seen from infancy, more complex feelings such as guilt and regret appear in later ages (Çelik et al., 2002). This emotional development includes the ability of the child to recognize his emotions, regulate and control his emotions, and establish empathy by transferring them to different situations (Bar-On, 2000). It can be said that emotional development has an impact on social development as well as its

biological bases (Denham, 1998). Sociobiologists stated that the feeling of angry protects us from the aggression of others, that pleasure and happiness prepare the ground for individuals to continue their species, and that the crying behavior of the individual in sadness and sorrow enables others to receive help (Cüceloğlu, 1991). Similarly, Ekman (1992) stated that emotions are a source of motivation for quality lifehelps the individual. It helps the individual adapt to nature and society by increasing the probability of survival. The last important finding is that all dimensions of the emotional intelligence scale together explain 12% of the total variance regarding social anxiety. Thus, it has been revealed that emotional intelligence is an important factor in reducing anxiety. Considering that emotions emerge at an early age and can be educated, it is thought that it will be effective to gain emotional awareness and empathy trainings starting from the preschool period and continuing in the following stages according to the developmental period of individuals. The learning environment and the role of the teacher are of great importance in gaining these skills.

For this reason, teachers should have sufficient knowledge about emotional intelligence and should be able to organize the environment in a developmental way. It is thought that the emotional literacy courses to be taught as elective courses in the education faculty will be effective in teachers' having this awareness. In addition, it is thought that providing psychological counselors as a consultation to other teachers and families and providing students with preventive and developmental guidance will contribute to students' cognitive and social development. All the training and activities that are carried out to improve emotional intelligence are important and necessary for students, and various studies on the subject will contribute to the field.

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# The Relationship Between School Administrators' Creative Leadership Qualities and School's Organizational Intelligence Levels*

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ABSTRACT

This study aims to investigate the relationships between the creative leadership qualities of school administrators and the organizational intelligence of schools. This is a correlational study, one of the methods of quantitative research. Teachers from the Van districts of pekyolu, Tuşba, and Edremit are included in the study. The sample for this study consists of 451 teachers randomly selected from schools in these districts. The research data was collected using the Multidimensional Organizational Intelligence Scale and The Creative Leadership Qualities of School Administrators' Scale. Using the arithmetic mean, standard deviation, correlation average, and regression analysis, the data were analyzed. The study found a significant and positive correlation between the creative leadership qualities of school administrators and the organizational intelligence of schools. School administrators' creative leadership qualities and sub-dimensions are significant predictors of their institutions' organizational intelligence.

Keywords:
School administrators, creative leadership, organizational intelligence.

## 1. Introduction

Rapid developments in technology and information fields transform the change in the society formed by individuals into a dynamic process (Marşap, 2009). In this process, the necessity of managing educational organizations based on knowledge dynamics emerges. Developments in technology and information with the management requirements of educational organizations lead to developments and changes in their organizational structures, management understandings, and leadership styles (Demir-Uslu, 2011). The importance of leadership in education is increasing daily, as education is considered an organization that should give the right answers to the changing social needs and meet the expectations with its outputs (Badejo, 2016; Ruiz-Mills, 2019). In education, leaders are seen as the conductors of an orchestra. The conductor's skills, such as being able to lead his orchestra for a common purpose with the same harmony and enthusiasm and creating a common vision, also reflect the styles of education leaders (Ruiz-Mills, 2019). Creative leaders are those who can manage their organizations by utilizing their skills in problem situations and complexities. In the field of education, leaders who can use creativity as a compass while navigating uncharted territory are regarded as crucial (Yanik, 2007).

### 1.1.Creative Leadership

There are numerous definitions of creativity, including discovery and innovation (Yanık, 2007), which takes on different meanings depending on its form (Harris, 2009), the set of responses created for the situations

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encountered (Rouquette, 2007), the development and communication of new ideas that are expected to be useful (Mentor, 2011), and the preparation of the new by arranging the old (Bentley, 1999). Creative leadership, on the other hand, is defined as a leadership approach that can be used for innovation and change, where imagination is used, an effective communication network is created, risks are effectively managed, and problem solving is carried out effectively (Agbor, 2008; Alder, 2004; Badejo, 2016; Ball, 2018). Creative leadership requires the ability to communicate with different people, to effectively fill the gaps where time, resources, opportunities, and shared learning takes place, and to find innovative solutions by combining different perspectives and ways of thinking with their self-awareness. In this context, it is stated that the creative leader should have entrepreneurial and effective communication skills, be open to innovation and change, and have the characteristics of a structure that will break the mold by making a difference and move away from the determined forms (Uçar & Sağlam, 2019).

Leaders with a creative leadership understanding have developed and renewed themselves by gaining many new leadership characteristics (Marşap, 2009; Yanık, 2007). Creative leaders are expected to respect developments and changes, tolerate differences, are innovative, have high imagination and advanced communication skills, can quickly understand the problems they face, produce solutions, and can manage risk (Harris, 2009; Stoll & Temperley, 2009). The new era, in which problem-solving skills were seen as the key point, brought with it the necessity of features such as perception, comprehension, and synthesis, and this revealed the understanding that the leaders of the new era should have certain expertise (Demir Uslu, 2011; Rouquette, 2007). Leaders who are experts in their fields and can use their intelligence effectively in problem-solving have come out of the old leadership understanding and have entered a tendency based on creativity in their management understanding (Harris, 2009). Therefore, intelligence can be expressed as an element of management skills. Leaders who can blend their individual intelligence with organizational understanding can effectively manage their organizations in line with their visions (Helal, 2006). However, it can be said that the intelligence of the organization works differently from the total intelligence of individuals. Organizational intelligence, which is accepted as the whole and use of the abilities that ensure the survival of the organization (Neyişçi, Potas, & Erçetin, 2018), is expressed as to use all of the skills and potential to make decisions about unexpected situations in the environment (Erçetin, 2004a), structure, culture, environmental relations, knowledge, and strategic processes, etc. problem-solving capacity created by its subsystems (Kull, 1997), ability to act target-oriented, creating and accessing an organizational knowledge base, selecting and managing appropriate actions, monitoring the results of actions (Erçetin, 2004b), using an organization's data and management processes scanning using the perception of information and the ability to combine knowledge with strategic options (Kull, 1997).

### 1.2.Organizational Intelligence

Organizations have entered an increasingly complex process to keep up with the changes they face. They use organizational intelligence management to survive in this complexity and demonstrate the necessary skills (Jung, 2009). The ability to act in harmony with the environment, to satisfy changing needs and to provide new services is considered a requirement of today (Resto-Gallardo, 2009).Organizational intelligence is seen as an important structure that combines the skills of adapting to the environment, changing the environment and itself, and solving the problems encountered in maintaining an organization (Erçetin & Demirbulak, 2002; Halal, 2006; Resto-Gallardo, 2009; Stalinski, 2004). Individuals who can solve the problems they encounter are aware of the changes in their environment and ask questions against these situations. At this point, making organizational intelligence work in the field of education gains importance and is expected to significantly contribute to education (Resto-Gallardo, 2009).

Organizations where organizational intelligence works differ from others in acquiring and using information. Because individuals who ask questions, research, have a sense of curiosity, and develop synthesis skills are trained in organizations where organizational intelligence is used effectively (Tekin, 2008). These individuals are needed for schools to adapt to contemporary conditions. For this reason, it is thought that using organizational intelligence skills in schools is important (Ekici & Titrek, 2011; Yörük, 2006).

As an educational institution, the need for leadership that can activate the organizational intelligence of schools, approach changing conditions with an innovative perspective and have problem-solving skills emerges. Leaders who advance in familiar ways and act on past experiences are no longer sufficient to meet

the needs of the age. In this context, organizational intelligence also leads to the emergence of new leadership understandings. Increasing the performance of the organization depends on the good management of its material and moral resources and the leaders who can use the intelligence of individuals at the level of organizational intelligence (Jung, 2009; Keleş & Özkan, 2010).

### 1.3. Creative Leadership and Organizational Intelligence

Using organizational intelligence in leadership positively contributes to environmental adaptation and development and effectively uses information for goals (Stalinski, 2004). With the changing and developing technology in the 21st century, organizational intelligence functions in the ability of leaders to solve the problems they face to maintain their existence and creates opportunities for success (Halal, 2006). Leaders who can be creative and provide flexibility can be different and differentiate themselves from other leaders positively (Jung, 2009). As an organization, the use of organizational intelligence and leaders who can provide these conditions of use, increase productivity in line with the common goal, renew themselves and create the physical and environmental conditions that can adapt to change is considered especially important in schools. In this context, it is thought that there may be a relationship between the creative leadership characteristics of school principals and the organizational intelligence levels of schools.

When the literature is examined, studies are seen about *creative leadership* (Dikmen Ada, 2012; Agbor, 2008; Alder, 2004; Aslan; 1994; Austin, 1997; Badejo, 2016; Ball, 2018; Botha, 2013; Casavant & Cherkowski, 2001; Chernin 2003; Gardner, 1993; Huard, 2008; Jarvis, 2015; Kabba, 2013; Li & Yue, 2019; Macbean, 2014; Mainemelis et al., 2015; Marşap, 2009; Mumford et al., 2002; Palus & Horth, 2005; Öztürk, 2014; Rouquette, 2007; Sisk, 2001; Stoll & Temperley, 2009) and *organizational intelligence* (Bümen, 2002; Düzer, 2008; Ekici, 2007; Erçetin, 2004; Glynn, 1996; Göktaş, 2017; Halal, 2006; Jung, 2009; Laine, 2000; Mikesell, 2001; Simich, 2005; Stalinski, 2004; Woodman et al., 1993; Yıldırım, 2006; Yörük, 2006). However, there is no research examining the relationship between school principals' creative leadership characteristics and the schools' organizational intelligence levels. This study aims to examine the relationship between the creative leadership characteristics of school principals and the organizational intelligence levels of schools and thought to fill this gap in the literature. In line with this main purpose, answers to the following questions were sought.

- What is the level of creative leadership characteristics of school principals according to teachers' opinions?
- What is the level of organizational intelligence in schools according to teachers' opinions?
- According to the teachers' opinions, is there a significant relationship between the creative leadership characteristics of school principals and the organizational intelligence levels in schools?
- According to teachers' opinions, are school principals' creative leadership characteristics a significant predictor of school organizational intelligence level?

## 2. Methodology

The research model, participants, data collection tools, demographic information of the participants, data collection process, and data analysis are explained in this section.

### 2.1. Research Design

This research is a predictive study created with the correlation method, one of the quantitative research methods. The screening model, which tries to determine the existence or degree of possible change between two or more variables, is referred to as relational screening (Karasar, 2012; Chan, 2003; Büyüköztürk, 2016). In relational screening models, there are two types of variables called dependent, which is expressed as the affected and predicted variable, and independent, which has the power to influence (McLeod, 2019). The independent variable of this research is creative leadership, and the dependent variable is organizational intelligence.

### 2.2. Participants

The target population of the research consists of secondary school teachers working in the province of Van in the 2018-2019 academic year. The sample in this study is secondary school teachers working in the central districts of Van, Tusba, İpekyolu, and Edremit. Many different classifications of sample types have been made in the literature. Probabilistic and non-probabilistic sampling types are the most common (Balcı, 2018;

Büyüköztürk, 2016). In such samplings, margins of error can be measured while generalizing the population. A simple random sampling method, one of the probability-based sampling types, was used in this study. As a result of the information obtained from the Van Provincial Directorate of National Education, it was determined that 1995 secondary school teachers were working in the central districts of Van, Tusba, İpekyolu, and Edremit. According to Anderson (1990), in cases where the population is 50,000 and 5,000 people, a sampling consisting of 381 and 356 people, respectively, is required to provide a .05 margin of error and a representation level of .95 (Cited by Balcı, 2018). As a result of this information, it was understood that 322 teachers could represent the universe in the calculation made by considering the 0.5 deviation amount. Considering the deficiencies such as incorrect coding and incomplete and incorrect information to be encountered in the application, 525 questionnaires were distributed to 27 schools. As a result of identifying and eliminating application errors, 451 scales that met the research conditions were used in data analysis. Demographic information about the participants is presented in Table 1.

**Table 1.** *Demographic Information of Participants*

| Variables | Groups | N | % |
|---|---|---|---|
| Gender | Female | 222 | 49,2 |
| | Male | 229 | 50,8 |
| Marital Status | Married | 245 | 54,3 |
| | Single | 206 | 45,7 |
| State of Education | Bachelor's Level | 404 | 89,6 |
| | Post Graduate | 47 | 10,4 |
| Field of Study | Numerics | 125 | 27,7 |
| | Verbal | 241 | 53,5 |
| | Practical | 85 | 10,8 |
| Employment Situation | Staffed | 306 | 67,8 |
| | Contractual | 145 | 23,2 |
| Total Seniority in Teaching | 0-3 | 148 | 32,8 |
| | 4-6 | 148 | 32,8 |
| | 7 and more | 155 | 34,4 |
| Working time in school | 0-1 | 178 | 39,4 |
| | 2-3 | 126 | 28,0 |
| | 4 and more | 147 | 32,6 |
| | Total | 451 | 100 |

### 2.3. Data Collection Tools

Teachers' opinions on the creative leadership characteristics of school principals and organizational intelligence levels in schools were investigated according to some variables. This study used a personal information form and two separate measurement tools to collect data. Personal Information Form: It is the form prepared by the researcher. There are questions to determine the criteria of gender, marital status, state of education, the field of study, employment situation, total seniority in teaching and working time in the school.

*The Creative Leadership Qualities of School Administrators' Scale (CLQSAS)*: It is a scale used to measure teachers' views on creative leadership qualities. It is developed by Uçar and Sağlam (2019) as a 5-point Likert scale. The item numbers, the scale dimensions, and the arithmetic mean value range are presented in the table below.

**Table 2.** *Statements of The Creative Leadership Qualities of School Administrators' Scale*

| Scale Dimensions | The Number of Items | Choice of Scale | Value Range |
|---|---|---|---|
| Entrepreneurship and effective communication | 14 | Do not agree at all | 1.00-1.80 |
| Openness to innovation and change | 11 | Little agree | 1.81-2.60 |
| Variety | 4 | Agree moderately | 2.61-3.40 |
| CLQSAS (Total) | 29 | Agree a lot | 3.41-4.20 |
| | | Totally Agree | 4.21-5.00 |

As seen in Table 2, the creative leadership qualities of school administrators' scale consist of three dimensions and a total of 29 items. Scale scoring: between 1.00-5.00, respectively, I disagree, I agree little, I agree

moderately, I agree a lot, and I totally agree. Scale averages are interpreted according to the given value ranges. The lowest score that can be obtained from the scale is 29, and the highest score is 145. Uçar and Sağlam (2019) tested the scale's reliability using the Cronbach Alpha coefficient and calculated the internal consistency coefficient of the scale as .98. It is found the same in this study.The validity analysis of the scale was performed and revealed that the CLQSA measurement tool is a valid measurement tool (Uçar & Sağlam, 2019)). In this context, CFA was performed for validity in this study. In the evaluation of the model, x 2 / sd, RMSEA, GFI, NNFI, CFI and SRMR were considered as goodness of fit criteria. As CFA eligibility criteria, x 2 / sd=2-5, RMSEA=0.03-0.08, GFI>0.90, NNFI>0.80, CFI> 0.90 and SRMR< 0.05 values are accepted as threshold values in some studies, (Eskioglu, 2017; Suhr, 2006). Accordingly, because of CFA; As x 2 / sd value is 3.70, NNFI=.92, CFI=.92, SRMR=.039, GFI= .81 and RMSEA=.078, it can be stated that the measurement tool of OMYLOO is valid.

*Multi-Dimensional Organizational Intelligence Scale (MDOIS)*: It is a scale used to measure teachers' views on organizational intelligence. The scale, which was developed by Erçetin, Potas, and Açıkalın (2001, 2004, 2007, 2009) and was redesigned in 2015, consists of 67 items and 7 dimensions. The scope and number of items in the scale, which is a 5-point Likert form, are shown in the table below.

**Table 3.** *Statements of Multi-Dimensional Organizational Intelligence Scale*

| Scale Dimensions | The Number of Items | Level | Value Range |
|---|---|---|---|
| Adapting to Changing Situations I | 6 | Incredibly low | 1.00-1.80 |
| Effective Communication with Stakeholders | 11 | Low | 1.81-2.60 |
| Quickness of Action and Response | 6 | Moderate | 2.61-3.40 |
| Sensing and predicting | 10 | High | 3.41-4.20 |
| Imagination and Creativity | 8 | Very High | 4.21-5.00 |
| Being Flexible and Comfortable in Practice | 5 | | |
| Adapting to Changing Situations II | 21 | | |
| MDOIS (Total) | 67 | | |

The MDOIS scale consists of seven sub-dimensions, as shown in the table above: adapting to changing situations I, effective communication with stakeholders, quickness in action and reaction, sensing and predicting, imagination and creativity, and being flexible and at ease in practice and adapting to changing situations II.It consists of 67 items. The lowest score that can be obtained from the scale is 67, and the highest score is 335. Neyişçi, et al. (2018), the Cronbach Alpha reliability coefficients of the scale were .98 for total scale and above .90 points for all sub-dimensions.

The construct validity of the multidimensional organizational intelligence scale was tested with CFA. x2/sd, RMSEA, GFI, NNFI, CFI and SRMR were considered in the CFA analysis. Accordingly, because of CFA, x 2 / sd value was 1.80, NNFI=.98, CFI=.99, SRMR=.043, GFI= .92 and RMSEA=.064 values were obtained (Turan, 2017). In this study, the scale's construct validity was tested with CFA and in the evaluation of the model, x 2 / sd, RMSEA, GFI, NNFI, CFI and SRMR were considered as goodness of fit criteria. Accordingly, because of CFA, the x 2/sd value was 2.41, NNFI=.90, CFI=.91, SRMR=.030, GFI= .73, and RMSEA=.056, and it was revealed that the measurement tool of MDOIS is a valid measurement tool.

### 2.4. Collecting Data

The researcher personally collected the data in the second semester of the 2018-2019 academic year. To use the measurement tools in the research, permission was obtained from the provincial district governorship via official correspondence, first by e-mail, and then by official correspondence in public schools in the central districts of Van, İpekyolu, Tusba, and Edremit. The scales were applied to randomly selected schools. Measurement tools were applied in the teachers' room, considering the principle of voluntariness and giving necessary information during seminar times, breaks and exits during class times. Most of the distributed forms were received on the same day, and an intermediary received the forms that could not be received on that day from the relevant schools.

### 2.5. Data Analysis

In analyzing process, SPSS was used. Descriptive statistics such as average, frequency and percentage related to the demographic characteristics of the participants were used. Before the correlation and regression tests

were performed, whether the data were normally distributed, skewness and kurtosis values, Q-Q plots (Q-Q Plot) and histogram plots were examined.

When examining the skewness and kurtosis values of the scale of creative leadership characteristics of school principals, the entrepreneurship and effective communication sub-dimensions are 1.142 and 1.257, the openness to innovation and openness to change sub-dimensions are.987 and 683, the difference sub-dimension is -.378 and.429, and the total is.927 and.667; the adapting to changing situations sub-dimension of the multidimensional organizational intelligence With 973 and 871, the sub-dimensions of using imagination and creativity -.940 and.664 - and being flexible and comfortable in functioning -.997 and.977 - were obtained, respectively (Can, 2017).In this context, the distribution is assumed to be normal when the skewness and kurtosis values obtained, and the Q-Q Plot and histogram graphs are examined. When the assumption of normality is provided, the sample size of the data, whether there is a multicollinearity problem between them and the extreme values in the data set were calculated to apply multiple regression analysis.

*Sample size.* It is important to meet the sample size condition in multiple regression analysis, which is multivariate analysis. The number of predictor variables is important in the process of testing the sample size. The inclusion of 15 individuals in the data set for each predictor variable is an accepted criterion for sample size (Field, 2009). Miles and Shevlin (2001) stated that a sample size of 200 people was sufficient for up to 20 predictor variables. There are 3 predictive variables in this study, and there are approximately 117 subjects per variable in a sample of 451 people. According to these two conditions regarding the determination of the sample size, the data set was accepted as suitable for multiple regression calculation.

*Multiple connection problem.* Durbin Watson coefficient was used to determine whether there is a multicollinearity problem in the research data. A value range of 1.5 to 2.5 is a desirable value range, indicating that there is no multicollinearity problem. To check whether there is multicollinearity between the independent variables, tolerance, condition index value (CI), and variance amplification factor (VIF) values were considered. CI values should not be higher than 30, tolerance values should not be lower than .20, and VIF values should not be higher than 10. If it does not comply with the specified values, it can be stated that there is a multicollinearity problem between the independent variables (Yavuz, 2009; Büyüköztürk, 2018). The results of the multicollinearity analysis of the research data are presented in Table 4.

**Table 4.** *Results of Multicollinearity Test*

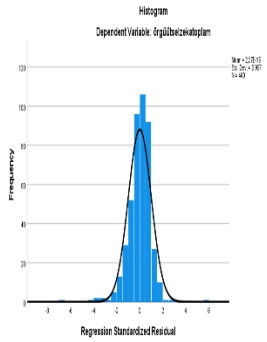
| Variables | Durbin- Watsons | CI | Tolerance | VIF |
|---|---|---|---|---|
| Entrepreneurship and effective communication | | 10.603 | ,194 | 5.164 |
| Openness to innovation and change | 1.832 | 14.293 | ,162 | 6.171 |
| Variety | | 30.235 | ,452 | 2.214 |

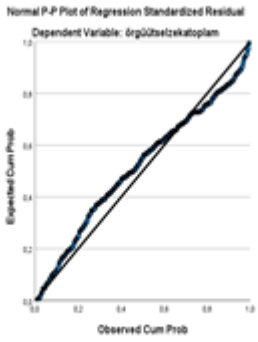
As seen in Table 4, since the Durbin Watson coefficient value is between 1.5 and 2.5 (1.83), it can be said that there is no multicollinearity problem. Although the CI value for the difference variable is 30.235, the tolerance and VIF values are acceptable, and the tolerance value for the openness to innovation and change variable is .162; although it is below the .20' limit, the CI and VIF values are acceptable, and finally, the tolerance value for the entrepreneurship and effective communication variable is .194, it can be seen that the CI and VIF values are acceptable.Since there was no multicollinearity problem in the entire data set, the variables were not excluded from the analysis. All these analyzes show that the data set is suitable for regression analysis.

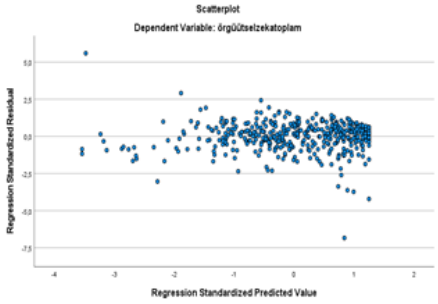
*Extreme values.* In the regression analysis, some extreme values disrupt the compatibility of the existing regression model with the theoretical model. In determining multivariate extreme values, Cook's distance coefficient was examined. It was determined that Cook's distance values for all values were below 1. Another value that should be considered in determining multivariate extreme values is the distance values of Mahalanobis. As a result of the analysis, it was determined that all values were not less than 11,345 for a .001 significance level. In a regression analysis with 3 independent variables, the p= 0.001 Mahalanobis value is 11,345 (Can, 2017). For this reason, those with a value higher than 11,345 in the data set were not included in the analysis. With these applications, it can be interpreted as the absence of multivariate extreme values in the data set (Field, 2009).

*Linearity and normality assumption.* Normality and linearity assumptions of the predictive variables in the study were tested with graphs between standardized estimated values and standardized error (deviation) values.

When the graphs were examined, it was observed that the variables had a linear and positive relationship. In addition, it was determined that the histogram and normal distribution curves created for the standardized predicted values indicated a close to normal distribution. These findings show that the available data are suitable for multiple regression calculations. The graphs related to linearity and normality assumption are presented below.




After providing the assumptions as mentioned above, correlation and regression analyses were performed in the SPSS statistical program. Pearson Moments product correlation calculation technique was used in the correlation analysis. In addition, multiple regression analysis was calculated to determine the predictive levels of the independent variables (entrepreneurship and effective communication, openness to innovation and change, and diversity) on the organizational intelligence dependent variable in the research. Continuous variables were directly included in the analysis in the study. A total of 3 predictive variables were analyzed in the study. Enter method was used in multiple regression analysis.

## 3. Findings

In this section, the findings of the analyzes made within the framework of the research problem are given. The average score of school principals' creative leadership characteristics and organizational intelligence levels in schools in Table 5 has also been given.

**Table 5.** *Statements of Multi-Dimensional Organizational Intelligence Scale*

| Scales | Sub- dimensions | n | X | Ss |
|---|---|---|---|---|
| The Creative Leadership Qualities of School Administrators' Scale | Entrepreneurship and effective communication | 451 | 4,08 | .94 |
| | Openness to innovation and change | 451 | 3,95 | .91 |
| | Difference | 451 | 3,53 | .98 |
| Multi-Dimensional Organizational Intelligence Scale | Adapting to Changing Situations I | 451 | 3,84 | .89 |
| | Effective Communication with Stakeholders | 451 | 3,88 | .84 |
| | Quickness in Action and Reaction | 451 | 3,97 | .85 |
| | Sensing and predicting | 451 | 3,87 | .87 |
| | Imagination and Creativity | 451 | 3,84 | .90 |
| | Being Flexible and Comfortable in Practice | 451 | 3,79 | .90 |
| | Adapting to Changing Situations II | 451 | 3,82 | .88 |

When Table 5 is examined, the highest average in the Creative Leadership Qualities of School Administrators' Scale is 4.08 in the sub-dimension, "entrepreneurship and effective communication". The mean in the "difference" sub-dimension is 3.53, lower than the other dimensions. When the statistical Data on organizational intelligence is examined, the highest average is 3.97 in the "quickness in action and reaction" sub-dimension, and the lowest average is 3.79 in the sub-dimension of "being flexible and comfortable in practice".

Whether there is a relationship between creative leadership and organizational intelligence with their sub-dimensions was analyzed with the Pearson Product Moments Correlation coefficient. The findings are shown in Table 6.

**Table 6.** *The Relationship between Creative Leadership Qualities of School Administrators and Organizational Intelligence Levels of Schools with Sub-Dimensions*

| Dimensions | Adapting to Changing Situations I | Effective Communication with Stakeholders | Quickness in Action and Reaction | Sensing and predicting | Imagination and Creativity | Being Flexible and Comfortable in Practice | Adapting to Changing Situations II | MI (Total) |
|---|---|---|---|---|---|---|---|---|
| Entrepreneurship and effective communication | .805** | .791** | .774** | .818** | .766** | .726** | .768** | .820** |
| Openness to innovation and change | .839** | .827** | .788** | .834** | .803** | .775** | .810** | .855** |
| Difference | .689** | .669** | .627** | .667** | .667** | .654** | .671** | .700** |
| CLQSA (Total) | .844** | .828** | .792** | .839** | .809** | .780** | .814** | .859** |

** p <was significant at the 01 level.

The correlation coefficient is expressed as r and takes a value between -1 and +1. The closer this coefficient between the two variables is to the +1 direction, the higher and more positive a relationship is observed. If this value approaches -1, the relationship shows a negative trend. If the correlation coefficient is found to be 0, this indicates that there is no relationship between the two variables. There are generally accepted ranges of values to determine correlation levels. If the coefficients take a value between 0-0.30, it is interpreted as a low relationship, if it takes a value between 0.30-0.70, it is a medium-level relationship, and if it takes a value between 0.70-1, it is interpreted as a high relationship (Büyüköztürk, 2007).

There is a highly positive and significant relationship between organizational intelligence's sub-dimension of "adapting to changing situations I" and the school administrator's creative leadership qualities sub-dimensions of "entrepreneurship and effective communication" (r=.80, p.01), "openness to innovation and change" (r=.83, p.01), and the total value of the creative lea The relationship between the creative leadership qualities of the school administrator and the "difference" sub-dimension is moderately positive and statistically significant (r=.68, p.01).There is a highly positive and significant relationship between the sub-dimension of organizational intelligence, "effective communication with stakeholders," and "entrepreneurship and effective communication" (r=.79, p.01), "openness to innovation and change" (r=.82, p.01), and the sum of creative leadership qualities of school administrators (r=.82, p.01). There is a moderately positive relationship between school administrators' creative leadership qualities and the "difference" sub-dimension (r=.66, p.01).

"Quickness in action and reaction" and "creative leadership" are correlated with organizational intelligence in school principals, as are "entrepreneurship and effective communication" (r=.77, p.01) and "openness to innovation and change" (r=.78, p.01). sub-dimensions There is a strong positive correlation (r =.79, p.01) between school principal dimensions and the total number of creative leadership characteristics among school principals. The relationship between the creative leadership characteristics of school principals and the "difference" sub-dimension is moderately positive (r=.62, p.01).

There is a strong positive and significant relationship between the "sensing and predicting" sub-dimension of organizational intelligence and "entrepreneurship and effective communication" (r=.81, p.01) and "openness to innovation and change" (r=.83, p.01) sub-dimensions of creative leadership qualities of school administrators and the sum of the creative leadership characteristics of school principals (r=.83, p.01). There is a moderately positive and statistically significant relationship between the "sensing and predicting" sub-dimension of organizational intelligence and the "difference" sub-dimension of creative leadership qualities of school administrators (r = 0.66, p .01).

There is a highly positive and statistically significant relationship between the "using imagination and creativity" sub-dimension of organizational intelligence and the creative leadership qualities of school administrators' sub-dimensions "entrepreneurship and effective communication" (r=.76, p .01) and "openness to innovation and change" (r=.80, p .01) and the sum of the creative leadership qualities of school administrators' (r=.80, p .01). There is a moderately positive and statistically significant relationship between

the "using imagination and creativity" sub-dimension of organizational intelligence and the "difference" sub-dimension of school administrators' creative leadership qualities (r=.66, p.01).

There is a highly positive and significant relationship between "being flexible and comfortable in practice" and "entrepreneurship and effective communication" (r=.72, p.01) and "openness to innovation and change" (r=.77, p.01) sub-dimensions of creative leadership qualities of school administrators and the total of creative leadership qualities of school administrators (r=.78, p.01). Considering the "difference" sub-dimension (r =.65, p .01) of school administrators' creative leadership qualities, there is a moderately positive and significant relationship between "being flexible and comfortable in practice" and organizational intelligence.

There is a highly positive and significant relationship between the "adaptation to changing situations II" sub-dimension of organizational intelligence and the "entrepreneurship and effective communication" (r=.76, p .01) and "openness to innovation and change" (r=.81, p .01) sub-dimensions of creative leadership qualities of school administrators and their sum (r=.81, p .01). The relationship between the "adapting to changing situations II" sun-dimension of organizational intelligence and the "difference" sub-dimension of school administrators' creative leadership qualities is moderately positive and statistically significant (r=.67, p.01).When considered in terms of sub-dimensions, the "difference" sub-dimension of the creative leadership qualities of school administrators' "adapting to changing situations II" sub-dimension of the organizational intelligence has a moderate positive relationship; on the other hand, "entrepreneurship and effective communication" and "openness to innovation and change" dimensions of the creative leadership qualities of school administrators' are also highly correlated with the "adaptation to changing situations II" sub-dimension of organizational intelligence. The total score of the creative leadership qualities of the school administrators' scale is in a highly positive and significant relationship with the total scale score and each dimension of organizational intelligence. In terms of value, it is seen that the highest correlation value is between the sum of the creative leadership qualities of school administrators and the "quickness in action and reaction" sub-dimension of organizational intelligence. Taking into account the innovative leadership qualities of school administrators, this high-level correlation between the need for leaders who can quickly recognize a problem situation and begin working on a solution and the "quickness in action and reaction" sub-dimension of organizational intelligence can be interpreted as a positive result.

The results of the multiple regression analysis regarding whether the sub-dimensions of school administrators' creative leadership qualities significantly predict the organizational intelligence level of schools are presented in the table below.

**Table 7.** *Multiple Regression Analysis Results on the Contribution of Continuous Variables in Predicting the Dependent Variable of Organizational Intelligence*

| Variables | B | Standard Error | *B* | *t* | *P* | Binary R | Partial R |
|---|---|---|---|---|---|---|---|
| Constant | ,670 | .097 | - | 6.914 | <.001 | | |
| Entrepreneurship and Effective Communication | .214 | .051 | .237 | 4.191 | <.001 | .104 | .197 |
| Openness to Innovation and Change | .461 | .056 | .504 | 8.169 | <.001 | .203 | .364 |
| Difference | .140 | .031 | .168 | 4.536 | <.001 | .113 | .212 |
| $R=.855$; $R^2=.731$; $F_{(3439)}=394.974$; p<. 001 | | | | | | | |

Examining the results in Table 7, it is found that the relationships between the predictor variables and the dependent variable "organizational intelligence" are correlated at the levels indicated: "entrepreneurship and effective communication" (r =.104, pr=.197), "openness to innovation and change" (r=.203, pr=.364), and "difference" (r=.113, pr=.212).It is seen that the stated variables together predict the Organizational Intelligence Levels dependent variable significantly (F=394.974; p< .001). All variables together explain approximately 73% (R2 = .731) of the dependent variable, Organizational Intelligence. According to the standardized regression coefficient (β), the relative importance order of the predictor variables on the dependent variable of Organizational Intelligence Levels is "openness to innovation and change", "entrepreneurship and effective communication," and "difference". Examining the t-test results for significance of the regression coefficients, it is found that the independent variable "entrepreneurship and effective communication" (β= .237 p <.001), the

independent variable "openness to innovation and change" (β= .504 p= <.001), and the independent variable "difference" (β= .168 p= <.001) are positive and significant predictors of the dependent variable "organizational intelligence level."In this context, it can be said that all the mentioned variables together are a positive and significant predictor of the Organizational Intelligence Levels dependent variable.

**4. Conclusion, Discussion and Recommendations**

As a result of this research, all teachers state “I agree very much” in sub- dimensions and total scale of Creative Leadership. This result can be interpreted as teachers finding school administrators' creative leadership qualities high. As a result of the research conducted by Dikmen Ada (2012), participation was expressed as "a little more than moderate". In this study, creative leadership qualities were found at the level of "very agree". The research conducted by Öztürk (2014) also indicates that creative leaders exist in the education system. Creative leaders are brave (Li & Yue, 2019); they are willing and quick to respond to events (Stenberg, 2004); their communication skills are valuable (Katz-Buonincontro, 2005); and they are entrepreneurial in addressing problems encountered (Ball, 2018); and they support the findings of the research. The fact that there is greater participation in the "entrepreneurship and effective communication" sub-dimension compared to the other dimensions can be interpreted as follows when the averages are calculated: Creative leaders are those who act entrepreneurially and can effectively communicate with their stakeholders.

As a result of this research, all teachers state ‘high level’ in sub-dimensions and total scale of Organizational Intelligence LevelOrganizational intelligence, defined as an organization's ability to survive change (Yörük, 2006), synthesize the necessary information for problem solving (Stalinski, 2004), create designs using imagination (Tekin, 2008), and maintain their existence and respond to environmental needs (Erçetin & Demirbulak, 2002), is regarded as an important enabling factor.In this context, having a ’high level' of participation in the sum and sub-dimensions of organizational intelligence, it can be interpreted as teachers are aware of the importance of organizational intelligence levels of schools.

According to the research results, a positive statistically significant relationship was found between the creative leadership qualities of school administrators and all sub-dimensions that make up the organizational intelligence levels of schools. It is important that creative leaders use organizational intelligence by blending them into education in institutions where they lead (Samurçay, 1983). Because organizational intelligence needs to adapt to changes in harmony with the environment and approach these changes in an innovative way to meet social needs. At this point, leaders who use their creativity in coping with new situations will be more successful. Creative leaders establish a system that can manage uncertainty, continuous change, and the chaos that this change brings (Ruiz-Mills, 2019). Organizational intelligence, on the other hand, is seen as a system that can produce innovative solutions for the problem situations brought by change, maintain the existence of the organization and work in harmony with the environment (Mikesell, 2000; Neyişçi, et al., 2018; Göktaş, 2017). In this context, it is thought that the relationship between the creative leadership qualities of school administrators reached in the research and the organizational intelligence levels of the schools is understandable.

Apart from the ‘difference’ sub- dimension, a high positive relation was found between the other sub-dimensions and the total scale of creative leadership qualities of school administrators and all sub- dimensions and the total scale of organizational intelligence level. ‘Difference’ sub- dimension has moderate relationship between all sub- dimensions and the total scale of organizational intelligence level. With these results, a lot of idea about creative leadership can be ensured. Creative leaders embody structuralist features such as respect, solidarity, cooperation, and effective communication (Katz-Buonincontro, 2005). Creative leaders strive to create an innovative and free environment (Mainemelis, Kark, & Epitropaki, 2015). In this formation process, they can create an effective communication network with different segments of their environment (Ubben, Hughes, & Norris, 2001). Creative leaders bring together differences, exhibit collaborative work and create effective communication networks (Stoll & Temperley, 2009). Creative leaders are individuals who are able to effectively use communication in their management processes (Basadur, 2004), create effective communication channels (Katz-Buanincantro, 2005), improve communication in all areas (Stoll & Temperley, 2009), and incorporate effective communication skills (Katz-Buonincontro, 2005).

Within the regression analysis framework, the research findings show that the creative leadership qualities of school administrators have significant effects on the organizational intelligence levels of the schools. According to this, 73% of the school's organizational intelligence levels stem from school administrators' creative leadership qualities (R2=.731). It was found that the creative leadership qualities of school administrators, entrepreneurship and effective communication, openness to innovation and change, and difference sub-dimensions positively predicted the organizational intelligence levels of schools. No study has been found in the literature showing such a strong relationship between intelligence and creativity, but a study explains 20% of creativity in intelligence areas (Yenilmez & Çalışkan, 2011). There are also studies stating that intelligence affects the creative thinking process (Yenilmez & Bozkurt,2006; İzci, Kara & Dalaman, 2007; Tekin,2008; Karataş Öztürk, 2007; Yenilmez & Çalışkan, 2011; Demirci, 2007). However, in this study, it is concluded that school administrators' creative leadership qualities strongly predict the schools' organizational intelligence levels. Leaders who can use intelligence effectively in creativity (Tekin, 2008; Jung, 2009) are needed in this context. The necessity of blending creativity into the education system is again encountered (Samurçay, 1983). In this context, the training of school administrators becomes important and innovative programs are required to train leaders (Işık, 2003).

Creative leadership requires the ability to manage the problems brought by change and development, to manage the complexity and to direct the change (Yu, 2009; Palus & Horth, 2005). In this context, the relationship between sub-dimensions and total scales makes these ideas true. This is because creative leaders leverage their creativity for change and exhibit breakthrough behaviors that have a positive impact on adapting to changing situations (Craig, 2015; Ruiz-Mills, 2019; Xu & Rickards, 2007). To adapt to change, leaders are expected to be willing to change (Makri & Scandura, 2010).Therefore, it can be stated that creative leaders who are open to innovation and change can adapt to changing situations more easily. Also, It can be said that the creative leader's ability to use the differences S/he encounters positively is related to adaptation to changing situations. It can be said that the ability of creative leaders to take fast and bold steps toward the situations they encounter for innovation and change (Ubben, Hughes, & Norris, 2001) is related to quickness in action and reaction. The characteristics of a creative leader include the ability to synthesize differences and use them effectively. Creative leaders are able to quickly grasp all kinds of changes and differences and turn them into management skills (Marşap, 2009).

Change brings with it the necessity of innovation and innovation in today's world. Creative leaders open to innovation and change can offer solutions to problems by managing the complexity of changing situations (Williams & Foti, 2013). The efficient use of differences by bringing them together is considered important to adapt to change (Stoll & Temperley, 2009). Organizations must adapt to changing conditions and meet social needs (Erçetin, 2004). In this adaptation process, leaders who are open to innovation and change and who can use creative works effectively in organizations are needed (Mumford & Gibson, 2011). Therefore, it can be accepted that the behaviors of school administrators displaying creative leadership qualities are related to the school's organizational intelligence levels.

Organizations must be different, innovative, and original to meet these expectations. To have these differences, they need to develop their creativity (Memduhoğlu, Uçar, & Uçar, 2017). Creative leaders are expected to activate creativity within themselves and the organization (Williams & Foti, 2013). The main task of schools is to raise creative individuals (Memduhoğlu, Uçar, & Uçar, 2017). In order to grow creative people, it is necessary to create a suitable environment in which creativity can flourish (Stoll & Temperley, 2009). Creative leaders are expected to create this environment. In this context, it can be said that the sum of school administrators' creative abilities is related to the level of organizational intelligence of schools by using imagination and creativity.In this study, which examined the relationship between the creative leadership qualities of school administrators and the organizational intelligence levels of the schools, it was found that creative leadership qualities accurately predicted the organizational intelligence of schools and that creative leadership traits and organizational intelligence levels were positively, significantly, and highly correlated. In this context, the study's conclusions are considered important to the body of knowledge. Based on the results, the following recommendations for researchers are made. Future research would do well by further exploring the creative school administrators' effect on organizational intelligence. Using the scale in studies that include different samples and students at different educational levels such as primary school, high school, and

university. It is recommended that school administrators be able to learn about creativity, how it occurs, and how it is managed.

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# The Turkish Form of the Delaying Gratification Inventory: Validity and Reliability Studies

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ABSTRACT

The aim of this research is to adapt the Delay of Gratification Inventory to a Turkish adult sample. The data for the study was obtained from adults over the age of 18 between April and May 2021. The "Personal Information Form," the "Delay of Gratification Inventory," the "Psychological Well-Being Scale," and the "Barratt Impulsivity Scale Short Form" were used to collect research data. In addition to construct validity and criterion-related validity in the validity assessment of the inventor, in the reliability evaluation, Cronbach's alpha internal consistency, test-retest, and lower-upper 27% group difference values were examined. In exploratory factor analysis, the measurement tool consists of five sub-dimensions, and these sub-dimensions explain 52% of the variance. The conclusion of the CFA show that the five sub-dimension structure obtained has a good fit ($\chi2$ = 352.97 N = 265, sd = 184, p = 0.00; $\chi2$ / df = 1.92, RMSEA = .059, CFI = .90, IFI = .90, GFI = .89 and AGFI = .86). In another validity study, it was found that delaying gratification was positively related to psychological well-being and negatively related to impulsivity. Within the framework of reliability, the Cronbach's alpha internal consistency coefficient of the whole inventory was found to be .78. The test-retest coefficient for the whole inventory was found to be .84. Findings at the end of the research indicate that the Turkish form of the measurement tool is at a level that can measure the delaying gratification variable in adults.

Keywords:
Delay of gratification, validity, reliability

## 1. Introduction

The concept of delaying gratification, which is accepted as an important personality trait in terms of Social Cognitive Theory, is defined as the ability to expect a better prize instead of suddenly enjoying a situation (Mischel & Ebbesen, 1970). The concept was also defined by Hoerger et al. (2011) as the "tendency to forego a strong and immediate reward for the sake of long-term rewards". In other words, it is the ability to delay gratification and involves acquiring a more valuable versus less valuable choice by tolerating a delay or investing more effort (or both) to achieve a more valuable outcome (Beran et al., 2016). An individual's ability to delay gratification is related to other similar skills such as patience, impulse control, self-control, and will (Anokhin et al., 2011). In another definition, delayed gratification is the resistance of short-term desires to a long-term reward (Zayas et al., 2014). The best example of the distinction of this concept is Wolter Mischel's Marshmallow Test, which concretizes that definition (Mischel, 1974; Mischel & Baker, 1975; Mischel & Mischel, 1983). The experiment investigated whether children would delay instant gratification. Years later, Mischel (2015) contacted the participant children and explored that children who waited a bit longer and earned two marshmallows rather than one instant marshmallow in the test, in other words, delayed short-term gratification and succeeded in receiving a bigger or greater reward, were more successful in their lives. Therefore, the ability to delay gratification seems to be more than an accommodationistic skill. Moreover, this

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personality attribute is necessary for the process of socialization alongside the impulses that create pressure to get satisfaction right away (Mischel, 1974). According to Dollard and Miller (1967), delaying gratification is an important condition of making life plans at the same time. Also, during a well-controlled delayed gratification task, an individual is expected to balance the risks of delay in receiving a present reward with the benefits (Gao et al., 2021).

Substance abuse, surplus fat storage in the body, dangerous sexual behavior, psychopathology, guilt, and a lower educational level have all been linked to poor delay of gratification (Baumeister et al., 2007; Bembenutty & Karabenick, 2004; DeWall et al., 2007; Gottdiener et al., 2008; Wulfert et al., 1999). Thus, the tendency to go towards short-term rewards rather than greater ones in the future may lead to undesirable outcomes both for individuals (e.g. lack of personal saving for emergencies) and society overall (e.g. inadequate investments in science and technology in the long run) (Michaelson et al., 2013). In addition, as concluded by the studies, delaying gratification and its psychological, behavioral, health, and financial consequences can be observed from early childhood until the middle age (Mischel et al., 2011). In summary, delaying gratification affects both the psychological and physical health of the individual.

Prominent descriptions of delaying gratification concentrate on the role of self-control, oversensitivity to immediately available rewards, and the cost of time spent for waiting (Benzion et al., 1989; McClure et al., 2004; Zauberman & Lynch, 2005). Accordingly, some of the research studies have shown that higher levels of delaying gratification are associated with more self-control and less impulsiveness (Casey et al., 2011), better academic performance (Duckworth & Seligman, 2005), and more social behaviors (Krueger et al., 1996). Furthermore, the ability to delay gratification has been found to predict career achievement and good relationships in adulthood (Newman et al., 1997). As they put more value on immediate rewards, the inability to delay gratification can often lead to procrastination, especially if taking an action requires immediate costs (Reuben et al., 2015). Numerous studies have explored how the absence of delayed gratification, or having present-biased preferences, is associated with lower academic performance (Golsteyn et al., 2014; Non & Tempelaar, 2016). Consciousness also plays a key role in the ability to delay gratification. Indeed, this ability entails foregoing an immediate pleasure in order to make conscious and deliberate decisions to await another pleasure in the long run (Baumeister et al., 1994). While delaying gratification has been negatively correlated with substance abuse (Abikoye & Adekoya, 2010), obesity (Bruce et al., 2011; Caleza et al., 2016), experiential avoidance (Gerhart et al., 2013), and anxiety and depression (Gerhart et al., 2016), it has been found to be positively correlated with flexibility and decisiveness (Hasçuhadar & Coşkun, 2017), satisfaction with life (Poon et al., 2019), and coping flexibility (Boyraz et al., 2018). Consequently, delaying gratification seems to play a role in several processes, including moral development, planning, addiction treatment, and learning (Dymek & Jurek, 2018). Considering the overall research results, it is possible to argue that delaying gratification enhances the positive psychological attributes while reducing the negative ones.

In sixty years of research on gratification delay, three types of alternative assessment methods have been used (Hoerger et al., 2011). The assessments have been performed with early performance-based strategies, Mischel's behavioral decision-making paradigm, and delay discounting tasks. In addition to being time-consuming, early performance-based strategies have been found to have a discrete theoretical relationship with delaying gratification (Rapaport, 1951), and poor evidence has been reached with regards to its construct validity (Nederkoorn et al., 2006; Singer et al., 1952; Wormith & Hasenpusch, 1979). Mischel's method of behavioral decision-making paradigm has been found to have poor content validity and is not intended to address adult individuals. Moreover, the method's limited number of options indicates that it has poor validity and reliability (Funder et al., 1983; Mauro & Harris, 2000; Mischel, 1958; Wormith & Hasenpusch, 1979). The method of delay discounting tasks has disadvantages, including not being economical in terms of time, covering only one aspect of content, and the costly use of real reinforcers (McLeish & Oxoby, 2007; Smith & Hantula, 2008; Wormith & Hasenpusch, 1979).

Likert measures can be preferred to avoid the disadvantages of delaying tasks. Likert measures stand out among other measuring strategies due to being more practical and providing more psychometric information. In compliance with this method, "Deferment of Gratification Questionnaire" for adults (Ray & Najman, 1986), "Academic Delay of Gratification Scale" (Bembenutty & Karabenick, 1998) and "Multidimensional Delay of Gratification Scale" (Ward et al., 1989) were developed. Baumeister et al. (2007) identified five behavioral areas that are vulnerable to ego fatigue.

These behavioral domains refer to delayed gratification: food, physical pleasures, achievement, money, and social interactions. Specifically, it is observed in the measures developed to date that all domains of measuring the gratification delay are not explicitly addressed. The Deferment of Gratification Questionnaire was developed within a narrow scope, whereas the Academic Delay of Gratification Scale was developed with a focus only on the achievement domain. Finally, factor structure seems not to be supported in the Multidimensional Delay of Gratification Scale. Thus, there is a need for a five-factor measure with adequate psychometric properties to measure gratification delay (Hoerger et al., 2011).

When research is examined, delayed gratification provides the opportunity for increased self-control, emotion control, and coping strategies (Mischel et al., 1989; Schalm et al., 2013); Zayas et al. (2014) found that delayed gratification also reduces anxiety, stress, and depression. Moreover, the ability to delay gratification is closely associated with socio-emotional competence, prosocial behavior, and health-related outcomes such as lower obesity rates and reduced psychopathy (Caleza et al., 2016; Hernandez et al., 2018; Schlam et al., 2013; Supplee et al., 2011; Watts et al., 2018). In several research studies, it is considered significant to include an important personality attribute such as delayed gratification. Yet, there is no Turkish measure for the assessment of gratification delay. It was therefore the aim of this research to adapt the Delaying Gratification Inventory developed by Hoerger et al. (2011) to a Turkish adult sample.

## 2. Methodology

### 2.1. Research Sample

Data in the research was collected from three different study groups. The study groups were composed of individuals at the age of 18 or older who volunteered for the research. Firstly, a pilot study was planned with a sample of 124 adults (92 [74.2%] women and 32 [25.8%] men) to ensure compliance of statements in the translation and to finalize the Turkish form. The mean age of those adults was 23.77 (SD= 6.18). Secer (2015) states that if the number of items in the scale is up to 30 in the pilot application, a sample size of around 50 may be sufficient, and if the number of items is 30 or more, a sample size of 2 or 3 times the number of items on the scale may be acceptable. According to this point of view, the data collected from 124 participants is adequate for the pilot application. Next, the validity and reliability of the measure were investigated with a sample of 265 adults (217 [81.9%] women and 48 [18.1%] men). The mean age of those adults was 29.43 (SD= 6.94). In addition, of those adults, 119 (44.9%) were married and 146 (55.1 %) were single. In addition, 7 (2.7 %) of the adults in this group have primary school, 21 (7.9%) high school, 31 (11.7%) associate's degree, 157 (59.7%) undergraduate, 39 (14.7%) have a master's degree, and 10 (3.8%) doctorate degree. Lastly, a test-retest study was performed on a group of 65 adults (50 [76.9%] women and 15 [23.1%] men). Erkus (2013) used the convenience sampling method when forming workgroups. Research data was collected online via Google-form due to COVID-19.

### 2.2. Data Collection Tools

*Personal Information Form.* In this form created by the researchers, there are four questions to obtain information about the age, gender, marital status and education level of the participants.

*Delaying Gratification Inventory (DGI).* Turkish adaptation of the DGI developed by Hoerger et al. (2011) was conducted within the scope of this research. An item pool that includes 70 items was created for the original form. The scale consists of 35 items related to five different satisfaction areas postponed in daily life and has a 5-point Likert scale. The measure involves reverse-coding items. The internal consistency coefficient of the original form was obteined to be .91. The internal consistency coefficients of the factors ranged from .69 to .89. In addition, the relations between the factors vary between .25 and .58, while the relation between a factor and the total scale varies between .63 and .81. In the confirmatory factor analysis, the fit index values of the scale ($\chi^2$/sd= 32.49, CFI= .96, NFI= .96, RMSEA= .05) were found. In the criterion-related validity study, positive and significant correlations were obteined among delaying gratification and self-discipline, self-control, impulse control and well-being, and negatively significant relationships with extravagance, neuroticism, depression and anxiety. The test-retest reliability coefficient was calculated as .88. Higher scores mean gratification latency and a tendency to self-regulate to achieve long-term satisfaction.

*Barratt Impulsiveness Scale – Short Form (BIS-SF).* Developed by Spinella (2007), BIS-SF was adapted into the Turkish language by Tamam, Güleç, and Karataş (2013). The 15-item BIS-SF is rated on a 4-point Likert scale. There are three- factors in BIS-SF. The measure involves reverse-coded items. In the EFA, factor loadings were calculated between.52 and .71 for "Attention Impulsivity", .34 and .72 for "Motor Impulsivity" and .66 and .79 for "Non-Planning". The internal consistency coefficients were obtained to be between .64 and .80 for the factors and .82 for the total scale. Higher scores mean more impulsive behaviors.

*Psychological Well-Being Scale (PWBS).* The original form of the scale was developed by Diener Wirtz et al. (2010) and its Turkish adaptation was conducted by Telef (2013). The PWBS, which has a 7-point Likert-type rating, and 8-items. Higher scores from the scale refer to increased psychological resources that an individual has. Item factor loadings of the measure vary range .54 to .76. In the confirmatory factor analysis, fit indices were found to be ($\chi^2$/sd= 4.64, RMSEA= .08, SRMR= .04, IFI= .95, CFI= .95, RFI= .92, NFI= .94, and GFI= .96). In the reliability study internal consistency coefficient of the scale was found to be .80. In another reliability study, the test-retest reliability coefficient was found to be .86.

**2.3. Ethical**

For the adaptation study, Michael Hoerger was contacted via e-mail and his permit was admitted for the scale's adaptation to the Turkish adult sample. For the research, approval was received from Muğla Sıtkı Koçman University Non-Invasive Ethical Committee on 09.04.2021 with no. 210144/143. The participants provided informed consent for the study.

**2.4. Procedure and Data Analysis**

The Turkish translation studies were made from the original 35-item form of the scale. Statements in the original form were translated independently by the researchers and three individuals with a doctorate. Based on the feedback from the experts (psychologist and psychiatrist), several corrections were made to ensure cohesion and simplicity of language, and statements in some of the items were changed without compromising the originality. A pilot study was started with 124 adults to evaluate the compliance of the Turkish form, and the items were reviewed in light of the data obtained from the pilot study to finalize the measure.

Following the pilot study, the psychometric properties of DGI were examined. Therefore, the construct validity of DGI was examed with "Exploratory Factor Analysis (EFA)" and "Confirmatory Factor Analysis (CFA)". For the criterion-related validity, "Pearson's Product Moment Correlation coefficient" was examed. In addiction for the reliability study, it was examed with Cronbach's alpha, test-retest coefficient (two-week interval) and independent groups t-test whether each item could determine the differences between 27% upper-lower groups.

Finally, sample size and Barlett's Sphericity test results were examined before the factor analysis. For determining whether the data collected for factor analysis were sufficient, the Kaiser-Meyer-Olkin (KMO) and Barlett's Sphericity tests were examined. According to Büyüköztürk (2007), a KMO coefficient above .60 and a significant Barlett's test result are required. In the analysis, the KMO coefficient was found to be .80, and the Barlett's test yielded $\chi^2$= 3253.114 ($p < .001$). These findings showed the data to be suitable for factor analysis, which is a multivariate statistic.

Whether the five-factor measure achieved in the EFA was confirmed was tested with the CFA model's fit. $\chi^2$/sd was reviewed to examine the model's fit of goodness. A $\chi^2$/sd smaller than 3 is generally assessed to be a good fit (Kline, 2005). There are also several fit indices to examine the fit of CFA models; "Comparative Fit Index (CFI)", "Adjusted Goodness of Fit Index (AGFI)", "Goodness of Fit Index (GFI)", "Incremental Fit Index (IFI)", and "Root Mean Square Error of Approximation (RMSEA)" are commonly used. CFI, IFI, AGFI, and GFI values of .95 and above mean perfect fit whereas values of .90 and above are described as good fit (Hu & Bentler, 1998). A RMSEA value below .05 is assessed to be a perfect fit, while .08 refers to an acceptable fit (Browne & Cudeck, 1993). SPSS 22.0 and AMOS 20.0 software packages were used for data analysis.

## 3. Findings

In the study, skewness and kurtosis values were -.09 and -.33 for delaying gratification; -.51 and -.35 for psychological well-being; .41 and -.41 values were found for impulsivity. It has been said that values in the range of ± 1.5 will be considered as a normal distribution (Tabachnick & Fidell, 2014).

### 3.1. Findings on Validity of the Inventory

As indicated in Figure 1, while examining the factor structure of the measurement tool, the scree plot was examined using the varimax rotation technique. Care was taken to ensure that the eigenvalue was above 1 in the scree plot. However, the 5-dimensional structure of the original form was not exceeded.

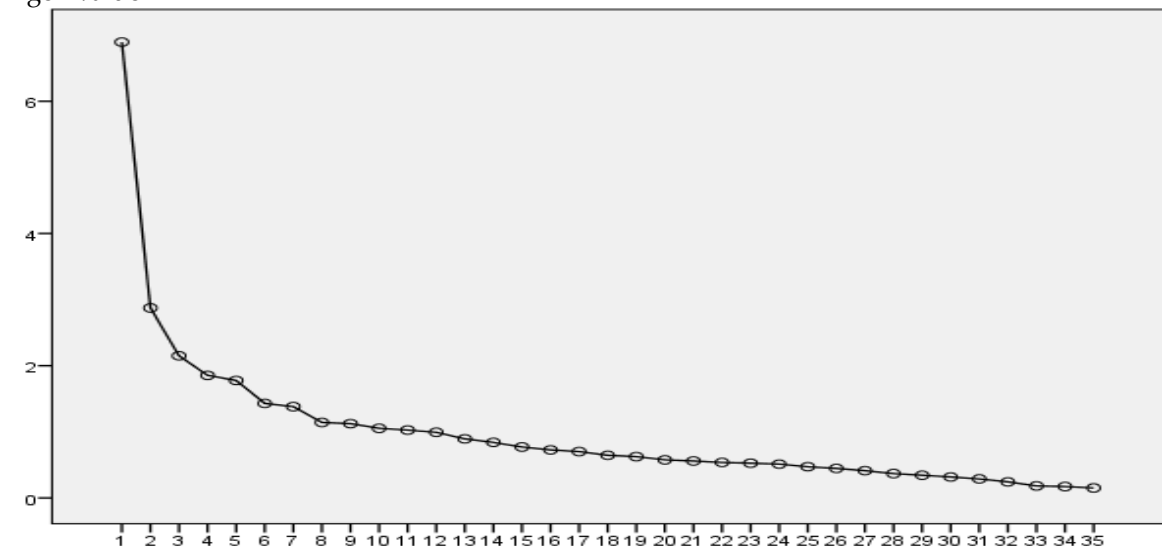


**Figure 1.** *Scree Plot Graphic*

Based on the findings achieved in the EFA, item 3 was omitted from the measure due to its low item-total test correlation value (.19). Furthermore, items 2, 6, 9, 15, 17, 25, and 35 were omitted from the measure because they were included in different factors. Finally, items 13 and 21 were omitted from the measure as they were cyclical. Content validity was reviewed with the remaining 25 items. The findings obtained from the validity and reliability studies for DGI are presented in Table 1. Following these procedures, a CFA was performed to test whether the five-factor structure of the measure was confirmed with the remaining items. As a result, items 26, 30, and 28 were omitted from the measure because they had no significant path coefficients in their respective subscales. As for the modification indices of the five-factor model, item 34 was not included in the analyses due to its semantic resemblance with item 24 and the final structure shown in Figure 1 was achieved. The validity and reliability study proceeded with the remaining 21 items.

As presented in Table 1, item factor loadings of DGI differ between .38 and .85. The five-item Delaying Gratification of Eating (DGE) subscale has item factor loadings between .56 and .75. The five-item Delaying Physical Gratification (DPG) subscale has item factor loadings of between .38 and .54. The five-item Delaying Monetary Gratification (DMG) subscale has item factor loadings between .69 and .85. The four-item Delaying Social Gratification (DSG) subscale has item factor loadings between .39 and .75. The four-item Delaying Gratification of Achievement (DGA) subscale has item factor loadings between .40 and .83. DGI with an eigenvalue of 12.9 has a five-factor structure which explains 52% of the variance of gratification delay. 16.10% of the variance is explained by the DGE subscale with an eigenvalue of 2.66, which explains 10.65% of the variance. DPG subscale with an eigenvalue of 2.07 explains 8.28% of the variance. DMG subscale with an eigenvalue of 4.03. 7.72% of the variance is explained by the DSG subscale with an eigenvalue of 1.93. 8.88% of the variance is explained by the DGA subscale with an eigenvalue of 2.22.

**Table 1.** *DGI Item Factor Loading, Item-Total Test Correlations and Independent Samples t-Test Results*

| Items | Food | Physical | Social | Money | Achievement | ITTC | Results for Upper and Lower Groups Independent Samples t-Test |
|---|---|---|---|---|---|---|---|
| **Item1** | .75 | | | | | .38 | -31.18* |
| **Item 2** | ***.52*** | | | | | ***.38*** | ***-26.30**** |
| **Item 11** | .62 | | | | | .35 | -33.10* |
| **Item 16** | .71 | | | | | .34 | -45.10* |
| **Item 17** | ***.47*** | | | | | ***.39*** | ***-27.71**** |
| **Item 21** | ***.42*** | ***.41*** | | | | ***.53*** | ***-20.37**** |
| **Item 26** | .56 | | | | | .52 | -3.33* |
| **Item 31** | .71 | | | | | .39 | -44.40* |
| **Item 6** | | ***.34*** | | | | ***.34*** | ***-37.73**** |
| **Item 7** | | .49 | | | | .30 | -15.34* |
| **Item 9** | | ***.50*** | | | | ***.34*** | ***-27.02**** |
| **Item 12** | | .51 | | | | .33 | -29.15* |
| **Item 15** | | ***.52*** | | | | ***.29*** | ***-36.59**** |
| **Item 22** | | .54 | | | | .35 | -30.44* |
| **Item 25** | | ***.53*** | | | | ***.49*** | ***-53.89**** |
| **Item 27** | | .52 | | | | .44 | -27.55* |
| **Item 32** | | .38 | | | | .44 | -38.39* |
| **Item 35** | | ***.59*** | | | | ***.46*** | ***-31.72**** |
| **Item 4** | | | .70 | | | .36 | -30.14* |
| **Item 14** | | | .78 | | | .51 | -35.52* |
| **Item 19** | | | .81 | | | .51 | -30.34* |
| **Item 24** | | | .69 | | | .54 | -28.69* |
| **Item 29** | | | .85 | | | .52 | -13.91* |
| **Item 34** | | | .78 | | | .58 | -34.19* |
| **Item 3** | | | | ***.20*** | | ***.19*** | ***-17.77**** |
| **Item 8** | | | | .67 | | .01 | -25.56* |
| **Item 13** | | | | ***.36*** | ***.30*** | ***.19*** | ***-23.73**** |
| **Item 18** | | | | .75 | | .21 | -31.26* |
| **Item 23** | | | | .45 | | .11 | -30.74* |
| **Item 28** | | | | .39 | | .11 | -24.75* |
| **Item 33** | | | | .51 | | .16 | -26.40* |
| **Item 5** | | | | | .82 | .39 | **-**33.60* |
| **Item 10** | | | | | .83 | .40 | -32.17* |
| **Item 20** | | | | | .44 | .30 | -24.18* |
| **Item 30** | | | | | .40 | .46 | -18.94* |
| N =265 | | * p<.01 | | | | | |
| % of Variance | 10.65 | 8.28 | 16.10 | 7.72 | 8.88 | | |
| Eigenvalues | 2.66 | 2.07 | 4.03 | 1.93 | 2.22 | | |

EFA= Exploratory Factor Analysis, ITTC= Item-Total Test Correlation

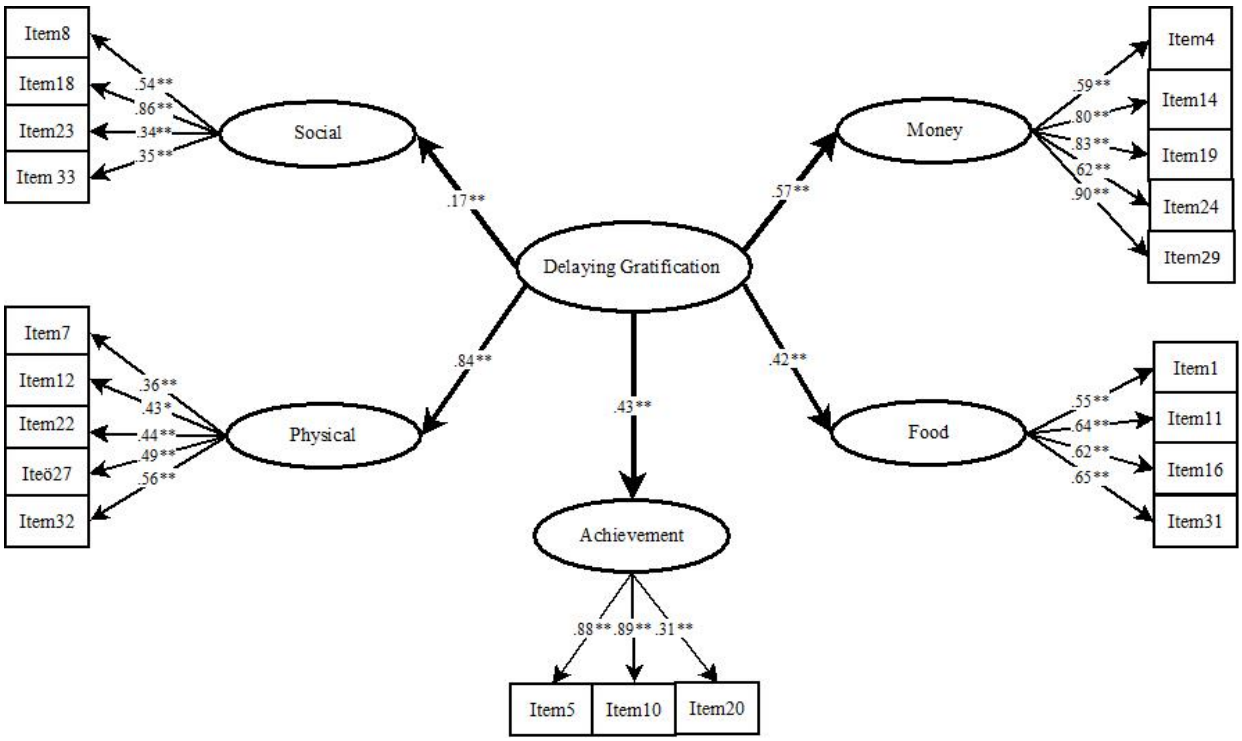


**Figure 2.** *Path Diagram Obtained from the CFA*

The fit index values of the model were achieved in the CFA, and its chi-square value ($\chi^2$= 352.97 N= 265, sd= 184, p= 0.00; $\chi^2$/sd= 1.92) was found to be significant. Fit index values were calculated to be (RMSEA= .059, CFI= .90, IFI= .90, GFI= .89, and AGFI= .86). As shown in Figure 2, the regression values for the items range between .31 and .90 (p< .01).

### 3.2. Criterion-Related Validity

**Table 2.** *Correlation Values between Impulsiveness, Psychological Well-Being and Delay of Gratification*

| Variables | $\overline{X}$ | Ss | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-BIS-SF | 27.52 | 6.87 | 1 | -.52** | -.60** | -23** | -.45** | -.16** | -.37** | -.50** |
| 2- PWBS | 44.68 | 7.26 | | 1 | .52** | .31** | .44** | .08 | .39** | .32** |
| 3-DGI | 79.94 | 10.0 | | | 1 | .60** | .70** | .32** | .55** | .71** |
| 4-DGE | 14.15 | 14.5 | | | | 1 | .26** | .001 | .20** | .19** |
| 5-DPG | 18.59 | 18.59 | | | | | 1 | .15** | .25** | .37** |
| 6-DSG | 16.10 | 16.10 | | | | | | 1 | .11 | -.04 |
| 7-DGA | 11.83 | 11.83 | | | | | | | 1 | .26** |
| 8-DMG | 19.27 | 19.27 | | | | | | | | 1 |

** p< .01

In the criterion-related validity study for DGI, negative significant correlation were found between scores of DGI and its subscales and BIS-SF whereas correlation between the scores of DGI and its subscales and PWBS were found to be positive significant (p< .01). In summary, psychological well-being increases and impulsiveness decreases with an increasing delay of gratification among adults.

### 3.3. Findings on Reliability of the Inventory

A Cronbach's alpha internal consistency coefficient of were calculaled .78 for DGI in total, .86 for DMG, .56 for DPE, .58 for DSG, .72 for DGA, and .74 for DGE. The test-retest coefficient were calculated to be .84 for DGI in total, .86 for DMG, .78 for DPE, .51 for DSG, .74 for DGA, and .86 for DGE. Moreover, the items were found to be able to significantly discriminate scores of delayed gratification for the individuals in the lower and upper 27% groups that were generated based on the mean score (Table 1). In other words, a significant difference among the scores of individuals in lower and upper groups indicates that the items can discriminate against the individuals with regard to the behavior to be measured (Büyüköztürk, 2007).

## 4. Conclusion and Discussion

DGI was designed to ensure practical and psychometric benifits over previous measuring methods (Mauro & Harris, 2000; Nederkoorn et al., 2006; Smith & Hantula, 2008), which makes it effective in the acceleration of social and behavioral public health studies (DeWall et al., 2007; Gottdiener et al., 2008). Therefore, basic validity and reliability studies of DGI were performed in a Turkish adult sample in the research.

An EFA, CFA, and criterion-related validity analysis was realized to test the test measure's validity level. Based on the EFA and CFA findings, the five-factor structure was proven in the Turkish adult sample. However, unlike the original form, the five-factor structure is explained with 21 items. This is because no EFA was performed for the construct validity of the DGI original form and there might be intercultural semantic differences. The measure explains 52% of the variance. This rate is acceptable due to being above .30 (Büyüköztürk, 2007). Factor loadings of the measure vary between .39 and .85. This finding indicates that factor loadings are acceptable due to being above .30 (Büyüköztürk, 2002; Kline, 1994).

The model's fit indices were reviewed based on the CFA result, and the Chi-square value was found to be significant [$\chi^2$: 352.97 N: 265, sd: 184, p: 0.00; $\chi^2$/sd: 1.92]. Fit indices were found to be RMSEA= .05, CFI= .90, IFI= .90, GFI= .89, and AGFI= .86. Those fit indices coincide with the fit indices achieved in the Spanish (Espada et al., 2019) and Polish (Dymek & Jurek, 2018) forms. As argued by Bryne (2001), those fit indices are acceptable.

As for the criterion-related validity, significant correlations were obteined among the delayed gratification inventory and the psychological well-being and impulsiveness scales. Consequently, delaying gratification seems to have a positive significant correlation with psychological well-being and a negative significant correlation with impulsiveness. It is possible to say that those correlations are similar to the ones achieved for the original form. Accordingly, one can argue that the behavior of delaying gratification increases impulse control, health, and psychological well-being while reducing risky behaviors (Hoerger et al., 2011). These findings reinforce the research findings which associate gratification delay with psychosocial adaptation (Ramanathan & William, 2007).

To examine the distinctiveness of DGI items, item-total test correlations were calculated, and correlation values of all items except the ones in the DSG subscale were found to be between .30 and .58. Erkuş (2012) states that a value above .30 indicates item distinctiveness. Accordingly, it is possible to say that statements in DGI are distinctive for measuring the behavior of delayed gratification. However, items in the DSG subscale were not omitted from the measure because their factor loadings obtained in the EFA were above .30 and they were significant in terms of path coefficients achieved in the CFA.

The Cronbach's alpha coefficient was found to be .78 for the measure's reliability. The subscales were found to have internal consistency coefficients of between .56 and .86. In the Spanish adaptation study, the internal consistency coefficient was found to be .80 with the whole scale. In the relevant form, the subscales were found to have internal consistency coefficients of between .60 and .82 (Espada et al., 2019). In the Polish adaptation study, the internal consistency coefficient was found to be .87 with the whole score, and the subscales were found to have internal consistency coefficients of between .55 and .83 (Dymek & Jurek, 2018).

These findings on the reliability of the measure coincide with the findings obtained in other adaptation studies. The internal consistency coefficient indicates whether items reliably measure a given property. It is stated that internal consistency coefficients of .70 and above for Likert scales developed to measure psychological variables are acceptable for reliability (Büyüköztürk, 2007; Fraenkel et al., 2012). The DPG subscale's low internal consistency could be attributed to cultural differences (Dymek & Jurek, 2018). Cultural values might have influenced the answers to some of the statements in the DPG subscale.

The test-retest coefficient was calculated to be .84 for the whole measure. The subscales were found to have test-retest coefficients of between .51 and .86. In the Brazilian adaptation study, the test-retest coefficient was calculated to be .87 for the whole measure. In the same study, the subscales were found to have test-retest coefficients of between .80 and .92 (de Paula et al., 2018). The test-retest coefficient was calculated to be .76 for the total measure in the Spanish adaptation study. In the relevant form, the subscales were found to have test-retest coefficients of between .54 and .68 (Espada et al., 2019). The test-retest coefficient was calculated to be .85 for the whole measure in the Polish adaptation study, and the subscales were found to have test-retest

coefficients of between .53 and .88 (Dymek & Jurek, 2018). Test-retest coefficients calculated for the Turkish form are notably lower than those for the Brazilian form and similar to those for the Polish and Spanish forms. According to Tezbaşaran (1996), a reliability value of .70 or above is considered sufficient for measures. It can therefore be argued that DGI is a consistent and stable measure.

In another reliability method, it was determined whether the answers of the participants to each item significantly discriminated between upper and lower 27 % groups. It was found in the analysis that the measure could discriminate between individuals with lower and higher levels of gratification delay (Erkuş, 2007). In other words, the significant intergroup difference refers to item distinctiveness (Erkuş, 2013).

The results of the studies on the validity and reliability and the literature review on delaying gratification show that the measure possesses sufficient psychometric values for the Turkish adult sample.

**5. Limitations and Recommendations**

There are a few limitations to the research. For instance, the fact that the research comprises 265 data points is a limitation with respect to generalizability. Lack of linguistic equivalence analysis for the measure can be considered a limitation as well. Lastly, it is possibly a limitation to have examined the criterion-related validity with two variables. DGI is a valid and reliable measure to assess behaviors that delay behaviors. Studies can be carried out with DGI to explore the correlation between delaying gratification and depression, stress, academic achievement, and neuroticism. The role of delayed gratification in obesity can also be investigated.

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# The Relationship Between Spirituality and Psychological Wellness: A Serial Multi-Mediation Analysis

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ABSTRACT

This study aims to investigate the relationships between spirituality, psychological well-being, compassion, and life satisfaction among adults, as well as the mediating role of compassion and life satisfaction in the relationship between spirituality and psychological well-being among adults. Using the relational survey model, 418 adults were recruited to participate in the study. The Spirituality Scale, Psychological Well-Being Scale, Compassion Scale, and Life Satisfaction Scale were used to collect data. Pearson Product-Moment Analysis was used to examine the links between adults' spirituality, psychological well-being, compassion, and life satisfaction. Using the Regression-Based Bootstrapping Technique and Serial Multiple Mediator Variable analysis, the researchers investigated the mediating function of compassion and life satisfaction in the link between spirituality and the psychological well-being of adults. The sequential mediation function of compassion and life pleasure was found to be significant in the link between adult spirituality and psychological well-being.

Keywords:
Adult, spirituality, psychological well-being, compassion, life satisfaction,

## 1. Introduction

Like any branch of science, the science of psychology updates itself according to contemporary needs. While approaches to psychology have tended to be problem-focused until recently, with the increasing emphasis on positive psychology, there is a growing emphasis on the importance of revealing people's strengths and promoting their positive functioning (Snyder et al., 2011).According to this point of view, while the individual increases the quality of life, he also prevents the emergence of problems (Demir & Türk, 2020). Spirituality also makes the individual strong in terms of positive psychology. Seligman (2007) states that spirituality is one of the basic elements of positive psychology.

Although spirituality is a concept that is often associated with religion and even used interchangeably, it is a concept that has recently started to be distinguished (Tanyi, 2002). It is stated that spirituality is a prerequisite for religion, but religion is not a prerequisite for spirituality (Fry, 2003). Spirituality aims to make life meaningful and achieve its spiritual salvation, but it is not necessary to achieve this purpose only through religion. The individual can achieve this goal through music, art, nature, family, and social relations (Astrow et al., 2001). Therefore, it would be correct to say that spirituality is a more comprehensive concept than

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religion. Different definitions have been made in the literature on spirituality. Some definitions of spirituality seem to be as revealing the meaning and purpose of life and reaching one's essence (Coma, 2007); the effort to find the meaning of life, self-acceptance, acceptance of the relations between himself and others, and between himself and the universe (Koenig, 2009), one's pursuit of being the best one can do (Helminiak, 2001). Although there is no common definition of spirituality, when we look at the studies of researchers explaining spirituality, it is seen that concepts such as meaning and purpose, sacred, belief in a power greater than oneself, and transcendence are common in the definition of the spirituality (Kasapoğlu, 2017).

Spirituality is closely related to being good. The World Health Organization (2021) definition of health reveals the importance of spirituality in psychology. The organization defines a healthy individual as being "fully well physically, mentally, socially, and spiritually." According to this definition, it is necessary to be functional spiritually to be healthy. In this respect, the spiritual aspects of people need to be addressed and studied. Studies on this have also contributed to the development of spiritual counseling. Spiritual counseling refers to an area that includes, but is not limited to, the religious aspect of the individual regarding meaning, belief, and purpose. Spiritual counseling aims to eliminate problems related to people's spiritual aspect, provide morale and motivation to the individual, increase their well-being, and support their coping processes (Ayten, 2020). The morale, motivation, and efforts to eliminate the problems that are tried to be gained by the individual with spiritual counseling are related to the individual's well-being. In the definition of health by the World Health Organization, it is stated that spirituality is important for the well-being of the individual. Thoresen (2007) states that people with a spiritual orientation generally do not engage in self-destructive behaviors and have better mental health functions. In addition, spirituality generally gives positive results to individuals' psychological health and well-being (Plante, 2009). In other words, it can be said that spirituality contributes to the health and potential of the individual. In this respect, it has a close relationship with psychological well-being (Arıcı, 2011), which focuses on the ability of individuals to reveal their functionality by increasing their healthy and positive potential. When we look at the theoretical approaches that deal with the concept of psychological well-being, it is seen that they care about the development of the individual and emphasize the importance of well-being in mental health (Çeri & Çiçek, 2021; Ryff & Singer, 2008; Yıldırım & Çelik-Tanrıverdi, 2020).

Psychological well-being is expressed as the whole of progressing in line with personal goals, establishing meaningful relationships with people, and personal development skills (Keyes et al., 2002). In another definition, psychological well-being is an excess of positive emotions and thoughts about one's life (Myers & Diener, 1995). Individuals with a high level of well-being based on thoughts have general satisfaction in life. In contrast, individuals with a high level of well-being based on emotions experience more positive emotions. On the contrary, individuals with low psychological well-being make negative evaluations of their lives more frequently. As can be seen, psychological well-being is a multidimensional concept. Ryff & Keyes (1995) suggest six dimensions of psychological well-being these include self-acceptance, which is defined as one's positive assessment of himself and his past; positive relationships; the ability to have friendly relationships with others; autonomy; the capacity to manage the environment; the ability of the individual to manage his or her life; living a purposeful life; and personal development, which is defined as the individual's ongoing growth.

When we look at the literature, it is possible to come across studies dealing with spirituality and psychological well-being. In these studies, generally, a positive relationship was found between spirituality and psychological well-being (Bożek et al., 2020; Ellison & Fan, 2008; Fiorito & Ryan, 2007; Jahan & Khan, 2014; Ivtzan et al., 2013; Thauvoye et al., 2017; Yoon et al., 2015).

**The Mediator Role of Compassion and Life Satisfaction**

The feeling of compassion, which has many positive features, is closely related to spirituality. Because spirituality is a concept related to positive characteristics such as love, compassion, forgiveness, and harmony that provide happiness for oneself and others (Lama, 2001), it would be correct to evaluate spirituality within a scope that encompasses compassion. It is expected that individuals with strong spirituality will also have a high sense of compassion, contributing to psychological well-being. Compassion means being able to share a person's pain (Gilbert, 2009). Compassion does not only form the basis of helping behaviors established with others (Cosley et al., 2010), but it is also stated that it is a process that has mental and physical healing effects

(Gilbert, 2009; Gilbert & Irons, 2005). Compassion is an emotion that also enables the establishment of close bonds with others (Shiota et al., 2006). Many concepts can be mentioned frequently among the characteristics of the compassionate individual. Among them are virtuous behavior patterns such as caring for kindness, being more driven to care for oneself and others, being sensitive to one's own and others' needs, sensitivity to one's own and others' feelings, empathy, and a non-insulting understanding (Gilbert, 2009). Compassionate individuals are more interested with giving. In other words, they do what they do without expecting anything in return, and they share their love with the other person without conditions (Osho, 2007).When we look at the literature, although there is no study between compassion and spirituality, it is stated that spirituality also contains the characteristic of compassion (Lama, 2001). For this reason, individuals with strong spirituality should also have a high level of compassion. Spirituality and compassion can be considered as two concepts that positively support each other. When we look at the relationship between compassion and psychological well-being, a positive relationship was found in studies (Jazaieri et al., 2014; Kirby, 2017). In similar studies, Neff & Germer (2012) developed a self-compassion-based intervention program and found that the implemented program reduced stress and increased life satisfaction and quality. In addition, many studies have found a positive relationship between happiness and compassion (Erdoğan, 2017; Goleman, 2003; İşgör, 2017; Ladner, 2004; Lyubomirsky, 2008).

It is thought that another variable that can mediate between spirituality and psychological well-being is life satisfaction. It is expected that individuals with high spirituality will also have high life satisfaction. One study even supports this (Ekşi, 2019). According to Ekşi, high life satisfaction may also indicate high psychological well-being.Because it is stated that life satisfaction is among the determinants of psychological well-being (Kermen et al., 2010). Life satisfaction, an important concept of positive psychology, is used to express the situation that occurs due to the difference between what one has in his life and what he desires (Özer & Karabulut, 2003). Life satisfaction is our general judgments and feelings about our whole life. It includes the individual's past, future, and present satisfaction, the desire to continue his life differently, and the thoughts of others on the individual's life (Diener et al., 1999). Life satisfaction is affected by personal and psychological factors, such as income level or gender (Myers & Diener, 1995). Life satisfaction is a concept that encompasses an individual's life, and it is not understood as the individual's satisfaction from a particular or a single event or situation (Yıldırım & Arslan, 2020). The general satisfaction of the person in his whole life is called life satisfaction (Dost, 2007). For the individual to be satisfied with his life, he is expected to have positive emotions in general. While emotional states are examined in positive psychology, more emphasis is placed on increasing positive emotions (Hefferon & Boniwell, 2014).

When we look at the literature, some studies have a positive relationship between spirituality and life satisfaction (Holder et al., 2016; Jafari et al., 2010; Kasapoğlu & Wildigül, 2018; Kim et al., 2013). On the other hand, it is stated that life satisfaction is one of the determinants for psychological well-being (Kermen et al., 2016). Therefore, it has been seen in the literature that the relationship between the two concepts and other concepts is generally examined (Demir et al., 2021; Mehmood & Shaukat, 2014; Parvizi, 2021).

Spirituality contributes positively to the physical and mental health of the individual in two ways. First, as a result of spiritual life, the individual is protected from being a prisoner of negative emotions by experiencing many positive emotions. Another is that a strong spirituality contributes positively to physiological and psychological health by reducing the use of harmful substances and negative emotions that harm the individual (Karslı, 2019). Spirituality is important for the individual's mental health and positive dimensions of life (Berghuijs et al., 2013). In the light of the information given above, it is understood that spirituality is an important force in human life. Being good in terms of spirituality is a characteristic that a healthy individual should have. It is thought that the individual's strong spirituality increases compassion and life satisfaction in the same way, and this situation will positively affect the individual's psychological well-being. One of the important points that positive psychology has emphasized recently is positive emotions. Increasing the well-being of the normal individual is currently one of the important tasks in psychology. It is aimed that the study will be an important study to increase the well-being of normal individuals. In this sense, it is thought that this study will contribute to positive psychology, which emphasizes the strengths of human beings, the developing fields of spiritual counseling, and to the well-being of normal individuals. It is expected to make significant contributions to positive psychology that emphasizes human strengths and the emerging fields of spiritual counseling. However, it is thought that the study is also important in terms of shedding light on the

mechanisms underlying the relationship between spirituality and psychological well-being. Therefore, this study examines the relationships between adults' spirituality, psychological well-being, compassion, and life satisfaction, and the mediating role of compassion and life satisfaction in the relationship between adults' spirituality and psychological well-being.

## 2. Methodology

### 2.1.Research Model

This study used the relational survey model, which is included in the general survey research. Karasar (2005) stated that relational survey models are research model that aims to determine the existence and degree of change between two or more variables. This study examined the relationship between adults' spirituality, psychological well-being, compassion, and life satisfaction. In addition, the mediator roles of compassion and life satisfaction in the relationship between spirituality and adults' psychological well-being were examined. Therefore, this study is in the type of predictive relationship research.

### 2.2.Research Sample

The research sample consists of 418 adults. The convenience sampling method was used while choosing the research study group. The convenient sampling method is choosing from easily accessible and applicable units due to the limitations in terms of time, money, and labor (Büyüköztürk et al., 2017). The study group reached a total of 418 people, 230 women (55%) and 188 (45%) men. Participants in the study are between the ages of 18-66 ($\bar{x}$= 32.14; SD= 12.61). 2 (0.5%) of the participants stated that they were primary school graduates, while 53 (13.2%) were high school, 271 (64.8%) were undergraduate, and 92 (22%) were graduate. 7 (1.7%) of the participants stated that they had a low socioeconomic level, 366 (87.6%) had a medium, and 45 (10.8%) had a high socioeconomic level.

### 2.3.Data Collection Tools and Procedure

*Spirituality Scale:* The Spirituality Scale was developed by Demirci & Ekşi (2018) and is a one-dimensional, 6-item scale. The fit index values calculated as a result of the confirmatory factor analysis during the development of the scale were found to be at an acceptable level ($x^2$ = 381.29, sd = 160, RMSEA = .074, NFI = .96, NNFI = .98, CFI = .98, IFI = .98). , RFI = .96 and SRMR = .052). The factor loadings of the items in the scale ranged from .37 to .84. The internal consistency coefficients for the subdimensions of the scale were calculated to range from .72 to .88 points, and the internal consistency coefficient of the total score was calculated to be .95. It was found that the corrected correlation coefficients of the scale ranged from .41 to .77. The reliability coefficient for this study was calculated to be .78.

*Psychological Well-Being Scale:* Diener et al. (2010) created the Psychological Well-Being Scale to measure socio-psychological well-being as a supplement to existing well-being measures.The Turkish adaptation of the scale was made by Telef (2013). The scale is a 7-point Likert type, and the scores that can be taken from the scale are between 8-56 points. As a result of the exploratory factor analysis performed during the adaptation process of the scale, it was determined that the total explained variance was 42%. The factor loads of the scale items were calculated between .54 and .76. In confirmatory factor analysis, fit index values were found to be RMSEA= 0.08, SRMR=0.04, GFI= 0.96, NFI= 0.94, RFI= 0.92, CFI= 0.95, and IFI=0.95. The Cronbach alpha internal consistency coefficient obtained in the reliability study of the scale was calculated as .80. According to the test-retest result, there was a high level, positive and significant relationship between the first and second application of the scale (r= 0.86, p<.001). It was determined that the item-total correlations of the Psychological Well-Being Scale varied between .41 and .63, and the t-values were significant (p<.001). The reliability coefficient for this study was found to be .82.

*Compassion Scale:* The Compassion Scaledeveloped by Pommier (2011), was adapted into Turkish by Akdeniz & Deniz (2016), and its validity and reliability studies were carried out. Psychometric properties of the scale are examined with confirmatory factor analysis, criterion-related validity, internal consistency, and test-retest methods. Confirmatory factor analysis was conducted for the scale's construct validity, and six dimensions constituting the compassion structure were confirmed. The scale consists of 24 items. The internal consistency reliability coefficient was found to be .85 for the entire scale. In addition, it was concluded that the correlation

coefficient between the applications made with the test-retest method was sufficient. It was observed that the reliability coefficient of this research was .85.

*Life Satisfaction Scale:* It is a 5-item single-factor scale originally developed by Diener et al. (1985). It was adapted into Turkish by Dağlı & Baysal (2016). To test the consistency between the scores obtained from both scales, the Pearson Product-Moment Correlation Coefficient was calculated and found to be 0.92. Accordingly, it was determined that there was a high level, positive and significant relationship between the English and Turkish scales. The scale's Cronbach Alpha internal consistency coefficient was 0.88, and the test-retest reliability was 0.97. The factor analysis results revealed that the Life Satisfaction Scale, as in the original scale, showed a single-factor structure and consisted of 5 items as in original scale. The reliability coefficient for this study was found to be .80.

### 2.4. Data Analysis

In the data analysis, it was first checked whether the variables exhibited a normal distribution. When the skewness (skewness) and kurtosis (kurtosis) of the values obtained were evaluated to understand if the variables had a normal distribution, it was found that the values had a normal distribution (spiritual, S= -.93, F= .12; psychological well-being, S= -.17, K = -.46; compassion, S= -.46, F= -.23; life satisfaction, S= -.17, F= -.45). The distribution is considered normal when the kurtosis and skewness scores are between -1 and +1 (Hair et al., 2013).The study tested the relationships between adults' spirituality, psychological well-being, compassion, and life satisfaction with Pearson Product-Moment Analysis. In the study, the mediating role of compassion and life satisfaction in the relationship between spirituality and psychological well-being of adults was performed using the Regression-Based Bootstrapping Technique with Serial Multiple Mediator Variable analysis (Hayes, 2013). This method is used by uploading the "Multiple Mediation (INDIRECT)" macro developed by Preacher and Hayes (2008) into the IBM SPSS Statistic 22 program.

This technique is a method that tests relationships between multiple variables. Parallel mediation models assume that no mediator causally affects the other, whereas serial mediation models assume that there may be a causal relationship between mediator variables. However, serial mediation models allow testing of a specific theoretical sequence between variables. In this respect, serial mediation models are considered advantageous in testing multiple paths between variables and determining which ones are significant using a single model (Carnahan et al., 2020). The model used for the mediator role in this study was designed according to Model 6 proposed by Hayes (2013) in the presence of one independent, dependent, and two mediating variables.

### 2.5. Ethical

Before the data collection process, the necessary ethics committee permission was obtained from the Trabzon University Social and Human Sciences Ethics Committee.

## 3. Findings

In this part of the study, the statistical analyzes applied according to the purpose of the study and the order of the subproblems, as well as the results obtained from the analysis, are given.

### 3.1. Findings Regarding the Relationships Between the Variables of Spirituality, Psychological Well-Being, Compassion, and Life Satisfaction

**Table 1**. *Pearson Product-Moment Analysis of the Relationships Between Spirituality, Psychological Well-Being, Compassion, and Life Satisfaction Variables*

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Spirituality (1) | 1 | | | |
| Psychological Well-Being (2) | .38** | 1 | | |
| Compassion (3) | .23 ** | .21** | 1 | |
| Life Satisfaction (4) | .21** | .45** | .10* | 1 |
| Average | 27.19 | 44.89 | 101.49 | 18.14 |
| Standard Deviation | 2.73 | 5.79 | 10.30 | 3.36 |

**$p$< .01, *p< .05

As shown in Table 5, according to the results of the Pearson correlation analysis conducted to show the relationship between the variables spirituality, psychological well-being, compassion, and life satisfaction, there is a moderately positive and significant relationship between spirituality and psychological well-being (r= .38, p <.01); a low level of a positive and significant relationship between spirituality and compassion (r= .23, p <.01); a low level of positive and significant relationship between spirituality and life satisfaction (r= .21, p <.01); a low level of positive and significant relationship between psychological well-being and compassion (r= .21, p <.01); a moderately positive and significant relationship between psychological well-being and life satisfaction (r= .45, p <.01); and a marginally positive and significant relationship between compassion and life satisfaction (r= .10, p <.05).

### 3.2. Findings Regarding the Mediation of Compassion and Life Satisfaction in the Relationship Between Spirituality and Psychological Well-Being in Adults

In the research, the answer to the question of "Does the spirituality of adults significantly predict their psychological well-being through compassion and life satisfaction?" has been sought. The data were analyzed with the Regression-Based Bootstrapping Technique to reach the answer. The model used for the mediator role was designed according to the Serial Multiple Mediation Model (Model 6) suggested by Hayes (2013). In the model, the independent variable spirituality is expressed by the expression x, psychological well-being as the dependent variable by the expression y, and the mediating variables by the expression m1 for compassion and m2 for life satisfaction. This model with two mediating variables includes three indirect and one direct effects. These effects are the indirect effect of spirituality on psychological well-being through compassion (a1b1), the indirect effect of spirituality on psychological well-being through life satisfaction (a2b2), and the indirect effect of spirituality on psychological well-being through the series of compassion and life satisfaction (a1d1b2). These three indirect effects represent the total indirect effect of spirituality on psychological well-being (X: a1b1 + a2b2 + a1d1b2). Adding the direct effect of boredom on happiness (c') to the total indirect effects shows the total effect of spirituality on psychological well-being (c).

$$c = c' + a_1b_1 + a_2b_2 + a_1d_1b_2$$

The PROCESS plug-in was used over the SPSS program to examine the indirect effects in this study. In the analyses, 10000 Bootstrap samples were used, and the estimates were evaluated at a 95% confidence interval, reflecting the corrected and bias-free results. Ind1, ind2, and ind3 expressions are used to explain the indirect mediation effects. The shape of the model is given in Figure 1. The results of the Bootstrapping Technique analysis of the mediation of compassion and satisfaction in the relationship between adults' spirituality and psychological well-being are given in Table 2.

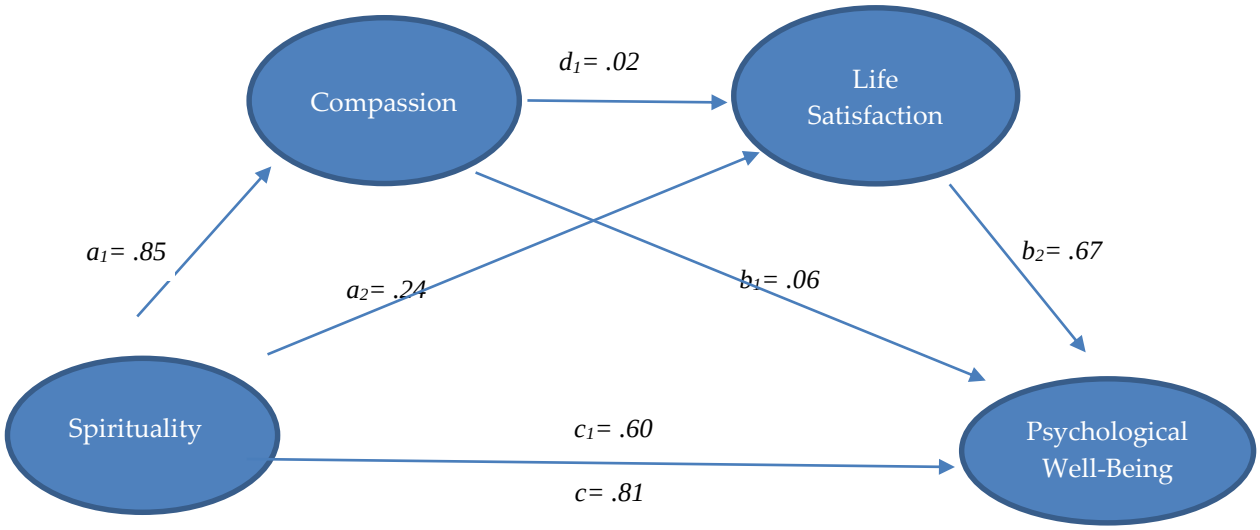


**Figure 1.** *The Mediating Role of Compassion and Life Satisfaction in the Relationship Between Adult Spirituality and Psychological Well-Being*

**Table 2.** *Serial Multiple Mediator Variable Analysis*

| Variable | *Compassion ($m_1$)* | | | *Life Satisfaction ($m_2$)* | | | *Psychological Well-Being (y)* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Coeff (β)* | *SH* | *p* | *Coeff (β)* | *SH* | *p* | *Coeff (β)* | *SH* | *p* |
| Spirituqality (x) | .85 | .18 | .00 | .24 | 3.91 | .00 | .60 | .09 | .00 |
| Compassion ($m_1$) | --- | --- | --- | .02 | 1.12 | .26 | .06 | .02 | .01 |
| Life Satisfaction ($m_2$) | --- | --- | --- | --- | --- | --- | .67 | .07 | .00 |
| Constant | 78.27 | 4.9 | .00 | 9.88 | 2.04 | .00 | 10.71 | 3.10 | .00 |
| $R^2$= .05; $R^2$= .26; $R^2$= .30 | | | | | | | | | |
| *F(1, 416)= 22.40; F(2, 415)= 9.75; F(3,414)= 60.31* | | | | | | | | | |

According to serial multiple mediator analysis, the overall effect of spirituality on psychological well-being was significant (path c; β=-.35, SH=.01, t= 8.46, p<.01, CI [.62, 1.00]). On the other hand, when the mediating variables (compassion and life satisfaction) were taken into the equation simultaneously, the direct relationship between spirituality and psychological well-being decreased; however, it did not lose its significance (path c'; β= .60, SH=.09, t= 6.55, p<.01, CI [.42, 77]). These findings indicate that some indirect effects mediated by compassion and life satisfaction may be significant in the relationship between spirituality and psychological well-being.

The first indirect effect (ind1) is the indirect effect of spirituality on psychological well-being through compassion (spirituality → compassion → psychological well-being), $a_1b_1$= .16. This indirect effect is significantly positive because the bootstrap confidence interval is above zero (CI [.01, .10]). These findings indicate that people with high spirituality also have high compassion ($a_1$ positive), and people with high compassion also increase their psychological well-being levels ($b_1$ positive).

The second indirect effect (ind2) is the indirect effect of spirituality on psychological well-being through life satisfaction (spirituality → life satisfaction → psychological well-being), $a_2b_2$= .16. This indirect effect is significantly positive because the bootstrap confidence interval is above zero (CI [.07, .25]). These findings indicate that people with high spirituality have high compassion ($b_2$ positive), and people with high compassion also increase their level of psychological well-being ($b_2$ positive).

The third indirect effect (ind3) is the serial effect of spirituality on happiness through compassion and life satisfaction (spirituality → compassion → life satisfaction → psychological well-being), $a_1d_1b_2$= .01. This indirect effect is significantly positive because the bootstrap confidence interval is above zero (CI [.12, .32]). These findings show that people with high spirituality have increased compassion ($a_1$ positive); people with high compassion have high life satisfaction ($d_1$ positive); and accordingly, the level of psychological well-being decreases ($b_2$ positive). In addition to these results, it is seen that the whole model is significant ($F_{(3,893)}$=326.59, p<.001, R2=.30) and explains 30% of the total variance.

**4. Conclusion and Discussion**

This study examined the relationships between adults' spirituality, psychological well-being, compassion, and life satisfaction, and the mediating role of compassion and life satisfaction in the relationship between adults' spirituality and psychological well-being.

As a result of the research, it was seen that there were positive and significant relationships between the spirituality of adults and their psychological well-being, compassion, and life satisfaction and that spirituality predicted psychological well-being, compassion, and life satisfaction. Similar to our research results, in the studies carried out, spirituality was found to be related to psychological well-being (Doğan, 2006; Horozcu, 2010; Koenig et al., 2001; Tiliouine et al., 2009), compassion (Sprecher & Fehr, 2005) and life satisfaction (Khalek, & Ahmed, 2010; Pollner, 1989; Poloma & Pendleton, 1990). Spirituality includes the individual's reaching his essence, the search for meaning in life, his relationship with other people, and the acceptance of himself and a power greater than himself (Astrow et al., 2001; Koenig, 2009). Spirituality will increase one's sensitivity and compassion for other people by increasing one's compassion for other people (Piedmont, 2013). Again, it is known that people will experience positive emotions more when they find meaning in their lives with their spirituality, have a purpose, and reach their essence, so that they will be more satisfied with life and feel positive emotions (Frankl, 2000). The reason why spirituality increases psychological well-being, compassion, and life satisfaction can be explained by the values it contains and the fact that a person with high spirituality values his or her relationships with others, cares about his or her own well-being and that of others,

is sensitive to their needs, and takes their feelings and thoughts into account.It can be expected that when an individual is sensitive to others and their pains and attaches importance to his relationships with others, his compassion will increase, he will be sensitive to his own needs and feelings, and his search for meaning will find the meaning of life. His satisfaction from life and psychological well-being will increase with his positive feelings and thoughts.

As a result of the research, it was seen that there were positive and significant relationships between adults' compassion and their psychological well-being and life satisfaction and that compassion predicted psychological well-being and life satisfaction. Similar to our research results, studies have shown that compassion is associated with psychological well-being (Hutcherson et al., 2008; İşgör, 2017; Lutz & Skirberk, 2012) and life satisfaction (Hopkins & Reynolds, 2001; Ladner, 2004). Compassion arises when others are perceived as vulnerable, distressed, or needy, motivating the person to support others (Goetz et al., 2010). Compassion is seen as an emotion, a reflection of life satisfaction and psychological well-being, that facilitates establishing close bonds with others (Shiota et al., 2006). Compassion increases life satisfaction and psychological well-being because compassion has features such as being interested in the pain of others and being more tolerant of their own mistakes and failures. Because it can be thought that the individual who has these attitudes and realizes himself will find resources for happiness, life satisfaction, or well-being.

As a result of the research, it was seen that there was a significant relationship between the psychological well-being of adults and their life satisfaction and that life satisfaction predicted psychological well-being. Studies have shown that these two variables are interrelated, and life satisfaction is considered as one of the complements of psychological well-being (Diener, 1984; Kermen et al., 2016). While life satisfaction is considered the presence of positive emotions and satisfaction with one's life (Hefferon & Boniwell, 2014), psychological well-being is expressed as the totality of progress in line with personal goals, building meaningful relationships with people, and personal development skills (Keyes et al., 2002). It can be explained by the fact that the individual with high life satisfaction has strong psychological well-being, is happy with his life, and experiences satisfaction and joy more than unpleasant emotions such as sadness and anger. Diener et al. (1999) also stated that if the individual has low satisfaction with his life, he will have low psychological well-being by frequently experiencing negative emotions such as anger and anxiety.

As another result of the study, the serial mediating role of compassion and life satisfaction was found to be significant in the relationship between adults' spirituality and psychological well-being. When examining the literature, some studies explain the direct effect of spirituality on psychological well-being (Koenig et al., 2001; Tiliouine et al., 2009). The direct effect of spirituality on psychological well-being can be explained by the fact that spirituality supports the strengths and positive lifestyles of the person in the process of self-realization, enables him to reveal himself at higher levels, and ensures that he is strong, hopeful, and peaceful (Baldacchino & Droper, 2001; Hall, 2006). However, no studies investigating the mediating variables which explain the relationship between spirituality and psychological well-being have been found in the literature. It is known that spirituality increases one's relationship with other people and their compassion for them (Piedmont, 2013). Emmons (2000) also stated that spirituality increases the use of spiritual resources in solving vital problems and virtuous behaviors such as compassion in interpersonal relationships. Compassionate people, on the other hand, are expected to share their pain with others (Gilbert, 2009), support others during difficult times (Gilbert & Irons, 2005) to solve their problems, build healthy relationships with others, reinforce positive emotions in their lives (Vara, 1999), and thereby make their lives easier and provide satisfaction (Brettle & Grant, 2004).It can be thought that the psychological well-being of people with high life satisfaction will increase as they progress towards their personal goals, establish meaningful relationships with other people, and have more positive emotions and thoughts in their lives (Diener, 1984; Hefferon & Boniwell, 2014; Myers, & Diener, 1995).

As can be seen, in this study, the relationships between adults' spirituality, psychological well-being, compassion, and life satisfaction were examined, and the mediating role of compassion and life satisfaction in the relationship between adults' spirituality and psychological well-being was examined. The study results show that the interventions designed to increase adults' psychological well-being should focus on increasing spirituality, self-compassion and life satisfaction stemming from spirituality. Spirituality provides values of psychological well-being such as the sense of meaning and purpose, social support, and positive emotions that make the individual healthy and happy in body and spirit (Karslı, 2019). It is thought that the research is

important in that it is carried out with positive psychological concepts that emphasize the strength of the human being, not the focus of mainstream psychology that emphasizes the negative. Seligman & Csikszentmihalyi (2000) argued that true happiness could be achieved by avoiding wrong and discovering right. A happy, healthy life is the desired outcome of positive psychology (Peterson & Seligman, 2004). It is thought that this research, in which psychological well-being is explained by spirituality, compassion, and life satisfaction, which includes human strengths and virtues, will contribute to the positive psychological literature.

**5. Recommendations**

The relationships between spirituality, psychological well-being, compassion, and life satisfaction in this study are limited to the quantitative data obtained from the adults participating in the research. Future studies can examine the relationships between spirituality, psychological well-being, compassion, and life satisfaction of participants in different age groups. In addition, qualitative and mixed-pattern studies can be designed to study these variables in detail.

In line with the results obtained from the research, it can be suggested by experts who are interested in mental health that positive psychotherapy-based individual and group counseling practices, including concepts such as spirituality, compassion, and life satisfaction, to increase psychological well-being of individuals. However, it can be recommended that individuals be given skill training on the mechanisms underlying psychological well-being by their psychological counselors in school environments, even before they are adults.

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# Supporting Concept Teaching with Activities in Primary School Third Grade Life Science Course*

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ABSTRACT

This research aims to support the "teaching of concepts" in the 3rd grade Life Science Course with activities. A quasi-experimental design (selective) with a pre-test and post-test control group, one of the quantitative research designs, was used in the research. Using songs, poems, rhymes, acrostics, stories, fairy tales, riddles/puzzles, animations, and traditional children's games, the experimental group's success in acquiring certain concepts from the third-grade life science course was enhanced by developing and implementing the above activities. Research data were collected with the "Concept Achievement Test" developed by the researcher by quantitative research data collection techniques. In the data analysis, arithmetic means were used to determine the academic success of the experimental and control groups. The Independent Sample t-Test was used for comparisons between groups. As a result of the research, there was a considerable achievement gap between the experimental and control groups, with the experimental group performing significantly better. According to these results, activities structured with songs, poems, nursery rhymes, acrostics, stories, fairy tales, puzzles/riddles, animations, and traditional children's games significantly impact student success in teaching concepts in third-grade elementary school biology classes. These activities apparently increase student success rates and are useful in this regard.

Keywords:
Concept, game, learning outcome, concept teaching activities, life science

## 1. Introduction

People are usually born with the equipment necessary to acquire basic life skills. However, is equipment alone is insufficient in all areas of life. Because: knowledge, skills, and values that a person needs in their life are acquired or developed according to the conditions to which he is exposed.In this process, people's education and training has a vital role in their life. It can be said that it is important to give these knowledge, skills, and values systematically to gain them effectively. According to Hayran (2010), the inclusion of school in human life has led to important developments. At the beginning of these, children encounter a wider, more active environment and begin to systematically acquire the knowledge, skills, and values necessary for their lives. According to Ülgen (2004), learning the concepts that form the basis of the knowledge and skills necessary for a person's life begins with birth but takes place in a planned manner only in schools.

The goal of science education taught in the first three years of elementary school is specifically to help students acquire the basic knowledge, skills, and values they will need and be able to apply in daily life (Ministry of National Education [MoNE], 2009). Because the concepts that form the basis of the knowledge and thought structure that people form throughout their life (Dündar, 2007) are beginning to be structured systematically,

* This research was produced from the master's thesis of the first author (Pınar Esener) titled.

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especially in the Life Science course in this period. In fact, according to many experts, many concrete or simple abstract concepts can be acquired by experiencing, seeing, or hearing in the pre-school period. For example, according to Senemoğlu (2018), abstract concepts such as clean and naughty can be learned from an early age by observing, experiencing, seeing, or hearing. However, learning more complex, defined, or abstract concepts often requires instruction. On the other hand, according to Piaget, concepts begin to form realistically during this period, especially since the cognitive concrete period begins after leaving the pre-operational stage. This is the period when the child starts school, and the life science course comes into play.

Children get acquainted with the life science course at a young age and form the basis of their future life with the knowledge, skills and values they will gain in this lesson (Ocak & Beydoğan, 2005). For this reason, the 1st, 2nd and 3rd years of primary school are very important (Aladağ, 2016). Especially from an early age (in the concrete operations phase), the Life Science course has a very important role in teaching the concepts to the child accurately and systematically. Because the learning outcomes gained in these years are highly likely to be permanent. In fact, mislearning persists for a long time and negatively affects future learning. For example, these mislearning often cause important misconceptions. In particular, basic misconceptions negatively affect many learning experiences and become more difficult to correct in the future.

As it is known, correcting mislearning is more difficult than teaching something for the first time. It seems even more difficult to change mislearning, especially at an early age. Considering that the permanence of the learning outcomes gained at early ages is more permanent, it will be a very difficult task for both the child and the teacher to change a learning outcome that the child has coded in his mind to realize a new learning. Therefore, laying the foundations of the concepts correctly at an early age, especially in the Life Science course, which forms the basis of many courses (Aladağ, 2016; Belet, 1999), will positively impact future education life.

Otherwise, the individual will have to deal with misconceptions and mislearning. According to MEB, concepts organize and combine a lot of information on a particular subject; they help to think, understand and make sense of it. In fact, an important part of the teaching consists of the learning outcomes that are tried to be given by teaching the concepts. Suppose the teaching of concepts does not take placeoccur while a lesson is being taught. In that case, there cannot be a complete learning, and even the realization of understanding and thinking processes does not seem possible (MoNE, 2005a). According to another definition, concepts are a mental tool and help people to think and contribute to making broad information usable. In short, they are mental tools that enable people to realize something. In addition, concepts are a category method that groups similar items, people, thoughts, and processes (Senemoğlu, 2018). Therefore, if the concepts are taught correctly, in a planned and effective way in the education-teaching processes of the relevant course (Altıntaş & Yorulmaz, 2018):

- ✓ Students experience an increase in academic success.
- ✓ Learning and remembering become easier.
- ✓ Teaching becomes personal.
- ✓ Students gain effective communication skills.
- ✓ Students can develop problem-solving and reasoning skills.

If concept teaching is not carried out in a correct, planned, and effective way, it is seen that adequate perception, understanding, and understanding cannot be achieved, and as a result, people often have misconceptions. This situation causes very important problems such as generalization errors, distinction errors and misconceptualization in the following processes (Tokcan, 2015). In addition, as mentioned above, these problems negatively affect students understanding and thinking about the subject (MEB, 2005a, p. 80). For these reasons, considering that the concepts learned in the primary school Life Science course will form the basis for the individual's daily life and future learning, it seems that learning the concepts correctly and effectively in this course is very important.

However, learning and making sense of concepts correctly and effectively seems difficult for primary school children (especially in the 1st, 2nd and 3rd grades of primary school). Because, according to many experts, the concepts are not concrete. We cannot call an event, a thing, a person a concept. Concepts are made up of abstract ideas. In the world we live in, there is no such thing as a concept. Some examples represent the concept. In other words, concepts come to life in ideas (Çaycı et al., 2007). So when we talk about a concept, we are actually talking about an abstraction in the real sense. On the other hand, Abstraction involves making

a distinction, recognizing and learning as a result, and clearing and choosing the appropriate one. Humans are the most intelligent creatures in the universe, they can do very complex mental processes and this is due to the brain's ability to abstract. This ability is shaped through language mostly. Language shapes the mind through concepts. At the root of concept, learning is the ability to abstract, which enables concept creation (Karataş-Coşkun, 2011). However, since this ability is not sufficiently developed in children who have just entered the concrete operational stage, they will have difficulty in abstracting sufficiently. This situation can cause children in the early elementary years to have difficulty learning or forming concepts, to learn incorrectly, or to become alienated from the appropriate course.

Examining the literature in this context reveals a variety of methods and techniques for presenting concepts. Concept Maps, Concept Networks, Meaning Analysis Tables, Concept Puzzles, Concept Cartoons, Concept Analysis Cards, Concept Development Forms, and Conceptual Change Texts (Alkş, 2014; Dündar, 2011; MoNE, 2005b; Tokcan, 2015; Yel, 2007) are the most prevalent types (Alkş, 2014; Dündar, 2011; MoNE, 2005b; Tokcan, 2015; Yel, 2007). However, it may not be sufficient for concept instruction, particularly in the early years of primary school, to explain the definitions of something in a given lesson time, to list the qualities that define it, to analyze them, to establish their relationships, or to identify particular properties.Because, according to many experts, concept learning occurs at certain stages and under the influence of many factors such as the developmental stages, knowledge, skills, mental capacities, emotions, thoughts, and experiences of children, as well as the methods-techniques, materials, and learning environments created in the teaching processes (Tahiroğlu & Esener, 2021).

For example, educational activities enjoyed by every age level are different. In the pre-school period, children enjoy using crayons, or the activities consisting of games, songs, and nursery rhymes are dominant (MEGEP, 2009). This situation remains valid as it continues in the first years of primary school. Therefore, in teaching abstract meanings such as concepts, especially in the first years of primary school (1-2-3), it is very important for the child to learn by doing, to become fun, and to reduce them to a more concrete form suitable for their level. Games have an important place in children's lives and learning with games can be remembered more easily. Similarly, alternatives such as nursery rhymes used by children in this age group in games, songs they sing daily, poems, riddles, puzzles, and stories will significantly contribute to their learning of concepts more efficiently, precisely, and easily.

Because children in elementary school have an expansive imagination. Therefore, using fairy tales in the classroom will enhance the learning experience. The child will have fun, establish connections between his own world and his imagination, and be influenced by the stories he or she hears (Şahin, 2011). This effect also plays an important role in children's cognitive development (Kaya, 2018). In light of this, it is evident that using fairy tales in concept instruction will help children learn while having fun. Because a child who combines his or her own world with his or her own imagination will be influenced by fairy tales. Consequently, it is highly probable that concept acquisition will become more permanent in the mind.

On the other hand, making use of riddles in the learning-teaching processes makes the process fun. One benefit of riddles is to improve vocabulary. According to Hayran (2010), the person who encounters the riddle also makes guesses to find the hidden answer, or even guesses without knowing the answer, which enables him or her to form a mental schema of the concept in order to comprehend and parse it. Therefore, the use of riddles while teaching a concept will have an effect on the interpretation and separation of the concept.

Rhymes, on the other hand, contain funny elements. These funny elements leave a trace in the person's memory and affect language skills developmentally (Yalçın & Aytaç, 2017). The use of nursery rhymes in concept teaching will attract the student's attention and make it easier to remember the concept.

The Turkish Language Association (Turkish Language Institution [TDK], 2020) defines an acrostic as "verse, poetry, arranged so that a word emerges when the first letter of each line is read from top to bottom." The use of acrostic in concept teaching will help students' permanent learning as it supports their memory. Coding new or first-time information makes it easier to remember. Therefore, using acrostic in concept teaching will contribute to establishing a strong link between the knowledge of the learned concept and recognizing that concept more easily.

It is thought that teaching with music will also be effective in learning. Because it takes place in a process where music and knowledge are not memorized, the effectiveness of music is assimilated, and the teacher is the guide, not the leader (Bilen & Açıkgöz Ün, 2019). With educational songs and games, the negativities in traditional education can be changed, and education can become enjoyable. It is giving the student the information hidden in the song rather than teaching it will motivate the student even more (Gürbüz et al., 2017). For this reason, while performing concept teaching with songs will provide entertainment, on the other hand, giving hidden information will make concept teaching more effective.

Another effective method to be used in the primary school period is the method of teaching with games. Using this method, difficult subjects for children can be taught easily and the learning activity can be made more interesting for them. If teaching is provided using the game method, an enjoyable classroom environment is created by preventing the abstract lessons that are difficult to understand from being boring. Thus, the child who desires to learn all the knowledge and skills to be acquired immediately learns/gains. While playing games, they both have fun and learn without realizing it. In other words, using the game teaching method makes the education environment fun (Uskan & Bozkuş, 2019). In addition, the game teaches children to find the truth through trial and error, finish the work they have started, and make an effort to achieve something (Semerci, 2019). Therefore, teaching concepts with games will have an effect on making the concepts, which are abstract words, more meaningful in the student's mind, as it will enable the student to become active, have fun while learning, and make the concepts more concrete.

As a result, considering the above explanations, it can be said that the reason for students' misconceptions from their inability to correctly and effectively gain the concepts learned at an early age. Because it is believed that children's inability to abstract sufficiently at a young age causes them to struggle with learning concepts and to fall prey to misconceptions. On the basis of these ideas, it was deemed necessary to create activities that children can enjoy, engage in, and learn through. As a result, activities based on fairy tales, traditional children's games, songs, nursery rhymes, poems, acrostics, and the like were designed and their contribution to concept instruction in the Life Science course was investigated. This research aims to use activities such as fairy tales, stories, traditional children's games, plays, songs, nursery rhymes, poems, riddles, and acrostics for concept teaching in elementary school life science course and evaluate the results.

## 2. Methodology

### 2.1.Research Model

This study was conducted with the purpose of demonstrating the differences between the success of students who participated in the sessions to implement the activities prepared for concept instruction in the life science course using traditional children's games, songs, poems, riddles/puzzles, drama rhymes, acrostics, stories, and fairy tales, and students who did not participate in the pre-test and post-test.The test was carried out according to the experimental model with the control group. In the pre-test and post-test experimental model with the control group, two groups were formed, one for the experiment and the other for the control group, by selective assignment method, and measurements were made on these groups before and after the experiment.

### 2.2. Study Group

An easily accessible sample was adopted in the determination of the study group of this research. Due to being easily accessible by the researcher, 3/A and 3/B class students in a primary school in Nevşehir Central district were chosen as the research sample in the 2020-2021 academic year. The selective assignment method was adopted in determining the experimental and control groups. For this purpose, Class 3-B was designated as the experimental group and Class 3/A as the control group. There are 21 students in both the experimental and control groups.

### 2.3 Experimental Process

#### 2.3.1. Preparation of the Application

- Permission has been obtained from the relevant authority.
- Data collection tools were prepared.

- The activities to be used in the experimental process were prepared for the concepts and performances in the Life Sciences Program of the Ministry of National Education. The activities were prepared during this process:
  - Activities were prepared with fairy tales, poems, animations, and the traditional game "Yağ satarım, Bal Satarım" to gain the concept of "thriftiness".
  - To gain the concept of "accident", activities were prepared by using the traditional game called "Köşe Kapmaca", animation and acrostic. To gain the concept of "earthquake", the traditional play "Istop", the song (Appendix-1), the words of which were written by the researcher and the composition was made by the music teacher Abdulsamet Gencel, the puzzle and the activities called "Nesi Var" were prepared.
  - To gain the concept of "fire", activities were prepared by using the traditional game called "Hımbıl" (Annex-2), story, animation and nursery rhyme.
  - Activities were prepared using traditional games, songs, animations and riddles called "Old Minder" to gain the concepts of settlement units (province, district, town, neighborhood, village).
- Lesson plans have been created for the achievements to teach the concepts, and the above activities are included in these plans. In addition, in the primary school curriculum, the Life Science course is 3 hours per week and 40 minutes per hour. The implementation process of the concept activities was planned and arranged accordingly.

**2.3.2. Implementation of the Application**

- ✓ Experimental and control groups were determined.
- ✓ Concept Achievement Test was applied to the experimental and control groups as a pre-test.
- ✓ Activities for the experimental process have been put into practice.
- ✓ The implementation process was carried out in 18 lesson hours in 6 weeks.
- ✓ The practice was concentrated in the period when the schools were opened (both in the experimental and control groups), that is, when face-to-face education was carried out. Because, considering that the face-to-face application of the activities would be more effective and a consensus was reached with the control group teacher, it was decided to give the relevant acquisitions in the face-to-face application processes. This indicates that the learning outcomes are tried to be gained simultaneously in the experimental and control groups. Therefore, the activities were implemented when the schools opened for face-to-face education and the lesson plans were adapted accordingly. Likewise, the relevant learning outcomes were given to the control group in face-to-face training processes.
- ✓ The concept Achievement Test was applied to the experimental and control groups as a posttest.
- ✓ The data obtained were analyzed and interpreted by the researcher.

**2.4. Data Collection Tools**

Quantitative data collection tools were used in this research. These tools are the Concept Achievement Test, developed by the researcherthe researcher by taking expert opinions. The concept achievement test consists of 39 true-false, fill-in-the-blank and multiple-choice questions to cover all the concepts used in this research. While preparing the questions, the primary school Life Science 3rd-grade textbook and workbook, as well as the Life Science unit evaluation books (Beş Yıldız Publishing, 2020; Kırmızı Beyaz Publishing, 2020) were used. The validity and reliability of this test was conducted with 171 3rd grade students from 5 different primary schools. The data obtained from these students were analyzed and the test's average item difficulty value (Pjx) was found to be 0.53, the item discrimination value (Rjx) was found 0.51 and the KR 20 value was found 0.82. In addition, expert opinions and approvals were obtained for the test's spelling control and content validity.

**2.5. Data Analysis**

After the results of the pre-test and post-test of the experimental and control groups were obtained, it was found that the data had a normal distribution according to the results of the Shapiro-Wilk analysis and the Skewness/Kurtosis values in the comparisons between the groups (For the pre-test: According to the Shapiro-Wilk result, the experimental group's data was p= 0.060; the control group's data was p=0.328. For the post-test, the Shapiro-Wilk result was p=0.685 for the experimental group and p=0.328 for the control group). Considering this situation, the independent samples t-test was used to compare the success of the experimental and control groups. A confidence level of 0.05 was assumed as the significance level.

### 2.6. Ethical

This study has been prepared by considering research and publication principles and ethical criteria. Nevşehir Hacı Bektaş Veli University Scientific Research and Publication Ethics Committee's Ethics Committee Approval with decision number 2021.03.07 and research permissions numbered E-82671082-44-24278384 from Nevşehir Governorship Provincial Directorate of National Education were obtained. Responsibility for research ethics that may arise within the scope of the prepared article belongs to the authors.

## 3. Findings

At this stage, the findings obtained from the analysis of the data obtained during the research process are presented below. These findings:

**Findings of academic achievement pre-test and post-test scores in the group comparison**

Within the scope of this study, the success levels of the students in the primary school 3rd grade Life Science Course concept learning process of the learning-teaching process structured by using traditional children's games, songs, poems, riddles/puzzles, dramas, nursery rhymes, acrostics, stories and fairy tales, and the normal education curriculum pre-test and post-test scores of the subjects in both groups were compared separately to test its effectiveness on the findings regarding these comparisons are shown in Table 1.

**Table 1.** *Independent Sample t-Test Results of the Students in the Experimental and Control Groups on Life Science Course Concept Achievement Pre-Test and Post-Test Scores*

| Groups | | N | $\bar{X}$ | S | Sd | t | p |
|---|---|---|---|---|---|---|---|
| Experimental | Pre-Test | 21 | 11.85 | 4.91 | 40 | 10.56 | .000* |
| | Post-Test | 21 | 25.90 | 3.60 | | | |
| Control | Pre-Test | 21 | 10.85 | 4.31 | 40 | 4.155 | .000* |
| | Post-Test | 21 | 15.52 | 2 .79 | | | |

*$p<0.05$

As seen in Table 1, the pre-test mean of the experimental group was 11.85, while it increased to 25.90 after the post-test application. This difference was also statistically significant when tested with Independent Sample t-Test ($t(40)= 10.56$; $p<0.05$). In the control group, while the pre-test average was 10.85, this score increased to 15.52 after the post-test. This difference was also found to be statistically significant when Independent Sample t-Test were tested with the t-test ($t(40)= 4.155$; $p<0.05$). As can be seen, after the experimental procedure, there were significant differences in favor of the post-tests between the pre-test and post-test applications in both groups. However, an increase of 14.05 points was observed between the pre-test and post-test application of the experimental group; 4.67 point increase was observed between the pre-test and post-test mean scores of the control group. In other words, the average success in the class where concept teaching is carried out with the activities developed during the research (traditional children's games, songs, poems, riddles, plays, nursery rhymes, acrostic and fairy tales) is significantly higher than the average in the class where concept teaching is carried out according to the normal curriculum.Intergroup analyzes to examine the statistical significance of these differences are presented below.

**Findings of academic achievement pre-test and post-test scores in the comparison between groups**

To understand whether there is a significant difference between the experimental and control student groups in terms of academic achievement in Life Science Course concept teaching, the pre-test results are analyzed and given in Table 2.

**Table 2.** *Independent Sample t-Test Results on Academic Achievement Pre-Test Scores of Experimental and Control Group Students*

| Groups | N | $\bar{X}$ | S | Sd | t | p |
|---|---|---|---|---|---|---|
| Experimental | 21 | 11,85 | 3,30 | 40 | 1,058 | ,296* |
| Control | 21 | 10,85 | 2,79 | | | |

*$p<0.05$

As seen in Table 2, the difference between the arithmetic means of the groups was not statistically significant ($t (40)=1,058$; $p>0.05$). Based on this result according to the pre-test data, there is no significant difference in the

level of success between the experimental and control groups. This indicates that the experimental and control groups were equivalent to each other before the experimental procedure.

After the findings obtained from the pre-test results, the activities prepared for the experimental group were applied (the current curriculum was applied to the control group), and the post-test mean scores of the subjects in both groups were analyzed to test whether this application was effective on the students' level of gaining the relevant concepts. The results of this analysis are given in Table 3.

**Table 3.** *Independent Sample t-Test Results on Academic Achievement Post-Test Scores of Experimental and Control Group Students*

| Groups | N | $\bar{X}$ | S | Sd | t | P |
|---|---|---|---|---|---|---|
| Experimental | 21 | 25,90 | 1,57 | 40 | 9,504 | ,000* |
| Control | 21 | 15,52 | 4,74 | | | |

*$p<0.05$

Table 3 shows a significant difference in favor of the experimental group between the arithmetic averages of the groups forming the sample. This difference was also found to be statistically significant when Independent Sample t-Test were tested with the t-test ($t(40)= 9.504$; $p<0.05$). This finding reveals that the success levels of the experimental group students were much higher than the control group students after the application. In other words, the activities prepared within this study's scope significantly increased the students' scores in the concept teaching processes of the 3rd grade Life Science course.

## 4. Conclusion and Discussion

When examining the results of the achievement tests of the students who participated in the study prepared for the concept learning process of the 3rd grade life science course, it was found that the achievement levels of the students in the experimental and control groups were very close on the pre-trial measurements (there was no significant difference between the achievement levels).In the measurements made after the experimental procedure, it is seen that there is a significant improvement between the success levels of both the experimental group and the control group. This is due to the fact that both the learning-teaching processes structured by using traditional children's games, songs, poems, riddles/puzzles, dramas, nursery rhymes, acrostics, stories, and fairy tales, and the activities carried out within the framework of the curriculum of the primary school 3rd grade Life Science Course concept learning have a positive effect on the level of educational success. In contrast, when comparing the pre-test and post-test scores of the experimental and control groups, there was a significant difference in favor of the experimental group when comparing the post-test scores. These results indicate that the learning-teaching processes structured around the use of traditional children's games, songs, poems, riddles, dramas, nursery rhymes, acrostics, and fairy tales have a greater impact on the achievement levels of students in the third grade Life Science course.

This research aims to develop activities that children can learn by having fun, concretizing and enjoying in order to increase the effectiveness of concept teaching in the 3rd grade life science course in primary school. This is because (as pointed out in the literature section of this study) it has been found that children have problems acquiring concepts at a sufficient level and fall into misconceptions because they cannot abstract enough at an early age and cannot be sufficiently motivated for the learningand teaching process, especially because they are still at play age.For this reason, it is considered very important that concept teaching, which is one of the most important steps of teaching in the life science course in the first years of primary school (1st, 2nd, and 3rd grades), is given with fun, concretization and enjoyment following the level of children. However, there are no studies (within the studies that can be examined) on how to design and use such activities, which are thought to have a very important place in the learning-teaching process in the concept teaching of the life science course. However, many studies in the literature show that the use of children's games, songs, poems, riddles, dramas, nursery rhymes, acrostics, stories, and fairy tales at early ages contribute to learning by making it fun, embodied, and enjoyable, and by increasing achievement levels.

In this context; Yılmaz (2019) found a significant difference in favor of the experimental group in the pre-test and post-test mean scores in the problem-solving achievement test conducted in his study on the effect of using the game teaching method on attitude and success in gaining problem-solving skills in a primary school mathematics course. Savaş and Gülüm (2014) found a significant difference in favor of the experimental group

in their study (an experimental study) on the effect of teaching with games on success and retention. As seen in this study, teaching with games at an early age affects success and permanence positively. Similarly, in his study, Hanbaba (2011) named the effect of the game teaching method on primary school 3rd-grade students' success and attitude in the life science course revealed that the success scores were in favor of the experimental group in the post-test. On the other hand, in their study titled "Game-Based e-Learning is More Effective than a Conventional Instructional Method: A Randomized Controlled Trial with Third-Year Medical Students", Booker et al. (2013) found that students who took a game-based learning approach had more fun and demonstrated that they performed more metacognitive behavior. Lengyel (2020), on the other hand, argued that the educational and digital game-learning method is effective in his study named "Can the game-based learning come".

In his study of the use of songs in teaching vocabulary to young students in a foreign language classroom, Atılay (2017) found that the use of songs was remarkably effective. In their study of teaching and learning science lessons through song, Governor et al. (2013) discovered that learning science lessons through song is very enjoyable for students, and that they learn science by having fun. In terms of academic achievement, it was also stated that a level of improvement had been achieved. Metin (2019) discovered a statistically significant difference between the effects of musical stories and fairy tales on the levels of creativity of pre-school children in favor of the experimental group.In this context, Yemenici (2019) revealed that activities with fairy tales in Turkish teaching were effective on listening skills. In this study, it was stated that music and story affected the creativity levels of pre-school children. Alkan Yılmaz (2019) states that in the study of the effect of nursery rhymes on developing fluent reading skills of primary school fourth-grade students, the activities that include rhymes applied in the experimental group have a significant effect on the reading speed Research conducted by Öz (2019) on the impact of creative drama on concept teaching in the Social Studies course found a statistically significant improvement for students in the experimental group; research by Falkner et al. (2012) on the growth of fundamental ideas through puzzle-based instruction found similar results.As a result of that research, they stated that teaching with puzzles improved problem-solving skills and access to information more easily.

Based on the findings of these studies, it is expected that traditional children's games, songs, poems, nursery rhymes, fairy tales, stories, riddles, puzzles, acrostics, and dramas will contribute significantly to the acquisition of concepts in the Life Science course by having fun, concretizing, and enjoying. Based on this assumption, concept teaching activities were developed using songs, poems, nursery rhymes, fairy tales, stories, riddles/puzzles, acrostics, and dramas; among the children, games such as "eski minder," "köşe kapmaca," "istop," "hımbıl," and "yağ satarım bal satarım" were adapted and applied to the relevant concepts. In fact, at the end of the application, it was discovered that concept teaching supported by traditional children's games is significantly effective. This situation demonstrates how traditional children's games can be used to teach concepts while also improving children's physical, mental, emotional, social, and psychomotor skills. In this context, Nosirova (2020) discovered that pre-school street games (most of which are included in 'traditional children's games' in our case) have a significant impact on the formation of the child's spirit and development. The activities structured with songs, poems, riddles/puzzles, dramas, nursery rhymes, acrostics, stories, and fairy tales made the learning-teaching processes especially fun and interesting, increasing the success level in concept teaching and being quite useful, according to the findings of this study.

On the other hand, since this study was conducted face-to-face when returning to school after the pandemic period, it was observed that the students participated in the activities (especially in terms of face-to-face and live participation) quite enthusiastically and eagerly. This situation shows once again how important lively, fun, concrete and lively activities are on primary school students' interests, desires and motivations.

## 5. Recommendations

As a result of the research, the implementation of activities structured by using songs, poems, nursery rhymes, acrostics, fairy tales, stories, riddles/puzzles, and traditional children's games in line with the interests, needs, and levels of primary school 3rd-grade students made significant contributions to the learning of some concepts in the life science course. Therefore, it is important to analyze students' problems and misconceptions about the concepts, identify the deficiencies in the subject, and determine and apply the appropriate techniques to address those deficiencies.However, some problems may occur in these processes. For example,

there were problems in the implementation process of this research, especially in the implementation of some of the activities related to traditional children's games in the classroom (due to reasons such as lack of physical space, etc.). Considering such situations, planning the application environments in advance or designing the activities in the environment is recommended.

Another problem is the participation of students in each activity. For example, not every student wants to sing. Then, there may be problems in terms of participation of all students in the activities. For example, in this research, a shy student did not want to sing individually in the classroom. In such cases, students can be provided to accompany the group or sing in chorus to keep them motivated and willing. In such cases, it should be essential for each student to participate in activities that appeal to them, considering their differences.

The activities in this study relate to concept teaching in science courses. However, they can also be used in other subjects such as social studies, Turkish, mathematics, and even science, biology, and geography if they are designed according to the content and level. A quantitative research design was used in this study, but more in-depth results can be obtained with qualitative or mixed methods research. For example, student opinions can be solicited or observations can be conducted for the purpose of process evaluation. Action research or case studies can also be conducted on this topic. This research conducted in person, and the same study or similar research can be adapted online and conducted through distance learning. Such studies can be uploaded to the EBA platform for teachers to access to facilitate access for practitioners.

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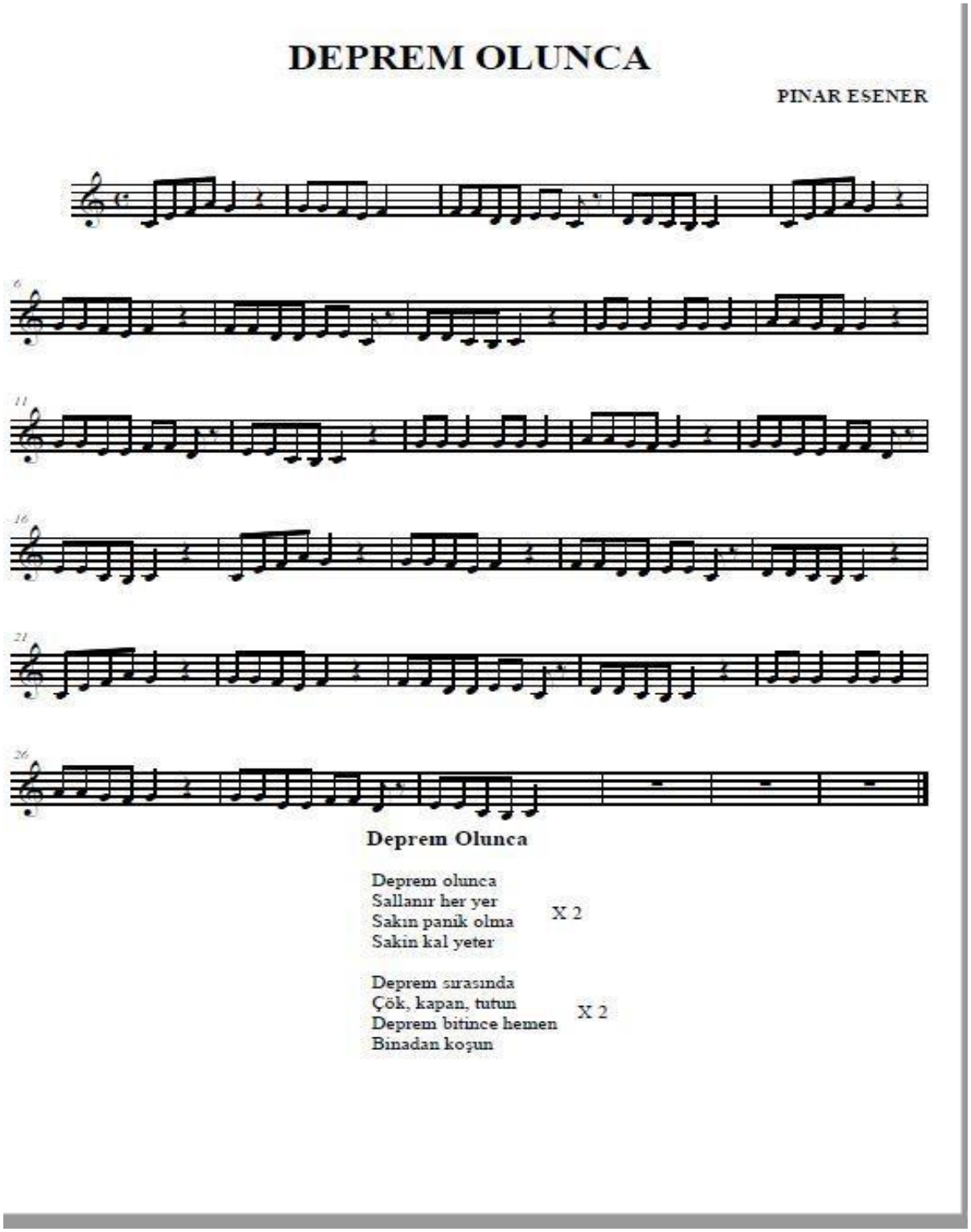
**Appendix-1: The Song "When There's an Earthquake"**



**Appendix-2: "Hımbıl" Game Activity (40 min.)**

**Rules of the Game:**

1. It is forbidden to look at the cards of the players around you in the hımbıl game. In this case, you will receive penalty points. You can set the penalty score before you start the game. Example: 100 points penalty. (Doing a slouchy in 1 round is 100 points. The player loses a hımbıl.)
2. 2. In the hımbıl game, an object equal to the number of players is determined. The specified object can be anything. In our prepared game, instead of object names, fire brigade, gendarmerie, ambulance, police, forest fire will be written.
3. Each emergency is written on a piece of paper as many as the number of players.
4. Pen and paper are prepared and a player is assigned to write down the scores.
5. The direction of the game is clockwise, that is, from right to left.
6. In each round, each player has to give a card to the person next to him.
7. The aim of the game is to collect all the papers with the same object in your hand.
8. Except for the player who starts the game first, no player can do a slouchy without giving a piece of paper from his hand. Example: You have 3 firefighters and 1 gendarmerie. The next player has given you a fire engine. You have now completed the 4 firefighting card, but you cannot do slouches this way. To make a hımbıl, you can give the other gendarmerie paper to the player next to you and do a hımbıl. However, he should not wait after giving the paper here. Otherwise, there is a possibility that the person to whom the paper is given will also slurp. If the player to whom you gave the card acts quickly and quickly gives the extra card to the person on his left and hımbıl, you lose your right. But here the player who starts the game is the exception. Because the first player already started with 4 cards, he can do a slouchy without laying any cards.
9. The player who collects the same cards "Hımbıl!" He/she quickly puts his hand in the middle of the playing field. The score for the player who collects the first cards is standard. But other players will score points according to the order of making hımbıl, not according to the cards in their hands. So if you are not the first person to do the slouchy, you should prepare for the second slouchy very quickly.
10. The player who does the slouchy gets 100 points. The hand on the slouchy player gets 75 points. The next player gets 50 points. The next player gets 25 points… If you have more than 4 players, you can set the points before starting the game (For example, 100-80-60-40-20 for 5 players)
11. On a different paper, a digit is opened for each player and the points they get from the rounds are written on these digits. Players can play as many rounds as they want. There is no limit on the number of tours. However, it is important to determine from the beginning how many rounds will be played, in order to prevent the loser from trying to prolong the game.
12. When the game is over, the points are added up. The player with the most points wins the game.

**Game Play:**

**1.** For the preparation of cards, first the number of players is determined and the cards are prepared.

**2.** Fire department, Gendarmerie, Police, Ambulance, Forest Fire… names and their emergency phone numbers are written on paper as many as the number of players. (Here, 5 pieces of fire department for 5 players, 5 pieces of ambulance, 5 pieces of forest fire, 5 pieces of gendarmerie on 5 pieces of paper, 5 pieces of police on paper). The prepared papers are reviewed again and any missing and errors are corrected. These papers are then folded so that the players cannot see the text.

**3.** The player to start the game is selected. For the game, the player who shuffles the cards, plays first and writes the scores is selected. For this, counting is done by saying the following rhyme (prepared for the concept of fire):

Ooooo,

There was a house
There's a fire
Everyone is scared
Don't be afraid,
Call the fire department
Here is the number
10-20-30-40-50-60-70-80-90-100-110.

**4.** Papers will be folded and handout. In this process, the first player or any player shakes the cards in their palms and shuffles them and leaves them in the middle of the players. Players get 5 cards at random. These papers are starting papers.

**5**. The player to start first was determined beforehand. This player gives an unsuitable piece of paper to the player on his left by dragging it with the text down (not being read by the others). Each player continues in this way by giving one of his cards to his/her friend next to him/her.

**6.** In this process, the person who collects the same papers (fire department) from a series, gives the excess paper in his hand to the person on his left before slouching, and then puts his hand in the middle and says hımbıl (However, he should not wait after giving the paper. Otherwise, there is a possibility that the person to whom he gives the paper will also slurp). This rule does not only apply to the first player. The player who slouches means that he has won that round and gets 100 points, that is, full points.

**7.** Other players must quickly squat on the hand of the slouching player. Because scoring will be done in order of hımbıl from bottom to top.

**8.** Scoring: The player to the first slouchy is 100, the hand over his hand is 75, and 50 in turn, 25

**9.** The points received are written to the players' account.

**10.** The game will be played for 5 rounds, each taking turns being a midwife once.

**11.** At the end of the game, the points of each player on the score sheet will be collected and the player/players with the highest score will win (Used source, URL-1).

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# Performance of the Q-Matrix Validation Methods in the DINA Model

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ABSTRACT

All cognitive diagnostic models that evaluate educational test data require a Q-matrix that combines every item in a test with the required cognitive skills for each item to be answered correctly. Generally, the Q-matrix is constructed by education experts' judgment, leading to some uncertainty in its elements. Various statistical methods are suggested to validate misspecifications in the Q-matrix. This paper evaluates the performance of the Q-matrix validation methods, the sequential expectation-maximization-based δ-method (SEM δ-method), and the Q-matrix refinement (QMR) method using a study with real data and simulations. The simulation design results showed that the misspecification percentage and the length of the test had a small or no effect on the mean q-entry recovery rates (MRRs) of both methods, while the increase in sample size had an improving effect. The MRRs of both methods decreased when the number of attributes and guessing (g) - slip (s) parameters increased. According to simulation study results, the QMR method performed better than the SEM δ-method. For the q-matrix validation, it can be suggested that CDM practitioners prioritize the QMR method and use a sample size of 1,000. On the other hand, the real data results revealed that the MRRs of both methods were at the base rates. This result highlights the need for further research on method comparison, specifically for real-world data applications where the number of attributes is relatively large and the test duration is short.

Keywords:
Q-matrix validation, Q-matrix refinement method, Q-matrix misspecification, sequential EM-based δ-method, DINA model.

## 1. Introduction

Over the past two decades, educational testing researchers and practitioners have paid more attention to cognitive diagnostic models (CDMs) due to their positive impacts on instruction and learning (de la Torre & Lee, 2013). CDMs have a great potential to specify students' strong and weak points and provide rich feedback on educational settings (de la Torre, 2008, 2009a). These models offer feedback on whether examinees master multiple fine-grained skills needed to resolve items in a test (de la Torre, 2009a, 2009b). Therefore, CDMs can provide more in-depth information about the skills each student has or does not have, unlike the classical test theory or item response theory, where a simple overall score is derived (DeCarlo, 2012; de la Torre et al., 2010; de la Torre & Lee, 2013). This information provided by CDMs can facilitate specific improvements to students' individual needs, better design of instruction and proper measurement of student development (de la Torre, 2009b).

In the CDM framework, attributes generally refer to the basic cognitive processes, knowledge representation, or skills required to correctly solve test problems (de la Torre, 2009a, 2009b; Leighton et al., 2004). Typically, all CDMs require a Q-matrix construction that shows these attributes' relationship to each test item (de la Torre et al., 2010; Tatsuoka, 1983). A Q-matrix consisting of 1 and 0's has items in its rows and attributes in its

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columns. If the corresponding attribute is required for a test item to be answered correctly, it is equal to 1 in the Q matrix and equals 0 otherwise.

The Q-matrix is crucial in test construction as it represents the attribute blueprint of the test or cognitive specifications (Leighton, Gierl, & Hunka, 2004). However, with the type of skills required for a specific item set, the number of skills involved, and their combination, the correct specification of a Q-matrix is not a simple assignment and it can lead to some uncertainty (DeCarlo, 2012). The Q-matrix is generally constructed by education experts' judgment, but "true skills" may differ from the labels these experts give. Changing some skill labels can entirely change the Q-matrix. Therefore, in terms of most educational tests, the Q-matrix is unknown, leading to the risk of Q-matrix misspecification (Chiu, 2013; DeCarlo, 2011). Misspecification of the Q-matrix can negatively affect estimates of item parameters, classification of respondents, and latent class sizes (DeCarlo, 2011; de la Torre et al., 2010). In recent years, a limited number of methods have been proposed for determining and refining a misspecified Q-matrix, such as the sequential expectation- maximization-based δ-method (SEM δ; de la Torre, 2008), the Bayesian method (DeCarlo, 2012), the residual sum of squares-based method (Chiu, 2013), a nonparametric method (Chiu & Douglas, 2013), a discrimination index-based method (Ma & de la Torre, 2020). However, the Q-matrix validation methods used in the current study are limited to the SEM δ-method and QMR methods. The deterministic input, noisy output, "and" gate (DINA; Haertel, 1989; Junker & Sijtsma, 2001) model, SEM $\delta$-method (de la Torre, 2008), and QMR method (Chiu, 2013) were briefly introduced below.

### 1.1. The DINA Model

The DINA model is one of the most widely used CDMs due to its simplicity, parsimony, and ease of interpretation (de la Torre, 2008; de la Torre & Lee, 2010; George & Robitzsch, 2014; Huang & Wang, 2014). The model requires only guessing ($g$) and slip ($s$) parameters for each test item regardless of the attributes number (de la Torre, 2008; de la Torre & Douglas, 2008; de la Torre & Lee, 2010). The DINA model presumes that examinees must have all the specified attributes for the test item in the Q-matrix to respond to a test item correctly and is considered a type of noncompensatory model (George & Robitzsch, 2014; Huang & Wang, 2014). Notably, the DINA model is most suitable for use where the conjunction of equally important attributes is required (de la Torre & Douglas, 2008).

Let $\alpha_i = \{\alpha_{ik}\}$ be the respondent $i$'s binary attribute vector, $k = 1,\ldots, K$, where a 1 on the $k$th element indicates the presence of attribute $k$ and 0, absence of the attribute. Let Q be a $J$ by $K$ matrix and the element $q_{jk}$ denoting whether skill $k$ is required to respond to item $j$ correctly (if the skill is required $q_{jk} = 1$, otherwise $q_{jk} = 0$). A latent response variable $\eta_{ij}$ that the considered the deterministic component in the DINA model is formulated as:

$$\eta_{ij} = \prod_{k=1}^{K} \alpha_{ik}^{q_{jk}}. \quad (1)$$

In Equation 1, $\eta_{ij}$ is equal to 1 if an examinee $i$ has all the required attributes for item $j$ and $\eta_{ij}$ is equal to 0 otherwise. The item response function is formulated as:

$$P(Y_{ij} = 1|\alpha_i) = g_j^{1-\eta_{ij}}(1 - s_j)^{\eta_{ij}}. \quad (2)$$

In Equation 2, $Y_{ij}$ is the observed response of examinee $i$ to item $j$, and the slip parameter $s_j$ is the probability of an answer to the item $j$ incorrectly the examinee who possesses all the required attributes for item $j$; conversely, the $g_j$ is the probability of a correct response to item $j$ the examinee who does not have at least one or more of the requisite attributes for item $j$. To put it differently, Equation 2 points out the probabilistic nature of the DINA model.

### 1.2. Sequential Expectation-Maximization-Based $\delta$-Method

de la Torre (2008) introduced a sequential expectation-maximization-based $\delta$-method (SEM $\delta$-method) that can be considered as an item discrimination index, $\varphi$, to identify misspecifications in the Q-matrix for the DINA model. $\varphi_j$ determines the correct q-vector by maximizing the difference between the success probabilities of the group of individuals who possess all the required attributes to answer item $j$ correctly ($\eta_j = 1$) and the group of individuals who lack at least one of the required attributes ($\eta_j = 0$).

de la Torre (2008) comprehensively reviewed the exhaustive search algorithm (ESA) and the sequential search algorithm (SSA) for the implementation of the SEM $\delta$-method. The author noted that computing $\varphi j$ for each item is burdensome when the number of attributes ($K$) increases because the $K$ patterns increase exponentially. In addition, the ESA algorithm is applicable and efficient for reasonably small $K$ values. On the other hand, the SSA is an alternative algorithm to the ESA, and it does not require computing $\varphi_j$ for the $2^K$ - 1 possible q vectors.

### 1.3. Q-Matrix Refinement Method

Chiu (2013) introduced the residual sum of squares (RSS) based on (i.e., nonparametric) Q-matrix refinement (QMR) method. The proposed validation method's rationale is based on minimizing the RSS computed according to observed and ideal item responses. By recalling $Y_{ij}$ and $\eta_{ij}$ from Equations 1 and 2, the RSS of item $j$ for respondent $i$ is formulated as:

$$RSS_{ij} = (Y_{ij} - \eta_{ij})^2. \tag{3}$$

Then, the RSS of item $j$ across all respondents is formulated as:

$$RSS_j = \sum_{i=1}^{N}(Y_{ij} - \eta_{ij})^2 = \sum_{m=1}^{2^K}\sum_{i \epsilon C_m}(Y_{ij} - \eta_{jm})^2. \tag{4}$$

In Equation 4, the latent proficiency-class $m$ is denoted by $C_m$ and $N$ is the number of respondents. Chiu (2013) noted that the indicator of the latent response to item $j$ was changed to "$i_j$" to "$j_m$" because ideal item responses are class-specific. This means that every respondent in the same latent class is thought to have the same ideal response to a test item. Chiu (2013) successfully applied the QMR method to the DINA model. The QMR method is fundamentally a nonparametric classification procedure introduced by Chiu and Douglas (2013) for cognitive diagnosis. Besides, de la Torre and Chiu (2016) proposed the discrimination index used with a broad class of CDMs covered by the generalized DINA (G-DINA) model. Ma and de la Torre (2020) recently introduced a stepwise Q-matrix validation method using a sequential G-DINA model for graded response data.

Although different Q-matrix validation methods have been proposed, the factors affecting these proposed Q-matrix validation methods' performances are not apparent. Studies comparing these methods' performance are minimal (e.g., Chen, 2017; Terzi & de la Torre, 2018). Notably, de la Torre (2008) noted that his work represents the first step in the empirical validation of a Q matrix, and there is still much work to be done in this area. For example, the author stated that more conditions such as the degree of Q-matrix misspecification, test length, and sample size should be investigated to determine the applicability of his method in different situations. In addition, the author indicated that real data covering more expansive areas should be analysed to obtain additional findings on how the method works in practice.

Furthermore, Terzi and de la Torre (2018) stated that research to be conducted based on the different number of attributes and other real datasets would contribute to understanding the performance of the methods. As a result, the goal of this study is to compare the performance of the SEM $\delta$-method (de la Torre, 2008) and the QMR method (Chiu, 2013) under various study conditions, such as the number of attributes, examinees, test lengths, guessing ($g$) and slip ($s$) parameters, and the percentage of misspecified q-entries.

## 2. Methodology

### 2.1. Simulation Study

Simulation study design was crafted from six variables: (a) Q-matrix validation methods (SEM $\delta$-method and QMR method), (b) number of attributes ($K$ = 3, 4, 5), (c) number of examinees ($N$ = 250, 500, 1000, 2000, 4000), (d) test lengths ($J$ = 20, 40), (e) guessing and slip parameters ($g$ = $s$ = 0.1, 0.2, 0.3, 0.4, 0.5), (f) misspecified q-entries percentage (10%, 20%). The Q-matrix, in which 20 items are associated with 3, 4, and 5 attributes (Chiu, 2013), is presented in Table 1. In this study, similar to Chiu (2013), the number of attributes ($K$ = 3, 4, 5) and the misspecified q-entries percentages (10%, 20%) were considered. For misspecified q-entries, for instance, if a Q-matrix has 10 percent misspecified q-entries for $J$ = 20 and $K$ = 3, 6 of 60 entries were changed randomly by producing over-specification or under-specification q-entries. Similar to Terzi and de la Torre (2018), two

restrictions were imposed on changing q-vectors, a maximum of two misspecified attributes were allowed in q-entries, and at least one attribute was identified as 1. In the scope of the study, the proportion of misspecified q-entries was considered rather than the specific types of misspecified q-entries (i.e., over specification or under-specification). In addition to this, the condition $g = s = 0.1$ (de la Torre & Lee, 2010) for high item quality was added to Chiu's item quality conditions ($g = s = 0.2, 0.3, 0.4, 0.5$). Furthermore, the conditions mentioned in de la Torre and Lee's (2010) study were considered in determining the test length ($J = 20, 40$). DINA model simulation studies in which different sample sizes are used can be encountered, for example, $N = 100, 500, 1000$ (Chiu, 2013), $N = 1000, 2000, 4000$ (de la Torre, Hong & Deng, 2010), and $N = 2000$ (de la Torre & Chiu, 2016; de la Torre & Douglas, 2008) etc. The present study set the sample size to $N = 250, 500, 1000, 2000$, and 4000, considering other specified research conditions.

**Table 1.** *The Q-Matrices for 20-Item Tests*

| | Number of attributes | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | 3 | | | 4 | | | | 5 | | | | |
| 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 5 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| 7 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 8 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| 9 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| 12 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 14 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 15 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| 16 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 17 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 18 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| 19 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 |
| 20 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

The 20-item Q-matrices were doubled to construct Q-matrices for the 40-item tests. Then, the original Q-matrices were used for generating simulated item responses. The original Q-matrix's 10% or 20% of q-vectors were changed randomly to create misspecified Q-matrices. 100 data sets were generated for each of the 3 (number of attributes) × 5 (number of examinees) × 2 (test lengths) × 5 ($g$ and $s$ parameters) × 2 (misspecified q-entries percentage) = 300 design conditions. Then, each data set was analysed using the SEM $\delta$-method (de la Torre, 2008) and the QMR method (Chiu, 2013). Analyses were done using R (R Core Team, 2020), the CDM (George, Robitzsch, Kiefer, Groß, & Ünlü, 2016) and the NPCD (Zheng & Chiu, 2019) packages. The mean q-entry recovery rates (MRRs) were computed by comparing the Q-matrices proposed by both methods with the original Q-matrices for one hundred data sets in each design condition.

The MRR is the ratio of correct q-entries in the Q-matrix proposed by the model to the total number of q-entries in the original Q-matrix. The recovery rate of the correct q-entries equals one if all elements of the Q-matrix proposed by the model and the original Q-matrix are the same (i.e., if the matrices are equal). Additionally, for design conditions where Q-matrix entries were defined with 10% and 20% misspecification, the base rates (BRs) were 0.90 and 0.80, respectively. Whereas a higher MRR than the BR is more informative, MRR close to or below the BR is less informative (Chiu, 2013).

### 2.2. Real Data

The present study used a mathematics achievement test comprising 11 items measuring four attributes and was administered to 2,918 6th grade students (Başokcu et al., 2018). This achievement test was constructed based on cognitive diagnostic models and required four attributes: communication and association, mathematization, reasoning, and strategy development, and use of symbolic and technical language. Due to

the fact that the *s* parameter of item 9 was 0.97 based on the preliminary analysis, this item was excluded from the real data set and was not included in the subsequent analyses. Real data analyses on ten items were conducted, and item parameters are shown in Table 4.

## 3. Findings

### 3.1. Simulated Data

The MRRs obtained for 20 and 40 items by SEM $\delta$-method and QMR method were presented in Tables 2 and 3, respectively. In general, MRRs obtained for the two misspecification percentages showed that the misspecification percentage had a small or no effect on the efficacy of both Q-matrix validation methods. In addition to this, the MRRs of both methods decreased when the number of attributes and *g* and *s* parameters increased. The performance of MRRs of the QMR method indicated perfect recovery for all design conditions when the *g* and *s* parameters were 0.1. However, SEM $\delta$-method MRRs values for the same *g* and *s* values started to deteriorate generally when the number of attributes increased.

**Table 2.** *The MRRs for 20 Items*

| | | SEM $\delta$-method | | | | | QMR method | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *N* | | | | | *N* | | | | |
| *K* | *g* and *s* | 250 | 500 | 1000 | 2000 | 4000 | 250 | 500 | 1000 | 2000 | 4000 |
| 10% misspecification of the Q-matrix | | | | | | | | | | | |
| 3 | 0.1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.99 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.96 | 1.00 | 0.97 | 0.97 | 0.97 | 0.97 | 1.00 | 1.00 | 0.99 | 1.00 |
| | 0.4 | 0.77 | 0.85 | 0.94 | 0.94 | 0.97 | 0.94 | 0.94 | 0.97 | 0.93 | 0.97 |
| | 0.5 | 0.67 | 0.69 | 0.68 | 0.71 | 0.71 | 0.91 | 0.93 | 0.90 | 0.93 | 0.90 |
| 4 | 0.1 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.97 | 0.98 | 0.98 | 0.98 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.91 | 0.96 | 0.96 | 0.96 | 0.96 | 0.93 | 0.97 | 0.98 | 1.00 | 0.99 |
| | 0.4 | 0.75 | 0.82 | 0. 90 | 0.93 | 0.97 | 0.93 | 0.95 | 0.98 | 0.95 | 0.98 |
| | 0.5 | 0.70 | 0.71 | 0.73 | 0.76 | 0.73 | 0.90 | 0.93 | 0.94 | 0.97 | 0.93 |
| 5 | 0.1 | 0.97 | 0.96 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.91 | 0.96 | 0.93 | 0.97 | 0.96 | 0.97 | 0.99 | 0.96 | 1.00 | 1.00 |
| | 0.3 | 0.88 | 0.94 | 0.96 | 0.96 | 0.97 | 0.97 | 0.98 | 0.98 | 0.96 | 0.98 |
| | 0.4 | 0.74 | 0.78 | 0.85 | 0.86 | 0.92 | 0.90 | 0.95 | 0.98 | 0.94 | 0.96 |
| | 0.5 | 0.70 | 0.72 | 0.70 | 0.73 | 0.71 | 0.88 | 0.92 | 0.93 | 0.94 | 0.92 |
| 20% misspecification of the Q-matrix | | | | | | | | | | | |
| 3 | 0.1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.98 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.92 | 0.93 | 0.94 | 0.93 | 0.95 | 0.96 | 0.95 | 0.99 | 0.95 | 0.98 |
| | 0.4 | 0.81 | 0.82 | 0.89 | 0.94 | 0.93 | 0.96 | 0.91 | 0.90 | 0.94 | 0.93 |
| | 0.5 | 0.65 | 0.66 | 0.68 | 0.66 | 0.68 | 0.87 | 0.87 | 0.87 | 0.87 | 0.87 |
| 4 | 0.1 | 0.98 | 1.00 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.94 | 0.95 | 0.95 | 0.97 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.89 | 0.94 | 0.95 | 0.96 | 0.94 | 0.92 | 0.95 | 0.94 | 0.95 | 0.97 |
| | 0.4 | 0.75 | 0.76 | 0.83 | 0.86 | 0.95 | 0.91 | 0.89 | 0.90 | 0.88 | 0.95 |
| | 0.5 | 0.66 | 0.66 | 0.68 | 0.70 | 0.71 | 0.82 | 0.84 | 0.84 | 0.88 | 0.88 |
| 5 | 0.1 | 0.92 | 0.94 | 0.92 | 0.96 | 0.93 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.92 | 0.92 | 0.92 | 0.93 | 0.95 | 0.98 | 0.95 | 0.98 | 0.95 | 0.98 |
| | 0.3 | 0.83 | 0.87 | 0.89 | 0.93 | 0.94 | 0.86 | 0.90 | 0.90 | 0.92 | 0.92 |
| | 0.4 | 0.70 | 0.76 | 0.79 | 0.82 | 0.86 | 0.87 | 0.89 | 0.90 | 0.88 | 0.88 |
| | 0.5 | 0.68 | 0.69 | 0.67 | 0.69 | 0.72 | 0.82 | 0.87 | 0.88 | 0.86 | 0.94 |

Notably, when the *g* and *s* parameters were 0.5, the QMR method generally provided values slightly higher than the base rates. In contrast, the SEM $\delta$-method provided values below the base rates under all design conditions. In study conditions where *g* and *s* parameters were 0.4, the MRRs of the SEM $\delta$-method was punished severely, but the increase in sample size mitigated this effect. However, under study conditions where *g* and *s* parameters were 0.5, the increase in sample size did not show this remedial effect for the SEM

δ-method prominently. The MRRs of the SEM δ-method were more severely affected by the increase of *g* and *s* parameters than the QMR method.

**Table 3.** *The MRRs for 40 Items*

| | | SEM δ-method | | | | | QMR method | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *N* | | | | | *N* | | | | |
| *K* | *g* and *s* | 250 | 500 | 1000 | 2000 | 4000 | 250 | 500 | 1000 | 2000 | 4000 |
| 10% misspecification of the Q-matrix | | | | | | | | | | | |
| 3 | 0.1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.97 | 0.98 | 0.99 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.4 | 0.82 | 0.92 | 0.96 | 0.98 | 0.96 | 0.91 | 0.97 | 0.95 | 0.97 | 0.93 |
| | 0.5 | 0.65 | 0.64 | 0.68 | 0.70 | 0.71 | 0.84 | 0.88 | 0.94 | 0.98 | 0.97 |
| 4 | 0.1 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.93 | 0.96 | 0.97 | 0.96 | 0.98 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 |
| | 0.4 | 0.75 | 0.80 | 0.90 | 0.96 | 0.96 | 0.90 | 0.92 | 0.95 | 0.96 | 0.94 |
| | 0.5 | 0.66 | 0.67 | 0.69 | 0.69 | 0.72 | 0.83 | 0.88 | 0.93 | 0.92 | 0.95 |
| 5 | 0.1 | 0.97 | 0.98 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.91 | 0.95 | 0.96 | 0.97 | 0.98 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.86 | 0.93 | 0.95 | 0.95 | 0.95 | 0.93 | 0.99 | 0.99 | 0.99 | 0.95 |
| | 0.4 | 0.73 | 0.78 | 0.83 | 0.91 | 0.92 | 0.87 | 0.95 | 0.94 | 0.94 | 0.93 |
| | 0.5 | 0.68 | 0.67 | 0.67 | 0.68 | 0.71 | 0.82 | 0.87 | 0.88 | 0.92 | 0.95 |
| 20% misspecification of the Q-matrix | | | | | | | | | | | |
| 3 | 0.1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.95 | 0.97 | 0.98 | 0.96 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.4 | 0.82 | 0.91 | 0.96 | 0.92 | 0.91 | 0.92 | 0.94 | 0.95 | 0.91 | 0.88 |
| | 0.5 | 0.60 | 0.63 | 0.67 | 0.66 | 0.67 | 0.76 | 0.82 | 0.93 | 0.88 | 0.87 |
| 4 | 0.1 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.96 | 0.98 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.90 | 0.93 | 0.94 | 0.95 | 0.97 | 0.95 | 0.99 | 1.00 | 1.00 | 1.00 |
| | 0.4 | 0.71 | 0.79 | 0.87 | 0.92 | 0.89 | 0.86 | 0.91 | 0.92 | 0.93 | 0.89 |
| | 0.5 | 0.65 | 0.65 | 0.67 | 0.68 | 0.68 | 0.81 | 0.84 | 0.87 | 0.88 | 0.90 |
| 5 | 0.1 | 0.96 | 0.97 | 0.99 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.2 | 0.89 | 0.92 | 0.94 | 0.97 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 |
| | 0.3 | 0.83 | 0.89 | 0.92 | 0.89 | 0.92 | 0.90 | 0.96 | 0.94 | 0.90 | 0.97 |
| | 0.4 | 0.73 | 0.73 | 0.79 | 0.88 | 0.88 | 0.87 | 0.88 | 0.85 | 0.91 | 0.89 |
| | 0.5 | 0.65 | 0.65 | 0.67 | 0.67 | 0.66 | 0.77 | 0.84 | 0.89 | 0.87 | 0.88 |

In general, while the other design conditions were fixed, notably under conditions where *g* and *s* were 0.5, the increase in the test length slightly increased the deterioration in SEM δ-method's MRRs. In contrast, this situation was less observed in the QMR method MRRs. Test lengths had little or no effect on the MRRs of both Q-matrix validation method. When other conditions were fixed, increasing the percentage of misspecification slightly worsened the MRR of both methods (maximum 0.07 for the SEM δ-method and 0.11 for the QMR-method).

### 3.2. Real Data

The fraction-subtraction test data (Tatsuoka, 1984) are widely used in cognitive diagnosis applications. This data set comprised dichotomous responses of 536 students to the 20 test items associated with eight attributes requiring the subtraction of fractions. Additionally, its arrangements consisting of 15 items associated with five attributes (Tatsuoka, 1990) were also analysed (DeCarlo, 2012; de la Torre, 2008; de la Torre & Douglas, 2008; de la Torre & Lee, 2010; Huang & Wang, 2014). However, DeCarlo (2012) points to uncertainties in the correct specification of some components in the Q-matrix of Tatsuoka's test data. In addition, Chiu (2013) stated that this Q matrix which involves eight attributes is not complete because not all possible attribute patterns are allowed to be described, and not every attribute is associated with at least one single-attribute item. The present study used a mathematics achievement test comprising ten items measuring four attributes and was administered to 2,918 6th grade students (Başokcu et al., 2018). It should also be noted that this Q-

matrix is also incomplete, but the number of potential attribute patterns that cannot be distinguished by the items (i.e., 9) is much smaller than Tatsuoka's fraction subtraction data (i.e., 198). The Q-matrix, *g*, and *s* parameters are shown in Table 4.

**Table 4.** *Q-Matrix and Item Parameter Estimations of Mathematics Achievement Test*

| | Attribute | | | | Estimates | |
|---|---|---|---|---|---|---|
| Item | 1 | 2 | 3 | 4 | $\hat{g}$ | $\hat{s}$ |
| 1 | 0 | 0 | 0 | 1 | 0.60 | 0.08 |
| 2 | 1 | 0 | 1 | 0 | 0.19 | 0.75 |
| 3 | 1 | 1 | 1 | 0 | 0.12 | 0.17 |
| 4 | 0 | 1 | 0 | 1 | 0.23 | 0.49 |
| 5 | 0 | 1 | 0 | 1 | 0.12 | 0.32 |
| 6 | 0 | 0 | 1 | 0 | 0.26 | 0.42 |
| 7 | 0 | 0 | 0 | 1 | 0.37 | 0.18 |
| 8 | 0 | 0 | 1 | 1 | 0.26 | 0.15 |
| 9 | 0 | 0 | 0 | 1 | 0.23 | 0.36 |
| 10 | 0 | 1 | 1 | 1 | 0.23 | 0.34 |

Initially, the analyses were performed using the original Q-matrix for Q-matrix validation. However, both Q-matrix validation methods did not suggest a modification to the original Q-matrix. Subsequently, the entries that indistinguishable response patterns by the original Q-matrix (e.g., 0000, 1000, 0100, 1100, etc.) were randomly changed by 10% and 20% to obtain misspecified Q-matrices. Both the Q-matrix validation methods' MRRs were at the base rate level in the analyses performed with misspecified Q-matrices.

## 4. Conclusion and Discussion

A Q-matrix reflecting the attributes and item design in cognitive diagnosis is the essential element determining the quality of the diagnostic feedback for the measuring tool. Therefore, Q-matrix has a crucial role in test development (de la Torre et al., 2010; Rupp & Templin, 2008). A Q-matrix constructed with the expert opinion is generally assumed to be correct. However, most problems with item parameter estimates, classification of respondents, and latent class sizes are related to Q-matrix design (DeCarlo, 2011; de la Torre et al., 2010). Therefore, instead of assuming that the Q-matrix is correct, it should be investigated by empirical scrutiny (de la Torre, 2008; de la Torre & Douglas, 2008). Empirical scrutiny has suggested some statistical methods to identify and refine the misspecifications in the Q matrix. This article evaluated the performance of the SEM δ-method (de la Torre, 2008) and QMR method (Chiu, 2013) under various study conditions. The conditions are the number of attributes, the number of examinees, the test lengths, the percentage of misspecified q-entries, and the guessing and slip parameters.

The simulation design results showed that the percentage of misspecification and the test lengths generally had a small or no effect on the MRRs of both Q-matrix validation methods. Chiu (2013) reported similar results for the percentage of misspecification on the effectiveness of the QMR method. In addition, the author noted that the effects of various factors on MRRs were the same for tests of different lengths ($J$ = 20, 40, and 80), but MRRs were higher than 20 items for tests of 40 and 80 items. Q-matrix validation is expected to be more difficult with a long test, as the number of misspecified Q-matrix entries increases with the number of items (or test length; Chiu, 2013).

In addition, simulation design results showed that overall, the larger sample sizes (or the number of examinees) improved the MRRs values of both methods. However, the remedial effect of sample size is minimal when *g* and *s* equal 0.1. In general, an increase in sample size is more effective on MRRs of the SEM δ-method. Chiu (2013) reported that a small sample size was sufficient (e.g., N = 100) for a high MRR in the QMR method. On the other hand, de la Torre (2008) fixed the sample size to 5,000 for the SEM δ-method. However, de la Torre et al. (2010) stated that a larger sample size provided a less biased estimation, but the improvement was not considerable. The authors reported that a sample size of 1,000 was adequate in affording true parameter estimation for the DINA model. Similarly, according to the MRRs obtained for both methods in the current study, it can be stated that a sample size of 1,000 is optimal.

The MRRs of both methods are affected by the number of attributes and *g* and *s* parameters. Chiu (2013) reported similar results on the number of attributes and *g* and *s* parameters. Notably, the deterioration in the

*g* and *s* parameters severely reduced the MRRs of both models. Among the study design conditions, the most crucial factor in the MRRs was the *g* and *s* parameter values. However, the MRRs of the QMR method generally were higher than the base rates for each study design condition. Therefore, it can be stated that the RSS-based Q-matrix validation method outperformed the SEM $\delta$-method. Dai et al. (2018) also reported similar results. This advantage of the QMR method is mainly due to the nature of it being a nonparametric method. The QMR method does not require the assumption of dependence on a possible suspicious parameter structure to determine test performance, nor does it require large sample sizes (Chiu, 2013).

On the other hand, the SEM $\delta$-method that can be considered an item discrimination index (IDI = 1- $s_j$ - $g_j$) considers both the *g* and *s* parameters. The increase in g and s parameters dramatically causes a decrease in MRRs. de la Torre (2008) stated that since the *g* and *s* parameters are utilized in calculating the posterior distribution, the misspecifications of the q-vector may reduce the approximation quality to this distribution.

The real data analysis results showed that both the Q-matrix validation methods' MRRs were at the base rate level. The Q-matrix used in the real data analysis is incomplete since not every attribute is represented by at least one single-attribute test item. The ideal item response patterns of the real data Q-matrix for the four attributes showed that only 7 of the $2^4 = 16$ potential attribute patterns could be recognized by items, but nine could not. Chiu (2013) stated that in real data analysis ($K = 8$, $J = 20$; Tatsuoka, 1984), the QMR method recovered 28.75% of misspecified q-entries. The author stated that this poor performance of the QMR method might be due to the fact that a relatively large number of attributes are measured with short tests.

On the other hand, de la Torre (2008) analysed fraction subtraction data ($K = 5$, $J = 15$; Tatsuoka, 1990) and 2003 NAEP 8th grade mathematics data ($K = 9$, $J = 90$) via the SEM δ-method and reported a reasonable model-data fit and misfit, respectively. In addition, de la Torre (2008) stated that even if the correct q-vector is used in the real data application for the SEM δ-method, there may not be a clear separation between the $\eta_j = 0$ and $\eta_j = 1$ groups because the correct q-vector and the estimated posterior distribution are used. The author stated that this limitation can be overcome if the q-vector contains more attributes than required. However, the practical implications for proposing to add more attributes to the Q-matrix than necessary are not yet clear in real test applications. Therefore, more research results are required under various conditions compatible with real data to have more in-depth information about Q-matrix validation methods' performance.

As a result, under simulation design conditions, the MRRs of the QMR method are generally higher than the SEM δ-method. Therefore, it can be said that the QMR method performs better than the SEM δ-method. Based on the study results, it can be recommended that CDM practitioners prioritize the QMR method in q-matrix validation. In addition, it may be suggested to use a sample size of 1,000 to validate Q-matrix with the DINA model. Since *g* and *s* parameters are effective in the performance of the MRRs of both methods, it is proposed to consider *g* and *s* values in Q-matrix validation. However, a large number of real data applications are needed to deepen our knowledge of the real data performance of the Q-matrix validation methods. Therefore, it can be suggested to compare the performances of the Q-matrix validation methods, specifically in real data sets where the number of attributes is relatively large, and the test length is short. The current research results are limited to the DINA model and dichotomous data sets, which show great interest in CDMs. It may be worthwhile to consider other CDM models (e.g., DINO model [Templin & Henson, 2006], reparametrized DINA [RDINA; DeCarlo, 2011], etc.), Q-matrix validation methods (e.g., Bayesian approach, etc.), and data sets (e.g., graded response data) in future research.

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# Developing a Financial Literacy Scale for Primary School Students: A Validity and Reliability Study

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ABSTRACT

This study aims to develop a valid and reliable measurement tool to determine the financial literacy levels of primary school 4th-grade students. The research sample consists of 567 4th-grade primary school students studying in the Kahta district of Adıyaman. The prepared scale items were sent to the field experts for content and opinion validity, and the scale was and finalized according to their feedback. As the second step, exploratory factor analysis (EFA) was performed to determine the scale's construct validity. As a result of the EFA, a draft scale consisting of 17 items and 3 sub-dimensions was obtained, which explained 40.9% of the total variance. The factor loads of these 17 items ranged from 0.439 to 0.840. Confirmatory factor analysis (CFA) was performed to verify this draft scale. According to the CFA results, the goodness of fit indices are as follows: $\chi 2/df = 1.138$, RMSEA = 0.023, GFI = 0.95, SRMR = 0.049, CFI = 0.98, and NFI = 0.82. The values found due to CFA show that the scale items were well validated. The significance of the item discrimination coefficients was tested using the test-retest reliability coewith fficient, lower and upper 27% values calculated to increase the scale's reliability. The Cronbach Alpha internal consistency coefficient was 0.77 for the overall scale and between 0.65 and 0.67 for the sub-dimensions. It can be said that the Financial Literacy Scale for Primary School Students, which was developed according to the results of the analysis, is valid and reliable.

Keywords:
Financial literacy, financial literacy skill, financial literacy education, social studies, primary school.

## 1. Introduction

Economy is a phenomenon that is found in various forms in all spheres of human life and is indispensable for people. The concept of finance in the context of economic activities is defined as a sector that provides opportunities for various purposes, such as purchases that people make to satisfy their wants and needs in daily life, or a comfortable life in retirement by converting their income into savings. Nowadays, people encounter finances in every moment of their lives.Therefore, people need to know how to manage their financial situations (Bayram, 2010).

Financial literacy is one of the concepts frequently used in studies conducted to help people gain the ability to manage their financial situations. There is no standard definition for the concept of financial literacy in the literature. It is called by different names from country to country and field to field. It is known as "financial capability" in the UK and Canada, whereas it is called "financial literacy" in the United Stateefficientalia and some countries. In addition, "financial awareness" and "financial education" appear as other denominations (Gökmen, 2012).

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Financial literacy has been defined in the literature in many ways. Remund (2010) defines financial literacy as the capacity to make rapid and correct judgments based on a comprehension of basic financial terms such as saving, borrowing, and investing, as well as an aptitude for long-term planning.According to another definition, financial literacy is the ability to read, analyze, and manage the process in financial circumstances effectively, so enabling individuals to achieve financial security. Due to this competency, individuals should be able to make sound financial judgments, debate monetary matters with ease, follow daily financial trends and carefully plan for the future (Vitt et al., 2000).Financial literacy skills are increasing due to the development in the world's financial markets and socioeconomic and political factors. As a result of the rapid development of technology, people can access investment tools from banks, intermediary institutions or through various ways from the internet. With the increase in their average life expectancy, people want to have savings to spend their lives comfortably when they retire. Saving, investing, using loans, or getting involved in banking systems have important financial consequences. With the effect of these results, many people in the Organization for Economic Co-operation and Development [OECD] countries are trading in financial markets. However, most of these people are caught unprepared for the financial problems they face (Temizel, 2010). In this case, individuals' financial literacy needs to be or must have been developed. People with advanced financial literacy abilities can understand their options in financial matters and make more wise financial decisions. They'll act in ways that put them in financial trouble. These people, who correctly evaluate the state of the economy, take logical actions to improve the quality of life for themselves and their family. These behaviors are crucial for national economies because they increase the proportion of people who are financially knowledgeable (Sargül, 2020).As financial literacy skills have gained importance for countries and people, financial literacy has been placed on the agenda. Although the terms "financial literacy" and "financial education" are often used interchangeably in the literature, it can be said that financial literacy is a process, and financial literacy emerges as a result of this process (Gökhan, 2012).Financial literacy education tries to gain the most basic skills such as raising people's awareness of financial issues, making more accurate decisions in the financial sector, using financial tools appropriately and effectively, and increasing their financial well-being by being informed about financial risks and fraud. In addition, it desires to achieve high-level targets such as countries' economic development and long-term financial stability by increasing savings (Adalar, 2020). Different programs can be applied in financial education, and education methods can be diversified. This difference and diversity aims to facilitate the access of different populations and target groups in financial literacy education to these training. Countries that adopt financial literacy education focus more on young people as the target audience. Countries especially try to provide such financial education in schools (OECD, 2013).

The necessity of providing financial education to all age groups in schools has increased, despite the fact that countries concerned with financial literacy education prioritize youth. Younger generations face greater financial risks than their parents since they utilize financial services such as bank accounts and credit cards more frequently. Therefore, basic financial subjects and education should be given at a much younger age. Although there are some difficulties in providing financial education, it is possible to say that starting these educations in schools as a national strategy will make an important contribution to the prevention of possible financial problems that may be encountered in the future (Turkiye Cumhuriyet Merkez Bankası, 2011).

For financial education to be more efficient, it is necessary to determine the data about the financial literacy level of individuals (Atkinson & Messy, 2012). The increase in the number of studies on financial literacy in recent years (Adalar, 2019; Çarıkçı, 2019; Goyal and Kumar, 2021; Gök and Coşkun, 2020; Kocabıyık and Teker, 2018; Morgan and Long, 2020; Meyer, 2020; Seyrek and Gül, 2017; Yılmaz and Elmas, 2016) show the importance given to this issue. It is seen that some of the studies in the literature are scale development or situation determination. When the studies are evaluated, it is revealed that data is mainly collected from secondary schools, high schools, universities, and adults through questionnaires (Akhan & Kılıçoğlu, 2014; Bayram, 2010; Baysa, 2015; Er, Temizel, & Sönmez, 2015; Goyal & Kumar, 2021; Sarıgül, 2020). In this context, it is noteworthy that there are studies conducted on primary school students (Çarıkçı, 2019; Çelikten & Doğan, 2020).

Although the number of financial literacy development trainings has increased globally and in Turkey, there is a growing emphasis on the importance of providing these trainings at a young age. In this context, the Ministry of National Education's inclusion of financial literacy as a skill that should be directly gained in the

4th-grade Social Studies Course in the 2018 Social Studies Course curriculum shows the importance of gaining this skill at a young age (Çekten and Doğan, 2020). This study aims to develop a valid and reliable measurement tool for measuring the level of financial literacy skills, where the importance of gaining it at an early age is increasing day by day. In line with this purpose, it aims to contribute to education by determining the needs for financial education in the country and abroad, with the data to be collected from primary school students. It is thought that the scale to be developed will be a comprehensive data collection tool, especially for primary school students and will contribute to the financial education given at the primary school level in Turkey.

## 2. Methodology

### 2.1. Research Model

This study aims to develop a valid and reliable scale to determine the financial literacy attitudes and behaviors of primary school fourth-grade students. In this study, survey model, one of the quantitative research methods, was used.

### 2.2. Research Sample

The sample of the scale development study consisted of 4th-grade primary school students studying in public primary schools in the centre of Kahta District of Adıyaman Province. A simple random sampling method was preferred while determining the sample in this study. In this method, each sample representing the universe has an equal chance of being selected (Büyüköztürk et al., 2019). In this direction, data were collected for research from 567 students, 294 students in the exploratory factor analysis study and 273 in the confirmatory factor analysis.

### 2.3. Data Collection Tools and Procedure

In the study, a literature review was conducted for measurement tools that can be used to determine the financial literacy levels of 4th-grade students. As a result of the literature review, it was seen that most of the studies on financial literacy (Akhan & Kılıçoğlu, 2014; Bayram, 2010; Baysa, 2015; Er, Temizel & Sönmez, 2015; Goyal & Kumar, 2021) were done in the high school and above age groups. As Sarıgül (2020) stated in his study, there was no study on the financial literacy of primary school students in domestic thesis studies. Talking about this shortcoming in their research, Çelikten and Doğan (2020) developed a 21-item scale to reveal the financial literacy information of primary school 3rd-grade, 4th-grade, and middle school 5th-grade students. Çelikten and Doğan's (2020) scale and other scales developed on high school students and adults in the literature (Collins & Urban, 2019; Güvenç, 2016; Sarıgül, 2015; Sorgente & Lanz, 2019) were examined to determine the theoretical structure in the research. In addition, semi-structured interviews were conducted with classroom teachers and students. As a result of these examinations, a new scale considering the scope of the research needed to be developed. While creating the item pool of the developed scale, data obtained from the scales in the literature (Collins & Urban, 2019; Güvenç, 2016; Sarıgül, 2015; Sorgente & Lan, 2019), interviews with classroom teachers and students, and the Primary School Social Studies Program were used to determine the theoretical structure. A 53-item question pool was created based on this information. The draft form of this scale was sent to field experts (Social Studies Education, Curriculum and Instruction, Assessment and Evaluation, Classroom Education and Classroom Teachers) to ensure content validity and determine its suitability for the student level. In line with the experts' feedback, six items that were interpreted as inappropriate were removed from the draft form, and the draft form was reduced to 47 items. In addition, some changes were made to the root of the item to understand them better (e.g., I finish my money very quickly was changed to I spend my money very quickly and I don't like to save money was changed to I like spending money more than saving money). The new draft form, created from these corrections, was applied to 42 4th-grade students for the pilot application. After the pilot application, data were collected to analyse the scale by evaluating the students' feedback.

### 2.4. Ethical

Ethics permission was obtained from the Anadolu University Ethics Committee and the Ministry of National Education for this study. The scale items were sent to experts in the field, and their opinions were taken about their suitability for primary-level students.

## 3. Findings

More than 5 times the number of items are needed for sample draft items to be applied in scale development studies (Cokluk, Şekercioğlu, & Büyüköztürk, 2012). 47 draft items were created in the study. Data were collected from 294 students for EFA. Kaiser Meyer Olkin (KMO) sample adequacy measurement and Bartlett's sphericity test were performed to see if the collected data were suitable for EFA. As a result of the test, the KMO value was 0.784; Bartlett's test is $\chi^2$ = 842,752; sd=136; It was calculated as p=0.00. If the result of this test is above 0.60, it indicates that the data are suitable for EFA. If this result is above 0.60, it can be said that the scores are normal (Büyüköztürk, 2019).

As a result of the EFA, a draft scale consisting of 17 items and 3 sub-dimensions was obtained, in which the total variance explained 40.9%. Considering that latent variables in social sciences can be affected by many observed or latent variables. As Çokluk, Şekercioğlu, Büyüköztürk (2016); and Karagöz, (2017) it is sufficient for the total explained variance to be between 40% and 60% for the studies in social sciences In the EFA analysis, the item factor load was entered as 0.40, and the promax horizontal rotation was used as the rotation process. Promax oblique rotation technique was used to test whether the scale was divided into different dimensions. The oblique rotation technique is preferred because there is a relationship between the dimensions that make up the scale. Based on the information in the literature, the oblique rotation technique is used when there is a relationship between the dimensions of the measurement tool (Kan, 2007). As a result of this process, 30 scale items with a factor load of less than 0.40, overlapping each other, and values less than 0.10 between two factors were removed from the draft scale. The remaining 17 items were named according to the factors in which they were included. The result of this analysis is shown in Table 1 below.

**Table 1.** *Financial Literacy Scale EFA Findings for Primary School Students*

| No | Items | Factor 1 %21,876 Planned | Factor 2 %9,923 Saving | Factor 3 %9,131 Extravagant | Correlation |
|---|---|---|---|---|---|
| 16 | I prepare a weekly plan for my expenses. | .710 | | | .499 |
| 20 | I make a shopping list when I go shopping with my family. | .787 | | | .436 |
| 22 | I help my family do their monthly budget. | .568 | | | .441 |
| 26 | While shopping, I check the expiry dates of the products. | .504 | | | .497 |
| 38 | I make sure that the packaging of the products I buy is recyclable. | .605 | | | .485 |
| 34 | If I borrow money from my friends, I pay it back. | | ,689 | | .368 |
| 35 | I use resources such as water, electricity and natural gas consciously at home or at school. | | .822 | | .470 |
| 43 | I save the pocket money I collect on holidays or special days. | | .629 | | .483 |
| 47 | I carefully use my belongings (such as shoes, clothes, notebooks, and pens). | | .664 | | .494 |
| 4 | When I have money, I spend it very quickly. | | | .439 | .533 |
| 11 | I spend all of my allowance the day I get it. | | | .603 | .570 |
| 13 | We can spend as much as we want with a credit card. | | | .840 | .338 |
| 14 | I would like to buy a product I want, even if it is expensive. | | | .573 | .462 |
| 23 | I pressure my family to comply with my wishes. | | | .543 | .541 |
| 10 | Even though I don't need it, I buy products that catch my attention (such as toys and fancy pens) from places such as canteens and markets. | | | .534 | .385 |
| 24 | I get very upset when my family doesn't buy my requests. | | | .587 | .463 |
| 46 | I spend the money I save for my wishes. | | | .459 | .494 |

When Table 1 is examined, it is seen that the factor loads of 17 items that make up the draft scale vary between .439 and .840, and the load of two items is less than .50 (0.439, 0.459). The scale-item correlations measured on

the scale ranged from .338 to .570. The draft scale was modeled in three factors, 17 items in total. The factors were named as the 1st Factor "Planned", the 2nd Factor as "Saving", and the 3rd Factor as "Extravagant". The financial literacy scale Scree Plot chart can be seen in Figüre 1 below.

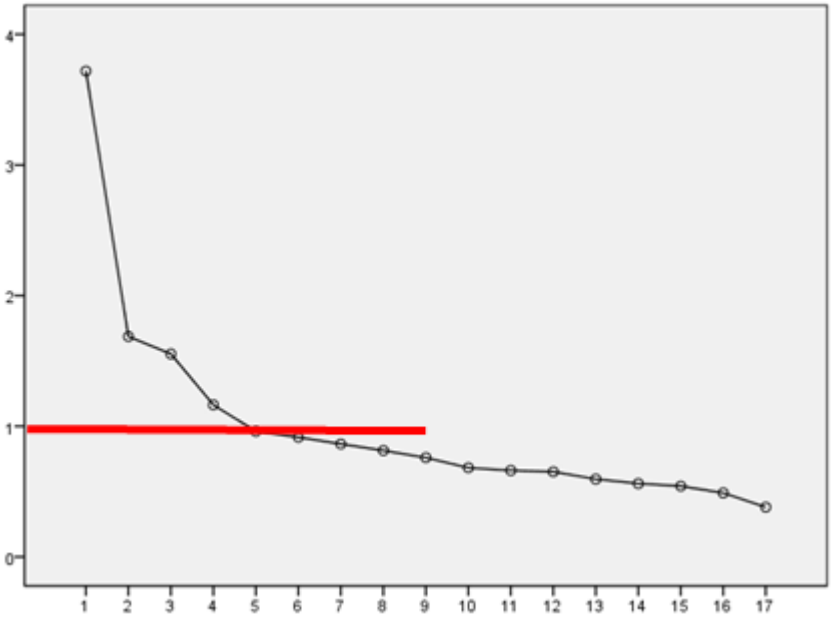


**Figure 1.** *Scree Plot*

The slope-slope graph is more important than the eigenvalue in interpreting the factor number and can also be used to decide the number of factors (DeVellis, 2014, pp. 128-129). When the graph given in Figure 1 is examined, it is seen that the cut-off point of the slope is at the fifth eigenvalue. According to this graph, it is revealed that the scale is four-dimensional. However, since the items in the third and fourth dimensions were very related to each other, it was decided to fix the scale in three factors.

To test the compatibility of the three-factor 17-item model determined after the EFA analysis in the research, data were collected from 285 4th grade students studying at schools in the city centre of Kahta, Adıyaman, except for the data used for the EFA analysis. Twelve of these scales were excluded from the analysis because they contain more than twenty per cent missing data. The remaining 273 data were used in confirmatory factor analysis. Confirmatory factor analysis tests and confirms the hypotheses made according to the analysis results previously found among the variables. For this purpose tests the factor structures found in the exploratory factor analysis (Özdamar, 2016, p. 231). The fit indices found from CFA are given in Table 2 below.

**Table 2.** *CFA Model Fit İndices of Primary School Financial Literacy Scale*

| Fit Criterion | Ideal Fit | Good Fit | Acceptable Fit | DFA |
|---|---|---|---|---|
| $\chi 2$ | p>0.10 | 0.05<p<0.10 | p<0.05 | 0.148 |
| $\chi 2$/df | <=2.00 | 2.00-5.00 | ---------- | 1.138 |
| RMSEA | 0-0.05 | 0.05-0.08 | ---------- | 0.023 |
| SRMR | 0-0.05 | 0.05-0.08 | ---------- | 0.049 |
| NFI | 1.00 | 0.95-1.00 | 0.90-0.94 | 0.82 |
| CFI | 1.00 | 0.95-1.00 | 0.90-0.94 | 0.98 |
| GFI | 1.00 | 0.90-1.00 | 0.85-0.89 | 0.95 |

As seen in Table 2, $\chi 2$/df (1.063) value and RMSEA (0.023) and SRMR (0.049) values, which constitute the analyses based on structural similarity functions, according to the values found after the confirmatory factor analysis performed, also showed an ideal fit. Ancillary criteria (NFI, CFI, GFI) values also provided a good and acceptable fit. After these evaluations, it can be said that the scale obtained valid results in structural terms (Özdamar, 2016). This shows that the values obtained from the exploratory factor analysis are confirmed by the values obtained from the confirmatory factor analysis. The DFA model is shown in Figure 2 below.

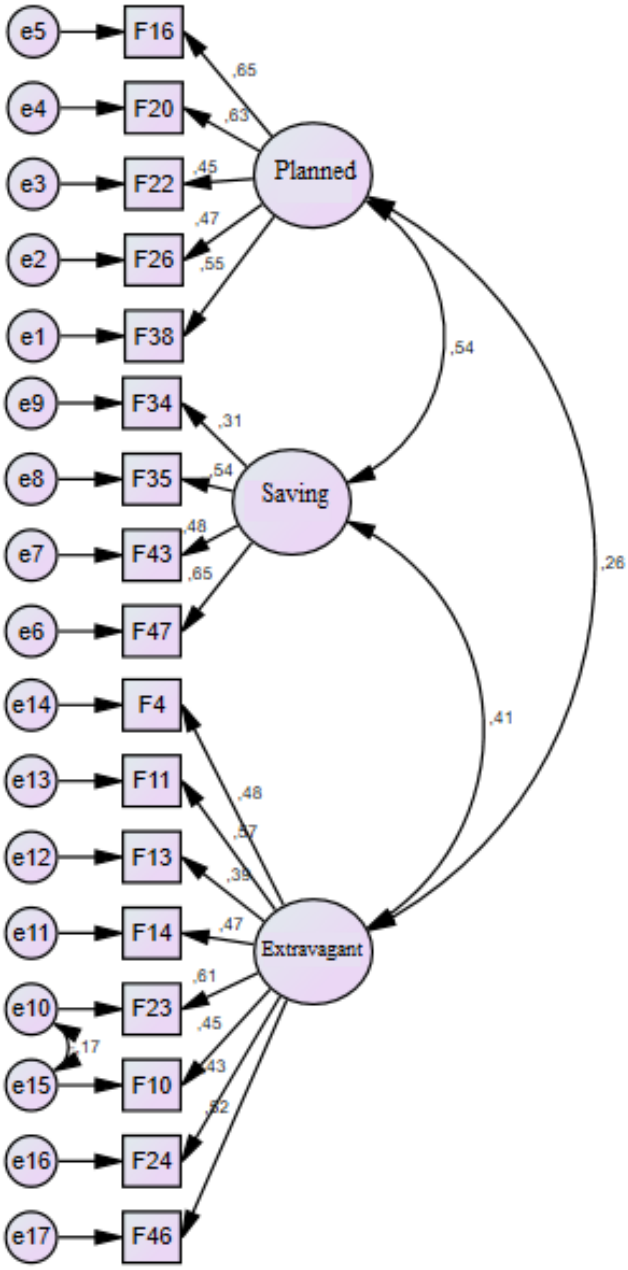


**Figure 2**. *Confirmatory Factor Analysis Model*

After the validity analyses of the Financial Literacy Scale for Primary School Students were completed, the reliability analyses of the scale were made. Büyüköztürk (2019) defines reliability analysis as the consistency of responses given by individuals to test items on a scale. Our study determined the Cronbach's alpha internal consistency coefficient and the upper group-subgroup formed by the item-total score correlation. The item analyses and test-retest correlation were calculated.

Table 3 displays the results of the t-test analysis comparing the difference between the item average scores of the lower 27 percent and upper 27 percent groups to the total score for each item.

**Table 3.** *Findings Regarding the Discrimination of Financial Literacy Draft Scale Items for Primary School Students*

| Item No | Groups | n | $\bar{X}$ | Ss. | Sd. | t |
|---|---|---|---|---|---|---|
| 16 | Upper Group | 73 | 1.77 | 0.768 | 0.089 | 10.09** |
| | Lower Group | 73 | 2.78 | 0.446 | 0.052 | |
| 20 | Upper Group | 73 | 1.97 | 0.74 | 0.086 | 9.15** |
| | Lower Group | 73 | 2.84 | 0.371 | 0.043 | |
| 22 | Upper Group | 73 | 2.03 | 0.662 | 0.077 | 7.90** |
| | Lower Group | 73 | 2.74 | 0.47 | 0.055 | |
| 26 | Upper Group | 73 | 2.34 | 0.727 | 0.084 | 6.19** |
| | Lower Group | 73 | 2.91 | 0.376 | 0.044 | |
| 38 | Upper Group | 73 | 2.07 | 0.764 | 0.089 | 8.36** |
| | Lower Group | 73 | 2.89 | 0.313 | 0.036 | |
| 34 | Upper Group | 73 | 2.69 | 0.618 | 0.072 | 3.06** |
| | Lower Group | 73 | 2,95 | 0.327 | 0.038 | |
| 35 | Upper Group | 73 | 2.62 | 0.59 | 0.069 | 4.65** |
| | Lower Group | 73 | 2.97 | 0.232 | 0.027 | |
| 43 | Upper Group | 73 | 2.43 | 0.664 | 0.077 | 6.64** |
| | Lower Group | 73 | 2.97 | 0.163 | 0.019 | |
| 47 | Upper Group | 73 | 2.46 | 0.706 | 0.082 | 6.19** |
| | Lower Group | 73 | 2.99 | 0.116 | 0.014 | |
| 4 | Upper Group | 73 | 2.19 | 0.655 | 0.076 | 8.14** |
| | Lower Group | 73 | 2.91 | 0.338 | 0.039 | |
| 11 | Upper Group | 73 | 2.28 | 0.712 | 0.083 | 7.67** |
| | Lower Group | 73 | 2.96 | 0.199 | 0.023 | |
| 13 | Upper Group | 73 | 2.41 | 0.701 | 0.081 | 5.49** |
| | Lower Group | 73 | 2.91 | 0.295 | 0.034 | |
| 14 | Upper Group | 73 | 2.19 | 0.715 | 0.083 | 7.53** |
| | Lower Group | 73 | 2.89 | 0.313 | 0.036 | |
| 23 | Upper Group | 73 | 2.41 | 0.739 | 0.086 | 6.08** |
| | Lower Group | 73 | 2.96 | 0.199 | 0.023 | |
| 10 | Upper Group | 73 | 2.31 | 0.701 | 0.081 | 5.53** |
| | Lower Group | 73 | 2.84 | 0.371 | 0.043 | |
| 24 | Upper Group | 73 | 1.95 | 0.617 | 0.072 | 7.11** |
| | Lower Group | 73 | 2.62 | 0.516 | 0.06 | |
| 46 | Upper Group | 73 | 1.91 | 0.725 | 0.084 | 8.43** |
| | Lower Group | 73 | 2.76 | 0.463 | 0.054 | |

***p<0.001*

When Table 3 is examined, the average scores of each item in the scale differ significantly between the upper and lower groups. This differentiation may show us that the items in the scale adequately distinguish the upper and lower groups in terms of the measured feature.

Table 4 shows the relationship between the overall scale and its sub-dimensions.

**Table 4**. *The Relationship Between the Overall Scale and Its Sub-dimensions*

| Factors | Planned | Saving | Extravagant | Total |
|---|---|---|---|---|
| Planned | 1 | .288 | .303 | .730 |
| Saving | | 1 | .301 | .634 |
| Extravagant | | | 1 | .800 |
| *p<0,01 | | | | |

As seen in Table 4, the correlation value between the overall scale and its sub-dimensions ranged from .634 to .800. It is seen that the correlation between the whole scale and its sub-dimensions is significant.

Examining the consistency of the entire scale and its subdimensions, the alpha internal consistency coefficient was computed. Table 5 displays the Cronbach's Alpha Coefficient Values for the Overall Scale and its Subdimensions.

**Table 5**. *Cronbach's Alpha Coefficient Values for the Overall Scale and its Sub-dimensions*

| | Factors | Number of Items | Cronbach Alfa Coefficients | Spearman-Brown Coefficients | Guttman-Split half Coefficients |
|---|---|---|---|---|---|
| 1 | Planned | 5 | .65 | .64 | .63 |
| 2 | Saving | 4 | .67 | .66 | .66 |
| 3 | Extravagant | 5 | .67 | .65 | .65 |
| Scale Overall | | 17 | .76 | .71 | .70 |

As can be seen in Table 5, the Spearman-Brown coefficient for the overall scale was .71, the Guttman- Split half coefficient for the overall scale was 0.70, the Cronbach's alpha coefficient for the overall scale was 0.77. It is seen that the Cronbach alpha coefficient of the sub-dimensions takes values between 0.65 and 0.67. There are various discussions about the acceptable limit of the Cronbach's alpha coefficient in the literature. Chakrapani (2004) states that the acceptable limit of the Cronbach's alpha coefficient is 0.50 and above. Bowling (2014), on the other hand, states that an acceptable limit of at least 0.50 in subscales with a small number of items may be sufficient in terms of internal consistency. When the Cronbach alpha coefficients of the sub-dimensions are examined, the sub-dimensions of "Planned Individual", "Saving Individual", "Extravagant Individual" are within limits accepted in the literature ($\alpha \geq 0.60$). The overall scale's coefficient is within the limits of "good" in terms of reliability (Salvucci, Walter, Conley, Fink, & Saba, 1997 as cited in Tan, 2010). According to the results of the content validity, construct validity, and reliability calculations, it can be said that the scale is valid and reliable.

## 4. Conclusion and Discussion

The purpose of this study was to design and develop a financial literacy scale for elementary school students to determine the attitudes and behaviours of fourth grade elementary students regarding financial literacy with a valid and reliable measurement tool. The literature states that it is very important to acquire and develop financial literacy at an early age (Holden, Kalish, Scheinholtz, Dietrich, and Novak 2009; Russia Trust Fund, 2013, cited in Çelikten and Doğan, 2020). When the literature is examined, it is noteworthy that the majority of studies on financial literacy are conducted with high school students and older individuals (Collins & Urban, 2019; Güvenç, 2016; Sarıgül, 2015; Sorgente & Lanz, 2019). It is seen that it is more functional and important to gain financial literacy skills early. Adding financial literacy skills to the 4$^{th}$-grade Social Studies Curriculum by the Ministry of National Education indicates that importance is given to developing this skill starting from primary school. However, when the studies on financial literacy in Turkey are examined, it becomes clear that there is a need for studies involving primary school students (Çarıkçı, 2019; Çelikten & Doğan, 2020). It is thought that the theoretical examination of the studies, scanning of documents, examination of the primary school social studies course curriculum, analysis of the data obtained from the interviews with the teachers and students, and the addition of a new scale to the literature when the data that can be added to the studies are reached, will contribute positively to future studies in this field.

For this purpose, the validity and reliability study of the 47-item scale, which was prepared to measure the attitudes and behaviours of primary school students regarding financial literacy, was conducted. A draft scale consisting of 17 items and 3 subdimensions was created in which 40.9% of the total variance could be explained from the EFA result conducted as part of the validity study. While naming the scale sub-dimensions (Planned, Saving, Extravagant) was used, the qualitative semi-structured research that the researcher made with teachers and students, based on the literature (Collins, & Urban, 2019; Çelikten & Doğan, 2020; Güvenç, 2016; Sarıgül, 2015; Sorgente & Lanz, 2019), benefited from the results of the negotiations. The values calculated as a result of the CFA analysis of the scale ($\chi^2$/sd=1.38, RMSEA=0.023, GFI=0.95, AGFI=0.93, SRMR=0.049, RMR=0.017, CFI=0.98) confirmed the construct validity of the scale. It is seen that it has an acceptable fit index (Özdamar, 2016). In the correlation test performed to check the scale's validity, it was observed that the relationship between the overall scale and the scale's sub-dimensions was positive and significant ($p<0.01$), and the scale-item correlation for the scale items values varied between .34 and .57. It can be said that the validity of the items found is high, and it is suitable for measuring the financial literacy attitudes and behaviours of primary school students. In the scale reliability analysis, the Cronbach's alpha coefficient found for the whole scale was 0.762, the coefficients of the sub-dimensions were between 0.65-.69, and according to the degree of safety preferred by the education and social sciences practitioners ($0.60 \leq \alpha < 0.75$) is among the generally accepted reliability level values in scales (Özdamar, 2017). In addition, the Spearman-Brown

coefficient was found to be .71 for the whole scale, and the Guttman-Split half coefficient for the whole scale was 0.70. The significance of the item discrimination coefficients was tested using the lower and upper 27% values and the test-retest reliability coefficient to increase the scale's reliability. The values found show that the scale is reliable.

- Considering the results of the above data analysis, the Financial Literacy Scale for Primary School Students has sufficient validity and reliability to be utilized in research on the attitudes and behaviors of primary school students about financial literacy. During the phase of scale development, the theoretical structures of comparable scales found in the literature, the perspectives of the classroom teachers and fourth-grade students, and the Social Studies Curriculum were utilized.Recommendations
- In future study, the opinions of parents and elementary school pupils at varying grade levels can be elicited in order to generate new expressions. Schools with low, moderate, and high socioeconomic levels might be selected for the sample. These schools' students can be investigated separately and will contribute to the literature in the future.

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# Examining the Relationship between Teachers' Self-Compassion, Forgiveness, and Psychological Resilience*

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ABSTRACT

The purpose of this study is to examine the relationship between teachers' self-compassion, forgiveness, and resilience. For this purpose, a total of 410 volunteer teachers, 222 women and 188 men, working in schools affiliated to the Ministry of National Education were reached. In the study, in which the relational screening model was used, the "Personal Information Form," the "Self-Compassion Scale," the "Heartland Forgiveness Scale," and the "Psychological Resilience Scale" were applied to the teachers. Pearson product moment correlation coefficient analysis, independent samples t-test, one-factor analysis of variance (ANOVA), and Kruskal-Wallis H-test were used to analyze the data. According to the data obtained from the study, there is a statistically significant relationship between teachers' self-compassion, forgiveness, and resilience. In addition, it was found that the scores for self-compassion and forgiveness differed significantly depending on the variables of gender and birth order, forgiveness depending on the variable of marital status, self-compassion and psychological resilience depending on the variable of seniority, and psychological resilience depending on the variable of industry. The results of the study were discussed, and suggestions for future studies were presented.

Keywords:
Self-compassion, forgiveness, psychological resilience

## 1.Introduction

Daily life can bring many problems with it. Sadness, failure, and challenging events are inevitable parts of life. Minor changes in the attitudes and perspectives of the individual in these and similar problems are taken into account in mental health studies (Burns, 2018). It is important to have good feelings and inner resources to overcome difficulties (Mert & Balcı, 2019; Neff, 2003a). Recent research in the field of mental health shows that positive self-evaluation and developing a healthy and useful attitude contributes to the individual's realization of his potential and using it at a high level (Akın, 2008). Even in the most challenging situations or traumas, the individual has the capacity to cope (Gillham & Seligman, 1999). Discovering inner resources and making them meaningful enables people to be better helped in difficult situations (Bluth et al., 2016; Erkoç, 2017; Gable & Haidt, 2005). With the positive psychology movement, the discovery and development of personal characteristics such as gratitude, hope, compassion, forgiveness, and psychological Resilience, which are protective and healing in negative situations, have become important (Neff et al., 2007).

### 1.1.Self-Compassion

Self-compassion can be defined as the attitude an individual takes toward themselves in times of difficulty and distress that is not harsh or cruel but rather kind, understanding, loving, and nonjudgmental; this is because the person recognizes that others have had similar experiences and is present in the moment without

* This study is derived from the master's thesis.

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internalizing their pain (Neff, 2003a).The concept of self-compassion, conceptualized by Neff (2003a), which aims to achieve a positive emotional state by accepting oneself, enables a person to establish a relationship with their self (Neff & McGehee, 2010). A caring, sensitive and understanding approach is displayed toward individuals who have had challenging experiences in interpersonal relationships (Neff & Germer, 2017). Showing a similar approach to oneself when needed is considered self-compassion (Barnard & Curry, 2011). With self-compassion, an alternative perspective is gained that contributes to developing healthier and more useful attitudes (Kirkpatrick, 2005). Questioning what is needed during challenging experiences and seeking answers are frequently used in explaining self-compassion (Germer & Neff, 2019). With self-compassion, the individual is aware of his feelings even if they are challenging, he touches them instead of escaping and breaking away from them, and he desires to heal himself in an understanding way (Barnard & Curry, 2011). Thus, it can be said that self-compassion plays a buffer role in negative experiences and supports the development of positive emotions (Bluth et al., 2016; Leary et al., 2007; Uyanık & Çevik, 2020).

Self-compassion includes the awareness that one can make mistakes and experience difficulties as a necessity of being human without feeling alone by isolating oneself from the outside world; self-judgment, in which the individual shows an understanding, loving, and accepting approach without harshly scolding himself for mistakes or shortcomings; isolation; and overidentification; all of which work against one another (Albertson, Neff ve Dill-Shackleford, 2014; Kirkpatrick, 2005; Neff, 2003b). Different aspects of self-compassion exist conceptually, but they are all expressed as part of the same experience that mutually develops, overlaps, and interacts with itself (Neff, 2003b; Neff & Dahm, 2015).Self-compassion is not synonymous with self-pity, selfishness, powerlessness, laziness, or narcissism. Contrary to the aforementioned negative concepts, it is stated that they contribute positively to subjective well-being and mental health (Neff & Germer, 2017). Results of research show that it is related positively to being happy, optimistic thinking, enjoying life, and being motivated.

**1.2.Forgiveness**

It is easier for an individual whose approach to themself is understanding, kind and affectionate to exhibit similar approaches to their environment. Compassionate attitude as human behavior is also exhibited to other individuals in painful and challenging experiences (Neff & Pommier, 2012). At this point, forgiveness is considered as another feature that is among the positive personality traits such as self-compassion and contributes to well-being. It is stated that forgiveness, which is the subject of many disciplines, has an important place in the repair of human relations (McCullough, 2000; Taysi, 2007a). People are not perfect and can make mistakes (Neff, 2003b). It is considered important to examine the personality trait of forgiveness in resolving conflicts in both personal and interpersonal relationships, replacing negative feelings and cognitions with positive ones. Based on the idea that all people are worthy of compassion, the walls between individuals can be destroyed. (Neff & Dahm, 2015). The individual can forgive their inadequacies and sensitivities and can respect both themself and others for what they have (Neff & Germer, 2017).

Most of the studies have a common view that forgiveness includes loving people in its base (McCullough & Witvliet, 2002; Rye, 2005). An individual who develops a perspective of forgiveness in a hurtful situation consciously turns his emotions from negative to neutral or positive (Gündüz, 2014). Thus, it is ensured to get out of the situation with the least damage. The idea of taking revenge against the mistake or damage in the relationships is abandoned, positive ones replace negative feelings, and a healthy and constructive relationship process is established (Bugay, 2010; Çoklar & Dönmez, 2014; Strelan & Covic, 2006). As with self-compassion characteristics, healthy cognitive developments such as decreasing anxiety and depressive state and increasing hope are also observed with forgiveness approaches (Rye, 2005). In the sub-dimensions of forgiveness, the individual's forgiving themself for mistakes or failures, forgiving the other person is hurtful and damaging situations, and forgiving situations that occur independently of people are discussed (Thompson et al., 2005; Worthington et al., 2017). Understanding forgiveness correctly is considered important in preventing conceptual confusion. There is a consensus that forgiveness does not mean an obligatory duty, condoning, forgetting the negativity experienced or acting as if it never happened, compromising, or ignoring (Taysi, 2007a; Thompson et al., 2005).

In addition, forgiveness becomes easier in disturbing situations through factors such as empathy, forgiveness, and secure attachment. (Taysi, 2007a; Worthington, 1998). Forgiveness, which is a dynamic feature, plays an

important role in healthier relationships and the development of coping skills in challenging experiences of the individual as a social being. (Bannink, 2013; Hall & Fincham, 2008).

**1.3.Psychological Resilience**

A person may be exposed to many experiences with negative features that stumble, worry, and shake throughout his life (Doğan, 2015). In these challenging experiences, some individuals may have difficulties in overcoming the process, while others can overcome it even if they have difficulties. It is stated that the individual's inner resources make it easier to cope with difficult situations (Gillham & Seligman, 1999).

In addition to positive personality traits such as self-compassion and forgiveness, Rpsychological resilience is also considered as one of the sources of resistance an individual has against difficult situations (Doğan, 2015; Işık, 2016). Psychological Resilience contributes to personal orientations and attitudes such as self-confidence, finding meaning in life and taking responsibility, which support and encourage the individual's relations with others in challenging experiences (Friborg et al., 2003). The individual is searching for meaning despite the uncertainties with psychological Resilience, which has its roots in the existential approach and is handled more with the positive psychology approach (Maddi, 2004). An individual who is aware of their actions and takes responsibility for it, does not alienate himself, and sees difficulties as situations that can be controlled rather than weakness, becomes more psychologically resilient (Işık, 2016; Terzi, 2005). Psychological Resilience, such as self-compassion in the ups and downs of life, also acts as a buffer against stress, contributing to the increase of the individual's success and controlling the behaviors (Narad, 2018). An individual with high psychological Resilience, who is aware of and can control his/her feelings, thoughts and behaviors, uses healthier ways in his relationship with themself (Bannink, 2013). The individual who experiences challenging situations gains immunity against possible experiences with their Resilience. As a positive personality trait that can be learned and developed, the sub-dimensions of psychological resilience are expressed as attachment ( devotion ), which enables individuals to be active in their own lives and find meaning through achieving the goal, a challenge that makes it easier to see control and experiences that express the belief that they can influence the outcome of situations, not as a threat but as an opportunity to develop (Işık, 2016; Terzi, 2005).rIndividuals who are successful in overcoming the period when faced with difficult situations have different personality traits compared to individuals who cannot cope with it (Narad, 2018). Self-compassion, forgiveness and resilience as internal capitals that enable the attitudes shown to turn into positive ones and develop the ability to overcome are included as positive personality traits that are heavily researched in the literature. An individual with a high level of self-compassion may first exhibit a loving attitude in their approach to themself. Thus, he/she tends to forgive himself/herself and those around him/her, and thanks to the strength he has gained, he/she will be more psychologically resistant to difficulties.

Positive personality traits have emerged as important subjects with the positive psychology approach. Self-compassion, forgiveness and psychological Resilience of individuals are considered important in challenging life situations. When the related literature is examined, it can be said that a high level of self-compassion can lead to a high level of forgiveness and psychological Resilience, thus protecting psychological health. The fact that studies on self-compassion, forgiveness and psychological Resilience, which are among the positive personality traits, are new, and these traits contribute to positive outcomes such as life satisfaction, psychological well-being, less anxiety and depression, has revealed the need to examine the relationships between them. In addition, teachers significantly impact children's lives at every stage of education. It is thought that psychologically healthy teachers who have developed positive personality traits can contribute positively to the personality development of students and can cope with difficulties in the work environment more easily.

For this reason, it was deemed important to study teachers' positive personality traits together. This study is considered to have a unique value as it is the first study to examine teachers' self-compassion, forgiveness and psychological resilience levels together. In light of this information, the purpose of the study was to examine the relationship between teachers' levels of self-compassion, forgiveness, and psychological resilience, as well as the influence of demographic factors on these variables. In this regard, it is anticipated that it will make a significant contribution to the body of knowledge by providing clear data on the relationship between variables.

## 2. Methodology

### 2.1. Research Model

This study employs a correlational survey design to investigate the relationship between teachers' levels of self-compassion, forgiveness, and psychological resilience. Relational screening models, one of the general screening models, are research models that seek to identify the presence and/or magnitude of change between two or more variables (Karasar, 2014, p.81).In studies where correlations are discussed, it is important in terms of revealing the relationships between variables, providing information about the level of these relationships, and expressing the guidelines needed for high-level studies on relationships (Büyüköztürk et al., 2016). The study also compares teachers' self-compassion levels, forgiveness characteristics, and psychological resilience levels in terms of some demographic variables.

### 2.2. Research Group

The study sample consists of a total of 410 volunteer teachers, 222 women, and 188 men, working in schools affiliated to the Ministry of National Education in the town of Tusba in Van province in the 2020-2021 academic year. In addition, 8 of the teachers were single, 132 were older, 161 were middle and 109 were younger children. 360 teachers have bachelor's degrees, 45 have master's degrees and 5 have doctorate degrees. Among the teachers, 74 were psychological counsellors, 58 were classroom teachers, 42 were Turkish, 24 were special education and 18 were preschool teachers. 192 of the teachers have been working for 5 or less years, 141 for 6 to 10 years, 35 for 11 to 15 years, and 42 for 16 or more years.

### 2.3. Data Collection Tools and Procedure

'Personal Information Form', 'Self-Compassion Scale', 'Heartland Forgiveness Scale' and 'Psychological Resilience Scale' were used as data collection tools.

*Personal Information Form:* It was developed by the researchers and included questions about gender, age, marital status, number of siblings, birth order, level of education that is taught, branch, seniority, education level, professional satisfaction, and income level.

*Self-Compassion Scale:* The Turkish adaptation of the scale developed by Neff (2003a) was carried out by Akın, Akın and Abacı (2007). The scale consists of a five-point Likert scale, 6 dimensions and 26 items. In the calculation of the scale, items 3, 4, 5, 7, 10, 11, 15, 16, 19, 20, 24, 25 and 26 are reverse coded. Evaluation of the scale can be made for each sub-dimension and the total score. Scores of 1-2.5 indicate low, 2.5-3.5 moderate, and 3.5-5 indicate high levels of self-compassion. The analyzes showed that the use of the scale in this study gave reliable results ($\alpha$= .94, Table 1).

*Heartland Forgiveness Scale:* The Turkish adaptation of the scale developed by Thompson et al. (2005) was made by Bugay and Demir (2010). The scale consists of a seven-point Likert scale, 3 sub-dimensions and 18 items. Items 2, 4, 6, 7, 9, 11, 13, 15 and 17 of the scale are reverse coded. The scale gives a total forgiveness score, and a high score from scale indicates a high level of forgiveness. The analyzes showed that the use of the scale in this study gave reliable results ($\alpha$= .88, Table 1).

*Psychological Resilience Scale:* The scale developed by Işık (2016) consists of a five-point Likert scale, 3 sub-dimensions, and 21 items. Items 2 and 15 of the scale are reverse coded. The scores obtained from the sub-dimensions of the scale, along with the total score for the level of psychological resilience, are operable. The scale's high scores indicate a high degree of psychological resilience. Analyses revealed that the scale used in this study produced reliable results (=.86, Table 1).

### 2.4. Data Analysis

To test the relationships among teachers' levels of self-compassion, forgiveness, and resilience and the effects of demographic characteristics on the variables, the statistical program for social sciences (SPSS 24.0) package program, a, was used.Since the skewness and kurtosis values were between -2.0 and +2.0 (Table 1), it was determined that the data showed normal distribution, and it was decided to use parametric tests (George & Mallery, 2010). Based on the results of Levene's homogeneity test, the Independent Sample t-Test was used for two-category variables with homogeneously distributed variances, One-Way Analysis of Variance (ANOVA) was used for variables with more than two categories, and the Kruskal Wallis-H Test was used for variables

with more than two categories that lacked homogeneity.Post Hoc Bonferroni test, one of the multiple comparison tests, was used to examine the source of intergroup variables. Pearson Product Moment Correlation Coefficient Analysis was used to analyze the relationship between self-compassion, forgiveness, and resilience variables.

**Table 1.** *Normal Distribution Assumptions and Reliability Analysis Results*

| | Skewness | Kurtosis | Cronbach Alpha |
|---|---|---|---|
| Self-Compassion | -0.253 | -0.276 | 0.945 |
| Forgiveness | 0.105 | -0.187 | 0.880 |
| Psychological Resilience | -1.064 | 1.050 | 0.861 |

In Table 1, the skewness kurtosis values range from -0.253 to -0.276 for self-compassion, 0.105 to -0.187 for forgiveness, and -1.064 to 1.050 for psychological resilience. Since the data obtained were in the range of -2.0 to +2.0, it was determined that the data were normally distributed. In addition, as a result of the reliability analysis, it was determined that self-compassion (⍵=0.945), forgiveness ((⍵=0.880) and psychological resilience ((⍵=0.861) scales gave reliable results in the study.

### 2.5. Ethical

Before the research, permission to use the scales was obtained from the authors via e-mail. After Van Yüzüncü Yıl University Ethics Committee Approval was obtained, legal permissions were obtained from the Provincial Directorate of National Education (Van Yüzüncü Yıl University Social and Human Sciences Publication Ethics Committee, 27.03.2020, 2020/02-07). The teachers in the sample group were reached through the electronic environment by providing the necessary information. The personal information of the teachers participating in the study was not collected, and the confidentiality of the collected data was taken care of.

## 3. Findings

In this part of the study, statistical analyses of the data collected in relation to the examined variables were performed and the findings obtained are explained below.

**Table 2.** *Analysis Results Regarding Self-Compassion Variable*

| Scale | Variables | | $\bar{x}$ | Levene's test F | Levene's test p | t | F | p | Significant Difference |
|---|---|---|---|---|---|---|---|---|---|
| Self Compassion | Gender | Female | 3.20 | | | | | | |
| | | Male | 3.51 | | | | | | |
| | | Total | | 3.571 | 0.060 | -4.640 | | 0.000 | 2>1 |
| | Birth Order | Middle Sibling | 3.49 | | | | | | |
| | | Little Sibling | 3.16 | | | | | | |
| | | Total | | 0.156 | 0.926 | | 5.402 | 0.001 | 3>4 |
| | Branch | Psychological Counselor | 3.22 | | | | | | |
| | | Primary School Teacher | 3.21 | | | | | | |
| | | Turkish Teacher | 3.27 | | | | | | |
| | | Special Education Teacher | 3.61 | | | | | | |
| | | Preschool Teacher | 3.47 | | | | | | |
| | | Total | 3.34 | 1.464 | 0.128 | | 1.330 | 0.192 | |
| | Seniority | 5 and Less Year | 3.42 | | | | | | |
| | | 6-10 Year | 3.22 | | | | | | |
| | | Total | | 1.950 | 0.121 | | 2.524 | 0.057 | 1>2 |
| | Educational Level | Preschool | 3.37 | | | | | | |
| | | Primary School | 3.22 | | | | | | |
| | | Secondary School | 3.39 | | | | | | |
| | | High School | 3.30 | | | | | | |
| | | Total | 3.34 | 1.247 | 0.290 | | 1.371 | 0.243 | |

(Gender: 1=Female, 2=Male), (Birth Order: 3=Middle Sibling, 4=Little Sibling), (Branch: 1=Psychological Counselor, 2=Primary School Teacher, 4=Turkish Teacher, 7=Special Education Teacher, 10=Preschool Teacher), (Seniority: 1=5 and Less Year, 2=6-10 year), (Educational Level: 1=Preschool, 2=Primary School, 3=Secondary School, 4=High School)

When Table 2 is examined, the self-compassion levels of male ($\bar{x}$=3.51) teachers were significantly higher than those of female ($\bar{x}$=3.20) teachers. Among the teachers, the self-compassion levels of the middle child ($\bar{x}$=3.49) are higher than those of the younger children ($\bar{x}$=3.16).

It was determined that teachers' self-compassion levels do not differ according to the branch variable (F=1.330; p>0.05).

The self-compassion levels of the teachers who have been working for 5 or less years ($\bar{x}$=3.42) were higher than those of the teachers who had been on duty for 6 to 10 years ($\bar{x}$=3.22).

Finally, teachers' self-compassion levels do not differ according to the level of education (F=1.371; p>0.05).

**Table 3.** *Analysis Results Regarding Forgiveness Variable*

| Scale | Variables | | | Levene's test | | | | | Significant |
|---|---|---|---|---|---|---|---|---|---|
| | | | $\bar{x}$ | F | p | t | F | p | Difference |
| Forgiveness | Gender | Female | 4.57 | | | | | | |
| | | Male | 4.76 | | | | | | |
| | | Total | | 2.243 | 1.135 | -2.125 | | 0.830 | 2>1 |
| | Birth Order | Middle Sibling | 4.82 | | | | | | |
| | | Little Sibling | 4.50 | | | | | | |
| | | Total | | 1.127 | 0.338 | | 3.540 | 0.015 | 3>4 |
| | Branch | Psychological Counselor | 4.75 | | | | | | |
| | | Primary School Teacher | 4.4 | | | | | | |
| | | Turkish Teacher | 4.6 | | | | | | |
| | | Special Education Teacher | 4.88 | | | | | | |
| | | Preschool Teacher | 4.78 | | | | | | |
| | | Total | 4.66 | 1.498 | 0.115 | | 1.330 | 0.192 | |
| | Seniority | 5 and Less Year | 4.73 | | | | | | |
| | | 6-10 Year | 4.61 | | | | | | |
| | | Total | 4.66 | 1.438 | 0.231 | | 0.909 | 0.437 | |
| | Educational Level | Preschool | 5.04 | | | | | | |
| | | Primary School | 4.57 | | | | | | |
| | | Secondary School | 4.68 | | | | | | |
| | | High School | 4.58 | | | | | | |
| | | Total | 4.66 | 0.918 | 0.453 | | 1.299 | 0.27 | |

(Gender: 1=Female, 2=Male), (Birth Order: 3=Middle Sibling, 4=Little Sibling), (Branch: 1=Psychological Counselor, 2=Primary School Teacher, 4=Turkish Teacher, 7=Special Education Teacher, 10=Preschool Teacher), (Seniority: 1=5 and Less Year, 2=6-10 year), (Educational Level: 1=Preschool, 2=Primary School, 3=Secondary School, 4=High School)

When Table 3 is examined, the levels of forgiveness of male ($\bar{x}$=4.76) teachers were found to be significantly higher than those of female ($\bar{x}$=4.57) teachers. Forgiveness levels of teachers with middle children ($\bar{x}$=4.82) are significantly higher than those of teachers with younger children ($\bar{x}$=4.50).

It was seen that the forgiveness levels of teachers did not differ statistically significantly according to the branch variable (F=1.330; p>0.05). Teachers' forgiveness levels do not differ according to the length of service variable (F=0.909; p>0.05). It was concluded that teachers' levels of forgiveness did not differ according to the level of education (F=1.299; p>0.05).

When Table 4 was examined, teachers' psychological resilience levels did not differ statistically significantly according to gender variable (t=-1.1231; p>0.05). It was seen in Table 4 that the psychological resilience levels of teachers did not differ according to the birth order variable (F=0.509; p>0.05).

When Table 4 is examined, it is seen that psychological resilience levels differ according to the branch variable. The resilience levels of special education teachers ($\bar{x}$=3.36) are higher than those of counselors ($\bar{x}$=3.08), primary school teachers ($\bar{x}$=2.9) and Turkish ($\bar{x}$=3.09) teachers. In addition, the resilience levels of preschool teachers ($\bar{x}$=3.36) were higher than those of classroom teachers ($\bar{x}$=2.9).

**Table 4.** *Analysis Results Regarding the Resilience Variable*

| Scale | Variables | | | Leneve's test | | | | | | Significant Difference |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $\bar{x}$ | F | p | t | $X^2$ | F | p | |
| Psychological Resilience | Gender | Female | 3.10 | | | | | | | |
| | | Male | 3.15 | | | | | | | |
| | | Total | 3.12 | 0.047 | 0.829 | -1.123 | | | 0.262 | |
| | Birth Order | Middle Sibling | 4.82 | | | | | | | |
| | | Little Sibling | 4.50 | | | | | | | |
| | | Total | 4.66 | 1.127 | 0.865 | | | 0.509 | 0.677 | |
| | Branch | Psychological Counselor | 3.08 | | | | | | | |
| | | Primary School Teacher | 2.9 | | | | | | | |
| | | Turkish Teacher | 3.09 | | | | | | | 7>1 |
| | | Special Education Teacher | 3.36 | | | | | | | 7>2 |
| | | Preschool Teacher | 3.36 | | | | | | | 7>4 |
| | | Total | | 3.536 | 0.000 | | 40.970 | | 0.000 | 10>2 |
| | Seniority | 5 and Less Year | 3.14 | | | | | | | |
| | | 6-10 Year | 3.19 | | | | | | | |
| | | 11-15 Year | 2.9 | | | | | | | 1>3 |
| | | 16 and More Year | 2.98 | | | | | | | 2>3 |
| | | Total | | 1.346 | 0.259 | | | 5.451 | 0.001 | 2>4 |
| | Educational Level | Preschool | 3.39 | | | | | | | |
| | | Primary School | 2.97 | | | | | | | 1>2 |
| | | Secondary School | 3.16 | | | | | | | 1>3 |
| | | High School | 3.12 | | | | | | | 1>4 |
| | | Total | | 4.764 | 0.001 | | 18.421 | | 0.000 | 3>2 |

(Gender: 1=Female,2=Male), (Birth Order: 3=Middle Sibling, 4=Little Sibling), (Branch: 1=Psychological Counselor, 2=Primary School Teacher, 4=Turkish Teacher, 7=Special Education Teacher, 10=Preschool Teacher), (Seniority: 1=5 and Less Year, 2=6-10 year, 3=11-15 year, 4=16 and More Year), (Educational Level: 1=Preschool, 2=Primary School, 3=Secondary School, 4=High School)

The psychological resilience levels of teachers who have been on duty for 5 years or less ($\bar{x}$=3.14) are higher than those of teachers who have been on duty for 11 to 15 years ($\bar{x}$=2.9). It was also found that the resilience scores of teachers who have been in service for 6 to 10 years ($\bar{x}$=3.19) are higher than those of teachers who have been in service for 11 to 15 years ($\bar{x}$=2.9) and 16 years ($\bar{x}$=2.98).Finally, the resilience levels of preschool teachers ($\bar{x}$=3.39) were found to be higher than those of primary school ($\bar{x}$=2.97), secondary school ($\bar{x}$=3.16) and high school ($\bar{x}$=3.12) teachers.

**Table 5.** *Pearson Moments Product Correlation Analysis Results*

| Scale | | 1 | 2 | 3 |
|---|---|---|---|---|
| 1-Self-Compassion | r | 1 | | |
| | p | | | |
| 2-Forgiveness | r | 0.768** | 1 | |
| | p | 0.000 | | |
| 3-Psychological Resilience | r | 0.425** | 0.439** | 1 |
| | p | 0.000 | 0.000 | |

**p<0.01

As seen in Table 5, teachers' self-compassion and forgiveness levels were positively correlated (r=0.768, p<0.01), self-compassion and resilience levels were positively correlated (r=0.425, p<0.01), and forgiveness and resilience levels were positively correlated (r=0.439, p<0.01). All of the above mentioned correlations were statistically significant. In the light of the findings, it can be stated that as the level of self-compassion increases, the levels of forgiveness and psychological Resilience will also increase. In addition, it can be stated that as the level of forgiveness increases, the level of psychological Resilience will also increase.

**4. Conclusion and Discussion**

In this study, the relationship between teachers' self-compassion, forgiveness, and resilience levels was examined, and statistically significant positive correlations were found in the light of the findings. We can say that as teachers' self-compassion levels increase, their forgiveness levels may also increase. When the relevant literature is examined, similar results are found in our study (Asıcı, 2013; Mistler, 2010; Neff, 2003b; Neff & Germer, 2012; Neff & Pommier, 2012; Oral, 2016; Sarıçam & Biçer, 2015; Skoda, 2011). In their studies, Neff and Germer (2017) also state that self-compassion is related to forgiveness. The loving and kind attitude that the individual will show to himself will also be shown to others. This approach will also bring forgiveness alongside. Karataş and Uzun (2021) talk about the predictive effect of self-compassion on forgiveness in their research. Humans may behave in error by nature, and in such cases, they may approach themselves and those around them without using judgmental and accusatory language with their self-compassionate and forgiving personality traits. In the case of difficult experiences in the school environment, the teachers' compassionate approach to themselves with a self-compassionate attitude will facilitate their tendency to forgive because they are free from emotions such as greed and revenge. Thus, we can say that it will be easier for them to manage the process with less harm and in a functional way.

We can say that as teachers' self-compassion levels increase, their psychological resilience levels may also increase. The results of our study agree with the results of similar studies in the literature (Bolat, 2013; Kıcalı, 2015; Leary et al., 2007; Neff & McGehee, 2010; Neff & Pommier, 2012; Thompson & Waltz, 2008; Yağbasanlar, 2018). For example, in a five-stage study conducted by Leary et al. (2007), it was explained that self-compassion plays a buffer role against negative feelings towards oneself due to sad experiences. Self-compassion contributes to the individual's acceptance of his responsibilities, regulating negative emotions, and resilience with positive approaches by recognizing the situation rather than getting lost in the experience.

We can say that teachers' psychological resilience increases as their forgiveness increases. Although there are studies that are consistent with the results of our study, it was found that the number of studies on two variables in the literature is small (Çapan & Arıcıoğlu, 2014; Doğruer, 2019; Dwiwardani et al., 2014; Halilova et al., 2020; Yaşar, 2015). With the forgiveness trait, the individual can more easily regulate his feelings and thoughts and obtain personal resources to adapt to changing situations. The forgiveness trait contributes to the feeling of stronger and increasing the psychological resilience of the individual who approaches challenging experiences from a different perspective.

The findings of our study show that teachers' self-compassion and forgiveness levels differ according to the gender variable. Some studies have reached similar results in the relevant literature (Bluth et al., 2016; Cleare et al., 2019; Gülmez, 2019, Neff, 2003a; Yarnell et al., 2015). There are also studies in which self-compassion and forgiveness do not differ significantly by gender (Bolat, 2013; İkiz & Totan, 2012; Kirkpatrick, 2005; Neff et al., 2005; Soyer, 2010; Taysi, 2007a; Worthington et al., 2017). The fact that studies were carried out in different ages, environments, and cultures may have been the source of the differences in the research results. The increase in women's self-consciousness during adolescence may affect the decrease in self-compassion. In addition, it was thought that the judgments about gender roles could prevent women from showing compassion to themselves. In addition, the fact that women are more exposed to negative experiences such as sexual harassment and abuse than men may be effective in their low self-compassion and forgiveness.

Another finding of our study shows that the level of self-compassion and forgiveness differs among teachers according to birth order.As far as it was examined, there were no studies examining the relationship between birth order and self-compassion. There was only one study (Bayın, 2020) examining the relationship between birth order and forgiveness, and as a result, it was seen that there was no difference. Based on Adler's view that a family's parenting skills for their first child and their approach and skills for their second or later child differ, it can be stated that an individual cannot have the same environment even if they were born in the same house (Kayacı & Özbay, 2016). In this respect, it is thought that birth order is distinctive in positive personality traits such as self-compassion and forgiveness.

Another outcome of this study indicates that the psychological resilience of instructors varies by industry variable. In analyzing the pertinent literature, it was discovered that there are few studies. Several research (Kılınc, 2013; Sezgin, 2012; Soyer, 2010) show that there is no statistical difference between psychological resilience and the industry variable.There is also a study in which the psychological resilience of classroom

teachers is higher than that of other branch teachers (Yalçın, 2013). In the light of the findings, it is thought that the trainings received by special education and preschool teachers contribute to their psychological resilience. It was thought that the activities of special education teachers contributed to their psychological resilience during the crises experienced by students with special education needs from time to time. In addition, when the audience the preschool teachers address is considered, it can be interpreted that their psychological resilience increases in the difficulties they encounter. Also, it is thought that individuals with psychological resilience traits tend to choose branches that require resilience such as special education and preschool teaching.

The findings of our study show that teachers' self-compassion and resilience levels differ according to the variable of seniority. Studies concluding that psychological resilience varies with tenure have been identified in the literature (Akgün, 2021; Er, 2018). In addition, research indicates that self-compassion (Atl, 2019) and psychological resilience (Atalay, 2020; Kılınc, 2013; Sezgin, 2012; Ucar, 2014) are not affected by seniority information. In light of the fact that the teachers who participated in the study entered the workforce after enduring adversity, were involved in various business groups prior to entering the workforce, or were unemployed and faced financial and psychological difficulties, it is possible that the adversity may have contributed to the compassionate approach and psychological resilience of teachers with a few years of experience. In addition, it can be stated that as teachers' duty hours increase, their exposure to multiple stressors and the resulting burnout reduces their psychological resilience.Another finding of our study is that the psychological resilience of teachers differs statistically significantly according to the education level they work. In the literature, a study examines similar variables together and expresses similar results (Atlı, 2019). It is thought that challenging factors that preschool teachers face, such as preschool teachers working with a small age group compared to other branches, dealing with the same students for only one year, the fact that family participation is very important in this age period, and this situation brings with it many difficulties, affect the high resilience of the relevant teachers. Moreover, it is thought that teachers working at the secondary school level, which coincides with the adolescence period, have many difficulties in addition to other branches. Since the secondary school teachers can cope with these challenges, the psychological resilience, one of the positive personality traits, may have been higher than that of primary school teachers.

**5. Limitations**

This study is limited to the data collected from 410 teachers working in schools affiliated to the Ministry of National Education in the Tuşba district of Van province in the 2020-2021 academic year and who were reached online. Within the scope of the research, the participants' self-compassion, forgiveness and psychological resilience levels are limited to the characteristics measured by the Self-Compassion Scale, Heartland Forgiveness Scale and Psychological Resilience Scale.

**6. Recommendations**

This study found statistically significant positive correlations between teachers' self-compassion, forgiveness and psychological resilience. In addition, statistically significant relationships were found between gender and birth order and self-compassion and forgiveness, branch and resilience, seniority and self-compassion and resilience, and education level and resilience. Based on the results and findings of the research, various suggestions have been made to the researchers.

It is understood that female teachers have low levels of self-compassion and forgiveness. Accordingly, individual and group studies can be conducted to increase female teachers' self-compassion and forgiveness levels. According to the birth order, it can be suggested to conduct studies to support the development of self-compassion and forgiveness levels of teachers with younger siblings and psychological resilience levels of teachers who have been on the job for a long time. It may be recommended to conduct individual or group counseling, psycho-education, and workshops for these teachers. Educational content and social activities can be planned to improve the psychological resilience of teachers working at different levels of education. In addition to the cross-sectional evaluation in our study, longitudinal studies can be conducted to reach more comprehensive information. To create an in-depth profile for teachers, it is recommended to conduct qualitative studies in addition to quantitative studies. In future studies, it is thought that conducting studies on individuals in different professional groups will contribute to the field. Similar studies can be conducted with teachers in different regions to investigate the relationships between variables. Based on the outputs of

our study, it is recommended that the content to be planned for teachers should be integrated into teachers' professional work calendars.

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# A Bibliometric Analysis of Research on Teacher Emotions

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ABSTRACT

This study mainly aims to reveal the bibliometric profile of research on teacher emotions. To this end, the study sought answers to seven research questions, including the most frequently used keywords and their relation networks, the frequency distribution of articles by country and the collaboration network between countries, the frequency distribution by years and the number of citations, the most prolific scholars, the most cited articles, the frequency distribution of articles by WoS categories, and the most prolific universities. The study employed the bibliometric method. The data were limited to the Web of Science and retrieved only from this database. The first search yielded a total of 598 publications. However, those who did not satisfy the criteria were excluded, and the analysis was conducted on the remaining 521 publications. The findings of the study can be summarized as follows. 255 keywords were used at least twice in the articles (excluding search terms). The top five keywords were "emotion regulation, teacher education, teaching, teacher identity, and emotional labour." The researchers who published on teacher emotions were from 54 different countries, and the five countries with the most publications were the United States, China, Germany, Australia, and England.The most publications were in 2019. The top ten most prolific scholars published 70 articles, and the most cited articles were published in 2011. As for categories, two-thirds of the articles were in “education educational research”. The most prolific institution was the University of Munich. The study also provided bibliometric maps, figures, tables, and graphs to illustrate the findings. It can be concluded that teacher emotions are associated with various disciplines. Although there is increasing research on teacher emotions, which has been ignored for a long time, teacher emotions as a research field is in its infancy. As the interest in teacher emotions increases, knowledge will accumulate, and the research capacity will be strengthened.

Keywords:
Teacher emotions, bibliometric analyses, web of science.

## 1. Introduction

Emotions are discussed in different disciplines, such as psychology, sociology, neurology, behavioural sciences, education, and economics (Küpers & Weibler, 2008). As expected, the authors emphasized various aspects of emotions handled from different perspectives in these disciplines. For this reason, emotions are one of the concepts whose definition is still controversial in the literature (Schuman & Scherer, 2014). In other words, it has been challenging to reach a consensus on the conceptualization of emotions (Chen, 2019a; Ellsworth & Scherer, 2003). However, in literature, some definitions come to the fore. Emotions are relatively short-term, perceptual, experiential, operational, and communicative patterns that emerge in response to physical and social challenges or opportunities (Keltner & Gross, 1999). Mulligan and Scherer (2012) defined emotions as episodic processes that begin and end at a particular time.

Emotions are essential for individuals’ daily lives and are also integral to organizational life (Oplatka & Arar, 2018). The literature reveals that emotions are intertwined with organizational life (Brotheridge & Lee, 2008).

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Schools are emotionally intensive organizations (Hargreaves, 1998; Pekrun, 2009), and teachers' emotions are at the forefront in schools (Farouk, 2012). As stated, emotions, which are at the centre of organizational life, have been ignored for a long time despite their emphasized importance (Atmaca et al., 2020; Frenzel et al., 2016). Because research on the professional development of teachers was primarily dominated by approaches that treated teachers from a rational perspective, they considered the emotional aspect of the teaching profession unimportant (Chen & Cheng, 2021). However, although teachers are thought to display their behaviours and reactions by filtering them through reason and logic, they are influenced by emotions (Goleman, 1995). The number of studies on teacher emotions, which have been ignored for decades, has increased recently (Burić, 2019; Chen, 2019b; Chen & Cheng, 2021). Recognition of various aspects of education in the light of developments in the literature has played a significant role in this growing interest (Chen et al., 2020). Emotions are essential in teachers' instructional behavior and students' academic success (Chen, 2019a; Burić & Frenzel, 2021). The findings that teacher emotions were influential on student emotions contributed to increasing interest in this research field (Brown et al., 2018; Frenzel et al., 2021; Linnenbrink & Pintrich, 2002; Yoon, 2002). Additionally, it can be said that teacher emotions play a critical role in pedagogical practices, change processes, power relations in schools, and understanding of social structures (Zembylas, 2011). Teacher emotions are considered an indispensable part of teaching (Hargreaves, 1998) and significantly improve the teaching and learning process (Gross & John, 2003).

There are various conceptualizations of teacher emotions in literature, as in emotions generally. One of the most commonly referred definitions of teacher emotions in literature was put forward by Farouk (2002). The researcher defined teacher emotions as "*internalized sensations that remain inert within the confines of their bodies but are integral to how they relate to and interact with their students, colleagues, and parents*." In literature, teacher emotions were categorized as positive and negative (Sutton & Wheatley 2003). However, the literature addressed them as multidimensional within these two main categories (Chen, 2021). For example, "*enjoyment*, *anger*, *anxiety* (Frenzel et al., 2010)"; "*joy*, *love*, *sadness*, *anger*, and *fear* (Chen, 2016)"; "*enjoyment*, *anger*, *anxiety*, *pride* (Hong et al., 2016)"; "*joy, satisfaction*, *love, fatigue*, *anger, hopelessness* (Burić et al., 2018)"; "*enjoyment*, *anger*, *anxiety*, *pride, hope*, *disappointment* (Dilekçi, 2018)"; "*anxiety*, *happiness*, *anger*, *pride*, *hope* and *despair*, *exhaustion*, *shame*, and *guilt* (Gramipour et al., 2019)" are among them. Since positive teacher emotions have a great potential to affect students' motivational, affective, and behavioural aspects and academic outcomes (Burić, 2019), teachers' experiencing positive emotions is essential for the efficiency and effectiveness of educational processes in schools (Dilekçi & Limon, 2022; Pekrun, 2009). Additionally, emotions are closely associated with teachers' well-being (Gross & John, 2003) and significantly contribute to teachers' professional development (Chen, 2021; Osman, 2017). On the other hand, negative emotions restrict teachers' thinking skills (Leithwood & Beatty, 2008), cause them to experience professional burnout (Kenworthy et al., 2014), and significantly reduce students' chances of benefiting from learning approaches offered by teachers (Linnenbrink-Garcia & Pekrun 2011). Shortly, teacher emotions significantly affect students, teaching, learning, and teachers themselves (Chen, 2019b; 2021).

The study by Sutton & Wheatley (2003) has become a milestone in emotion literature, and the number of studies has increased since then (Chen & Cheng, 2021). This increase has created an accumulation of knowledge regarding teacher emotions globally. It is emphasized that this accumulation is sufficient to be dealt with through a bibliometric analysis (Chen 2019b; Chen, 2021; Chen & Cheng, 2021; Fried et al., 2015). In this sense, this study aims to manifest bibliometric profiles of the articles on teacher emotions. When the literature is examined, it is seen that the number of bibliometric studies aimed at teachers has increased, apart from teacher feelings (Çiftçi et al., 2016; Gülmez et al. 2021; Sönmez, 2020; Sönmez & Bozdoğan, 2020). The study identifies the most prevalent keywords and their network of relationships, the countries where the majority of studies were conducted and their networks, the number of publications and citations by year, the most prolific scholars, the most cited articles, and the classification of articles according to WoS Core Collection categories and universities. To this end, the study sought answers to the following questions:

Q1. *What are the most frequently used keywords in articles about teachers' emotions, and which keywords are included with which other keywords on the web?*

Q2. *Which countries are the articles on teacher emotions most frequently published, and with which other countries are these most frequently linked?*

Q3. *What is the frequency distribution of articles on teacher emotions by years and the number of citations?*

Q4. *Who are the most prolific scholars in teacher emotions?*

Q5. *What are the most cited/most influential articles on teacher emotions?*

Q6. *What is the articles' classification on teacher emotions based on WoS Core Collection categories?*

Q7. *Which universities publish the most articles on teacher emotions?*

## 2. Methodology

### 2.1. Research Model

The primary purpose of this study is to reveal the bibliometric profiles of the articles on teacher emotions. To this end, data mining was conducted on primary data sources, and descriptive analyses were employed. A bibliometric analysis was used (López López, 1996; Salini, 2016), which is a quantitative method to analyze bibliographic data associated with limited literature (Hallinger & Kovačević, 2019). Bibliometric analysis is integral to the research evaluation methodology (Ellegaard & Wallin, 2015).

### 2.2. Research Sample, Data Collection Tools and Procedure

The study included the research on teacher emotions indexed in ISI Web of Science (WoS Core Collection), and scanning was conducted on February 8, 2022.

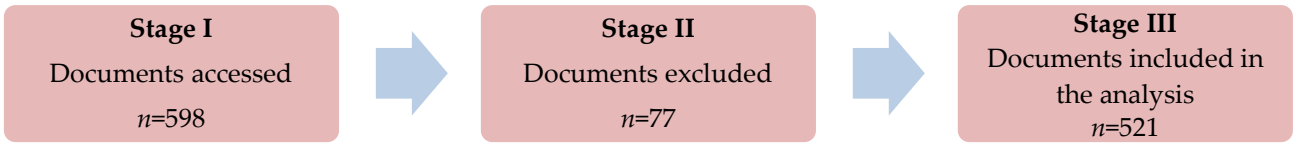



**Figure 1.** *Stages of Data Collection*

The following terms were used for the search: "*Teacher emotion*," "*Teachers emotion*," "*Teacher's emotion*," "*Teacher emotions*," "*Teachers emotions*," "*Teacher's emotions*," "*Teacher feeling*," "*Teachers feeling*," "*Teachers feeling*," "*Teacher feelings*," "*Teachers feelings*," "*Teachers feelings*," "*Teachers mood*," "*Teachers mood*," "*Teacher's mood*," "*Teachers moods*," "*Teachers moods*," "*Teacher's moods*," "*Teacher affect*," "*Teachers affect*," "*Teacher's affect*," "*Teacher affects*," "*Teachers affects*," "*Teacher's affects*." The terms were searched together and using the "OR" link. The results were added to the WoS marked list ($n$=598). In the second stage, we excluded the documents which were "*Early access* ($n$=42)", "*Book chapters* ($n$=34)", "*Proceedings paper* ($n$=1)". During this stage, all articles' title, abstract, and keywords were checked. A total of 521 articles were reached as of 1986. Since the number of publications and citations in 2022 was unclear, 2022 was excluded from the analysis.

### 2.3. Validity and Reliability

The study included only the WoS to reach high-quality articles as an database. The search results were also added to WoS marked list. On the other hand, WoS database indicates that the findings were objective and could be presented descriptively easily.

### 2.4. Data Analysis

The articles included in the study were selected considering the criteria of "*dealing with teacher emotions and being indexed in WoS*." The *VOSviewer* was employed to answer the first and second research questions (Arts, 2020); *Microsoft Office Excel 2020* for descriptive statistics regarding the fourth and fifth research questions; the "*Analyze Results*" menu of WoS for the third, sixth, and seventh research questions. Bibliometric analysis was conducted within the first research question (the frequency of keywords and their network), excluding the 24 keywords in the first search and the concepts such as teacher, emotion, feeling, affect, and mood. They were excluded to make the bibliometric map in Figure 2 more understandable, and articles on teacher emotions stand out more clearly.

### 2.5. Ethical

The data were obtained from WoS. The data analysis was conducted through *VOSviewer*, *Microsoft Office Excel 2020*, and the *Analyze Results* menu on the WoS website, not requiring an ethics committee's permission.

## 3. Findings

Q1. *What are the most frequently used keywords in the articles on teacher emotions, and which are most frequently included in the network of relations with other keywords?*

Figure 2 below shows the keywords and their relationship network.

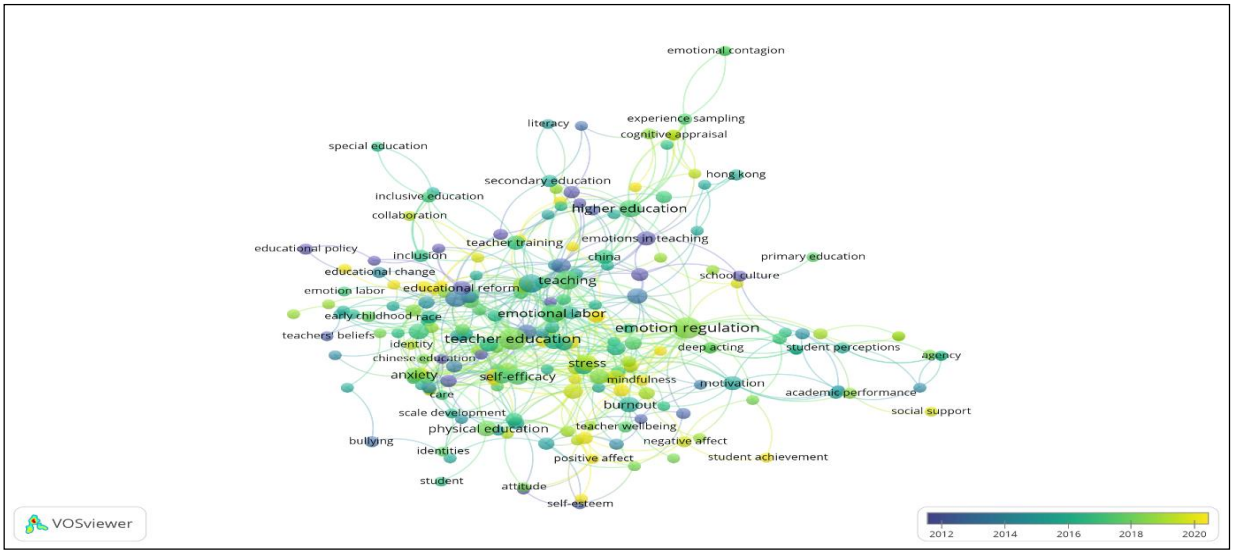



***Figure 2.*** *Analysis of Keywords*

As Figure 2 shows, there were 255 keywords used at least twice in 521 articles (excluding search terms). The most frequent 5 keywords were *"emotion regulation (f=27)"*, *"teacher education (f=27)"*, *"teaching (f=17)"*, *"teacher identity (f=16)"*, and *"emotional labor (f=15)"*. Considering Total Link Strength, the first five keywords are the same. However, the order changed among themselves. It was as follows *"emotion regulation (f=35)"*, *"teacher education (f=27)"*, *"teaching (f=27)"*, *"emotional labor (f=25)"* and *"teacher identity (f=24)"*. The term *"teacher identity"* was used more frequently than *"emotional labor"*; however, *"emotional labor"* has more links with other keywords. Two keywords were used together at most four times in the articles. These are *"anger"* and *"enjoyment."* The keywords used together three times in the articles are *"teacher education and student-teacher," "anxiety and enjoyment," "emotion regulation and teacher wellbeing", "emotional labor and emotion regulation", "emotion labor and emotional rules"*, and *"emotional labor and China."* These findings indicate that the articles mostly focus on teacher education, teacher identity, learning, emotion regulation, and emotional labor. As for types of emotions, the studies mostly focus on *"anger," "anxiety,"* and *"stress."*

Q2. *In which countries are the articles on teacher emotions most frequently published, and which countries are these most frequently linked?*

Figure 3 below presents the countries where most articles were published on teacher emotions and their relation network.

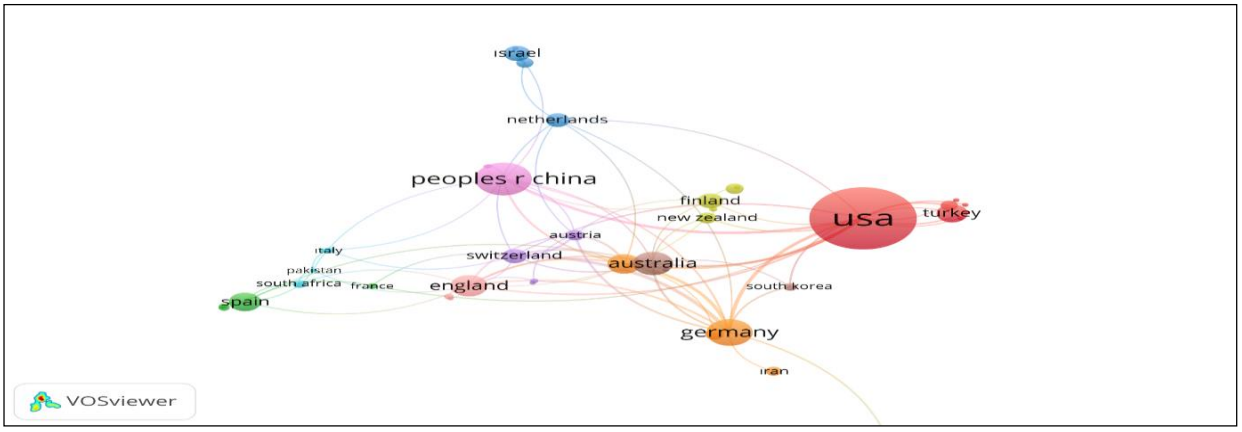
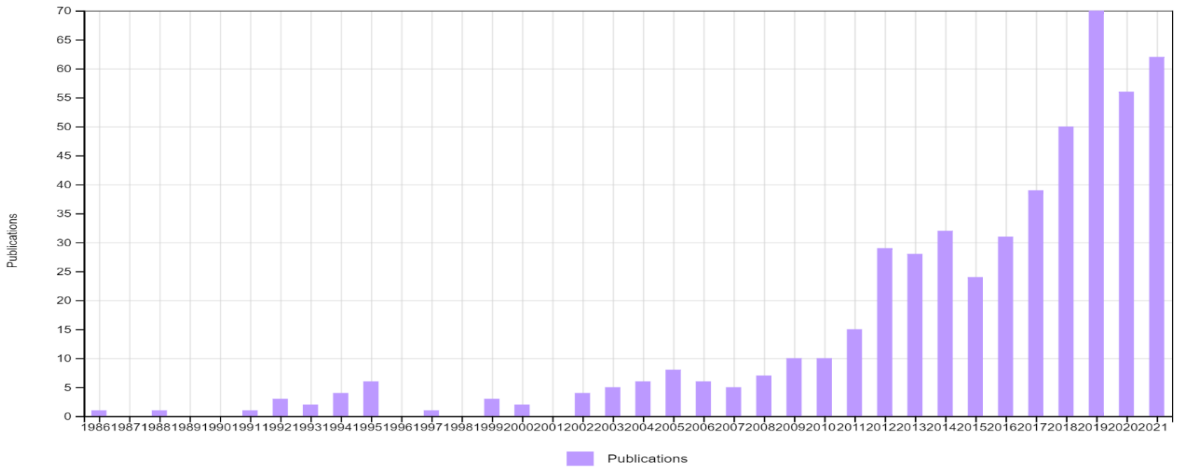



***Figure 3.*** *Most Frequently Publishing Countries and Analysis of Countries*

As Figure 3 shows, there are researchers from 54 different countries, and the most publishing five countries are the U.S.A. (*f*=164), China (*f*=60), Germany (*f*=43), Australia (*f*=35), and England (*f*=31). Eight countries have less than five articles. Some of the articles are authored by researchers from more than one country. Researchers from the U.S.A. co-authored with researchers from 17 countries; researchers from England coauthored with researchers from 13 countries; researchers from Germany coauthored with researchers from 12 countries; researchers from China and Australia coauthored with researchers from 11 countries and lastly, researchers from Canada coauthored with researchers from 10 other countries. *"Germany and Switzerland"* had the most collaborations (Link Strength=9). On the other hand, there were seven collaborations between the counties of *"the U.S.A. and China," "the U.S.A. and Germany," "the U.S.A. and Canada," "Canada and Germany."*. By total link strength (not considering whether they are different countries or not), the top five countries are as follows: Germany (*f*=42), the U.S.A. (*f*=39), Canada (*f*=31), Switzerland (*f*=22), and Australia (*f*=19).

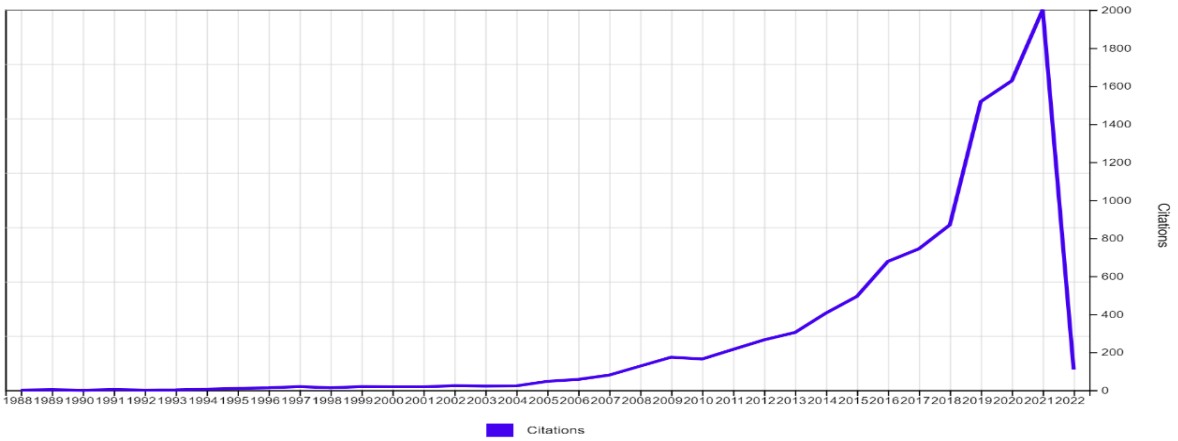
Q3. *What is the frequency distribution of articles on teacher emotions by years and the number of citations?*

Graph 1 below shows the number of articles by year.




***Graph 1.*** *The Number of Articles by Year*

Graph 1 shows that the first article on teacher emotions was published in 1986. There was a slight increase in the number of articles between 1991-1995. From 1995 to the beginning of the 2000s, few articles were published in WoS. A relative decrease in 2015 was observed compared to the previous three years (2012, 2013, 2014). As of 2017, there was a dramatic increase, and at least 50% of the total articles were published in and after this year. It was also striking that the highest number of publications was in 2019 (*f*=70; 13.4%). However, there was a relative decrease in the number of articles in the following two years (2020, 2021). The number of articles as of 2001 was 499 (95.8%), and it was only 22 (4.2%) in and before 2000. Graph 2 presents the number of citations by year.




***Graph 2.*** *Citations by Year*

Graph 2 shows that the number of citations by year was consistent with the number of publications by year as in Graph 1. As can be seen in the graph, there is a sharp increase in the number of citations as of 2000.

**Q4.** ***Who are the most prolific scholars on teacher emotions?***

Table 1 below presents the ten most prolific scholars publishing on teacher emotions.

**Table 1.** *The Most Prolific Scholars*

| No. | Author | The number of articles | The number of citations | Total Link Strength |
|---|---|---|---|---|
| 1 | Anne C. Frenzel | 16 | 529 | 36568 |
| 2 | Thomas Goetz | 9 | 472 | 22945 |
| 3 | Irena Burić | 9 | 110 | 22214 |
| 4 | Jamie I. Taxer | 7 | 270 | 16521 |
| 5 | Reinhard Pekrun | 5 | 210 | 13882 |
| 6 | Nathan C. Hall | 6 | 44 | 12747 |
| 7 | Anna Sliskovic | 4 | 38 | 10890 |
| 8 | Junjun Chen | 6 | 127 | 10722 |
| 9 | Gerda Hagenauer | 5 | 163 | 10048 |
| 10 | Eva S. Becker | 3 | 151 | 8973 |
| Total | | 70 | 2114 | - |

As Table 1 presents, the total number of articles by the ten most prolific scholars is 70. The three most prolific scholars are *Anne C. Frenzel*, *Thomas Goetz*, and *Irena Burić*. Anne C. Frenzel is the most prolific one, with 16 articles based on the total link strength. Although Nathan C. Hall and Anna Sliskovic have the fewest articles, they are in the middle of the most influential scholar list, thanks to their total link strength.

Q5. *What are the most cited/ most influential articles on teacher emotions?*

Table 2 presents the most cited ten articles on teacher emotions.

As Table 2 displays, the most cited ten articles were published between 2005 and 2014. The article titled *"Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion"* by Skaalvik & Skaalvik (2011) ranks first with 428 citations. It was followed by Hong's article titled "Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession" (2010). Although the article titled *"You choose to care: Teachers, emotions, and professional identity"* by O'Connor (2008) ranks fourth by the number of citations, it ranks third by the annual average number of citations ($\bar{X}$= 21,7). On the other hand, articles by Chang (2013) and Becker et al. (2014) rank seventh and eighth by the number of citations, but their average number of citations by year is high. Eight out of ten most cited articles were published in *"Teaching and Teacher Education."* The two remaining articles were published in *"Educational Psychologist"* and *"Motivation and Emotion."*

**Table 2.** *The Most Cited Articles*

| | Title | Authors | Source Title | Year of Publication | Number of Citations | Average by Years |
|---|---|---|---|---|---|---|
| 1 | *"*Teacher job satisfaction and motivation to leave the teaching profession: Relations with school context, feeling of belonging, and emotional exhaustion"* | *Skaalvik, EM and Skaalvik, S | Teaching And Teacher Education | 2011 | 428 | 42,8 |
| 2 | *"*Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession"* | *Hong, JY | Teaching And Teacher Education | 2010 | 304 | 27,6 |
| 3 | *"*Teachers' emotions in educational reforms: Self-understanding, vulnerable commitment, and micropolitical literacy"* | *Kelchtermans, G | Teaching And Teacher Education | 2005 | 303 | 18,3 |
| 4 | *"*You choose to care: Teachers, emotions and professional identity"* | *O'Connor, KE | Teaching And Teacher Education | 2008 | 283 | 21,7 |
| 5 | *"*Discovering emotion in classroom motivation research"* | *Meyer, DK; Turner, JC | Educational Psychologist | 2002 | 275 | 14,5 |
| 6 | *"*Discursive practices, genealogies, and emotional rules: A poststructuralist view on emotion and identity in teaching"* | *Zembylas, M | Teaching And Teacher Education | 2005 | 189 | 11,8 |
| 7 | *"*Toward a theoretical model to understand teacher emotions and teacher burnout in the context of student misbehaviour: Appraisal, regulation and coping"* | *Chang, ML | Motivation and Emotion | 2013 | 146 | 18,3 |
| 8 | *"*The importance of teachers' emotions and instructional behavior for their students' emotions - An experience sampling analysis"* | *Becker, ES; Goetz, T; Morger, V; Ranellucci, J | Teaching And Teacher Education | 2014 | 127 | 18,1 |
| 9 | *"*Teachers' sense-making about comprehensive school reform: The influence of emotions"* | *Schmidt, M; Datnow, A | Teaching And Teacher Education | 2005 | 126 | 7,9 |
| 10 | *"*One teacher's identity, emotions, and commitment to change: A case study into the cognitive-affective processes of a secondary school teacher in the context of reforms"* | *van Veen, K; Sleegers, P; van de Ven, PH | Teaching And Teacher Education | 2005 | 122 | 7,6 |

Q6. *What is the articles on teacher emotions classification based on the WoS Core Collection categories?*

Figure 4 below shows the classification of the articles based on WoS Core Collection categories.

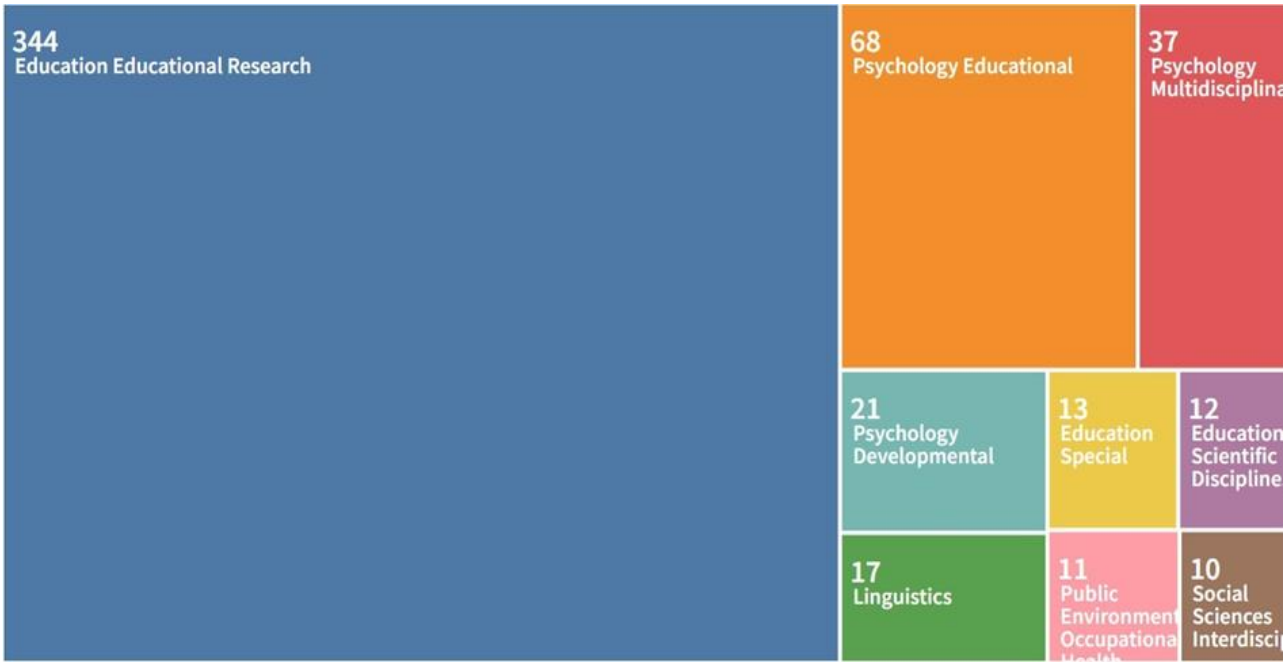



***Figure 4.*** *The frequency distribution of the articles based on WoS categories*

Figure 4 includes the categories in which at least ten articles were published. Based on these criteria, nine categories emerged. The *"Education Educational Research"* category had the most articles (*f*=344), which accounted for 66% of all the publications. In other words, two-thirds of publications were related to education and educational research. It is followed by *Psychology Educational* (*f*=68), accounting for 13% and *Psychology Multidisciplinary* (*f*=37), accounting for 7% of the publications.

Q7. *Which universities published the most articles on teacher emotions?*

Figure 5 below displays the frequency distribution of the published articles by universities.


**Figure 5.** *The Number of Articles Published by Universities*

Figure 5 displays the universities which published at least ten articles on teacher emotions. The findings showed that eight universities satisfied this criterion. The *University of Munich* ranks first with 21 articles (4%), the *Education University of Hong Kong* ranks second with 18 articles (3.4%), and the *Chinese University of Hong Kong* ranks third with 15 articles (2.87%).

## 4. Conclusion and Discussion

This study revealed the bibliometric profiles of the articles on teacher emotions indexed in WoS. To this end, the study examined *the most frequently used keywords and their network of relationships, the countries with the most publications and their network of relationships, the number of publications and citations by year, the most prolific scholars, the most cited articles, the classification of articles based on WoS categories, and the universities where the authors work.*

"*Emotion regulation and teacher education*" were the most frequently used keywords. Teaching is described as an emotional effort (Hargreaves, 1998). To attain desired instructional outcomes, the teacher may sometimes have to regulate their emotions within this spirited effort (Fried, 2011; Sutton & Harper, 2009). Thus, teacher emotions are frequently discussed together with the *regulation of these emotions* in literature (Jiang et al., 2016; Uzuntiryaki-Kondakci et al., 2021). Another keyword with a relatively high frequency is "*teacher education*", handled with teacher emotions. Teacher emotions directly affect the success of educational activities by reflecting on their qualifications (Zembylas, 2011). Emotions are especially an integral part of teacher training. The literature suggests that emotions also affect cognitive performance, motivation, success, decision making, and problem-solving (Anttila et al., 2016). Additionally, it is not enough to have field expertise and use proper methods and techniques (Hargreaves, 1998). Considering the association between emotions and teaching/learning, it is inevitable that an emotional perspective to rationality in teachers' professional development should be integrated to increase teacher effectiveness (Chen, 2020; Chen & Cheng, 2021). In this sense, it can be said that emotions have a critical role in teacher training (Hong, 2010). The third most frequently used keywords were "*teaching, teacher identity,* and *emotional labor*", respectively. The five most commonly used keywords were the same based on Total Link Strength. However, their ranks changed within themselves. It was observed that "*teacher identity*" is used more frequently than "*emotional labor*", but "*emotional labor*" had more network relations with other keywords. Shortly, teacher emotions have a critical role in teaching, students, and teachers themselves (Chen, 2019b; 2021).

"*Anger* and *enjoyment*" were used together four times in the articles indexed in WoS. Anger is a negative emotion that may have detrimental effects on teachers' psychological and professional functioning (Burić & Frenzel, 2019). Previous literature suggests that anger is among the negative emotions experienced by teachers (Burić et al., 2018; Dilekçi, 2018; Hong et al., 2016; Uzuntiryaki-Kondakci et al., 2021). On the other hand, "*enjoyment*" is associated with lower teacher burnout, higher job satisfaction, and improved student outcomes (Wang & Hall, 2021). In literature, enjoyment is one of the most prominent positive teacher emotion (Dilekçi, 2018; Frenzel et al., 2016; Hong et al., 2016; Uzuntiryaki-Kondakci et al., 2021). The keywords which were used three times together are as follows: "*teacher education and student-teacher*", "*anxiety and enjoyment*", "*emotion regulation and teacher well-being*", "*emotional labor and emotion regulation*", "*emotion labor and emotional rules*" and "*emotion labor and China*". To conclude, it can be said that articles dealing with teacher emotions mostly focus on teacher education, teacher identity, teaching, emotion regulation, and emotional labor. The most commonly discussed emotion types are anger, enjoyment, anxiety, and stress.

The findings also suggested that the scholars who published on teacher emotions were from 54 countries. The *U.S.A.*, *China*, *Germany*, *Australia*, and *England* are at the top. Scholars from Germany and Switzerland had the most collaborations. Each of the country pairs of "*the U.S.A. and China*", "*the U.S.A. and Germany*", "*the U.S.A. and Canada*", "*Canada and Germany*" had seven collaborations. Based on Total Link Strength, which does not consider whether it is a different country, the first five countries were Germany, the U.S.A., Canada, Switzerland, and Australia. These findings suggested that Western countries contributed to the literature on teacher emotions more than others (Chen, 2019b; King & Chen, 2019; Oplatka & Arar, 2018; Uitto et al., 2015). Chen (2019b) stated that political, social, and cultural differences might play a role in this difference between countries. On the other hand, there is a lack of scientific knowledge and capacity to inform policymakers and practitioners in teacher education which can be shown as another reason for the scarcity of research conducted in Asian countries on teacher emotions (Chen, 2019b).

The findings indicated that the first article in WoS on teacher emotions was published in 1986. However, there was not a considerable increase in publications until the beginning of the 2000s. On the other hand, the literature witnessed a slight increase between 1991 and 1995. Again, from 1995 to the beginning of the 2000s, few articles on teacher emotions in WoS were published. In other words, teacher emotions did not attract

much attention from researchers until the late 1990s. Adopting a rational perspective, the policymakers and administrators ignored the emotional aspect of the teaching profession (Chen & Cheng, 2021). This suggests that teacher emotions were ignored for a long time (Atmaca et al., 2020; Frenzel et al., 2016). As of 2017, there was a rapid increase in articles published in WoS. More than half of the articles were published in the following years, showing that scholars increasingly recognise teachers' emotions (Chen, 2019b; Chen et al., 2020). Another striking finding was that most publications were in 2019. It can be said that the number of publications that increased consistently from 2016 reached its peak in 2019. However, there were fewer publications in 2020 and 2021 than in 2019, which can be attributed to the Covid-19 pandemic. The researchers directed their attention to studies on pandemics (Chahrour et al., 2020; Wang & Tian, 2021). Shortly, the frequency distribution of articles suggested that interest in teacher emotions increased in the 21st century (Burić, 2019). However, it can be said that the literature on teacher emotions is still in its infancy (Chen et al., 2020). There was a consistent correlation between the number of publications and the number of citations by year.The number of citations, which was horizontal until the beginning of the 2000s, increased continuously with minor breaks in the following years. This indicates an increased research capacity on teacher emotions. As expected, more publications on teacher emotions resulted in more citations.

The findings showed that *Anne C. Frenzel*, *Thomas Goetz*, *Irena Burić*, *Jamie I. Taxer*, *Reinhard Pekrun*, *Nathan C. Hall*, *Anna Sliskovic*, *Junjun Chen*, *Gerda Hagenauer*, and *Eva S. Becker* were the most prolific scholars on teacher emotions in the WoS database. These scholars had 70 publications in total. The most prolific three scholars were Anne C. Frenzel, Thomas Goetz and Irena Burić. Anne C. Frenzel has most publications on teacher emotions based on total link strength. Nathan C. Hall and Anna Sliskovic had few citations among the most prolific scholars, but their total link strength carried them to the sixth and seventh ranks in the most prolific scholars list. The finding that the most prolific scholars were from Western countries was consistent with the frequency distribution of articles by country.

The top ten articles by the number of citations were published between 2005 and 2014. The article by Skaalvik and Skaalvik (2011) ranks first, followed by Hong (2010). Although O'Connor's (2008) study ranks fourth by the number of citations, it ranks third by the annual average number of citations. On the other hand, eight out of the top ten articles were published in "*Teaching and Teacher Education*". *"The Impact Factor of this journal is 3.272, ranking it 65 out of 264 in Education & Educational Research and this journal is indexed in 26 international databases as of 10th March 2022."* (https://www.journals.elsevier.com/teaching-and-teacher-education)

The findings suggested that at least ten articles by WoS categories emerged nine categories. The diversity of the number of categories can be attributed to the interdisciplinary nature of emotions. Emotions are interdisciplinary because they are handled from various disciplines such as psychology, sociology, neurology, behavioural sciences, education, and economics (Küpers & Weibler, 2008). As expected, most articles were in the "*Education Educational Research*" category, which accounted for two-thirds of all articles. It is followed by "*Psychology Educational*" and "*Psychology Multidisciplinary*" categories.

Considering the universities with which the scholars were affiliated, the findings suggested that eight of them had at least ten publications. The *University of Munich* ranks first by the number of publications which can be explained by the contributions of Anne C. Frenzel and Reinhard Pekrun working for this university. On the other hand, the *Education University of Hong Kong* ranks second by the number of publications. This can be attributed to scholars Junjun Chen and Hui Wang. The *Chinese University of Hong Kong* ranks third by the number of publications. It is noteworthy that there were two universities from Hong Kong among the top three universities, which shows a growing interest in teacher emotions as a research field in Asia (Chen, 2019b).

## 5. Limitations and Recommendations

This study has some limitations. *First*, the data was limited to the WoS database. Articles in other databases such as Scopus, was not included in the study. *Second*, the articles investigated in the study were published by 2021. *Third*, early access, book chapters, and proceedings papers were excluded from the analysis. Although there is a growing interest in teacher emotions, which has been ignored for a long time, it is still in its infancy. Thus, further studies on teacher emotions can contribute to the existing literature, expanding the keyword network, universities and countries publishing on teacher emotions, and the number of publications, citations, and scholars. Further studies can also investigate the different bibliometric profiles of articles on teacher emotions.

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# Domain Specific Hope as a Predictor of Psychological Symptoms During the Covid-19 Pandemic

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ABSTRACT

The likelihood that individuals will experience psychological problems increases during the pandemic periods, and these problems usually continue after the pandemic process is over. Regarding psychological problems, some concepts, such as hope, have a protective and accelerating role of well-being. This study aims to reveal the psychological symptoms experienced by individuals during the COVID-19 pandemic process and their relationships with hope and special areas of expectancy. 412 individuals aged 18-67, who are residing in Turkey, participated in the study. The data were collected within three months from the emergence of the first case in Turkey. Brief Symptom Inventory (BSI-53), Life Domains Hope Scale (DSHS) were addressed to the participants for investigation. The results show that gender and education level significantly affect psychological symptoms and hope. That family and leisure time, among the special domains of hope, explained almost half of the variance and partially predicted psychological symptoms. Psychological symptoms increase and hope in some domains decreases with educational level increases. Women seem to have more psychological symptoms. It is necessary to conduct supportive and empowering studies for these groups. Since hope is a good predictor of psychological symptoms, all interventions that increase hope in the pandemic process will reduce psychological problems. In addition, it is recommended to investigate other protective and supportive factors that may be associated with psychological symptoms during the pandemic process.

Keywords:
Psychological symptoms, hope, COVID-19 pandemic

## 1. Introduction

The new coronavirus (COVID -19) spread rapidly to many other countries after its emergence in December 2019 (Bao et al., 2020). The world has been facing a pandemic for more than a year, and the spread still has devastating consequences, especially on physical and mental health. According to the World Health Organization, "health" refers not only to the absence of disease and disability but also to "complete well-being in physical, psychological and social terms" (World Health Organization, 2007). Psychological well-being contributes to people's lives, such as healthy and longer lives, functioning social relationships, and greater success in work and achievement (Diener & Chan, 2011). In addition, psychological well-being is considered one of the protective factors for diseases such as hypertension and diabetes (Richman et al., 2005). The results of previous outbreaks have shown that the impact on mental health lasts longer than the pandemic, its prevalence is higher, and determining the psychological impact is very difficult (Shigemura et al., 2020). Stress such as fear of contagion, frustration and boredom over a long period, inadequate information, lack of personal contact with friends, lack of personal space at home, and financial loss in the family can have developmental

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and psychologically problematic and lasting effects (Brooks et al., 2020). It also leads to stress, negative mental and physical symptoms, increased anxiety, and dissatisfaction. At the same time, this situation has negative consequences on the individual's mental health (Cox et al., 2000). Positive psychology concepts such as hope (Gallagher et al., 2009), psychological well-being (Simon et al., 2021), and optimism (Çelebi et al., 2021; Snyder et al., 2000) are negatively related to mental health problems before and during the pandemic.

The social domain of hope; includes the individual's friend relationships and close environment and interaction with them. In the academic field, his courses include his interest in school and his grades. The family domain is concerned with relationships with family members, activities, and one's home life experiences. In love relationships, the focus is on the romantic field. The person's field of work includes work history, current job, and future occupation. Leisure time includes sports, music and art activities that provide satisfaction to the person outside of school or work (Sympson, 1999). Studies on domain specific hope include positive psychology concepts such as self-efficacy, optimism, academic achievement (Feldman & Kubato, 2015) and mental health problems (Shorey et al., 2012).

Hope and positive thinking are important coping strategies for healthy psychological functioning (Nunn, 1996; Snyder, 1995). Hope is one of the most important concepts in positive psychology. Recently, Seligman and Csikszentmihalyi (Seligman et al, 2014). Criticized the idea of focusing on psychopathology. Positive expectations about the future, such as hope and optimism, are viewed as effective mechanisms by which people can achieve positive mental health (Snyder et al., 2000). Hope, as a distinct and independent concept from optimism, is closely related to mental health (Gallagher et al., 2009; Mathew et al., 2014). In the literature, the concepts of courage, hope, and optimism (Chang et al., 2009; Shorey et al., 2003) are found to positively affect mental health problems such as depression and anxiety (Seligman et al., 2014). Hope is specifically defined as a positive trait that can contribute to happiness and overall health (Shorey et al., 2003). Kavradım and Özer, 2014, in their study on the concept of hope in patients diagnosed with cancer, referred to hope as a concept that empowers people and positively influences their perception of their future life. Alkan and Erdem, 2020, in their study on the relationship between the concept of happiness and temporary disability, which indicates perceived health status, state that the concepts of happiness and feeling healthy are two related concepts. The onset triggers common psychological symptoms such as stress, anxiety, and depression (Dar et al., 2017). People with high levels of hope are reported to have fewer depressive symptoms in normal circumstances (Du et al., 2016) and in times of crisis (Amau et al., 2007). Information from previous pandemics shows that people have serious concerns, such as fear of death during pandemic periods (Lui et al., 2020). Hope appears to be associated with psychological symptoms necessitates a specific assessment. When hope is examined based on private life domains, the limitation that "hope" is assessed in terms of its general and dispositional characteristics is eliminated. For example, a person's level of hope may vary across domains (Shorey et al., 2012). Therefore, in this study, hope is discussed in the context of life's social, academic, family, domestic, romantic, occupational, and leisure domains. The social domain of hope includes the individual's friendship relationships and close environment, as well as his interaction with them. In the academic domain, this includes his interest in school and his grades. The family domain involves the relationships with family members, the activities and experiences the individual has at home. In love relationships, the focus is on the romantic domain. The work domain includes the individual's career, current job, and future job. Leisure includes activities in sports, music, and the arts that provide satisfaction to the individual outside of school or work (Sympson, 1999). Studies of domain-specific hope include positive psychology concepts such as self-efficacy, optimism, academic achievement (Feldman & Kubato, 2015) and mental health problems (Shorey et al., 2012).

During pandemics, the number of people whose mental health is usually greater than the number of people affected by infection (Reardon, 2015). Stress in the pandemic process causes the pandemic to exhibit significant vulnerability for the individual and a direct health-related threat. During the pandemic, psychosocial situations such as high levels of stress and anger symptoms, sudden lifestyle changes, economic difficulties, and hopelessness have occurred (Shanahan et al., 2020). Changes in social relationships and life (Yelboğa & Açıkgöz, 2020), both positive and negative changes in family relationships (Özyürek & Çetinkaya, 2021), difficulties in interpersonal relationships (Artan et al., 2021), and increasing psychological problems (Ripon et al., 2020; Yazıcı et al., 2021) have been reported. Hope is a significant predictor of life satisfaction (Karataş et al., 2021).

Stress occurs when the demands of the environment or the intrinsic demands of a person exceed his or her ability to cope (Lazarus & Folkman, 1984). In this case, assessing hope or coping stress and the psychological symptoms it causes seems important. It is known that hope plays a protective role against depressive thoughts, attitudes, and mood states (Feldman & Snydeer, 2005). In this direction, it is considered important to understand the psychological symptoms that occurred during the pandemic and to assess the level of privacy and hope and people's coping mechanisms. Given the information from previous pandemics, it is necessary to know the important variables related to psychological symptoms to design psychosocial support programs to be prepared to cope with the pandemic process (Decosimo et al, 2019) and implement mental health protection measures. The present study aims to examine hope for private living spaces as predictors of mental health symptoms during the pandemic process COVID -19. To this end, the variables gender, education level, and age is known to predict psychological symptoms were controlled for, and the predictive power of specific domains of hope for family, social relationships, academics, work, leisure, and romantic traits was assessed. It seems important to examine the hope that seems to be associated with the psychological well-being and physiological health of individuals in the pandemic process that comprehensively affects life and health. Given the complex nature and impact of the pandemic process, it is anticipated that an assessment of individuals' areas of hope will provide more detailed information than the general assessment of their levels of hope.

## 2. Methodology

### 2.1. Research Model

This research was carried out based on the predictive correlational model. Predictive correlational studies are those in which one variable is attempted to be predicted based on the relationships between the variables (Fraenkel & Wallen, 2009).

### 2.2. Research Sample

The sample of the study was determined using the convenience sampling method. 412 individuals aged 18 and over residing in Turkey in March and April 2020 were found within this research. The minimum sample size for the study is “50+8m” as Tabachnick and Fidell (2013) suggested. In this study, m (number of the independent variable) is 6. In this regard, the minimum number for the study sample was 98. 317 of the participants are women (76.9%), and 95 of the participants (23%) are men. The average age of individuals in the 18-67 age range is 30; the average age of women is 29, and men is 33.2. The demographic characteristics of the participants are as follows: 51 of the participants (12%) have a chronic disease, 361 of the participants (88%) have no chronic disease; 159 of the participants (39%) are married, 253 of the participants are single (61%); 136 of the participants have children (33%), 276 of the participants have no children (67%); 184 (43%) of the participants work, 177 (43%) of the participants are students, 51 (12%) of the participants do not work; 362 (88%) of the participants were at home during the isolation process, and 50 (12%) of the participants went to work. 203 (49%) of participants live in the metropolitan area, 116 (28%) of participants live in the province, 76 (19%) of participants live in the district, and 17 (4%) of participants live in the village.

### 2.3. Data Collection

This study obtained data online using Brief Symptom Inventory (BSI-53), Life Domains Hope Scale (DSHS), and Personal Information Form. Qualitative data were obtained with two semi-structured open-ended questions in the Personal Information Form. The study's data were collected within three months from the emergence of the first case in Turkey.

*Personal Information Form***.** The questions of gender, age, marital status, education level, whether they had COVID-19 or not were included in the research.

*Brief Symptom Inventory (BSI-53).* Brief Symptom Inventory is a Likert-type self-assessment inventory developed by Derogatis (1992) that provides a general psychopathology assessment. The Short Symptom Inventory is the short form of SCL-90-R, consisting of 9 sub-dimensions and 53 items, which emerged from studies conducted with SCL-90-R. It is a multidimensional symptom screening scale developed to capture psychological symptoms that may arise in various psychiatric and medical patients as in normal samples. BSI consists of five factors as "Anxiety", "Depression", "Negative self-concept", "Somatization" and "Hostility" in its Turkish adaptation by Şahin and Durak (1994). In the adaptation study, the Cronbach's alpha of the

subscales are .85, .81, .80, .71, .72 and .94 in total, respectively. In this study, the Cronbach's alpha of BSI total score is .96, while the Cronbach's alpha values of the sub-dimensions are as follows: .87 (Anxiety), .91 (Depression), .90 (Negative self-concept), .78 (Somatization), and .78 (Hostility).

*Life Domains Hope Scale (DSHS).* The DSHS is a measure of hope in different life domains. This 48-item measure contains 6 domain scales: social, academic, family-home, romantic, work, and leisure (Snyder et al, 1997). Respondents rate each item on a 1 (definitely false) to 8 (definitely true) scale. Researchers have provided evidence supporting the reliability and validity of the DSHS [26]. This scale, adapted into Turkish by Özbay, Terzi & Aydoğan (2011), was found to be valid and reliable in Turkish culture. Different studies obtained similar results (Mutlu, 2017; Şakar, 2019). In this study, the Cronbach's alpha of DSHS total score is .95, while the Cronbach's alpha values of the sub-dimensions are as follows: .84 (Social), .89 (Academic), .90 (Family-home), .93 (Romantic), .86 (Work), and .94 (Leisure).

**2.4.Data Analysis**

Preliminary analyses before regression analysis found that the assumptions of covariance, normality, and linearity were confirmed. Before the parametric tests, the data were examined for their assumptions. Since the data were collected via online forms, there are no missing values in the data set. Mahalanobis distances and z scores were calculated to examine the extreme values, and 3 data were not included in further analyses. When normality was examined, the skewness and kurtosis coefficients were found to be in the range of -1 to +1. The scatter plot showed multiple normalities close to the normal distribution, and the linearity assumption was satisfied.

Concerning the research question, a regression model was estimated to predict psychological symptoms. In the stepwise regression model, the VIF ranged from 1.03 to 1.22, and the tolerance ranged from .81 to .96. In the second step, when the subscales of hope were included in the model, the VIF was found to ranged from 1.05 to 1.39, and the tolerance ranged from .71 to .95.

**2.5. Ethical**

Ethical permission was obtained from the Hasan Kalyoncu University (13.04.2020/804.01-BABBFCF3).

**3. Findings**

When the correlations between variables are examined before Stepwise Regression Analysis (Table 2), it is seen that there is a low-level negative relationship between psychological symptoms and academic and romantic hope sub-dimensions, and a moderate negative relationship in social relations, family-home, work and leisure hope sub-dimensions.

Table 2 shows the results of the stepwise regression analysis, which was performed to examine the sub-dimensions of hope to predict psychological symptoms.

**Table 1.** *Correlations between all variables*

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | Mean ± SD |
|---|---|---|---|---|---|---|---|
| 1.Psychological Symptoms | 1.00 | | | | | | 58,24 ± 39,47 |
| 2.Social Relations Hope | -30** | 1.00 | | | | | 45.33 ± 9.97 |
| 3.Academic Hope | -,27** | ,52** | 1.00 | | | | 49.96 ± 9.50 |
| 4.Romantic Hope | -,18** | ,45** | ,35** | 1.00 | | | 41.77 ± 12.75 |
| 5.Family-Home Hope | -,53** | ,34** | ,39** | ,23** | 1.00 | | 50.42 ± 12.72 |
| 6.Work Hope | -,30** | ,50** | ,56** | ,45** | ,40** | 1.00 | 48.59 ± 10.54 |
| 7.Leisure Hope | -,35** | ,45** | ,47** | ,28** | ,44** | ,58** | 50.46 ± 11.47 |

As shown in Table 2, the first stepwise regression model included hope in the parental home as a significant predictor of the model ($R = .28$, $F(1, 411) = 166.66$, $p < .01$). In the second model, hope in the parental home and hope in leisure are significant predictors ($R = .30$, $F(2,411) = 89.677$, $p < .01$ ). In the third model, in addition to family hope and leisure hope, social hope is the significant predictor of psychological symptoms. The tested model describes 30% of the total variance ($R = .31$, $F(3,411) = 61.687$, $p < .01$).

**Table 2**. *Stepwise Regression Analysis on the Psychological Symptoms*

| Predictor Variables | *B* | *SE B* | *β* | *t* | *p* | $R^2$ | Total adjusted $R^2$ |
|---|---|---|---|---|---|---|---|
| Model 1 | | | | | | .28 | .28 |
| Family-home Hope | -1.668 | 6.719 | -.538 | -12.910 | .000 | | |
| Model 2 | | | | | | .30 | .30 |
| Family-home Hope | -1.472 | .143 | -.475 | -10.290 | .000 | | |
| Leisure Hope | -.484 | .159 | -.141 | -3.052 | .002 | | |
| Model 3 | | | | | | .31 | .30 |
| Family-home Hope | -1.421 | .145 | -.458 | -9.820 | .000 | | |
| Leisure Hope | -.357 | .170 | -.104 | -2.107 | .036 | | |
| Social relations Hope | -.384 | .186 | -.097 | -2.067 | .039 | | |

## 4. Discussion and Conclucion

This study examined the role of hope in predicting psychological symptoms during the pandemic period COVID -19. As predicted, hope was associated with psychological symptoms. However, the striking finding was that hope predicted only the subdimensions of psychological symptoms of family-home, leisure, and social relations. The present study found that the family-home, leisure, and social relations subdimensions of hope predicted psychological symptoms. When people's hopes increase, it contributes positively to physical and mental health (Seçer & Yazıcı, 2018), while hopelessness causes depression (Sayar et al., 2000) and anxiety symptoms (Abromson et al., 1989). Studies conducted during the pandemic show that hope is a protective factor for psychological symptoms (Gallagher et al., 2021; Oktan, 2012; Söner et al., 2021), that people spend more time at home with their family and become closer to each other ( Bitan et al., 2020) because they are afraid that a family member might get sick or because they are afraid of losing a family member ( Prime et al., 2020).In times of a pandemic, some families may become vulnerable while others may develop resilience (Colhoun & Tedeschi, 2014). Individuals were constantly concerned about their family's health even though they remained isolated at home, suggesting that the family is a system that is greatly affected by the COVID -19 process (Prime et al., 2020). The reason that hope for leisure predicted mental health symptoms might be related to their inability to continue daily routines during the pandemic or to assume that they placed a high value on leisure and spent time with hobbies at home (McFayden et al., 2021).

The pandemic also produced mixed results regarding changes like social relationships. In addition to studies indicating that social relationships were negatively impacted by conditions such as the isolation of the pandemic (Luykx et al., 2020; Sommerland et al., 2021), there are also studies indicating the importance of perceived social support (Özmete & Park, 2020). The results found that the academic, occupational, and romantic subdimensions of hope were not significant predictors of psychological symptoms. This situation can be interpreted as the first actions taken in the pandemic are the conversion of educational institutions to distance learning, and the closure of workplaces (Varol & Tokuç, 2020), so academic and vocational domains are not prioritized list of individuals. Looking at the sub-dimension of a romantic relationship, it can be said that the unmarried (romantic) group did not cohabit during the quarantine process, they took less responsibility, acted more autonomously and individually. In this context, the dissatisfaction with the relationship was lower (Artan et al., 2021). . It is also possible to view the research findings in the context of the hierarchy of needs. Because the pandemic suddenly became a life-threatening situation and impacted many areas of life, the health of the affected individuals, their families, and their loved ones likely came first. In Maslow's hierarchy of needs, survival and safety come first; after these needs are met, higher-order needs such as belonging, liking/loving come to the fore (McLeod, 2007).

Consequently, while hope is a protective factor for mental health, extraordinary times such as pandemics can lead to differences in the relationship between mental health and hope. Furthermore, hope reduces psychological symptoms by supporting psychological well-being, but it is considered important to assess the sub-dimensions of hope.

## 5. Limitations and Recommendations

This research was carried out early in the pandemic process. From this point of view, the results should be interpreted to reflect the uncertainties of the pandemic process. From Turkey's point of view, since the study was conducted during the first six months of the COVID-19 outbreak, the results are likely to reflect more

anxiety and uncertainty. In addition, the vast majority of participants are women, which should be considered as a limitation. This point should be considered when interpreting the research results from the point of view of women. Another limitation that will affect the generalizability of research results is that the number of graduate participants in terms of educational level is less than others. For this, it would be more meaningful to evaluate the results as people with high school and lower education levels and people with university and higher education levels.

In order to see the long-term effects of the pandemic process, it may be useful to design new studies with the variables of the current research. In addition, working with more inclusive samples in terms of age, educational status, and socio-economic status variables may contribute to the subject. Considering the relationships between hope and psychological symptoms in terms of practitioners working in mental health and education, studies to support hope can be planned.

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# Teaching Practices in Inclusive Classrooms from the Perspective of Primary School Teacher Candidates: An Observation Study

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ABSTRACT

As a result of the nature and outcomes of classroom education, questions concerning what constitutes successful teaching persist. This study intends to characterize, from the perspective of primary school teacher candidates, the practices of primary school teachers in terms of effective instruction in inclusive classrooms. Observations of nonparticipants were used to collect qualitative data for this study. The research study group consists of the final-year primary school teaching students and the teachers at the schools where these students do their internships. Students' observations yielded qualitative data that was examined using content analysis. The study revealed that classroom teachers are deficient in their use of teaching tactics, particularly in adjusting instruction, classroom management, and behavior management. The acquired results were reviewed within the context of the issues encountered by classroom teachers in terms of successful teaching in inclusive classrooms and the suitability of undergraduate programs that prepare teachers for general education.

Keywords:
Inclusive education, instruction, observations to inform professional development, teacher classroom practies

## 1. Introduction

Since the anactment of the Every Student Succeeds Act (2015) in the United States, issues pertaining to the need for teachers to implement research-based interventions in their classrooms, the quality of their instruction, and their professional competence have reemerged.. In Turkey, new decisions are taken to improve students' academic performance, ensure that they are educated according to the needs of the age, and improve teacher competencies (Ministry of National Education [MoNE], 2017). These initiatives support teachers' effective teaching practices, create positive learning environments for all students, including students with special needs, and examine how teachers teach.

Effective teaching practices are a) intensive instruction, b) explicit instruction, c) systematic instruction, and d) individualized teaching practices. (Archer and Hughes, 2011; Vaughn et al., 2012). Among the practices, intensive instruction refers to arranging the teaching according to the needs of the students; explicit instruction refers to making content and disciplinary processes visible by naming, labeling, and demonstrating skills and strategies; and systematic instruction refers to providing comprehensive support for a variety of skills.

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Individualized instruction encompasses performance-based planning and modifications (Morris-Mathews et al., 2021).

Effective teaching emerges from instructional interactions that respond to students' academic, emotional, and social needs (Bronfenbrenner, 1979; Sameroff, 2009). In addition, student learning results from this effective teacher-student interaction (Hamre et al. 2012), and these interactions occur in a highly structured classroom or environment. For effective teaching to take place, teachers adapt these behaviors according to students' current knowledge and skills instead of using certain teaching behaviors (Connor et al., 2011). Instructional adaptations and interactions that support the learning of students with special needs are clearly defined as teaching behaviors that support student learning and require being sensitive to them (Jones & Brownell, 2014; Swanson et al., 1999). Teaching studies conducted for students with special needs and risk groups show that these students need teaching in which classroom management is good, different teaching methods and techniques are used, and the content is conveyed simply and clearly (Swanson & Deshler, 2003; Swanson & Sachse- lee, 2000).

In order for students with special needs to be successful, general education classes should be organized to support the components of effective teaching (Horner et al., 2010). Teachers carry out effective teaching practices in classrooms where attention is not distracted, communication and interaction are established within the framework of respect, and teaching acceleration is not interrupted (Brophy, 2006). At the same time, teachers provide behavioral support by constantly reinforcing correct behaviors to monitor students' behaviors, establish classroom rules, quickly eliminate or reduce off-task or disturbing behaviors, and contribute to the formation of effective teaching (Pua et al., 2021 ). Effective teaching includes the teacher's knowledge, practices, and beliefs (Bell et al., 2012).

The realization of all these practices on effective teaching in inclusive environments is obviously related to teacher competence. Studies also show that teachers are the most important factor affecting students' learning (Hanusek, 2014; Hattie, 2009). Clearly, the quality of teaching is a determinant of students' learning outcomes. For this reason, it is very important how teachers to realize the components of effective teaching in inclusive environments where students with special needs are present. In this regard, observation studies have started to attract more attention in terms of examining and evaluating teacher competencies and providing feedback on the content of education that students with special needs receive in inclusive environments (Biancarosa et al., 2010; Johnson et al., 2021; Reddy et al., 2021).

Observation studies on the teaching characteristics of the classrooms, in which inclusive practices have been carried out in Turkey, and the practices of classroom teachers investigated teachers' knowledge of individualizing, adapting, rewarding, effective teaching practices, and classroom management for students with special needs (Güner, 2011; Güner-Yıldız & Melekoğlu, 2016; Sazak-Pınar & Güner-Yıldız, 2017; Sucuoğlu & Demirtaşlı, 2009). These studies show that classroom teachers have problems in the areas mentioned above.

One of the most important reasons for the continuing success gap between students with special needs studying in the same classroom with their peers in inclusive environments is that effective teaching practices are not sufficiently implemented in general education classrooms (Johnson et al., 2021). On the other hand, pre-service teachers are in the process of developing their teaching skills by modeling teachers' effective teaching practices during the transition to service. Therefore, pre-service teachers' observations about effective teaching are important in their role in general education classrooms. It is expected that the results to be obtained from this research will expand the findings regarding the problems that teachers have experienced while performing effective teaching practices, which are pointed out in the current studies. Studies in the field of inclusive education mostly focus on the quality of teaching in the classroom for students with special needs, and it is expected that this will reflect on the success of students with special needs. Therefore, there is a need for studies that provide in-depth information on how classroom teachers implement effective teaching practices in inclusive environments. This study also stemmed from such a need, and it aimed to describe primary school teachers' practices regarding effective teaching in inclusive classrooms from the perspective of primary school teacher candidates.

## 2. Methodology

### 2.1.Research Model

The study is a case study, which is one of the qualitative research methods, as it aims to reveal the effective teaching practices of classroom teachers who have students with special needs in their classrooms from the perspective of classroom teacher candidates. The case study is defined as examining and describing activities for students and subjects (eg, teaching process) in a certain organization, such as a school or teacher's classroom (Yin, 2018). In this study, the teaching practices of classroom teachers who have students with special needs in their classrooms were taken as a case and were described by primary school teacher candidates as a result of observations.

### 2.2. Study Group

Within the scope of the research, classroom teachers were observed by teacher candidates who are the final year students of the classroom teaching undergraduate program. During their education, they took classroom management classes and special education integration. Before the observation, the observation training process for teacher candidates was organized by the first and second authors of this study. At the end of the training process, 17 classroom teachers were observed by 53 teacher candidates in the classroom environment. Pre-service teachers are senior undergraduate students who continue their education at Gazi University, Department of Basic Education, Division of Classroom Instruction Education. Pre-service teachers are students who attend special education and inclusion courses.

When the demographic characteristics of the teachers observed in the study and the students with special needs in their classes are examined, two of the teachers are male, and 15 are female, they have between 16 and 20 years of professional experience, and their ages range from 38 to 62. Observed schools are located in Çankaya, Yenimahalle, and Keçiören districts of Ankara. Observations were made in eight different schools in these districts. When the diagnoses of students with special needs are examined, eight have learning difficulties, three have attention deficit and hyperactivity disorder, three have intellectual disability, two have autism spectrum disorder, and one has language and speech difficulties.

### 2.3. Data Collection

In this study, data were collected with a classroom observation form. The classroom observation form was developed in three stages: the literature review, expert opinion, and pilot study. The first stage examined the literature on classroom management and adaptations for students with special needs (Gilmour et al., 2019; Jones & Brownell, 2014; Pua et al., 2021). In the second stage, two special education and two classroom teacher education field experts evaluated the created observation form. An expert opinion form was used to carry out this evaluation. The expert opinion form was prepared in 3-point Likert type, as appropriate (3), undecided (2), not appropriate (1). The form includes the titles and explanations of the situations to be observed. Items related to titles and explanations, which all experts gave 3 points, were used. Third, a pilot study was conducted by observing the classroom of a teacher who was not involved in the research.

The observation form, which was created as a result of the three stages described above, consists of two columns as competencies and descriptions/comments, and the lines of subject/content knowledge, organization, interaction, teaching methods, presentation, classroom management and behavior control, responsiveness/sensitivity, adaptations and personal characteristics. In the research, the observation form was turned into a booklet consisting of 11 pages. On the first page are demographic features related to the observation date, place, class, and the observed teacher, while the following pages contain the titles on the lines. In the title of subject/content knowledge, teachers' ability to have in-depth knowledge of the subject they teach and to show them while lecturing; in the organization title, the competence of organizing the subject that the teachers will teach, being ready for the lesson and giving details, explaining the objectives of the lesson clearly, emphasizing and summarizing the main points, presenting the lesson at the designated date and time, monitoring the course of the lesson in the process and presenting the lesson efficiently; in the title of interaction, the competence of teachers to attract students' attention, to approach each student with fairness and impartiality, to give feedback, to encourage participation in the lesson, to interact with students and to teach the lesson enthusiastically; in the title of teaching methods, teachers' use of relevant teaching methods, assistive technology, and materials, diversifying the course presentation, including all students in the course,

ability to use simple, understandable, plain, precise and appropriate examples, and to realize their goals by focusing on the goals they will teach throughout the course; in the title of the presentation, the competence of the teachers to create a classroom environment conducive to learning during teaching, to make eye contact with the students, to explain the lesson in an appropriate tone for the whole class to hear, to use the tone of voice to attract the attention of the students; in the title of classroom management and behavior control, teachers use of time efficiently, interacting with students during the lesson, maintaining discipline and control, using the area / scene where they teach effectively, ignoring problematic behaviors, drawing students' attention to appropriate behaviors, offering alternative behaviors, highlighting other (positive) behaviors, giving clues about positive behaviors, reinforcing positive behaviors; in the title of responsiveness/sensitivity, the competence of teachers to be sensitive to students with special needs and students from different cultures; in the title of adaptations, the competence of teachers to make adaptations for students (physical adaptation, adapting the content, adapting the teaching presentation, adapting the assessment); in the title of personal characteristics, the competence of teachers to exhibit behaviors that show their self-confidence in professional and personal competence are covered. In addition, pre-service teachers were asked to write their general impressions of the observations in the relevant section on the last page of the booklet.

### 2.4. Data Analysis

Within the scope of the research, data were collected with an observation form. In the observation form, the students observed the teachers under eight main headings (subject content knowledge, organization, interaction, teaching methods, presentation, classroom management and behavior control, responsiveness/sensitivity, and adaptations). The students submitted their observations in an unstructured way. Qualitative data obtained as a result of students' observations were analyzed by content analysis. Content analysis is a family of methods in which researchers systematically analyze text data to classify and identify themes and patterns (Hsieh & Shannon, 2005). The answers of the students were thoroughly examined, and categories were created. The categories obtained are described in tables with their frequencies. Since more than one observer observed a teacher, the reliability of the observation process was evaluated by examining the compatibility between the categories created in line with the answers given by the students. Fleiss Kappa, Krippendorff alpha, and Kendall W coefficients were calculated to examine the agreement between the categories created in line with the answers given by the participants who observed the same teacher. These coefficients calculated for each teacher are presented in Table 1.

**Table 1.** *Evaluation of the Reliability of Observations*

| Classrooms | Number of observers | Kappa | Krippendorff | Kendall W |
|---|---|---|---|---|
| C1 | 4 | 0,41 | 0,45 | 0,61 |
| C2 | 3 | 0,24 | 0,27 | 0,51 |
| C3 | 3 | 0,32 | 0,32 | 0,56 |
| C4 | 4 | 0,32 | 0,35 | 0,54 |
| C5 | 2 | 0,31 | 0,40 | 0,69 |
| C6 | 3 | 0,21 | 0,27 | 0,51 |
| C7 | 3 | 0,18 | 0,34 | 0,57 |
| C8 | 3 | 0,24 | 0,19 | 0,50 |
| C9 | 3 | 0,34 | 0,33 | 0,59 |
| C10 | 4 | 0,28 | 0,33 | 0,49 |
| C11 | 3 | 0,25 | 0,30 | 0,56 |
| C12 | 4 | 0,30 | 0,39 | 0,55 |
| C13 | 3 | 0,21 | 0,32 | 0,55 |
| C14 | 2 | 0,89 | 0,89 | 0,94 |
| C15 | 2 | 0,43 | 0,43 | 0,72 |
| C16 | 4 | 0,34 | 0,36 | 0,52 |
| C17 | 3 | 0,11 | 0,14 | 0,47 |

It is seen that teachers were observed by at least two and at most four teacher candidates. The Fleiss kappa values calculated for teachers are between 0.11 and 0.89. It is seen that Krippendorff alpha values vary between 0.14 and 0.89, and Kendall w values vary between 0.47 and 0.94. Correction was used in calculating the Kendall w value due to inter-rater relation. Fleiss kappa and Krippendorf alpha coefficients cannot give such a correction. Since the relationship between the students who made the observations cannot be prevented within

the scope of the study, it seems more appropriate to use the corrected Kendall w values. As Kendall w values approach 1, it can be said that there is an inter-observer agreement, and as it approaches zero, there is no inter-observer agreement. When the values are examined, it can be said that the observations made according to Kendall omega are moderately reliable.

### 2.4. Ethical

The ethics committee approval for this study was obtained from Gazi University's Committee on Scientific Research, and Publication Ethics with the decision numbered 13/12/2021_E.237253.

## 3. Findings

The candidate teachers who made observations within the scope of the research were asked to evaluate the subject content knowledge to have in-depth knowledge of the subject that the teachers teach and to show this knowledge while teaching. Thirty-nine of the candidate teachers stated that they were sufficient in terms of subject content knowledge, 10 of them stated that the teacher had knowledge but could not reflect it, and three of them stated that the teacher did not have enough knowledge. As a result of the in-depth examination of the teacher candidates' evaluations of the teaching processes of the teachers who have students with special needs in their classes, 16 categories were obtained. The categories obtained were gathered under the themes of positive and negative behaviors and presented in Table 2.

**Table 2**. *Evaluation of Teachers' Teaching Processes*

| Themes | Categories | f |
|---|---|---|
| Positive Behaviours | Delivers content in an engaging way | 4 |
| | Shares additional information and content on the subject | 2 |
| | Enriches the topic with examples | 5 |
| | Does research/make efforts to improve himself/herself | 2 |
| | Uses methods to enrich content presentation | 3 |
| | Gives clues about future topics | 2 |
| | Presents content appropriate to student level | 5 |
| | Relates the subject to daily life | 2 |
| | Makes the necessary preparations before the lesson | 2 |
| | Tries to detect and correct missing learning | 2 |
| Negative Behaviours | Adheres to book and EBA contents | 7 |
| | Does not teach according to student level | 1 |
| | Ignores important points by distracting the topic | 1 |
| | Uses lecturing only | 1 |
| | Sticks to his/her experiences/does not update his/her knowledge | 3 |
| | Does not have enough knowledge for the special student in the class | 2 |

The teacher candidates who made observations within the scope of the research were asked to evaluate the organizational skills of the teachers. Teachers' organizational skills are grouped under seven basic categories and presented in Table 3.

**Table 3**. *Evaluation of Teachers' Organizational Skills*

| Organizational Skills | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Comes prepared for the subject to be taught | 20 | 37,74 | 5 | 9,43 | 9 | 16,98 | 19 | 35,85 |
| Explains the purpose of the course | 12 | 22,64 | 2 | 3,77 | 9 | 16,98 | 30 | 56,60 |
| Emphasizes important points of the topic | 15 | 28,30 | 2 | 3,77 | 4 | 7,55 | 32 | 60,38 |
| Gives details on the subject | 6 | 11,32 | 2 | 3,77 | 5 | 9,43 | 40 | 75,47 |
| Uses the time effectively | 20 | 37,74 | 6 | 11,32 | 8 | 15,09 | 19 | 35,85 |
| Monitors the progress of the course | 10 | 18,87 | 3 | 5,66 | 3 | 5,66 | 37 | 69,81 |
| Summarizes the topic | 5 | 9,43 | 4 | 7,55 | 2 | 3,77 | 42 | 79,25 |
| Other | 21 | 39,62 | 0 | 0,00 | 0 | 0,00 | 32 | 60,38 |

According to Table 3, in the observation made by the candidate teachers for the classroom teachers who have students with special needs in their class, the skills that students highlight about organizational skills are that the teacher is prepared for the subject to be taught and uses the lesson time effectively. In addition, teacher's explaining the purpose of the lesson and emphasizing important points about the lesson are among the

prominent observations of the candidate teachers about organizational skills. However, it was observed that the teachers did not exhibit the behaviors of summarizing the subject and giving details. The other negative opinions of the pre-service teachers as a result of their observations of the classroom teachers are that the teachers stick to the book, do not give attention-grabbing expressions, and use the lecturing method. In particular, students stated that teachers do not deal with students with special needs and do not carry out special practices for them. Only one student stated that the teacher adapted the learning outcomes for special-needs students. There are also positive opinions given under the other title. Some candidates stated that teachers try to attract students' attention by using different teaching methods and techniques, keeping students active without going beyond the subject, and monitor their readiness. A teacher candidate stated that the teacher improvised the lesson based on his experience. The fact that most of the candidate teachers did not express their opinions on organizational skills can be interpreted as the classroom teachers they observed did not exhibit these behaviors in their classrooms.

The teacher candidates who made observations within the scope of the research were asked to evaluate the interaction skills of the teachers. Teachers' interaction skills were gathered under six categories and presented in Table 4.

**Table 4.** *Evaluation of Teachers' Interaction Skills*

| Interaction Skills | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Engages students | 15 | 28,30 | 2 | 3,77 | 15 | 28,30 | 21 | 39,62 |
| Treats each student fairly, respectfully, and impartially | 20 | 37,74 | 6 | 11,32 | 12 | 22,64 | 15 | 28,30 |
| Gives feedback | 12 | 22,64 | 4 | 7,55 | 2 | 3,77 | 35 | 66,04 |
| Encourages participation | 13 | 24,53 | 9 | 16,98 | 4 | 7,55 | 27 | 50,94 |
| Interacts with students | 8 | 15,09 | 6 | 11,32 | 4 | 7,55 | 35 | 66,04 |
| Teaches enthusiastically | 8 | 15,09 | 4 | 7,55 | 18 | 33,96 | 23 | 43,40 |
| Other | 17 | 32,08 | 0 | 0,00 | 0 | 0,00 | 36 | 67,92 |

According to Table 4, 37.74% (n = 20) of the candidate teachers stated that teachers approached each student fairly, respectfully and impartially in their class where there are special needs students while 11.32% (n = 6) stated that students were partially treated fairly, respectfully and impartially, and 22.64% (n = 12) stated that teachers did not approach every student with a fair, respectful, and impartial manner. Also, 28.20% (n = 15) of the teacher candidates did not express an opinion on this issue. It is seen that 28.30% (n = 15) of the teacher candidates stated that the teachers behaved in a way that would attract the students' attention, while 28.30% (n = 15) stated the opposite. In addition, the number of candidate teachers (15.09%; n = 8) who stated that the teachers taught the lesson enthusiastically was significantly less than the number of candidate teachers (33.96%; n = 18) who expressed the opposite opinion. The opinions in the other heading indicate that the teacher does not interact with students with special needs, does not encourage them, gives them negative feedback, makes fun of the children, does not tolerate mistakes and wrong answers, behaves differently when it comes to their success, sticks to the textbook, and does not relate the subject to daily life.In the other category, only one opinion is positive: "teacher reinforces the correct answer and makes students treat each other with respect". Only one teacher's reinforcement of a student's correct answers shows that teachers' classroom management knowledge is insufficient.

The candidate teachers who made observations within the scope of the research were asked to evaluate the skills of teachers in using teaching methods. Teachers' skills in using teaching methods are grouped under six basic categories and presented in Table 5.

When Table 5 is examined, it is seen that the candidate teachers emphasize the view that teachers especially use assistive technology and materials (yes: n = 20, 37.74%; partially: n = 19, 35.85%) regarding the skills in using teaching methods. It was stated by the candidate teachers that teachers actively benefit from the projection and smartboard. In addition, it was stated by 37.74% (n = 20) of the teacher candidates that the teachers used simple, understandable, plain, precise, and appropriate examples. It was seen that 20.75% (n = 11) of the candidate teachers stated that the teachers diversified the course presentation, but 20.75% (n = 11) of them stated that the teachers did not diversify the course presentation, and 15.09% (n = 8) expressed that teachers partially diversified. Regarding the ability of teachers to use the relevant teaching methods, 18.87%

(n = 10) of the candidate teachers stated that teachers used these methods, 11.32% (n = 6) of them stated partial use, and 22.64% of them (n = 12) stated that teachers did not use them. This may indicate that teachers with students with special needs in their class have problems choosing the relevant teaching method and diversifying the course presentation. On the other hand, the fact that most of the candidate teachers did not express their opinions about the classroom teachers' appropriate teaching methods may indicate that the classroom teachers are unable to demonstrate such teaching skills.

**Table 5**. *Evaluation of Teachers' Skills in Using Teaching Methods*

| Teaching Methods | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Uses relevant teaching methods | 10 | 18,87 | 6 | 11,32 | 12 | 22,64 | 25 | 47,17 |
| Uses assistive technology and materials | 20 | 37,74 | 19 | 35,85 | 5 | 9,43 | 9 | 16,98 |
| Diversifies the course presentation | 11 | 20,75 | 8 | 15,09 | 11 | 20,75 | 23 | 43,40 |
| The lesson taught includes the whole group | 10 | 18,87 | 1 | 1,89 | 8 | 15,09 | 34 | 64,15 |
| Uses simple, clear, precise and appropriate examples | 20 | 37,74 | 0 | 0,00 | 4 | 7,55 | 29 | 54,72 |
| Realizes his/her goals by focusing on the goals to be taught throughout the course | 10 | 18,87 | 4 | 7,55 | 1 | 1,89 | 38 | 71,70 |

The candidate teachers who made observations within the scope of the research were asked to evaluate the presentation skills of the teachers. Teachers' presentation skills are grouped under four basic categories and presented in Table 6.

**Table 6**. *Evaluation of Teachers' Presentation Skills*

| Presentation Skills | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Creates a classroom environment conducive to learning | 19 | 35,85 | 11 | 20,75 | 5 | 9,43 | 18 | 33,96 |
| Makes eye contact with students | 28 | 52,83 | 3 | 5,66 | 1 | 1,89 | 21 | 39,62 |
| Teaches in an appropriate tone for the whole class to hear | 32 | 60,38 | 9 | 16,98 | 5 | 9,43 | 7 | 13,21 |
| Uses tone of voice to attract students' attention | 10 | 18,87 | 4 | 7,55 | 3 | 5,66 | 36 | 67,92 |
| Other | 4 | 7,55 | 0 | 0,00 | 0 | 0,00 | 49 | 92,45 |

When Table 6 is examined, according to the candidate teachers, in terms of presentation skills, teachers teach the lesson with an appropriate tone of voice so that the whole class can hear (Yes: n = 32, 60.38%; partially: n = 9, 16.98%) and they make eye contact with the student (Yes: n = 28, 52.83%; partially: n = 3, 5.66%). The statements of candidate teachers who expressed their opinions as "other" are that they provide students with freedom of movement, have high classroom dominance, and address students by name. One of the candidate teachers who expressed his opinion as "other" stated that the teacher never noticed the student who did not attend the lesson.

Teacher candidates who made observations within the scope of the research were asked to evaluate teachers' classroom management and behavior control skills. Teachers' classroom management and behavior control skills are gathered under seven basic categories and presented in Table 7.

**Table 7.** *Evaluation of Teachers' Classroom Management and Behavior Control Skills*

| Classroom Management and Behavior Control Skills | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Uses time efficiently | 24 | 45,28 | 8 | 15,09 | 7 | 13,21 | 14 | 26,42 |
| Interacts with students during class | 15 | 28,30 | 5 | 9,43 | 1 | 1,89 | 32 | 60,38 |
| Maintains discipline and control | 21 | 39,62 | 9 | 16,98 | 6 | 11,32 | 17 | 32,08 |
| Effectively uses the area/scene | 9 | 16,98 | 1 | 1,89 | 13 | 24,53 | 30 | 56,60 |
| Ignores problem behavior | 3 | 5,66 | 8 | 15,09 | 29 | 54,72 | 13 | 24,53 |
| Promotes/reinforces positive behaviors | 24 | 45,28 | 2 | 3,77 | 4 | 7,55 | 23 | 43,40 |
| Hints/directs positive behavior | 8 | 15,09 | 1 | 1,89 | 7 | 13,21 | 37 | 69,81 |
| Other | 4 | 7,55 | 0 | 0,00 | 0 | 0,00 | 49 | 92,45 |

According to Table 7, 45.28% (n =24) of the candidate teachers stated that teachers use time efficiently, 45.28% (n = 24) said that teachers emphasize and reinforce positive behaviors, 39.62% (n = 21) expressed that the teacher maintains discipline and control. In terms of teachers' classroom management and behavior control

skills, 28.30% (n = 15) of the teacher candidates stated that the teachers interacted with the students during the lesson. While 16.98% (n = 9) of the candidate teachers stated that the teacher used the area/scene effectively, 24.53% (n = 13) said they did not use the area/scene effectively, 1.89% (n = 13). 1) said that the teacher partially used the area/stage where he lectured effectively. This situation can be interpreted as that there are some problems in using the classroom space effectively in terms of teachers' classroom management and behavior control. In addition, 54.72% (n=29) of teacher candidates stated that teachers do not ignore problem behavior. Teachers are interested in students' problem behaviors by not ignoring the problem behavior. In fact, problem behaviors that will not disrupt the lesson and that are not important can be ignored, and the problem behavior can be prevented. Especially if the problem behavior's function is to attract attention, post-behavior attention/attention can be withdrawn and ignored. The observation of candidate teachers in this regard is that teachers do not ignore such behaviors. One of the candidate teachers who expressed an opinion in the other category stated that the teacher used reinforcements for successful students, another stated that the teacher did not interact with unsuccessful students, another did not reinforce the positive behaviors of the student exhibiting undesirable behavior, and another stated that the way the teacher intervened in the undesirable behavior changed according to the success of the student. Another candidate teacher who gave an opinion in the category of other is that the classroom teacher did not solve the problems that the students had with each other, and instead of understanding the problem, he asked the students to solve the problem during recess.

The candidate teachers who made observations within the scope of the research were asked to evaluate their sensitivity of the teachers. Responsiveness-sensitivity of teachers were gathered under five basic categories and presented in Table 8.

**Table 8.** *Evaluation of Teachers' Responsiveness/ Sensitivity*

| Responsiveness/ Sensitivity | Yes | | Partially | | No | | No opinion expressed | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Sensitive to students with special needs | 16 | 30,19 | 7 | 13,21 | 14 | 26,42 | 16 | 30,19 |
| Sensitive to students from different cultures | 16 | 30,19 | 2 | 3,77 | 10 | 18,87 | 25 | 47,17 |
| Sensitive to gender differences | 16 | 30,19 | 1 | 1,89 | 8 | 15,09 | 28 | 52,83 |
| Creates a non-threatening learning environment | 11 | 20,75 | 0 | 0,00 | 5 | 9,43 | 37 | 69,81 |
| Gives appropriate answers to student predictions about the content of the course | 11 | 20,75 | 1 | 1,89 | 2 | 3,77 | 40 | 75,47 |
| Other | 3 | 5,66 | 0 | 0,00 | 0 | 0,00 | 50 | 94,34 |

When Table 8 is examined, it is seen that teachers are sensitive in creating a non-threatening environment and giving appropriate answers to students' predictions regarding the lesson's content. While 30.19% (n = 16) of the candidate teachers stated that teachers are sensitive to students with special needs, 26.42% (n=14) of teachers are not sensitive to students with special needs, and 13.21% (n = 14) 7) stated that they are partially sensitive. At this point, it makes us think that classroom teachers with students with special needs are not sensitive enough to students with special needs. In terms of being sensitive to students from different cultures, 30.19% (n=16) of candidate teachers stated that teachers are sensitive, 3.77% (n = 2) stated that teachers are partially sensitive, and 18.87% (n = 10) stated that they are not sensitive. When evaluated in terms of being sensitive to gender differences, 30.19% (n = 16) of the candidate teachers indicated that the teachers they observed were sensitive, 1.89% (n = 1) teachers were partially sensitive, and 15.09% (n = 1). 8) stated that they were not sensitive. In the other category, it was stated that a teacher identified the students who had problems in their families and acted accordingly. On the other hand, one student stated that in line with his observations, the teacher treated his student with a low socioeconomic level more harshly than other students. On the other hand, a student stated that the teacher left the control of the student with special needs to the shadow teacher.

The teacher candidates who made observations within the scope of the research were asked to evaluate the adaptations made by the teachers for the special needs student in their classroom. The adaptations made by the teachers for the special needs student in the classroom are grouped under four basic categories and presented in Table 9.

**Table 9.** *Evaluation of Teachers' Adaptations for the Special Needs Student in the Classroom*

| Adaptations | Yes | | No | |
|---|---|---|---|---|
| | f | % | f | % |
| Physical Adaptation | 13 | 24,53 | 40 | 75,47 |
| Adapting Content | 9 | 16,98 | 44 | 83,02 |
| Adapting the Teaching Presentation | 7 | 13,21 | 46 | 86,79 |
| Adapting Assessment | 9 | 16,98 | 44 | 83,02 |

When Table 9 is examined, 24.53% (n = 13) of the candidate teachers stated that physical adaptations were made for special needs. The physical adaptations made include seating the student with special needs next to a successful student, placing the students with special needs in a way that they are not isolated from their friends, placing the student with special needs in the front row close to the teacher, and seating the student with special needs where they can see the blackboard. Of the teacher candidates, 16.98% (n = 9) stated that the content was adapted for students with special needs. The content adaptations consist of teaching different subjects with the shadow teacher, adapting the accomplishments to the level of the student, offering the student additional activities, asking questions appropriate to the level of the student, and organizing activities suitable for the student, as well as enriching with visual materials and providing familiar examples. Also, 13.21% (n = 7) of the teacher candidates stated that the instructional presentation was adapted for students with special needs. The teaching adaptations include allocating extra time outside of the classroom, creating a collaborative working environment for students with academic failure, staying close to the student during the lesson and intervening when he does not understand, giving examples that will attract the attention of the student with special needs during the lesson, engaging in activities that can effectively involve students with special needs in the lesson, and selecting an appropriate assessment tool. . As for assessment adaptations, 16.98% (n = 9) of teacher candidates stated that assessment was adapted for students with special needs. Evaluation adaptations include preparing a different exam with more visual elements for the student, paying close attention to using clearer and more understandable language in the exam, using a little more reinforcement for students with special needs, and evaluating these students according to their levels and what they can do, providing worksheets that are appropriate for the student's level, and evaluating the student by taking into account the special circumstance.One of the candidate teachers stated that the teacher made the evaluations by exchanging views with the shadow teacher. Another candidate teacher stated that a teacher who had a student with speech difficulties in the class evaluated the student in a written way rather than verbally.

## 4. Discussion and Conclusion

Teachers' use of the components that make up effective teaching in today's inclusive classrooms is an integral part of the development of students with special needs. Questions about what constitutes effective teaching, arising from the nature and effects of classroom instruction, still dominate much of the current debate (Jones & Brownell, 2014). This study aims to describe the teaching practices of classroom teachers with students with special needs in their classrooms by the classroom teacher candidates through observation.

In the study, when the findings regarding the content presentations of the classroom teachers are examined, it is seen that the teachers do not prepare materials for the content they will teach, they use the activities on the websites they are members of, and they adhere to the contents of the Education Information Network (EBA) and the book. In their study, Güneş et al. (2016) observed the classroom teachers, and it was revealed that the teachers adhered to the EBA and book contents in the same way and did not prepare any materials even in lessons such as teaching reading. These results may be due to teachers' thinking that the materials available in the program are sufficient and their indecision about preparing materials. However, students with special needs need instruction that includes specially designed practices and a set of teaching strategies (Morris-Mathews et al., 2021).

Within the scope of the study, it is seen that very few classroom teachers use teaching strategies such as explaining the purpose of the lesson, giving details, summarizing the content or concepts. This finding is in line with the results of previous observational studies, which stated that teachers' teaching strategies such as summarizing the topic and explaining the purpose of the lesson are the least used strategies (Reddy et al., 2021; Sucuoğlu & Demirtaşlı, 2009). Although the tools and observers used in this study and other studies are

different, the similarity of the findings gives an idea that teachers do not use such strategies. In addition, the interaction skills of classroom teachers with students during the lesson were observed. In this direction, it has been determined that the rate of teachers exhibiting behaviors toward individual learning of students such as giving feedback on academic and non-academic behaviors, attracting attention, and encouraging participation in the lesson during the lesson, is low. Likewise, several research results support the findings of this study and show that classroom teachers are insufficient in the process of providing feedback to students and ensuring students' participation in the lesson (Güner & Melekoğlu, 2016; Reddy et al., 2021).

In inclusive environments, where there are students with special needs, the classroom teachers do not carry out the teaching process by thinking of these students, in other words, the lesson taught does not include all the students in the class (Sucuoğlu & Demirtaşlı, 2009), the teaching presentation and method for students with special needs or at risk are not diversified (Morris-Mathews et al., 2021). These results can be considered as an indication that the qualifications of classroom teachers cannot meet the teaching needs of students with special needs. Actually, the fact that today's general education teacher training programs train classroom teachers based on the constructivist approach (Reddy et al., 2021; Güneş, 2016) may be a reason why students with special needs remain in the background in inclusive environments. In the constructivist approach, the teacher carries and facilitates the students' high-level thinking skills further and creates a rich discussion environment with high-level questions posed by the students (Pua et al., 2021). As a matter of fact, students with special needs in inclusive environments may not be able to respond to this expectation. Cognitive load theory advocates that direct, clear, and systematic instruction should be given to students with special needs to reduce cognitive load (Morris-Mathews, 2021), and teachers should use a set of teaching skills, routines, and strategies to help these students remember and retain information by structuring instructions for them (Archer & Hughes, 2011). By providing direct and explicit instruction, teachers can reduce cognitive load, avoid overloading working memory, and facilitate productive interactions between long-term memory and working memory. Organizing such a teaching process and using different teaching methods can increase the participation of students with special needs and enable them to be more successful. In fact, due to the increasing number of students with special needs in mainstream environments, general education teacher training programs can be updated to include a variety of teaching strategies, and the basic competencies of teacher candidates can be enhanced before they enter the actual classroom (Gottfried et al. 2019). These recommendations can be put into practice when it is thought that education through certification is generally ineffective in increasing teacher competence (Harris & Sass, 2011).

Teachers need to use classroom management and behavior control skills effectively in the realization of an effective teaching process. Unfortunately, it is seen that classroom teachers do not perform their classroom management and behavior control skills adequately in the classrooms where inclusive practices are carried out (Güner, 2011; Sazak-Pınar & Güner-Yıldız, 2017; Sucuoğlu & Demirtaşlı, 2009). These findings may be because classroom teachers do not have sufficient knowledge about classroom management, and adequate training on classroom management and behavior control is not included in general education teacher training programs (Gilmour et al., 2019). At the same time, it is another important finding of this study that primary school teachers are quite inadequate in adapting the physical adaptation, the content of the course, and the assessment. However, the results of the study showed that only 24.53% of classroom teachers were able to make adjustments in the physical area, 16.98% in the content area, 16.98% in the teaching presentation, and 16.98% in the evaluation process.. These rates confirm the findings of a previous study (Sucuoğlu & Demirtaşlı, 2009). Physical and instructional adaptations are very important in inclusive environments, and adapting the physical characteristics of the classroom, the content of the course, and the teaching methods increase student participation in the lesson and prevent possible problem behaviors (Güner-Yıldız & Melekoğlu, 2016; Sucuoğlu & Demirtaşlı, 2009). The fact that primary school teachers do not use teaching strategies that constitute effective teaching suggests that their knowledge and experience about students with special needs and inclusion are insufficient. Due to the fact that primary school teacher candidates take only one course related to special education during their undergraduate education, they are unable to practice and gain knowledge of other teaching approaches, such as classroom management, individualized education, open education, systematic education, and intensive education.However, research on students with special needs underlines that open intensive individualized instruction directly increases student achievement (Al Otaiba et al., 2011; Connor et al., 2013). Teaching these practices as a part of effective teaching to teachers working with students with special needs in general education classrooms seems like a necessity.

Findings of the present study show that classroom teachers cannot perform the teaching and classroom management needed by students with special needs in inclusive environments. To prevent the failure of mainstreaming practices that have been going on for a long time, and for general education teacher training programs to train classroom teachers who can meet the needs of students with special needs, undergraduate education should be revised. It is necessary to prepare teacher training programs that will appeal to all children without excluding children with special needs from education by strengthening the general education structure.

**5. Recommendation for Teaching Practices**

Our study highlights the needs of classroom teachers working in inclusive environments. Classroom teachers should know how to apply teaching strategies, classroom management skills, intensive, systematic and individualized teaching approaches to meet the more specific needs of students with special needs in inclusive settings. Indeed, studies indicate that intensive, systematic and individualized teaching approaches are beneficial to meet the needs of students with special needs (Morris et al., 2021). In addition, observation studies provide information about the teaching processes implemented by classroom teachers in the classroom and offer important feedback to improve the quality of teaching processes (Reddy et al., 2021). In future research, coaching training can be given to classroom teachers in line with the feedback. The feedback provided during the coaching training process can increase the frequency and quality of effective teaching practices teachers implement in the classroom.

**6. Limitations**

Although this study is one of the first studies in Turkey to examine the teaching practice processes of classroom teachers with students with special needs in their classrooms through the observations of classroom teacher candidates, there are some limitations of the study. First of all, Fleiss Kappa, Krippendorff alpha, and Kendall W coefficients were calculated to examine the harmony between the categories created in line with the answers given by the participants who observed the same teacher was found that the observations made according to Kendall Omega were moderately reliable. Secondly, candidate teachers who made observations within the scope of the study consisted of students studying only in an undergraduate program. Moreover, although more than one candidate teacher observed a teacher in the study, only seventeen classroom teachers were observed. Therefore, the generalizability of the results is limited. Future research can expand the findings of the study by observing more classroom teachers in more different provinces. Thirdly, the results of the study are based on the data written by candidate classroom teachers on the observation form. The results of the study may have been affected by the fact that teacher candidates' writing skills and knowledge about special education differ. Finally, the results of our study are based on observation data only. The opinions of the classroom teachers can support the data obtained during the observation process and the data can be diversified to enrich the research results. In future studies, teacher behaviors can be observed on a larger sample with the validity and reliability tested observation tools, and extensive and in-depth data can be obtained for classroom teaching.

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# Developing a Student Satisfaction Index and a Strategic Management Map for Turkish Higher Education

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ABSTRACT

This research aims to examine student satisfaction at higher education institutions through the estimation of a student satisfaction index (SSI) by simultaneously building a strategic management map (SMM) to help higher education leaders identify the areas for improvement at their institutions during Covid-19 induced hybrid education in Turkish Higher Education. The research was carried out with university students at a well-known foundation university in Turkey during Covid-19 pandemic. American Customer Satisfaction Model (ACSI) was used as a lens of analyisis to demonstrate the causal relationship between the antecedents and consequences of student satisfaction in Turkish Higher Education. The partial least squares (PLS) estimation was employed to test the model and obtain the SSI score. Given the complex nature of student satisfaction and loyalty, the model was found to adequately predict overall student satisfaction and loyalty. SSI score of 64.95 was found to be lower than the weighted average of all sectors in the United States in 2021. The SMM that was built to examine the relative importance of each quality attributes demonstrated that the perceived utility/benefit and interactional/process-based quality attributes have the greatest positive influence on satisfaction score. The research contributed to the discussion on quality perceptions by highlighting the significance of perceived utility/benefit and interactional/process-based quality attributes over the core/hygiene factors in quality construct. The research also contributed to the discussion on the relationship between satisfaction and complaining behavior by proving that the relationship it is not necessarily negative but contingent on the number of different factors.

Keywords:
Student satisfaction index, strategic management map, Covid-19 pandemic, higher education

## 1. Introduction

The purpose of this study is to develop an index for student satisfaction model for Covid-19 induced hybrid education by using American Customer Satisfaction Index (ACSI) which was originally developed by Fornell (1992) as a lens of analysis. A Strategic Management Map (SMM) was built on the student satisfaction index (SSI) to assist higher education leaders to identify the areas for improvement at their institutions. The ACSI model was built on two well-established theories: 1) the quality, satisfaction and performance paradigm and 2) Hirshman's (1970) the exit-voice theory (Hsu, 2008). The model depicts a cause-and-effect relationship running from the primary drivers of overall satisfaction (customer expectation, perceived service quality, and perceived value) to its consequences (customer loyalty and customer complaint). Throughout the literature you may come across several variations of the model adapted for different contexts. This study utilizes two different variations of the model: 1) e-CSI developed for online shopping by Hsu (2008) and 2) augmented variation of Serenko (2011) which was developed for Canadian higher education. Unlike the conventional model, in the e-CSI model, the construct of customer expectation was removed and replaced by the construct of trust. Hsu (2008) also replaced the construct of service quality by e-service quality and introduced one

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additional relationship from trust to customer loyalty. In Serenko's (2011) variation which was developed for educational settings, the model was augmented by the introduction of tuition change tolerance (TCT) and word of mouth (WOM) as the consequences of SS. On the other hand, Customer Expectation (CE) was changed as Perceived Expectation (PE), Customer Satisfaction (CS) as Student Satisfaction (SS), Customer Loyalty (CL) as Perceived Loyalty (PL), and Customer Complaint (CC) as Student Complaint (SC).

Other than Serenko's (2011) study where the American Customer Satisfaction Model (ACSM) was adapted for Canadian higher education, so far no study utilized ACSM as a lens of analysis in the context of higher education. Moreover, so far there has been no attempt to test and validate an index for student satisfaction that facilitates a systematic benchmarking over time and across institutions in Turkish higher education. This model can also serve a diagnostic tool to suggest why students are satisfied or dissatisfied with their institution; whether the institution handles the SCs effectively or not; how the institution can improve SS; how effective the efforts of the institution are at improving SS; and where the institution stands on SS relative to its competitors at the higher education. Therefore, this study is both theoretically and practically important.

### 1.1. SSI Model

American Customer Satisfaction Model (ACSM) was used as a lens of analysis for this study. The SSI model which will be tested for Turkish higher education was adapted utilizing the two different variations of ACSM (adaptation of ACSI by Serenko (2011) and adaptation of ACSI by Hsu (2008)). It focuses on three key antecedents: perceived trust (PT), perceived quality (PQ) and perceived value (PV); and two consequences: student complaints (SC) and student loyalty (SL). Following the footprints of Hsu (2008), customer expectation was removed and replaced by perceived trust (PT) and one additional relationship from trust to SL was introduced into the model. In the model, CS was replaced by SS, and CL was replaced by SL and CC was replaced by SC.

*Perceived Quality:* Johnston (2010) argues that in the field of higher education, students' choice of university is influenced by a variety of factors, the most important of which is the perceived quality of the programme. PQ has been considered to be one of the leading drivers of CS (Ha & Janda, 2008) and also recognized as an important driver of SS (Athiyaman, A. 1997; Cheng et al., 2016; Dericks et al., 2019; Mwiya et al., 2017; Naylor et al, 2021).

It is believed that PQ may accurately explain SS, because students who perceive PQ as high are also likely to become more satisfied with the programme (Serenko, 2011). PQ includes variety of factors from how qualified professors are to how prestigious the university is perceived in the community (Mestrovic, 2017; Polat et al, 2016; Polat, 2015). Yet the student interactions with educational environment are the most important indicator of PQ that contributes to SS (Stukalina, 2012). Considering the fact that students and educational institutions are engaged in a value exchange relationship, students exercise their choices by selecting the educational institutions that best meet their personal needs and expect their institution to meet certain level of quality (Serenko, 2011) and if their choice of university fails to meet those expectations, students become dissatisfied with the experience (Arat, 2011; Ewell, 1989).

Consistent with prior research, in SSI model, it was hypothesized that favorable student experience with PQ leads to high SS. PQ is also expected to have a positive effect on PT, because favorable PQ can increase the perceived trust in a service provider (Hsu, 2008). Also, consistent with prior research, those who perceive the quality more favorably also find it of higher value (Fornell et al., 1996). Therefore the following hypothesises will be tested.

Hypothesis 1. PQ affects PT positively.

Hypothesis 2. PQ affects PV positively.

Hypothesis 3. PQ affects SS positively.

*Perceived Trust:* Trust is vitally important for all economic activities (Hsu, 2008) and one of the three major components of social capital which promotes the ability of people to work together for common purposes in organizations (Hamilton et al., 2016; Fukuyama, 1999; Garbarino & Johnson, 1999). This situation is even more apparent in the case of educational institutions that engage in value exchange relationships. After all, enrolling an educational institution is a long-term commitment that will affect the whole life. The lack of direct methods

to judge ethical commitments of an educational institution and the time lag between the enrollment and graduation make students even more sensitive to the issues of trustworthiness in their exchange with the educatiobal institution. Thus, the importance of trust in education can never be exaggerated.

Trust (together with social networks and norms of reciprocity) is also considered as an important antecedent of CS that, in turn, promotes CL (Castañeda, 2011; Chiou, 2004; Dehghanpouri, 2020). Gefen et al. (2003) argue that trust initially helps attract new clients and later preserve the existing ones. In a similar way, trustworthiness of the educational institutions helps them attract new students, ensure student enrollment and then keeps the students in the system until graduation (Latif et al., 2021). Lack of trust, on the other hand, is one of the most frequently cited reasons why most students do not even consider some higher education institutions as an alternative when selecting a specific education service provider or stay in the system until graduation (Chen, 2017). Trust to the institution is therefore perceived as an essential resource that contributes to SS and SL. Hence, the SSI model utilizes trust as an antecedent to SL and SS.

PT directly affects loyalty and satisfaction by reducing the uncertainity of value exchange relation between the university and the students, but it also affects them indirectly through PV by adding relational benefits that are derived from interaction (Chiou, 2004). Therefore, in SSI model, it was hypothesized that trust has a positive impact on SL, SS and PV.

Hypothesis 4. PT affects SL positively.

Hypothesis 5. PT affects SS positively.

Hypothesis 6. PT affects PV positively.

*Perceived Value:* PV refers to the PQ relative to the price paid (Fornell et al., 1996). Prior research indicated that PV is an important predictor of overall satisfaction and customer loyalty and can be defined as a trade-off between the benefit received and the cost incurred (Hsu, 2008). Likewise, Parasuraman et al (1984) define PV as the favorable perception of the utility of a service based on what was received and what was given. Serenko (2012) argues that by bringing a price dimension, PV achieves to assess PQ relative to the tuition paid; and doing so it plays two major roles: First, it controls for budget and income differences; and second, it facilitates systematic comparisons and benchmarking.

Hence, a superior value relative to competitors and a favorable assessment of a trade between what was received and what was given (Jiang, 2016; Kusumawati & Rahayu, 2020) is expected to have a favorable effect on SS. Therefore, it was hypothesized that

Hypothesis 7. PV affects SS positively.

*Student Loyalty:* SL has long been considered as the major consequence of SS and the major driver of improved profits. Loyal students are more likely to express their satisfaction to others, engage in favorable word-of-mouth more and are less likely to leave their current institution (Anderson, 1998; Serenko, 2011). Most importantly, satisfied and loyal students become more willing to invest into their relationship with their institutions over time, leading to increased enrollments and improved profits for the institution (Kalia et al., 2021; Kaur & Soch, 2018). On the other hand, overall dissatisfaction may dramatically increase the probability of disenrollment even close to graduation (Braxton, 2019; Lint, 2013).

According to Fishman et al. (2017), the path to university graduation is more uncertain than ever: Nearly one-third of undergraduates leave after their first year and many transfer to other institutions. No longer does the typical student come to university straight from high school and stay there until the graduation. Especially after the digitalization and standardization efforts in education, students are more mobile than ever. Acquiring students is enormously hard and unless those students stick around and stay there until graduation, profits will remain unpredictable for many higher education institution. Considering the fact that number of people holding a master or PhD degree or the professionals who pursue multiple degrees will increase tremendously, turning students into loyal ones has never been more important for universities.

Hence, all these new trends and future projections indicate that assuring student loyalty, positive word-of-mouth and lower marketing expenditures are more important than ever in higher education for improved profits. We, therefore, expect to see a positive relationship between SS and SL.

Hypothesis 8. SS positively affects SL.

*Student Complaints:* SC measures how often students have ever formally or informally expressed a concern about their programme experience (Serenko, 2011). In the case of unsatisfactory experience, students are expected to make their complaints officially or unofficially (Bearden & Teel, 1983). Lala and Priluck (2011) argue that dissatisfaction is the one of the main reasons for complaining behavior and imply that the relationship between SS and SC should be negative. However, there are also other studies suggesting the otherwise (e.g. Ping, 1997).

At the first sight, high SS might suggest a low level of SCs. However, one should never disregard the fact that dissatisfied customers have another alternative as to exit the relationship (Hirschman, 1970). So, especially when the perceived switching cost is low, dissatisfied customers might just exit the relationship without bothering to complain. In line with this thinking, complaining customers might still be the ones who are still satisfied. Therefore, observing a positive relationship between SS and SC is quite possible. On the other hand, if the perceived switching cost is too high, then the dissatisfied students would have no chance but to complain. Then, the complaining behavior would result in a negative relationship between student SS and SC.

It is also important to note that satisfied customers might not instantly switch to another institution after experiencing a problem (Hsu et al., 2006). This might not be just because the perceived costs of exiting the current relationship are relatively high but because they sincerely believe that their complaints will be dealt with attentively and problems will not remain unsolved. This implies that complaining students may still be the satisfied students who are believing that they can make a difference in their universities by seeking solutions for their complaints. To sum up, the relationship between SS and SC is complex and depends on several factors: 1) the behavior of the dissatisfied students and 2) the anticipation of students about how the complaints will be received and dealt by the university. So, it was hypothesized that

Hypothesis 9. SS might have a negative or positive relationship with SC.

The association between the complaint levels and loyalty mostly depends on the organization's complaint-handling capabilities (Hsu, 2008). Positive association between the complaint levels and loyalty might suggest that the organization is successful in turning complaining customers into loyal customers and vice versa (Fornell, 1992; Hsu, 2008). Hence, SSI model proposes that

Hypothesis 10. If the association between SC and SL is negative, then the university fails to turn complaining students into loyal students and vice versa (Serenko, 2011).

## 2. Methodology

### 2.1.Research Design

It is a cross-sectional quantitative investigation. As the problem addressed by this study concerns the understanding of the relationship between the key drivers of SS (including PT, PV and PQ), and the key outcomes of SS (SC and SL), an explanatory (hypothesis testing) type of research design was preferred in this study.

### 2.2. Data Collection Procedure

An on-line survey was administered to 416 undergraduate and graduate students at one of the most well-known foundation universities in Turkey in 2020-2021 spring semester during the Covid-19 induced hybrid education.

### 2.3. Data Collection Tools

A 25-item, 10-point Likert scale was designed to test the constructed hypothesis. Whenever possible, previously tested items were used. To address face validity, items are reviewed by several academics and minor adjustments were made both on the format and the content. A preliminary survey was tested with 10 graduate students from another private university. After several refinement the survey was finalized.

PQ was measured by 10 items. In this research, quality was considered to have three main aspects: core/hygiene aspects; interactional/process aspects and perceived utility/benefit aspects. Items for this construct were developed in a focus group composed of 10 graduate students and a list of 10 items were

identified. Academic staff credentials, educational infrastructure, international experience, second language acquisition were grouped under the core/hygiene aspect (4 items); campus location, campus facilities, industry-university cooperation and interpersonal interactions with the faculty were grouped under interactional/process aspect (4 items); lastly, local employability and global employability were grouped under perceived utility/benefit aspect (2 items). PT was measured by two items which were adopted from the study of Gefen et al (2003) and re-worded to fit into higher education context as ''caring about student needs" and ''trustworthiness". PV was measured by two items which were adapted from the study of Serenko (2011) "tuition paid relative to programme quality" and "programme quality relative to tuition paid". SS was measured by three items which are adapted from the study of Fornell et al. (1996): (1) Overall satisfaction (2) Satisfaction compared with expectation and (3) Satisfaction compared with one's ideal experience. SC was measured by whether a student expressed a concern formally or informally when were dissatisfied (Serenko, 2011). This study proposed that SL has three dimensions: positive student predisposition towards the programme (SPP), tuition change tolerance (TCT) and positive word of mouth (WOM). All the measures of SPP, WOM and TCT were adapted from the study of Serenko (2011). Positive SPP was measured by two items: (1) likelihood of a student repeating the same choice by enrolling in the same programme again, and (2) students' positive opinion about the rightfulness of their choice in selecting a specific service provider (Serenko, 2011). TCT is related to two types of switching costs: transactional and learning costs (Willis et al, 2007 as cited in Serenko, 2011). Transactional costs are associated with financial costs incurred when a student has to move to another place (e.g. exstra expenses or interruption in employment) and the learning costs are associated with the inconveniences of becoming a transfer student (e.g. a transfer students are more likely to exert more effort to adapt to a new university, take exstra courses not offered by his/her previous university, or learn a new culture, values and programme structure) (Serenko, 2011). TCT was measured based on two items: (1) likelihood of a student staying in the programme despite an increase in its tuition, or (2) likelihood of a student transferring to a rival programme if it offers a discount in its tuition (Serenko, 2011). WOM was measured based on three items: (1) tendency to tell a favorable opinion about the programme to others (Browne et al, 1998 as cited in Serenko, 2011) and (2) the likelihood of suggesting the programme to others or (3) encouraging others to apply to this programme (Serenko, 2011).

### 2.4. Data Analysis

The partial least squares (PLS) estimation (using SmartPLS 3.3.2) was used to test the measurement model and to estimate the predictive power of the theoretical model. PLS has several strengths that made it appropriate for this study. First, PLS is effective at handling both reflective and formative constructs. Second, PLS is effective when the data exhibits non-normality, and third, PLS is effective when the sample size is small. Most importantly, in a PLS estimation, estimated weights can be utilized to derive index scores that facilitates a systematic comparison over time and across institutions (Hsu, 2008).

### 2.4. Ethical

The ethics committee approval for this study was obtained from Bahçeşehir University's Committee on Scientific Research, and Publication Ethics with the decision numbered 01/02/2021_E.1170.

## 3. Findings

In a PLS estimation, construct indicators must be specified as either formative or reflective. While the reflective measures are the items that represent the consequences of the construct under study, formative measures represent the items that affect the construct under study (Diamantopoulos & Siguaw, 2006). Since the PQ has three different dimensions that strive to cover the construct domain fully by different indicators with minimum overlap, the indicators of PQ were treated as formative measures. The indicators of other constructs, on the other hand, were treated as reflective measures as the aim is to maximize the overlap between different indicators (Diamantopoulos & Siguaw, 2006).

### 3.1. Measurement Model

In order to validate the measurement model, item reliabilities for all formative constructs including PT, PV, SSI, SL, and SC were estimated by outer loadings and the outer weights were obtained in order to determine the significance and the relevance of the formative indicators for PQ (see Table 1). As can be seen on Table 1, all item loadings explained over 50% of variance in their respective reflective constructs, and therefore were

retained in the measurement model. Since all the outer weights were significant, no items were removed from the formative indicators for PQ.

**Table 1.** *Items Statistics*

| | Mean | Loadings (Weights) |
|---|---|---|
| *PQ-Formative Indicator* | | |
| PQ1- Academic staff credentials (core aspect) | 7.49 | (0.08) |
| PQ2- Educational infrastructure (core aspect) | 8.08 | (0.06) |
| PQ3- International experience (core aspect) | 8.45 | (0.02) |
| PQ4- Second language acquisition (core aspect) | 6.92 | (0.11) |
| PQ5- Campus location (process aspect) | 7.83 | (0.23) |
| PQ6- Campus facilities (process aspect) | 6.78 | (0.14) |
| PQ7- Industry-university cooperation (process aspect) | 7.89 | (0.17) |
| PQ8-Interpersonal interactions with the faculty (process aspect) | 8.09 | (0.21) |
| PQ9- Local employability (utility aspects) | 8.02 | (0.18) |
| PQ10- Global employability (utility aspects) | 7.56 | (0.27) |
| *PT-Reflective Indicators/Internal Consistency=0.89* | | |
| PT1-caring about students' needs | 7.46 | 0.90 |
| PT2-trustworthiness | 7.34 | 0.89 |
| *PV-Reflective Indicators/Internal Consistency=0.94* | | |
| PV1- tuition paid relative to programme quality | 7.11 | 0.93 |
| PV2- programme quality relative to tuition paid | 6.98 | 0.94 |
| *SSI-Reflective Indicators/Internal Consistency=0.88* | | |
| SSI1-Overall satisfaction | 6.58 | 0.88 |
| SSI2-Satisfaction relative to expectation | 7.10 | 0.90 |
| SSI3-Satisfaction relative to an ideal experience | 6.96 | 0.92 |
| *SC-Reflective Indicators/Internal Consistency=1* | 6.68 | 1 |
| SC-formal/informal student complaint | | |
| *SL- Reflective Indicators/ Internal Consistency=0.71* | | |
| SL1- likelihood of enrolling in the same programme again | 7.58 | 0.68 |
| SL2- student perceptions of whether they made a right choice | 8.14 | 0.73 |
| SL3- likelihood of continuation despite an increase in tuition | 6.62 | 0.70 |
| SL4- likelihood of transferring to a rival if it offers a discount in tuition | 7.32 | 0.69 |
| SL5- expressing a positive opinion about the experience | 7.56 | 0.65 |
| SL6- likelihood of recommending the experience | 7.80 | 0.68 |
| SL7- encouraging others to apply to the programme | 7.74 | 0.75 |

In order to assess the internal validity, Cronbach's alpha has been employed for reflective constructs. Table 1 shows that all internal consistency reliability measures of each reflective construct were above the threshold level of 0.70 (see Table1). For the formative construct of PQ, on the other hand, Cronbach's alpha was not calculated as the indicators of a formative construct neither need to correlate nor represent a single sub-dimension. Instead, the weight of each item was calculated to assess how much it contributes to the overall factor (Chin, 1998).

Discriminant validity measures the extent to which a given construct is different from all other constructs. To assess discriminant validity, Fornell and Lacker (1981) suggest the use of Average Variance Extracted (AVE). For adequate discriminant validity, the diagonal entries in the correlation matrix (see Table 2) must exceed the inter-construct correlations.

As can be seen from the Table 2, all diagonal values are greater than the off-diagonal values in the correlation matrix confirming that all constructs had adequate discriminant validity.

**Table 2.** *Correlation Matrix for Discriminant Validity*

| Latent Variables | | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| 1. | PQ | 0.71* | | | | | |
| 2. | PT | 0.69 | 0.86* | | | | |
| 3. | PV | 0.63 | 0.72 | 0.93* | | | |
| 4. | SSI | 0.65 | 0.68 | 0.81 | 0.83* | | |
| 5. | SL | 0.53 | 0.59 | 0.77 | 0.79 | 0.75* | |
| 6. | SC | 0.21 | 0.27 | 0.33 | 0.36 | 0.26 | 1* |

* Diagonal entries are square roots of Average Variance Extracted (AVE)

### 3.2. Structural Equation Model

In order to test the goodness of the predictive model, path coefficients and $R^2$ values were examined by PLS method. The path coefficients show the strengths of the relationships between the constructs. $R^2$ values, on the other hand, indicate the amount of variance explained by the independent constructs.

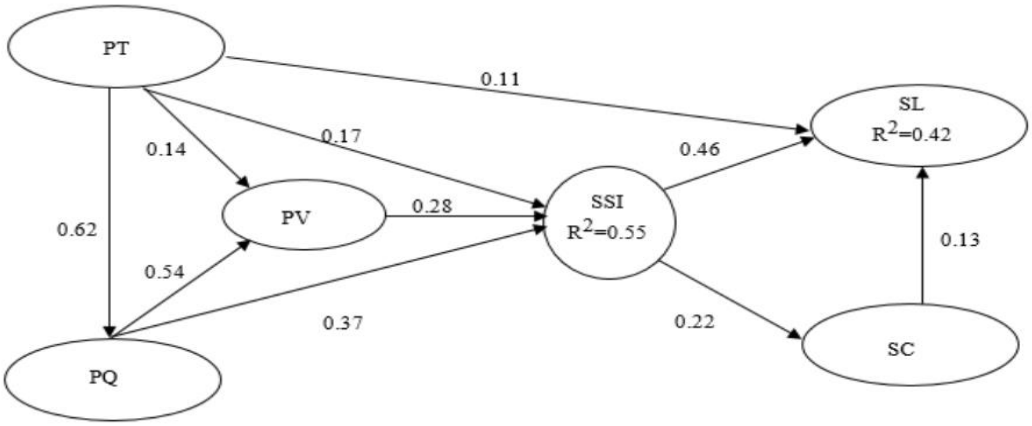


***Figure 1.*** *The Structural Model* (Note: All links are significant at 0.05).

The theoretical model explained 55% of the variance in SS. On top of it, the model captured 42% of the variance in SL. Considering the number of factors that may affect SS and SL, the amount of variances explained by the model is adequate enough.

To test the path significance, bootstrap analysis was performed. All the path estimates were found to be statistically significant (see Fig.1). PQ showed a positive effect on PT ($b = 0.62$, $p < 0.05$), PV ($b = 0.54$, $p < 0.05$), and SSI ($b = 0.37$, $p < 0.05$). PT was found to have positive effect on SL ($b = 0.11$, $p < 0.05$), SSI ($b = 0.17$, $p < 0.01$) and PV ($b = 0.14$, $p < 0.05$). PV had a positive effect on SSI ($b = 0.28$, $p < 0.05$). SSI was found to be positively associated with SL ($b = 0.46$, $p < 0.05$) and SC ($b = 0.22$, $p < 0.05$). The path coefficient from SC to SL is positive and statistically significant ($b = 0.13$, $p < 0.05$). This implies that the university was effectively handling student complaints which meant that complaining students indeed turn into loyal ones.

It is also interesting to note that SSI has a positive relationship with SC. As discussed in the literature section, there might be several explanations for this specific finding which is contrary to the conventional thinking. However, apart from all the possible explanations provided in the literature section, this finding which is contrary to the conventional thinking might have more of a case-specific explanation. Since the data was collected during Covid-19 induced hybrid education, complaining students may still be the satisfied students who believe that the problems are quite normal for such an extraordinary situation and tend to be more tolerant to problems because they believe that their complaints will be held attentively and sincerely for students' best interests.

To examine the effects of antecedent constructs on SSI, the total effect of each construct (e.g., the total effect of PT on overall SSI = [PT on overall SSI] + [trust on PV] · [PV on SSI]). The total effects of PQ, PT, and PV on overall SS are 0.52, 0.21, and 0.28, respectively. Accordingly, PQ has the greatest impact on overall SS. The $R^2$ values for overall SSI, SL and SC are 0.55, 0.42 and 0.07. Given the complex nature of SSI, SL and SC, the results can be considered as adequately high.

In order to facilitate the comparison among different educational institutions, across different sectors and over time, a SSI score was derived from the model with the following formula:

$$SSI = \frac{\sum_{i=1}^{n} w_i . \bar{x}_i - \sum_{i=1}^{n} w_i}{9 . \sum_{i=1}^{n} w_i} * 100$$

where *wi* is the non-standardized weight of the *i*th item from the measurement model generated by PLS, $\bar{x}i$ is the average of the *i*th item loading on the SS construct and n is the number of measurement variables (Anderson & Fornell, 2000). Using the formula, the SSI score was found to be 64.95 on a scale of 1-100. This score is lower but not too much lower than the weighted average in the United States in 2021[2] (National ACSI score = 75.30).

### 3.3. Strategic Management Map (SMM)

Examining the relative contribution of each quality item on SS is critically important as it encourages the educational institutions to address the quality issues from the students' viewpoint. To achieve this aim, the importance and contributions of each quality attribute on satisfaction score were estimated and a SMM was built based on significance-satisfaction analysis (Hsu et al., 2006). A SMM consists of four quadrants: ''do better'', ''keep up'', ''education'' and ''no change'' areas (see Fig. 2) (Hsu, 2008). Based on the results derived by the SMM, leaders are able to prioritize areas for improvement and determine the size of each quadrant strategically based on the university's needs and resources. For example, universities with limited resources may want to prioritize only the most critical items for improvement, and in order to identify these items, they may prefer to squeeze the ''do better'' area by setting a higher-threshold value on weights and a lower-threshold value on scores (Hsu et al., 2006).

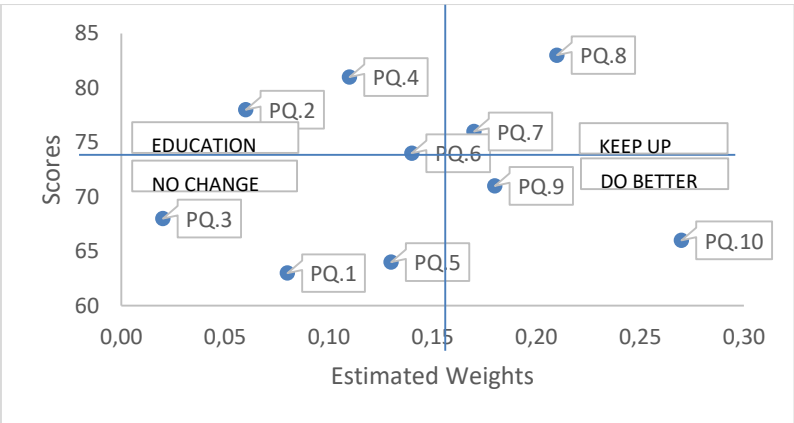


**Figure 2.** *Strategic Management Map.*

The quality items in the ''do better'' quadrant need the most attention from the leaders as the improvement in this quadrant would account for most of the influence on satisfaction (Hsu et al, 2006). The quality items in the ''keep up'' quadrant, on the other hand, should be well-preserved (Hsu et al, 2006). Despite the high satisfaction scores on the quality items on "education" quadrant, low weights of these quality items indicates that the quality items on "education" quadrant are not adequately appreciated by the students and not adequately promoted by the university. This finding implies that the importance of these quality items on "education" quadrant needs to be acknowledged by the students and efforts must be geared up for persuasive public relations in order to turn these qualities into competitive advantages. Finally, the quality attributes in the ''no change'' quadrant should receive the least attention from the leaders as to improving the quality attributes in this quadrant has the least positive effect (Hsu et al., 2006).

In line with the study of Loes and Pascarella (2015), findings showed that successful formal and informal interaction with faculty contributes to SS. This finding also confirms the findings of Abdous and Yen (2011)

[2] As of 2020, ACSI score for 46 industries and 10 sectors can be obtained at: https://www.theacsi.org/national-economic-indicator/national-sector-and-industry-results

and Johnson et al (2014) who argue that interpersonal interactions might have the greatest effect on the quality perceptions. Consistent with Herzberg (1959) hygiene-motivation theory which asserts that the hygiene factors are taken for granted factors that does not really make a difference in satisfaction, the research finding indicated that students value the interactional/process more than the core/hygiene aspect. On the other hand, this finding also coincides with the findings that the perceived usefulness is the strongest predictors of satisfaction (Dubey & Sahu, 2021; Liaw & Huang, 2013). All of these findings suggest that the higher education institutions should focus more on the interactional/process and utility/benefit aspects of the quality to achieve high student satisfaction with the lowest possible cost.

## 4. Conclusion and Discussion

Over the last decade, Turkey like many other countries exhibited a great expansion and greater competition both in its undergraduate and graduate levels. All the future projections suggest that the competition for undergraduate and graduate students will continue to increase gradually causing programmes to lose its former selectivity and causing people to question whether it is time to slow down the production line (Fishman et al., 2017). Although many people continue to question the value of what is taught in the universities, number of people with bachelor, master or PhD degree is increasing rapidly worldwide in order to accommodate those who want to get higher education in the hope of finding better jobs in the future. As we all know, completing a certain level of education has long been viewed as vital for assuring a good employment and economic advancement, yet the education level needed to pursue a reasonable economic success has increased a long time ago. Indeed, whether the rewards of having a bachelor, master or PhD degree compensate for the costs of acquiring one, we are now swiftly heading from a time where a high school diploma was more than adequate to a time where four years of bachelor's degree is just a minimum prerequisite to attain a good employment (Fishman et al., 2017). To improve their employment prospects and to distinguish themselves on the labor market, many people now attend to university. Many people think that holding a degree (Bachelor, Master or PhD) is an absolute necessity and an invaluable asset for securing good employment and upward economic mobility. Hence, to remain competitive in the sector, higher education institutions need to become increasingly student-driven and identify the drivers of satisfaction continually as to retain their most profitable assets–students. With that being said, the task facing leaders in the higher education is to focus on the right quality attributes that have the greatest positive effect on student satisfaction.

Through a SMM, our analysis may help leaders identify weak areas and optimize limited resources by prioritizing the areas for improvement to increase students' institutional and personal commitment and reduce early dropouts. This research also contributes to the discussion on quality by demonstrating that the higher education institutions better focus on the interactional/process and utility/benefit aspects of the quality construct if they wish to survive in the competition. Specifically, the higher education leaders must ensure that their staff (both academic and administrative) should always be attentive, supportive and willing to help students with their problems (interactional/process aspect). Moreover, higher education institutions better help themselves if they focus more on their alumni and seek their support in order to increase the chances of employment for their graduates (perceived usefulness/benefit aspect).

This research also contributes to the discussion about the relationship between SS and SC by proving that this relationship is contingent on the number of different factors. Although the conventional thinking tends to anticipate a negative relationship between SSI and SC, this study demonstrated that this is not necessarily true. Indeed, students that complain may still be the satisfied but demanding students who are believing that they can make a difference in their universities by seeking solutions and improvements with their complaints. It is important to note that such feedbacks from complaining students may provide invaluable insights and learning opportunities for the higher institutions. As argued by Hsu et al. (2006), this is indeed why well-managed organizations identify their most demanding customers and focus not on the ones who are easily satisfied. Therefore, it is concluded that the investment in complaint handling process can create an invaluable competitive edge for higher education institutions.

## 5. Recommendations

Despite its important theoretical and practical contributions, this study also has several limitations. First, the findings are based on a one-site design which limits the generalizability of the findings. Therefore, to better understand the model, a more representative sample should be obtained. Second, the findings are based on a

one-time design. Since the data was collected during the Covid-19 induced hybrid education, the findings might potentially be limited to this specific time span and so, some of the explanations that are provided in the findings section may only be limited to these extraordinary circumstances. In line with this thinking, it is important to note that the relationship between SSI and SC is elusive. Students, for instance, might be less tolerant over time when they no longer perceive the hybrid mode of education as something extraordinary; and some quality attributes may lose their significance while some others gain more importance. For instance, when the hybrid education becomes a norm, significance of campus location or campus facilities may lose some of its weight on the perceived quality attributes. So, to better understand the phenomenon, the study should be continually repeated to better understand the drivers of perceived quality and student satisfaction along with their consequences within different context and time. However, despite all these limitations, this research should still be considered as a successful attempt to explain the phenomenon of student satisfaction by providing some important insights to higher education leaders about some specific quality attributes that need to be improved to enhance student satisfaction.

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# The Effect of Discrimination Model-based Group Supervision on Counseling Self-Efficacy and Insights of Novice Supervisees

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ABSTRACT

This study examined the effect of Discrimination Model (DM)-based group supervision on novice supervisees' counseling self-efficacy and insight levels. The study used a pretest-posttest model with 3X2 quasi-experimental, comparison, and control groups. Eighteen novice supervisees (6 participates in each group) constituted the participants. Two-factor ANOVA for mixed designs/split-plot tests was performed to analyze the data. The results revealed that DM-based group supervision significantly increased the levels of Helping Skill Self-efficacy (HSS), Session Management Self-efficacy (SMS), Counseling Challenges Self-efficacy (CCS), and Insight of novice supervisees. The comparison group showed significant changes only in their HSS and SMS levels, but not in their CCS and Insight levels. The results revealed that DM-based group supervision led to a significant difference in novice supervisees' SMS, CCS, and Insight levels compared to the comparison group. However, there was no significant difference between the two groups in terms of their HSS levels. Moreover, the control group did not score differently regarding the research variables. DM-based group supervision is an effective way for novice supervisees to develop counseling self-efficacy and insight. Findings provide an empirically-based clinical map for those aiming to provide effective supervision.

Keywords:
Clinical supervision, discrimination model, group supervision, counselor self-efficacy, insight

## 1. Introduction

Clinical supervision, described as "signature pedagogy" in the education of mental health professionals (Bernard & Goodyear, 2014; Luke & Peters, 2020), significantly supports supervisees' professional development (Bernard & Goodyear, 2014). Indeed, numerous studies reveal that counseling self-efficacy of supervisees increased in the supervision process (Brejcha, 2021; Crockett & Hays, 2015; Hunter, 2021; Morrison & Lent, 2018; Mullen et al., 2015; Park et al., 2019), their counseling skills (Erbaş et al., 2020; Watkins, 2011), session management (Aladağ, 2014), and challenge coping skills (Bakalım et al., 2018) improved. Furthermore, studies are revealing that the supervision process is effective in reflective processes such as developing supervisees' personal (Aladağ, 2014; Brashear, 2021; Inma et al., 2014) and multicultural awareness (Brejcha, 2021; Bradley et al., 2019; Ivers et al., 2017). Moreover, it is possible to find studies indicating that group supervision, especially peer support, supports supervisees to improve their counseling self-efficacy (Atik & Erkan Atik, 2019; Bakalım et al., 2018; Brashear, 2021; Brejcha, 2021; Chui et al., 2021; Tan & Chou, 2018; Ülker Tümlü, 2019) and acquire insight (De Stefano et al., 2007; Orchowski et al., 2010; Tan, 2019). On the other hand, I can say that the studies focusing on the development of counseling self-efficacy and insight of supervisees in the supervision process are mostly independent studies without following a supervision model (e.g., Atik & Erkan Atik, 2019; Chui et al., 2021; Ivers et al., 2017). Furthermore, it is possible to see that some similar

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studies are limited to qualitative results (e.g., Brejcha, 2021; Calvert et al., 2020; Stinchfield et al., 2019; Tan, 2019; Ülker Tümlü, 2019).

On the other hand, a supervision model provides the supervisor with a conceptual and systematic roadmap for conducting the supervision process (Bernard & Goodyear, 2014; Campbell, 2006) and mediates a wide range of changes in supervisees (Milne et al., 2011). In this context, although the available studies provide extensive results that reveal changes in supervisees in the supervision process, there is a need for empirical studies that reveal the effect of supervision models on these changes (Milne et al., 2011; Watkins, 2011). This study focuses on the change in counseling self-efficacy and insights of supervisees during a Discrimination Model-based group supervision.

### 1.1. Discrimination Model

A supervision model provides a framework for arranging the knowledge and skills of what and how the supervisor will instruct the supervisee in terms of professional development (Borders & Brown, 2009; Corey et al., 2021). Various supervision models have been developed to understand and conduct the clinical supervision process. It is possible to classify these models as models grounded in psychotherapy, developmental models, and process models (Bernard & Goodyear, 2014). The Discrimination Model (DM), one of the process models, refers to a condition when a supervisor conducts the supervision process based on three supervisor roles and four supervision focuses based on the supervision needs (Bernard, 1979; Borders & Brown, 2009). These roles are *teacher*, *counselor*, and *consultant*, and the focuses are *counseling performance skills*, *cognitive counseling skills*, *self-awareness*, and *professional behaviors* (Bernard, 1979; Borders & Brown, 2009). While the role of the *teacher* includes the supervisor's instructional activities such as modeling, explaining, and giving information, the role of the *counselor* includes processes such as the supervisor's empathic approach to the supervisee and unconditional acceptance of them. The role of the *consultant* corresponds to the supervisor's actions to support the supervisee in finding their style.

On the other hand, the focus of *counseling performance skills* includes giving feedback on the supervisee's verbal or non-verbal observable behaviors in the counseling process. The focus of *cognitive counseling skills* includes processes of understanding what the client says, seeing the themes in the client's messages, and choosing the appropriate strategies for the client to reach their goals. *Self-awareness* refers to carrying out a supervision process focused on the supervisee's awareness of the dynamics related to their practice and discriminating these dynamics from their practice. Finally, the focus of *professional behaviors* includes a feedback process for the supervisee's behaviors in accordance with the ethical principles and legal procedures in the counseling and supervision process. According to the DM, it is possible to apply for these roles and focuses in 12 distinct ways in a 3x4 matrix, based on the supervision needs (Borders & Brown, 2009). The DM is remarkable as the most known and commonly used model among supervision models (Arthur & Bernard, 2012; Bernard & Goodyear, 2014). The fact that it provides flexibility to switch between roles, focuses based on the need for supervision, and is based on empirical data (Timm, 2015), and its suitability for both individual and group supervision processes (Bernard & Goodyear, 2014) make the DM preferable. With these advantages, the DM also aims to improve the counseling self-efficacy of supervisees (Bernard, 1979).

### 1.2. Counseling Self-efficacy

Bandura (1982), who first suggested the concept of self-efficacy, defined this concept as "an individual's judgments about how well he/she can implement the action plans needed to deal with potential situations" (p. 122). This concept has been adapted to the field of mental health as well as to many fields. In this context, counseling self-efficacy refers to "an individual's beliefs and judgments about his/her ability to provide effective counseling assistance to his/her clients in the near future" (Larson et al., 1992; Hunter, 2021). According to Bandura (1982), it is possible to observe ineffective behaviors of an individual if their self-efficacy is low despite their knowledge and skills. Therefore, people's high perception of self-efficacy can enable them to insist on their efforts until they succeed. This also applies to counseling self-efficacy. In particular, novice supervisees' perception of counseling self-efficacy may significantly affect their counseling performance and motivation (Larson et al., 1992). One of the DM's main purposes is to improve supervisees' counseling self-efficacy (Bernard, 1979). In this context, it is possible to improve the counseling self-efficacy of novice supervisees by focusing on four supervision focuses and three supervisor roles in supervision. In fact, novice supervisees need their supervisors to have both instructive and empathetic and supportive approaches

(Aladağ, 2014; Bird & Jonnson, 2020; Swank & McCarthy, 2015). These approaches to be demonstrated by supervisors correspond to the roles of teacher, counselor, and advisor emphasized by the DM.

Nevertheless, supervisees feel secure in a supervision process focused on counseling performance skills, cognitive counseling skills, professional behavior, and self-awareness, their anxiety decreases, and their counseling self-efficacy improves (Ülker Tümlü, 2019). Moreover, group supervision can be very effective in improving the counseling self-efficacy of supervisees (Chui et al., 2021; Tan & Chou, 2018). In this process, supervisees' counseling self-efficacy improves through various ways, such as receiving and giving feedback from peers (Swank & McCarthy, 2015), normalizing anxiety (Mastoras & Andrews, 2011), receiving peer support and acquiring multiple perspectives (Atik & Erkan Atik, 2019). Therefore, a DM-based group supervision process can support novice supervisees in developing counseling self-efficacy. The development of counseling self-efficacy can also mediate the development of insight.

### 1.3. Insight

Akdoğan and Türküm (2014; 2018), who developed an insight scale for nonclinical university students, defined insight as a construct that indicates inspecting one's cognitive, emotional, and behavioral processes and their effects on each other, on one's self, and on surrounding individuals and circumstances. Although the literature generally focuses on clients' insights, the supervision process can mediate the development of insight of supervisees, just like clients (Ladany, 2007). Indeed, although insight is crucial in supervisees' development (Lampropoulos, 2003), novice supervisees may have less insight into their effects on the supervisor or client (Barrett & Barber, 2005; Loganbill et al., 1982). The DM supports novice supervisees in developing insight. Thus, within the scope of the focus of self-awareness in the DM, supervisees become aware of their own needs and conflicts that affect the counseling and supervision process, and they discriminate their personal needs from the counseling and supervision process (Bernard, 1979; Borders and Brown, 2009).

Furthermore, providing both an instructive and empathetic and supportive supervision environment based on this model supports supervisees in becoming free of their defense and becoming more open to development (Ülker Tümlü, 2019). Moreover, in a supervision process that allows interaction such as group supervision, indirect learning and peer support support supervisees in developing insight (Bernard & Goodyear, 2014; Tan, 2019). In conclusion, as supervisees' insights increase, their counseling performance increases, and they provide clients with a more qualified assistance service (Tan, 2019). Therefore, DM-based group supervision can effectively support novice supervisees in developing insight.

### 1.4. Present Study

Supervision takes a crucial place in the education of mental health professionals (Bernad & Goodyear, 2014; Borders & Brown, 2009, Corey et al., 2021). On the other hand, studies that reveal the changes and developments of supervisees are limited, and there is a continuing need for studies that reveal the outcomes of the supervision process (Alfonsson et al., 2018; Bernard & Luke, 2015; Watkins, 2011). There is a considerable need for empirical studies that reveal the effectiveness of the supervision models followed, especially in the supervision processes (Milne et al., 2011; Watkins, 2011). The fact that the DM, as a supervision model, allows carrying out the supervision process systematically and provides evidence-based data (Timm, 2015) strengthens supervision practices. In the literature, some studies reveal the effects of the DM on the change and development of supervisees (see, Brejcha, 2021; Stinchfield et al., 2019; Tan, 2019). However, there is a lack of empirical studies that reveal the effects of the DM-based group supervision process on the counseling self-efficacy and insight levels of novice supervisees. This study investigated the effects of the DM-based group supervision process on novice supervisees' perceptions of counseling self-efficacy and their insights to fill this gap in the literature. The questions of the present study that I think will shed light on practitioners and researchers are as follows:

(i) Does DM-based group supervision affect novice supervisees' perception levels of counseling self-efficacy?

(ii) Does DM-based group supervision affect novice supervisees' insight levels?

## 2. Methodology

### 2.1. Research Design

This study examined the effect of DM-based group supervision on counseling self-efficacy and insight levels of counselor candidates. The study was based on a 3 x 2 quasi-experimental model, including the pretest and post-test measurements of the experimental, comparison, and control groups.

### 2.2. Participants

Senior undergraduate counselor candidates studying in the guidance and counseling undergraduate program in two different state universities in Turkey constituted the study participants. While the experimental and comparison groups included participants studying in the same university, the control group included participants studying in a different state university. The participants had informed consent to participate voluntarily in the study. In the study, there were 18 students, including 6 students (1 male, 5 females) in the experimental group, 6 students (2 males, 4 females) in the comparison group, and 6 students (6 females) in the control group. While the mean age of the experimental group participants was 21.33 (SD = 0.51), the comparison group and the control group had a mean age of 22 (SD = 1.67) and 21.67 (SD = 0.81), respectively.

### 2.3. Materials

I used the Counseling Self-Efficacy Scale to determine the participants' counseling self-efficacy and the Insight Scale to determine their insight levels.

*Counseling Self-Efficacy Scale:* Pamukçu and Demir (2013) adapted the scale developed by Lent, Hill, and Hoffman (2003) to measure the counseling self-efficacy levels of counselor candidates to Turkish. The scale includes three factors and 41 items. It includes three sub-dimensions: Helping Skill Self-efficacy factor, insight, exploration and action skills, and 16 items. The Session Management Self-efficacy factor consists of 10 items. The Counseling Challenges Self-efficacy factor includes 16 items and has two sub-dimensions, "Relationship conflicts" and "Client distress." The answering system of the scale is in the form of a ten-point rating with (0) "I do not trust at all" and (9) "I completely trust" for each statement. A high score on the scale indicates high counseling self-efficacy. In the adaptation study, the internal consistency coefficient was found to be .92 for "Helping Skill Self-efficacy," .95 for "Session Management Self-efficacy," and .95 for "Counseling Challenges Self-efficacy." In this study, the internal consistency coefficients of the scale were calculated as .99 for the "Helping Skill Self-efficacy" dimension, .93 for the "Session Management Self-efficacy" dimension, and .98 for the "Counseling Challenges Self-efficacy" dimension.

*Insight Scale:* Akdoğan and Türküm (2018) developed the scale for nonclinical university students. The scale includes 3 subdimensions, consisting of "holistic view," "self-acceptance," and "self-understanding," and 20 items. The response system of the scale takes the form of a five-point rating with (5) "always" and (1) "never" for each statement. Items 4, 9, 13, and 17 of the scale are reverse scored. The scale gives a minimum of 20 and a maximum of 100 points. Cronbach's alpha value in the original form of the scale was .84. In this study, I considered the total score of the scale and calculated Cronbach's alpha value as .73.

### 2.4. Procedure

*Context of the Study*

This study aimed to investigate the effects of the supervision process within the scope of the Individual Counseling Practicum (ICP) course, which is taught in the counseling and guidance undergraduate program in Turkey. The ICP course is taught in different semesters in universities in the country where the study was conducted. The researcher formed the experimental and comparison groups at the university where she worked. The ICP course is taught in the fall semester at the university where the researcher worked. Since the control group should not undergo any procedure, this group was formed from a university that would open the ICP course in the spring semester. Consequently, both the experimental and comparison groups participated in supervision throughout the same semester. The control group, however, did not get supervision. Both institutions, where the groups were formed, had similar counseling programs and were located in major metropolitan citiesIn the university including the experimental and comparison groups, the ICP course is conducted in small groups of 6-7 people.

**Table 1.** *Content of Group Supervision Sessions*

| | Content of the Experimental Group Sessions | Content of the Comparison Group Sessions |
|---|---|---|
| Beginning stage | • Meeting<br>• Introducing the DM<br>• Sharing duties and responsibilities<br>• Preparation for the counseling process. In this context, emphasizing the focuses of (i) counseling performance skills (initiating the pre-interview, establishing the therapeutic relationship, putting therapeutic skills into practice, initiating and maintaining a session, regulating verbal and non-verbal responses), (ii) cognitive counseling skills (such as seeing the themes under the client's potential explicit and implicit sharing, clarifying the client's potential goals, conceptualizing the client's potential problems), (iii) self-awareness (such as focusing on the supervisee's concerns and needs for supervision, discriminating these needs from the supervision and counseling process), and (iv) professional behaviors (such as exhibiting behaviors in accordance with ethical principles). Correcting misunderstandings and completing deficiencies in each focus<br>• As a supervisor, emphasizing each focus with the roles of teacher (such as role-playing, giving information, discussion), counselor (such as showing respect and unconditional acceptance and empathetic approach to the supervisee), and consultant (such as brainstorming, supporting supervisees in finding their style)<br>• Receiving and providing peer feedback in role plays | • Meeting<br>• Sharing duties and responsibilities<br>• Preparation for the counseling process (giving information about therapeutic skills, pre-interview skills, setting goals and starting the first session, discussion, role-playing) |
| Working stage | • Utilizing self-report, process notes, video recordings, role-playing, and modeling in feedback<br>• According to the needs for supervision, purposefully carrying out the feedback process based on four supervision focuses and three supervisor roles, and transition between the roles and focuses<br>• Conducting the process of receiving and providing peer feedback based on the four supervision focuses | • Utilizing self-report, process notes, video recordings, role-playing, and modeling in feedback<br>• Carrying out the feedback process. In this context, as a supervisor, focusing on supervisees' skills of establishing therapeutic relationships, putting therapeutic skills into practice, setting goals, initiating, maintaining, and terminating a session<br>• Ensuring that peers receive and provide feedback in case of need<br>• Correcting misunderstandings in feedback, giving information to complete deficiencies, utilizing the discussion, role-playing, and modeling processes |
| Termination stage | • Preparing supervisees for termination based on the professional behavior focus,<br>• Enabling each supervisee to make self-evaluation and peer evaluation within the context of supervision focuses, evaluating supervisees as a supervisor, and receiving feedback on a supervisory style<br>• Terminating the supervision relationship. In this context, encouraging supervisees to be individualized with the role of consultant.<br>• Saying goodbye | • Supervisor's evaluation of supervisees and self-evaluation of supervisees<br>• Saying goodbye |

A separate supervisor manages each group. In the ICP course, supervisees can choose their own supervisors to support the working alliance between supervisor and supervisee. Within the scope of this study, one of the

6-person groups was the experimental group, and the other was the comparison group. The author of this study is a member of the academic staff at the same institution that served as the setting for both the experimental and comparison groups. In addition, the author was in charge of supervising the activities of the experimental group.A different supervisor led the comparison group, as required by the institution's procedure for conducting supervision groups. On the other hand, to avoid researcher bias, the supervisors of the experimental and comparison groups worked together throughout the process to make sure that there were no differences between the groups because of the style of supervision or the roles and responsibilities of the supervisors during the experimental and comparison groups. In this context, the supervisors established a joint supervision agreement and determined similar responsibilities for the supervision techniques to be used in the supervision process, the number of clients to be met by supervisees, the number of counseling sessions they would conduct, and the duration of sessions. Both supervisors carried out 14 group supervision sessions, each of which lasted approximately 150-180 minutes, once a week.

At the beginning of the process, pretests were applied to the experimental, comparison, and control groups. The supervisors conducted both the experimental and comparison groups in accordance with the beginning, working, and termination stages, which are the stages of group supervision (Corey et al., 2021; Ülker Tümlü & Ceyhan, 2021). In this respect, both groups were based on the principles of the group supervision process. The main point that separated the experimental and comparison groups from each other in the study was whether a supervision model was followed. Intentionality is very important in following supervision models. In this context, a supervisor is required to have command of the supervision model that he or she applies, to prepare for supervision within the scope of this model, and to provide feedback during supervision within the scope of this model (Bernard & Goodyear, 2014; Corey et al., 2021). In this study, the researcher/supervisor who conducted the experimental group had experience in implementing the DM. The researcher purposefully conducted the supervision process based on the DM. The supervisor of the comparison group had no experience in the use of supervision models. The supervisor of the comparison group did not purposefully follow any supervision model while preparing for and conducting the supervision. Table 1 shows similarities and differences in conducting the groups. In the study, the control group did not undergo any procedure. The post-tests were administered to each group during the week following the conclusion of the supervision processes. To reduce researcher bias, post-tests were administered after the evaluation of supervisees. Depending on the accessibility of supervisees, the scales were administered in-person or via e-mail.

### 2.5. Data Analysis

To decide on the analyses used in the study, I examined whether the pretest and post-test scores of the experimental, comparison and control groups obtained from the scales met the basic assumptions of the parametric tests. Accordingly, I examined the skewness and kurtosis values of all measurements to check whether the data met the normality assumption (Field, 2006; Huck, 2012). It was assumed that the data were normally distributed if the skewness and kurtosis values ranged from -3 to +3 (Jondeau & Rockinger, 2003). Furthermore, whether the data were normally distributed was examined by the Shapiro-Wilk test, applied in case the group size is smaller than 50, and whether the variances were homogeneous was tested by Levene's test (Büyüköztürk, 2016). Two-factor ANOVA was performed for mixed designs/split-plot tests to determine the differences between groups. The effect sizes were calculated through the $\eta^2$ (eta square) for ANOVA. The effect size values were interpreted as weak when they were less than 0.20, moderate when they were between 0.20 and 0.80, and strong when they were above 0.80 (Cohen, 1988). The $p$-value assumed was .05, with the exception of the Bonferroni correction used with $p \leq .0125$ (Huck, 2012).

Furthermore, post hoc Tukey's test was performed to determine the source of the differences (Field, 2006). The graphs of change of the results obtained from the multiple comparison test were also examined in the study. Statistical testing was computed with SPSS-IBM® (Statistical Package for Social Sciences, Version 25) statistical software.

### 2.6. Ethical

The ethics committee approval for this study was obtained from Anadolu University's Committee on Scientific Research, and Publication Ethics with the decision numbered 6568.

## 3. Findings

*Preliminary Analysis*

The study results revealed that the pretest and post-test scores of each scale for the experimental, comparison, and control groups met the normality assumption. Table 2 shows the skewness, kurtosis, and Shapiro-Wilk normality test results for each group and measurement.

**Table 2**. *Skewness, Kurtosis, and Shapiro-Wilk Results of the Experimental, Control, and Comparison Group's Score from Pretest and Posttest Measurement*

| Variable | Sample size (n) | Group | Factor | Skewness | Kurtosis | Shapiro-Wilk | |
|---|---|---|---|---|---|---|---|
| | | | | | | Statistics | *p*-value |
| Helping Skill Self-efficacy | 6 | E | Pre | -.289 | -2.289 | .883 | .283 |
| | | | Post | .067 | -1.732 | .889 | .314 |
| | 6 | P | Pre | -.546 | -1.007 | .953 | .764 |
| | | | Post | .300 | .684 | .954 | .772 |
| | 6 | C | Pre | 1.518 | 2.988 | .871 | .229 |
| | | | Post | -.087 | -1.101 | .964 | .847 |
| Session Management Self-efficacy | 6 | E | Pre | .383 | -1.481 | .920 | .505 |
| | | | Post | -.000 | 2.500 | .827 | .101 |
| | 6 | P | Pre | -.894 | 1.020 | .954 | .769 |
| | | | Post | -.075 | -1.550 | .907 | .415 |
| | 6 | C | Pre | -.889 | -.781 | .823 | .093 |
| | | | Post | -.523 | -1.875 | .831 | .110 |
| Counseling Challenges Self-efficacy | 6 | E | Pre | -.939 | .807 | .942 | .535 |
| | | | Post | -.438 | -.1.359 | .935 | .621 |
| | 6 | P | Pre | -.830 | -.232 | .924 | .535 |
| | | | Post | -.100 | 2.042 | .924 | .535 |
| | 6 | C | Pre | .795 | .068 | .940 | .659 |
| | | | Post | -.077 | -.867 | .979 | .945 |
| Insight | 6 | E | Pre | .723 | -1.721 | .848 | .152 |
| | | | Post | .281 | -1.023 | .971 | .901 |
| | 6 | P | Pre | -.463 | -.300 | .983 | .964 |
| | | | Post | -.461 | -1.260 | .952 | .755 |
| | 6 | C | Pre | -.712 | .256 | .950 | .741 |
| | | | Post | -.546 | -1.751 | .873 | .238 |

Table 2 shows that all variables' pretest and post-test scores were normally distributed in terms of skewness and kurtosis values. Likewise, the Shapiro-Wilk values of each variable revealed that the distributions met the assumption of normality ($p > .05$). Table 3 demonstrates the one-way ANOVA results of the pretest scores for each scale of the experimental, comparison, and control groups.

**Table 3.** *One-Way ANOVA Results of the Pretest Scores of the Experimental, Comparison, and Control Groups*

| Variable | Source | SS | df | MS | F | *P* |
|---|---|---|---|---|---|---|
| Helping Skill Self-efficacy | Between-Subjets | 252.778 | 2 | 126.138 | 2.138 | .152 |
| | Within-Subjets | 886.833 | 15 | 59.122 | | |
| | Total | 1139.611 | 17 | | | |
| Session Management Self-efficacy | Between-Subjets | 12.11 | 2 | 6.055 | .945 | .411 |
| | Within-Subjets | 96.167 | 15 | 6.411 | | |
| | Total | 108.278 | 17 | | | |
| Counseling Challenges Self-efficacy | Between-Subjets | 133.778 | 2 | 66.889 | 1.229 | .321 |
| | Within-Subjets | 816.667 | 15 | 54.444 | | |
| | Total | 950.444 | 17 | | | |
| Insight | Between-Subjets | 75.111 | 2 | 37.556 | 2.632 | .105 |
| | Within-Subjets | 214.000 | 15 | 14.267 | | |
| | Total | 289.111 | 17 | | | |

Table 3 shows no significant difference between the pretest results of the variables (p >.05). In other words, the experimental, comparison, and control groups consisted of members who were equivalent on helping skills self-efficacy, session management self-efficacy, counseling challenges self-efficacy, and insight levels.

*Post-Procedure Analysis*

The pretest and post-test mean scores and standard deviations of the experimental, comparison, and control groups for each scale are presented in Table 4.

**Table 4.** *Pretest and Posttest Mean Scale Scores and Standard Deviations of the Experimental, Comparison, and Control Groups*

| Variable | Factor | Experimental | | | Comparison | | | Control | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | N | $\bar{x}$ | SD | N | $\bar{x}$ | SD | N | $\bar{x}$ | SD |
| Helping Skill Self-efficacy | Pre-test | 6 | 53.00 | 8.2 | 6 | 60.50 | 9.07 | 6 | 61.33 | 5.20 |
| | Post-test | 6 | 116.17 | 3.37 | 6 | 104.50 | 4.76 | 6 | 60.33 | 3.77 |
| Session Management Self-efficacy | Pre-test | 6 | 40.66 | 1.63 | 6 | 41.50 | 3.83 | 6 | 61.33 | 5.20 |
| | Post-test | 6 | 59.00 | 0.63 | 6 | 53.66 | 1.21 | 6 | 43.00 | 1.26 |
| Counseling Challenges Self-efficacy | Pre-test | 6 | 42.67 | 11.02 | 6 | 47.67 | 4.80 | 6 | 49.00 | 4.34 |
| | Post-test | 6 | 77.33 | 6.65 | 6 | 53.17 | 7.05 | 6 | 44.67 | 2.58 |
| Insight | Pre-test | 6 | 60.66 | 5.47 | 6 | 63.33 | 2.16 | 6 | 65.67 | 2.89 |
| | Post-test | 6 | 75.66 | 3.01 | 6 | 65.50 | 3.08 | 6 | 67.67 | 3.44 |

Table 5 shows the results of Levene's test applied to the pretest and post-test scores of the experimental, comparison, and control groups.

**Table 5.** *Results of Levene's Test Applied to the Pretest and Posttest Measurement Scores of the Experimental, Comparison, and Control Groups*

| | | Levene's test | |
|---|---|---|---|
| Variables | Factor | *F* | *p* |
| Helping Skill Self-efficacy | Pre-test | 1.864 | .189 |
| | Post-test | .167 | .847 |
| Session Management Self-efficacy | Pre-test | 2.639 | .104 |
| | Post-test | 2.857 | .089 |
| Counseling Challenges Self-efficacy | Pre-test | 2.783 | .094 |
| | Post-test | 1.324 | .295 |
| Insight | Pre-test | 4.727 | .026 |
| | Post-test | .127 | .882 |

Levene's test results of the pretest and post-test measurements of the groups showed that the variances were homogeneously distributed in terms of the variables of *Helping Skill Self-efficacy, Session Management Self-efficacy,* and *Counseling Challenges Self-efficacy* (p > .05). With regard to the *Insight* variable, Levene's test was violated in the pretest measurement. Table 6 shows the ANOVA results for repeated measures of the pretest and post-test scores for each variable of the experimental, comparison, and control groups.

**Table 6.** *Results of the ANOVA method for mixed designs of the Pretest and Posttest Scores for the Experimental, Comparison, and Control Groups*

| | Source | | SS | df | MS | F | *p* | $\eta^2_p$ |
|---|---|---|---|---|---|---|---|---|
| Helping Skill Self-efficacy | Between-Subjects | Group (E/P/C) | 4151.38 | 2 | 2075.69 | 46.19 | .000 | .860 |
| | Within-Subjects | Factor (pre-post) | 11271.36 | 1 | 11271.36 | 372.06 | .000 | .961 |
| | | Group*Factor | 6509.72 | 2 | 3254.86 | 102.44 | .000 | .935 |
| Session Management | Between-Subjects | Group (E/P/C) | 306.50 | 2 | 153.25 | 43.58 | .000 | .853 |
| Self-efficacy | Within-Subjects | Factor (pre-post) | 950.69 | 1 | 950.69 | 234.74 | .000 | .940 |
| | | Group*Factor | 502.05 | 2 | 251.03 | 61.98 | .000 | .892 |
| Counseling Challenges | Between-Subjects | Group (E/P/C) | 1112.16 | 2 | 556.08 | 8.44 | .003 | .530 |
| Self-efficacy | Within-Subjects | Factor (pre-post) | 1284.03 | 1 | 1284.03 | 57.99 | .000 | .795 |
| | | Group*Factor | 2468.39 | 2 | 1234.19 | 55.75 | .000 | .881 |
| Insight | Between-Subjects | Group (E/P/C) | 85.50 | 2 | 42.75 | 2.791 | .093 | .271 |
| | Within-Subjects | Factor (pre-post) | 367.36 | 1 | 367.361 | 40.39 | .000 | .729 |
| | | Group*Factor | 333.72 | 2 | 166.861 | 18.35 | .000 | .710 |

According to the study results, while the joint effect of the group and the measurement significantly differed with a strong effect size in terms of the *Helping Skill Self-efficacy* [$F(2, 15) = 102.44$, $p < .0125$, $\eta^2_p = .860$], *Session Management Self-efficacy* [$F(2, 15) = 61.98$, $p < .0125$, $\eta^2_p = .892$] and *Counseling Challenges Self-efficacy* mean scores [$F(2, 15) = 55.75$, $p < .0125$, $\eta^2_p = .881$], it significantly differed with a moderate effect size in terms of the *Insight* mean score [$F(2, 15) = 18.35$, $p < .0125$, $\eta^2_p = .710$]. Tukey's test revealed that the experimental and comparison groups significantly differed in favor of post-test in terms of the *Helping Skill Self-efficacy* level ($p < .0125$). However, the control group did not significantly differ within itself ($p > .0125$). Furthermore, the results revealed no significant difference between the experimental and comparison groups regarding the *Helping Skill Self-efficacy* level ($p > .0125$).

Concerning the *Session Management Self-efficacy* level, the results of Tukey's test showed that the experimental and comparison groups significantly differed in favor of the post-test within themselves ($p < .0125$). However, the control group did not differ significantly ($p > .0125$). Furthermore, the results demonstrated a significant difference between the experimental group and the comparison and control groups in favor of the experimental group ($p < .0125$). Moreover, the results revealed a significant difference in favor of the comparison group compared to the control group ($p < .0125$).

Concerning the *Counseling Challenges Self-efficacy* level, the results of Tukey's test demonstrated that the experimental group significantly differed in favor of the post-test within itself ($p < .0125$). However, the comparison and control groups did not differ significantly within themselves ($p > .0125$). Furthermore, the results showed a significant difference between the experimental group and the comparison and control groups in favor of the experimental group ($p < .0125$). However, there was no significant difference between the comparison and control groups ($p > .0125$).

Concerning the *Insight* level, the results of Tukey's test revealed that the experimental group significantly differed in favor of the post-test within itself ($p < .0125$). However, the comparison and control groups did not differ significantly within themselves ($p > .0125$). Furthermore, the results indicated a significant difference between the experimental group and the comparison and control groups in favor of the experimental group ($p < .0125$). However, there was no significant difference between the comparison and control groups ($p > .0125$).

It is possible to see the graphs of change of the results obtained from the multiple comparison test for each variable below. Figure 1 shows the graph of change of the *Helping Skill Self-efficacy* variable.

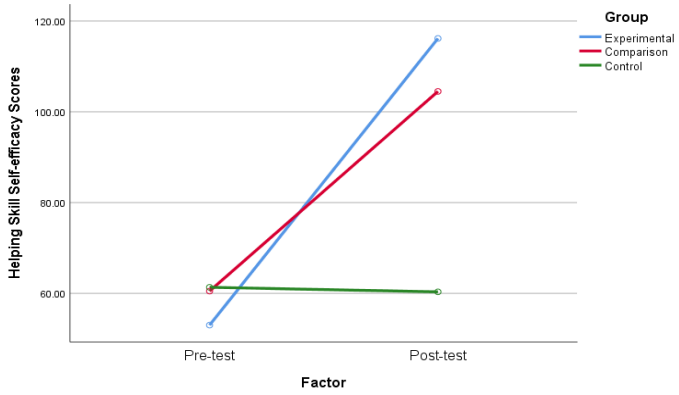


**Figure 1.** *Changes in the Helping Skill Self-efficacy Scores Depending on the Measurement and Group*

Figure 1 shows that the Helping Skill Self-efficacy levels of the individuals in the experimental and comparison groups increased after the procedure. Nevertheless, this increase was higher in the experimental group. The Helping Skill Self-efficacy levels of the individuals in the control group did not change significantly. Figure 2 shows the graph of change of the Session Management Self-efficacy variable.

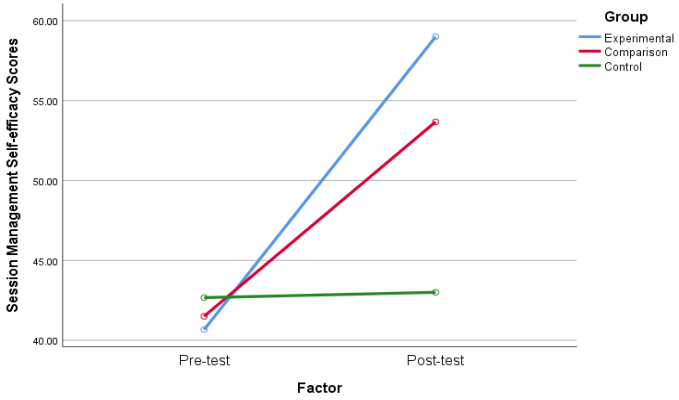


**Figure 2.** *Changes in the Session Management Self-efficacy Scores Depending on the Measurement and Group*

Figure 2 shows that the self-efficacy scores of individuals in the experimental and comparison groups increased after the procedure.However, the increase in the experimental group was higher. There was no significant change in the *Session Management Self-efficacy* levels of the individuals in the control group. Figure 3 shows the graph of change of the *Counseling Challenges Self-efficacy* variable.

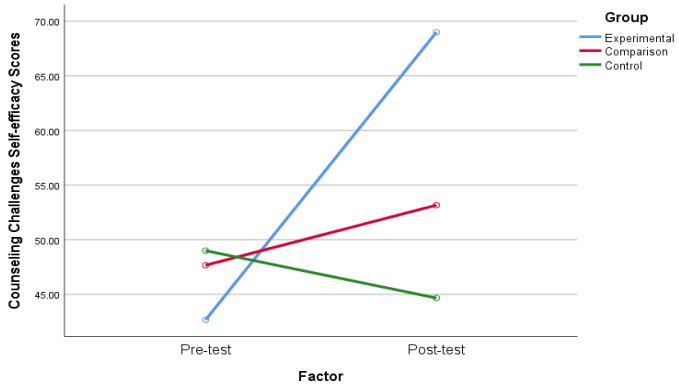


**Figure 3.** *Changes in the Counseling Challenges Self-efficacy Scores Depending on the Measurement and Group*

Figure 3 shows that the self-efficacy level of individuals in the experimental and comparison groups increased after the procedure.However, the change in the experimental group was much more significant. Nevertheless, there was a decrease in the *Counseling Challenges Self-efficacy* levels of the individuals in the control group after the procedure. The graph of change of the *Insight* variable is presented in Figure 4.

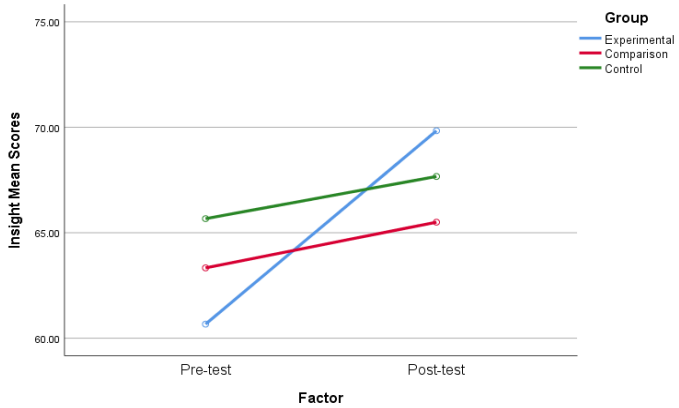


**Figure 4.** *Changes in the Insight Scores Depending on the Measurement and Group*

According to Figure 4, the insight levels of the comparison and control groups slightly increased after the procedure. On the other hand, the insight levels of the experimental group increased significantly.

## 4. Conclusion and Discussion

The supervision process can be full of anxiety for novice supervisees, and people may question their self-efficacy in this process (Larson, 1998). In particular, novice supervisees have difficulties in counseling practicum skills and session management (Aladağ, 2014; Ülker Tümlü, 2014). In this process, supervisees need a systematic supervision process (Meydan & Koçyiğit, 2019). A systematic supervision process provided to them supports them in overcoming these difficulties (Borders et al., 2014; Carroll, 2014; Corey et al., 2021). Nevertheless, the inclusion of peers in the supervision process supports novice supervisees in normalizing their anxiety and fears and developing their counseling self-efficacy (Atik & Erkan Atik, 2019; Borders & Brown, 2009; Mastoras & Andrews, 2011; Swank & McCarthy, 2015; Ülker Tümlü, 2019). In this sense, conducting supervision in the form of group supervision is very effective in improving the counseling self-efficacy of supervisees (Bakalım et al., 2018; Borders & Brown, 2009; Chui et al., 2021; Ivers et al., 2017; Tan & Chou, 2018). The current study revealed that both the experimental and comparison groups were effective in improving the counseling and meeting management skills of novice supervisors. However, the control group did not exhibit the same improvement. These results revealed that group supervision was effective in helping novice supervisees to develop counseling skills and session management skills regardless of following a supervision model. Hence, there are also studies revealing that the group supervision process independent of a supervision model effectively improves supervisees' perceptions of helping skill self-efficacy efficacy (see, Atik & Erkan Atik, 2019; Bakalım, 2018). The results of the relevant study supported the results of this study. Furthermore, the fact that the supervisors of the experimental and comparison groups provided feedback based on counseling performance skills within the scope of this study may have been effective in developing the helping skill self-efficacy and session management self-efficacy of supervisees in both groups.

Even though group supervision not based on a supervision model improved session management skill self-efficacy in this study, the DM-based group supervision procedure was more effective at improving session management skill self-efficacy than the group supervision not based on a supervision model. In addition, the findings of this study indicated that supervision without a model and without prior supervising experience did not assist novice supervisees in enhancing their capacity to manage problems and sense of self-efficacy in the counseling process. In contrast, the DM was both more effective on its own and in comparison to the other two groups. Thus, novice supervisees generally feel anxiety and inability to manage sessions and cope with challenges that may arise during the counseling process (Aladağ, 2014; Atik, 2017; Ülker Tümlü, 2014). Although the group supervision process is supportive in developing efficacy beliefs for session management and challenge coping (Bakalım et al., 2018), novice supervisees may need more systematic conduct of group supervision. Hence, a supervision model may be functional in conducting the supervision process systematically (Corey et al., 2021) and supports the development of counseling self-efficacy perceptions of supervisees (Bernard & Goodyear, 2014; Ülker Tümlü, 2019). There are also studies emphasizing that various supervision models are functional in improving counseling self-efficacy (see, Hunter, 2021; Milne et al., 2011). Therefore, the results of this study may be related to the fact that a model-based supervision process provides a more systematic supervision process compared to group supervision conducted without a model.

On the other hand, contrary to the experimental group in this study, it was observed that the focus of feedback and the supervisor role in the comparison group corresponded to the counseling performance skills focus and the role of the teacher in the DM (see Table 1). This may have limited the feedback process in the comparison group compared to the experimental group. Indeed, the focus of cognitive counseling skills in the DM enables looking at the patterns of clients in the counseling process theoretically and conceptually. However, the focus of professional behavior enables supervisees to progress by being aware of their professional limits. This may have supported novice supervisees in the experimental group in looking at challenging situations in the counseling process from a more professional and broader perspective. In addition, the structure of the DM allows for the transition between supervision focuses (counseling performance skills, cognitive counseling skills, self-awareness, and professional behavior) and roles (teacher, counselor, and consultant) based on the supervision needs (Bernard & Goodyear, 2014; Timm, 2015), which may have allowed novice supervisees to increase in all dimensions of counseling self-efficacy. Similarly, supervision studies emphasized that adopting an instructive, supportive, and guiding approach for novice supervisees (Aladağ, 2014; Bird & Jonnson, 2020; Swank & McCarthy, 2015) and implementing a supervision process centered on skills (Bakalım et al., 2018; Baigorri et al., 2021; Hunter, 2021), conceptualization (Milne et al., 2011), professional behaviors, and self-

awareness (Aladağ, 2014; Calvert et al., 2020) enhanced their counseling self-efficacy in a manner sensitive to their supervision needs. In addition to studies demonstrating that DM-based group supervision is directly effective in enhancing counseling self-efficacy (see, Brown et al., 2018; Ülker Tümlü, 2019), there are also studies demonstrating that supervision processes based on the integration of DM with various models and approaches are effective in enhancing counseling self-efficacy (see, Brejcha, 2021; Carnes-Holt et al., 2014; Stinchfield et al., 2018). Therefore, the results of this study were consistent with similar studies.

In this study, the experimental group improved novice supervisees' counseling self-efficacy and led to changes in their insights. Hence, it is desirable that supervisees develop insight during the supervision (Ladany, 2007). In this respect, it was an expected situation that the group that did not experience supervision in this study did not develop insight. On the other hand, in the present study, while the comparison group did not develop insight in novice supervisees, the experimental group led to a change in insight. Although the feedback was provided on the anxiety of the novice supervisees in the comparison group, the responsibilities of counselor and consultant were absent, which may account for the finding.. Contrary to this situation, the DM directly includes the focus of self-awareness and the roles of counselor and consultant. In this context, the focus of self-awareness serves individuals to recognize their dynamics involved in the implementation and supervision process and to discriminate these dynamics from both processes (Bernard, 1979).

Nevertheless, the roles of counselor and consultant in the DM that give opportunities to provide empathetic and supportive interventions in addition to being instructive (Bernard & Goodyear, 2014; Borders & Brown, 2009) may have similarly supported novice supervisees in developing insight. Similar studies also emphasize that giving feedback based on matching supervision focuses and supervisor roles in the DM supports supervisees in developing insight (see Carnes-Holt et al., 2014; Crunk & Barden, 2017; Koltz, 2008; Tan, 2019; Timm, 2015). Therefore, within the scope of this study, the results indicating that DM-based supervision increased the insights of novice supervisees were consistent with the literature.

In conclusion, this study has demonstrated that conducting DM-based group supervision for novice supervisees is most effective in developing counseling self-efficacy and insight. I think that this study will shed light for practitioners and researchers on the systematic conduct of the supervision process and producing research on these processes.

## 5. Limitations and Future Directions

In this study, different supervisors conducted the experimental and comparison groups due to the context in which the supervision groups were included. Although the supervisors worked collaboratively in structuring and conducting the supervision process, I can consider this a study limitation. Therefore, I can suggest that similar studies should be conducted to compare the groups conducted by the same supervisor. Nevertheless, this study focused on the DM as a supervision model. Although the DM is the most well-known and empirically supported supervision model (Arthur & Bernard, 2012; Bernard & Goodyear, 2014; Timm, 2015), many studies highlighted the uncertainty of the role of consultant emphasized by this model (e.g., Bernard & Goodyear, 2014; Crunk & Barden, 2017; Ülker Tümlü, 2019). I can consider this situation a limitation of the DM.

Nevertheless, when I consider that supervisors follow supervision models in their practices limitedly (Aladağ & Kemer, 2017) and that there are limited studies on the outcomes of supervision models (Milne et al., 2011; Watkins, 2011), similar studies can be carried out with different supervision models (Milne et al., 2011; Watkins, 2011). Furthermore, the present study is based on quantitative data. Although there is an ongoing need for empirical studies on the application of supervision models, similar studies can be undertaken using mixed research methodologies to assess novice supervisees' involvement and nonparticipation in the DM-based group supervision process. Furthermore, the fact that the number of supervisees in each group was 6 in this study can be considered a limitation of the study in terms of sample size. Although the ideal number of supervisees in group supervision is 5-10 (Bernard & Goodyear, 2014), future studies may compare a larger number of groups to increase the generalizability of the results. In addition, the findings of this study showed that supervision processes managed by different supervisors produce different results. I suggest that experimental study be conducted on supervision models and the supervision relationship. The importance of supervision processes in the education of counselors and other mental health professionals cannot be disputed.

It is possible to expand research on the education of supervisors and the supervision process in order to better prepare mental health professionals and guide researchers and practitioners.

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# Pre-school Teachers' Attitudes towards Mathematical Pedagogical Content Knowledge, Mathematics, and Mathematics Teaching*

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ABSTRACT

This study was carried out to examine the relationship between preschool teachers' mathematical pedagogical content knowledge (MPCK), their attitudes towards mathematics (ATM), and their attitudes towards mathematics teaching (ATMT). The research method was designed according to the relational survey model, one of the quantitative research methods. The study group consisted of 365 pre-school teachers working in pre-school educational institutions affiliated with the Ministry of National Education. The research data were obtained using the "General Information Form", "Knowledge Scale of Pedagogical Content in Preschool Mathematics" and "Scale of Attitudes for the Teaching of Mathematics". The obtained data were analyzed using the SPSS 22 package program. Firstly, as a result of the research, it was found that the ATM and ATMT levels of the teachers participating in the research were above average. In addition, findings showed that the levels of knowledge of mathematical pedagogical content were below average in some content areas (counting) and above average in some content areas (pattern, order, shape, spatial dimensions and comparison, and total score). Second, although the age of the teachers did not affect the levels of ATM and ATMT, on the contrary, it did affect the levels of MPCK. Third, the seniority variable was found to affect ATM and MPCK levels but did not affect ATM. Finally, low positive correlations were found between the levels of MPCK, ATM, and ATMT. These research findings were discussed in light of the relevant literature and suggestions were made.

Keywords:
Attitude towards mathematics, attitude towards teaching mathematics, mathematical pedagogical content knowledge, preschool teachers

## 1. Introduction

The foundation of mathematical development is laid in the pre-school period (NAEYC, 2010). It is crucial to present quality early mathematics to children while establishing this foundation because the quality of early mathematics education positively affects children's emotional attitudes, mathematics performance, and achievement (Zhang et al., 2020). In addition, early mathematics skills affect children's future academic achievement and mathematics learning (Dearing et al., 2009; Jordan et al., 2009). In this context, children's love of mathematics and ability to use it is directly related to developing positive attitudes towards mathematics and acquiring mathematical skills in early childhood (Boyd et al., 2008). The education provided in this period has critical importance since early childhood has a major impact on children's future lives. Some studies presented the shortcomings in children's mathematical skills development due to the low quality of the mathematics education offered in this critical period. For example, children who start primary school behind

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their peers in mathematics skills may fall further behind in time (Starkey & Klein, 2008) and have difficulties in learning mathematics (Dornheim, 2008).

In contrast to the negative effects of low-quality mathematics education, a study examining the development of mathematical performance and cognitive characteristics such as counting, visual attention, metacognition, and listening comprehension in children from preschool to second grade found that children who begin school with high-level mathematical skills progress more quickly in mathematics (Aunola et al., 2004).In this context, studies that explore the critical importance of the early period from the perspective of mathematics education and determine the variables that make a difference in supporting children become important.

Internationally, there are many outstanding resources related to what the content of early mathematics education should be. For example, the Principles and Standards for School Mathematics (NCTM 2000) in early mathematics education aims to provide children with skills such as describing, classifying, ordering, comparing, matching, graphing, symbolizing, communicating, and solving problems in the content of numbers and operations, algebra, geometry, measurement, statistics and probability (NCTM, 2000). In addition, the content of early mathematics in the document "Curriculum focal points for prekindergarten" published by NCTM (2007; 26-29); was determined as number and operations, geometry, data analysis, algebra, patterns, and detailed sub-objectives were listed. In another important document released in 2009, the National Research Council (NRC) committee established early mathematics's content as number core, relation core, and operation core (NRC, 2009). In addition to NRC (2009), Van de Walle et al. (2016) added content areas such as geometry, spatial thinking, measurement and data analysis to the content of early mathematics education. Finally, a resource in early mathematics education, early mathematics content is presented as number sense and counting, shape, spatial sense, measurement and graphing (Charlesworth, 2015). On the other hand, when the content of early mathematics education in Turkey is examined, estimation, matching, grouping, comparison, ordering and problem solving skills are emphasized. Content includes counting, operation (addition, subtraction), geometry (space skills and shape), measurement, pattern, and graphics (data analysis) (MoNE, 2013).

It is important to present the identified standards and support the development of relevant skills. However, concerning cognitive development, children in the early period are in the preoperational stage. Due to the period's specific limitations (such as transductive reasoning, inadequacy in conservation, limitation in symbolic thought, and inability to reverse the order of relationships between mental categories), Piaget asserts that children in the preoperational stage should be provided with experiences appropriate to the period's developmental characteristics (Piaget, 1952: cited in Berk & Meyers, 2016).Therefore, pre-school teachers should understand how to teach mathematical concepts and skills to children during this period. In this context, quality mathematics education requires teachers to know what to present, how to present it, and to whom to present it (Cerezci, 2020).

For this reason, pre-school teachers are expected to have a high level of mathematical pedagogical content knowledge (Gervasoni et al., 2012; MacDonald et al., 2012). In addition, it is recommended that teachers consider children's individual differences, thinking and understanding levels, use expressions and explanations appropriate for their development, employ different teaching methods and techniques and thus present the content to children in the most appropriate way (Rovegno, 1992; Smith & Neale, 1989). Teachers with sufficient knowledge and skills in early mathematics teaching have a very important role in improving children's mathematics skills with quality education (Chen & McCray, 2012; Zhang et al., 2020). It is important to investigate teachers' pedagogical content knowledge (Özdemir, 2020; Parpucu & Erdoğan, 2017) and attitudes toward mathematics (Dağlıoğlu et al., 2014; Kesicioğlu, 2014) to ensure that teachers can fulfill this critical role effectively. Although these variables were investigated separately before, they were not addressed together in previous studies. Since teachers' mathematical pedagogical content knowledge (Pelkowski et al., 2019; Trawick-Smith et al., 2016) and attitudes towards mathematics and mathematics teaching (Anders & Rossbach, 2015; McLeod, 1992; Relich & Way, 1992) were regarded as important variables in providing quality early mathematics experience, this study aimed to examine the relationships between these variables.

### 1.1. Mathematical Pedagogical Content Knowledge (MPCK), Attitudes towards Mathematics (ATM), and Attitudes towards Mathematics Teaching (ATMT)

Mathematical Pedagogical Content Knowledge (MPCK) consists of the intersections in mathematics teaching regarding who will teach what and how to teach it (McCray, 2008). Understanding mathematics is the basis of mathematics teaching. At this point, how mathematics will be taught to children, and which approaches and methods will be used become important (Zhang, 2015). For a quality mathematics education, teachers should have mathematical content knowledge, pedagogical knowledge regarding teaching methods, techniques, and strategies, and the ability to create learning environments that will support children's mathematical development, and to support children's inquiry and curiosity about mathematics (NCTM, 2000). NCTM standards in mathematics education include the content and process standards. Content standards are listed as number and operations, algebra, geometry, measurement, and data analysis, and probability and process standards are defined as problem-solving, reasoning and proof, communication, connections, and representation (NCTM, 2000). The primary purpose of mathematics education in the MoNE Preschool Education Program is to support children's mental development, create a positive attitude toward mathematics, establish meaningful connections between previous knowledge and new knowledge, make sense of mathematical concepts, and support the development of high-level thinking skills such as questioning and critical thinking. It can be said that the early math content presented in the Preschool Education Program in Turkey was affected by approaches such as Montessori, Reggio Emilia, Waldorf, and standards such as NRC, and NCTM. In addition, it can be argued that early mathematics education is based on theoretical foundations such as Piaget's cognitive development theory, Vygotsky's sociocultural development theory, van Hiele's theory of levels of geometric thinking (MoNE, 2013). Therefore, the content of early mathematics education in the measurement tool used in this study was examined with the measurement tool developed by Smith in 1998 and adapted into Turkish by Aksu & Kul (2017). It can be stated that the sub-dimensions in the content of the measurement tool are compatible with the "focal points" document published by NCTM (2007), but it has some deficiencies (e.g., operations, measurement, and graphics) compared to the MoNE Preschool Education Program. The pedagogical content in the measurement tool covers number, pattern, geometry (shape and spatial thinking), ordering, and comparison skills.

One of the most important goals of mathematics education is to provide a positive attitude towards mathematics (Reyes, 1984; 558). Attitude towards mathematics (ATM) is a more complex phenomenon characterized by people's emotions, beliefs, and behaviors related to mathematics (Zan & Di Martino, 2007; 158). The fact that developing positive attitudes towards mathematics is included among the objectives of mathematics teaching is crucial because positive attitudes affect students' mathematics learning positively (Neale, 1969; 631). Many studies in the literature report relationships between students' attitudes towards mathematics and their mathematics achievement (Chiesi & Primi, 2009; 312; Lubienski et al., 2012; 130; Marchis, 2011; 788).

Changing student attitudes is hard but not impossible. At this point, education has a significant impact. The importance of attitude towards mathematics teaching (MTA) emerges while examining teachers' ATM (Ernest, 1989). Relich & Way (1992), who developed a scale to investigate attitudes toward teaching mathematics, emphasizes the importance of teachers' attitudes towards teaching mathematics. For quality mathematics teaching, it is recommended that teachers stay away from all kinds of negative attitudes that may negatively affect the process (Sarı & Aksoy, 2016). Teachers' current attitudes towards mathematics were identified as an important variable predicting their sensitivity towards mathematical content and teaching (Anders & Rossbach, 2015). This study examined pre-school teachers' attitudes towards both mathematics and mathematics teaching.

### 1.2. Relationships between MPCK, ATM, and ATMT

MPCK in mathematics education was highly correlated with teacher efficacy, methods, and skills used by teachers, and students' attitudes and achievements towards mathematics (Empson & Junk, 2004; Hill et al., 2005; Oppermann et al., 2016). Also, a relationship was identified between teachers' ATM, beliefs, and MPCK (Thiel, 2010). Affective characteristics such as attitudes, beliefs, emotions, and values were found to be effective in quality mathematics education as well as teachers' MPCK (McLeod, 1992). Teachers' ATM determined their mathematics teaching achievement and student attitudes (Relich & Way, 1992). Similarly, pre-school teachers'

ATMs were found to be an important predictor of their sensitivity to mathematical content (Anders & Rossbach, 2015). In addition, teachers' MPCKs and their beliefs about mathematics education were also related (Demirbaş, 2019; Işıtan, 2020). In addition, pre-school teachers' ATMs were found to affect developmentally appropriate mathematics applications (Lee, 2005), while ATMs affected their choices regarding mathematical skill areas and the mathematical development of 6-year-old children (Çelik, 2017b). From another perspective, teachers' beliefs about mathematics affected their level of access to resources, which in turn influenced their mathematics teaching (Dawkins, 2020). Preschool teachers' high-level positive attitudes toward mathematics supported mathematics teaching in their classrooms, direct them to child-centered practices, increase their awareness of early mathematics education, and support their self-confidence in teaching (Lema, 2019). Finally, pre-school teachers' high-level positive ATMs created high-level positive MTAs (Benz, 2012).

Many variables have been identified that affect the quality of early mathematics education. Among these variables, there are variables such as family background, teaching (McCray & Chen, 2012), mathematical language, active participation of children, use of concrete materials (Aktaş Arnas, 2012; Clements & Sarama, 2009), curriculum, effective teaching, assessment, and technology support (NCTM, 2000). Besides these variables, as explained above, MPCK, ATM, and ATMT appear as variables that affect the quality of early mathematics education. Therefore, examining the relationships between MPCK, ATM, and ATMT in this research is significant in the context of the relevant literature.

### 1.3. Variables Affecting MPCK, ATM, and ATMT

MPCK, ATM, and ATMT levels of preschool teachers are influenced by variables such as age, seniority, experience, whether they received education in mathematics, the type of school from which they graduated, the type of institution in which they worked, the length of their experience, the number of children they worked with, and the frequency with which they included mathematics activities in their lessons.Teachers' pedagogical content knowledge levels were found to be in favor of teachers who are in a specific age range (Argın, 2019) and who received in-service training on mathematics teaching (Işıtan, 2020). In addition, in some groups, teachers' pedagogical content knowledge levels were in favor of teachers with 0-5 years seniority (Bilgen, 2019) and 6-10 years seniority (Argın, 2019), while MPCK levels increased as seniority increased (Lee, 2010; Lee, 2017). MPCK was found to be directly proportional to experience as well (Dewi et al., 2020).

The age variable affected teachers' ATMs and ATMTs but differed according to the group. In some groups, older teachers felt more open to mathematics and had a more positive attitude. In comparison, younger teachers were found to have a more reluctant and negative attitude towards mathematics (Thiel, 2010). On the contrary, in some groups, attitude levels decreased as their age increased (Çelik, 2017a) and in some groups, teachers' attitudes were at a lower level at a certain age range (Tokgöz, 2006). In parallel, seniority created different effects in different groups. In some groups, the attitudes of teachers with a seniority of 6-10 years were higher (Tokgöz, 2006). In some groups, as seniority increased, attitude levels decreased (Çelik, 2017a) while, on the contrary, attitudes increased with time and experience in some groups (Sumpter, 2020; Thiel, 2010). In addition, in-service training/courses/seminars regarding mathematics positively affected teachers' attitudes (Karataş et al., 2017; Markovits & Forgasz, 2017; Sumpter, 2020).
In summary, the research results in Turkey revealed that age and experience differ significantly from the results of the international research. While the MPCK, ATM, and ATMT levels of young teachers are high in Turkey, on the contrary, the MPCK, ATM, and ATMT levels of older and senior teachers are understood to be higher in the international context. Therefore, examining the reasons for this fundamental difference may be suggested.

### 1.4. Problems in Early Mathematics Education

Studies on early mathematics education revealed that some teachers who participated in the research did not have sufficient awareness of the spatial aspects of mathematics, they experienced limitations regarding the targeted application of mathematical content (Björklund & Barendregt, 2016), the majority of the teachers participating in the research could not define the concept of countdown embedded in a math game, and they made one-to-one matching and counting errors such as the cardinality principle (Li, 2021). In addition, a study found that nearly half of the teachers were unaware of the necessity of using the correct language, and some teachers lacked the knowledge regarding denomination, definitions, and properties of two- and three-dimensional shapes. However, they are included in the curriculum (Markovits & Patkin, 2020). Studies

conducted with teacher candidates reached similar conclusions as well. For example, it was observed that pre-school teacher candidates' field knowledge was insufficient in defining angular shapes and in providing examples from daily life (Korkmaz & Şahin, 2019). On the other hand, some pre-school teachers were found to use everyday objects rather than didactic applied materials; they progressed by reducing field knowledge to merely numbers, counting, and calculations, such as counting materials, knowledge of numbers, simultaneous recording of numbers, and matching numbers and objects; they rarely addressed domain-specific skills (Kroger et al., 2013); they did not recognize the spontaneous mathematical learning opportunities in the classroom (Costa et al., 2021; Figueiredo et al., 2018; Reimer, 2020). A study examining children's level of participation in mathematical activities determined that only 28 activities out of 171 activity plans were on the participation level, and 143 activities were not participatory (Pekince & Avcı, 2016).

Many studies in national and international literature reported that most pre-school teachers had low knowledge levels of mathematical pedagogical content (Björklund & Barendregt; 2016; Korkmaz & Şahin, 2019; Li, 2021; Torbeyns et al., 2020). In addition, it was found that teachers considered themselves inadequate for teaching mathematics (Lee, 2010; Lee & Ginsburg, 2007; Sheridan et al., 2011) and were afraid of making mistakes during mathematics activities (Wigfield & Eccles, 2002). However, negative perceptions of mathematics, and shortcomings in content and pedagogy were reported to be important variables limiting mathematics experiences (Knaus, 2017). In addition, pre-school teachers were found to associate early mathematics with numbers and counting general and experienced problems in presenting other content areas to children (Pekince & Avcı, 2016; Thiel, 2010). Based on the evaluation of all these research results together, it can be argued that the quality of early mathematics teaching is quite low (Cerezci, 2019).

Although teachers were aware of the significance of early mathematics education, they had an insecure attitude and beliefs of inadequacy in mathematics teaching (Noviyanti, 2019). The effects of teachers' attitudes and beliefs on teaching and mathematics achievement were clear in studies. It was concluded that teachers needed to change negative attitudes such as fear, anxiety, and concern that may negatively affect the quality of mathematics teaching process (Sarı & Aksoy, 2016). After all, teachers cannot be expected to teach children the knowledge, skills, and attitudes they do not possess (Kandemir, 2017). Based on the effects of all these cognitive and affective properties relevant to mathematics teaching, this study was planned to examine pre-school teachers' mathematical pedagogical content knowledge and their attitudes towards mathematics and mathematics teaching. The research aimed to contribute to the limited amount of literature in this field by identifying the relationship between pre-school teachers' mathematical pedagogical content knowledge and their attitudes towards mathematics and mathematics teaching, and by presenting the effect of different variables on this relationship. From this point of view, it can be argued that the findings and conclusions in this study are important to raise awareness in terms of supporting the development of positive attitudes towards mathematics and mathematics teaching and mathematical pedagogical content knowledge in teacher education.

## 2. Methodology

### 2.1.Research Model

This quantitative cross-sectional research was conducted with a relational survey model. As a research approach, the survey model describes situations in the past or present as they are. On the other hand, the relational survey model investigates the relationships between two or more variables (Fraenkel et al., 2012). Since the purpose of the present study was to determine the relationship between pre-school teachers' mathematical pedagogical content knowledge and their attitudes toward mathematics and mathematics education, the relational survey model was chosen from the research models, and the relational variables were identified as pre-school teachers' mathematical pedagogical content knowledge, attitudes toward mathematics, and mathematics education.

### 2.2. Research Sample

The study group was composed of 365 pre-school teachers employed at schools affiliated with the Directorate of National Education in Province Maraş. The convenience sampling method was used to determine the study group. Convenience sampling involves choosing a non-representative sample by selecting respondents as it is

convenient for the researcher (Scott & Usher, 2010). Table 1 presented below provides information on the study group's demographic characteristics.

**Table 1.** *Distribution of Demographic Variables*

| *Gender* | *f* | *%* | *Valid %* | *Cumulative %* |
|---|---|---|---|---|
| Female | 354 | 97,0 | 97,0 | 97,0 |
| Male | 11 | 3,0 | 3,0 | 100,0 |
| Total | 365 | 100,0 | 100,0 | |
| *Age* | *f* | *%* | *Valid %* | *Cumulative %* |
| Between 20-25 | 80 | 21,9 | 21,9 | 21,9 |
| Between 25-30 | 110 | 30,1 | 30,1 | 52,1 |
| Between 30-35 | 89 | 24,4 | 24,4 | 76,4 |
| Between 35-40 | 49 | 13,4 | 13,4 | 89,9 |
| 40 or older | 37 | 10,1 | 10,1 | 100,0 |
| Total | 365 | 100,0 | 100,0 | |
| *Seniority* | *f* | *%* | *Valid %* | *Cumulative %* |
| 1-5 years | 154 | 42,2 | 42,2 | 42,2 |
| 6-10 years | 98 | 26,8 | 26,8 | 69,0 |
| 11-15 years | 71 | 19,5 | 19,5 | 88,5 |
| 16 years or more | 42 | 11,5 | 11,5 | 100,0 |
| Total | 365 | 100,0 | 100,0 | |

According to Table 1, 354 of the 365 preschool teachers participating in the research were females (%97,0) and 11 were males (%3,0); 80 were in the 20-25 age range (%21,9), 110 were in the 25-30 age range (%30,1), 89 were in the 30-35 age range (%24,4), 49 were in the 35-40 age range (%13,4) and 37 were 40 years or older (%10,1); 154 had 1-5 years seniority (%42,2), 98 had 6-10 years seniority (%26,8), 71 had 11-15 years seniority (%19,5) and 42 had 16 years or more seniority (%11,5).

### 2.3. Data Collection Tools and Procedure

The research data were obtained by using the "*General Information Form*", "*The Survey of Pedagogical Content Knowledge in Early Childhood Mathematics*" and "*Attitudes to Teaching Mathematics Questionnaire*". Below, you can find detailed information about the data collection tools used in this study.

*General Information Form:* The general information form designed by the researcher to collect data about the demographic characteristics of the participating teachers included questions about gender, age, and seniority.

*The Survey of Pedagogical Content Knowledge in Early Childhood Mathematics:* Developed by Smith in 1998, the scale consists of 6 sub-dimensions (number, pattern, ordering, shapes, spatial skills and comparison) and 15 items. Aksu & Kul (2017) carried out the Turkish adaptation of the scale. KR-20 reliability coefficient was calculated to determine the internal consistency reliability of the scale. The overall Cronbach alpha value of the adapted scale was 0.71. In this study, the scale's reliability was found to be KR-20=0,719. This value shows that the scale is reliable and that the items in this scale are in harmony. The questions in the measurement tool are scored as 0-1. High scores indicate a high level of content knowledge.

*Attitudes to Teaching Mathematics Questionnaire*: The measurement tool developed by Relich & Way (1992) was adapted into Turkish by Tabuk & Tabuk (2018). The 8-point Likert type scale consists of 2 sub-dimensions and 20 items. Cronbach's alpha coefficients were calculated as .82 and .85, respectively, for the internal consistency of attitudes towards mathematics teaching and attitudes towards mathematics dimensions. In this study, the internal consistency of the scale between the dimensions of attitude towards mathematics teaching and attitude towards mathematics was determined to be 0.91 and 0.90, respectively, and 0.95 for the entire scale. These values show that the scale is consistent and reliable within itself. Of the scale items, 11 measure attitudes towards teaching mathematics, and the remaining 9 measure attitudes towards mathematics (Tabuk & Tabuk, 2018).

### 2.4. Data Analysis

The obtained data were analyzed using the SPSS 22 statistical package program. The data analysis started by examining the parametric test conditions and Kolmogorov-Smirnov and Shapiro-Wilk tests were applied to test normality.

**Tablo 2.** *Kolmogorov-Smirnov and Shapiro-Wilk Test Results for Testing Normality*

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistics | sd | p | Statistics | sd | p |
| ATM | ATMT | ,095 | 365 | ,000*** | ,939 | 365 | ,000*** |
| | ATM | ,108 | 365 | ,000*** | ,942 | 365 | ,000*** |
| MPCK | Number | ,196 | 365 | ,000*** | ,861 | 365 | ,000*** |
| | Pattern | ,186 | 365 | ,000*** | ,865 | 365 | ,000*** |
| | Ordering | ,347 | 365 | ,000*** | ,726 | 365 | ,000*** |
| | Shape | ,447 | 365 | ,000*** | ,588 | 365 | ,000*** |
| | Spatial | ,218 | 365 | ,000*** | ,827 | 365 | ,000*** |
| | Comparison | ,322 | 365 | ,000*** | ,771 | 365 | ,000*** |
| | Total | ,104 | 365 | ,000*** | ,979 | 365 | ,000*** |

****p*<,001, *Note: ATMT: Attitudes Towards Mathematics Teaching, ATM: Attitudes Towards Mathematics , MPCK: The Survey of Pedagogical Content Knowledge in Early Childhood Mathematics*.

In table 2, the analysis results showed that the data were not normally distributed (p<,05). Non-parametric tests were used for the analysis of the data that were found to be not normally distributed. While comparing the data, the Mann-Whitney U test was used for comparisons between two groups, and the Kruskal Wallis H test was used for comparisons between more than two groups. Spearman correlation analysis was performed to determine the existence and direction of the relationship between the variables.

### 2.5. Ethical

Permission for the study was obtained from Bolu Abant Izzet Baysal University, the Human Research Ethics Committee in Social Sciences, and the directorate of national education of a province located in the east of the Mediterranean in Turkey. The data were obtained from 365 pre-school education teachers employed at pre-schools in the 2020-2021 academic year. Because there was a worldwide pandemic at the time of the study and the opening and closing of schools was affected by the pandemic, research data were collected online to reach teachers as effectively as possible in terms of time, money, and health.Forms were delivered to teachers via Google Forms. The link address was forwarded to the relevant schools and teachers through the Provincial Directorate of National Education to obtain the data.

## 3. Findings

The findings regarding pre-school teachers' mathematical pedagogical content knowledge levels and their attitudes towards mathematics and mathematics teaching are presented below.

**Table 3.** *Preschool Teachers' MPCK Levels*

| | *N* | $\bar{X}$ | *Sd* | *Min.* | *Max.* |
|---|---|---|---|---|---|
| Number | 365 | 1,49 | 1,10 | ,00 | 3,00 |
| Pattern | 365 | 1,63 | 1,07 | ,00 | 3,00 |
| Ordering | 365 | 1,47 | ,65 | ,00 | 2,00 |
| Shape | 365 | 1,69 | ,57 | ,00 | 2,00 |
| Spatial | 365 | 2,09 | ,79 | ,00 | 3,00 |
| Comparison | 365 | 1,10 | ,61 | ,00 | 2,00 |
| Total | 365 | 9,44 | 2,61 | 1,00 | 15,00 |

According to Table 3, the arithmetic mean values of pre-school teachers' pedagogical content knowledge levels in pre-school mathematics were 1.49 (below the average) in the number dimension; 1.63 (above the average) in the pattern dimension; 1.47 (above the average) in the ordering dimension; 1.69 (above the average) in the shape dimension; 2.09 (above the average) in the spatial dimension; and 1.10 (above the average) in the comparison dimension. Regarding total scores, 9.44 was the value (above the average).

**Table 4.** *The Effect of the Age Variable on MPCK Scores*

| Sub-dimension | Age | N | Mdn | $\bar{X}$ | MR | $X^2$ | sd | p |
|---|---|---|---|---|---|---|---|---|
| Number | Between 20-25 | 80 | 2,00 | 1,61 | 195,19 | 8,123 | 4 | ,087 |
| | Between 25-30 | 110 | 1,00 | 1,48 | 182,49 | | | |
| | Between 30-35 | 89 | 2,00 | 1,62 | 195,76 | | | |
| | Between 35-40 | 49 | 1,00 | 1,12 | 150,17 | | | |
| | 40 or older | 37 | 1,00 | 1,35 | 170,93 | | | |
| | Total | 365 | | | | | | |
| Pattern | Between 20-25 | 80 | 2,00 | 1,99 | 216,71 | 22,048 | 4 | ,000*** |
| | Between 25-30 | 110 | 2,00 | 1,73 | 192,12 | | | |
| | Between 30-35 | 89 | 1,00 | 1,46 | 166,37 | | | |
| | Between 35-40 | 49 | 1,00 | 1,16 | 136,86 | | | |
| | 40 or older | 37 | 2,00 | 1,65 | 184,14 | | | |
| | Total | 365 | | | | | | |
| Ordering | Between 20-25 | 80 | 2,00 | 1,56 | 193,99 | 10,613 | 4 | ,031* |
| | Between 25-30 | 110 | 2,00 | 1,53 | 194,45 | | | |
| | Between 30-35 | 89 | 2,00 | 1,47 | 184,43 | | | |
| | Between 35-40 | 49 | 1,00 | 1,20 | 147,90 | | | |
| | 40 or older | 37 | 1,00 | 1,35 | 168,24 | | | |
| | Total | 365 | | | | | | |
| Shape | Between 20-25 | 80 | 2,00 | 1,76 | 193,42 | 7,381 | 4 | ,117 |
| | Between 25-30 | 110 | 2,00 | 1,71 | 184,44 | | | |
| | Between 30-35 | 89 | 2,00 | 1,66 | 182,85 | | | |
| | Between 35-40 | 49 | 2,00 | 1,49 | 155,73 | | | |
| | 40 or older | 37 | 2,00 | 1,76 | 192,68 | | | |
| | Total | 365 | | | | | | |
| Spatial skill | Between 20-25 | 80 | 2,00 | 2,13 | 191,11 | 1,113 | 4 | ,892 |
| | Between 25-30 | 110 | 2,00 | 2,07 | 180,14 | | | |
| | Between 30-35 | 89 | 2,00 | 2,10 | 185,20 | | | |
| | Between 35-40 | 49 | 2,00 | 2,00 | 173,92 | | | |
| | 40 or older | 37 | 2,00 | 2,08 | 180,70 | | | |
| | Total | 365 | | | | | | |
| Comparison | Between 20-25 | 80 | 1,00 | 1,06 | 178,30 | 8,582 | 4 | ,072 |
| | Between 25-30 | 110 | 1,00 | 1,21 | 200,01 | | | |
| | Between 30-35 | 89 | 1,00 | 1,04 | 176,07 | | | |
| | Between 35-40 | 49 | 1,00 | 1,12 | 187,53 | | | |
| | 40 or older | 37 | 1,00 | 0,89 | 153,27 | | | |
| | Total | 365 | | | | | | |
| Total MPCK | Between 20-25 | 80 | 10,00 | 10,13 | 208,22 | 19,022 | 4 | ,001** |
| | Between 25-30 | 110 | 10,00 | 9,75 | 196,59 | | | |
| | Between 30-35 | 89 | 9,00 | 9,36 | 178,71 | | | |
| | Between 35-40 | 49 | 9,00 | 8,10 | 132,68 | | | |
| | 40 or older | 37 | 9,00 | 9,08 | 165,04 | | | |
| | Total | 365 | | | | | | |

**p<,05, **p<,01, *** p<,001, Note: Total MPCK: Total score obtained from the Survey of Pedagogical Content Knowledge in Early Childhood Mathematics*

The Kruskal Wallis H test, which was conducted to determine whether the MPCK scores differed based on the ages of the teachers, revealed that the mean rank of the groups did not differ significantly based on the number (X2=8,123, p>.05), shape (X2=7,381, p>.05), spatial (X2=1,113, p>.05), and comparison (X2=8,582, p>.05) sub-dimension scores.However, statistically significant differences were found between pattern ($X^2$=22,048, p<,05), ordering ($X^2$=10,613, p<,05) sub-dimensions and total score ($X^2$=19,022, p<,05). Mann Whitney U test was performed to determine the source of the difference and the results are presented below.

Examination of the differences revealed that the pattern dimension differences were in favor of the teachers in the 20-25 age range between the teachers in the 20-25 age range (MR =97,01) and the teachers in the 30-35 age

range (MR =74,20); in favor of the teachers in the 25-30 age range between the teachers in the 25-30 age range (MR =87,57) and the teachers in the 35-40 age range (MR =63,00); and in favor of the teachers in the 40 or older age range between the teachersThe ordering scores also differed significantly. Significant differences were found in favor of teachers in the 20-25 age range between those in the 20-25 age range and those in the 35–40 age range (MR =71.38 and 54.59, respectively); in favor of teachers in the 20-25 age range between those in the 20-25 age range and those in the 35-40 age range (MR =86.14 and 66.22, respectively; and in favor of teachers in the 30-35 age range between those in the 30-35 age range and those in the 35–40 age range (MR =59.17).

The total MPCK scores were found to differ significantly as well. These significant differences were in favor of teachers aged 20 to 25 years between teachers aged 20 to 25 years (MR =75.31) and teachers aged 35 to 40 years (MR =48.17); in favor of teachers aged 20 to 25 years between teachers aged 20 to 25 years (MR =63, 40) and teachers aged over 40 years (MR =49.49); in favor of teachers in the age range 20-25 between teachers in the age range 20-25 (MR =88.89) and teachers in the age range 35-40 (MR =60.05, and finally in favor of teachers in the age range 30-35 between teachers in the age range 30-35 (MR =75.19) and teachers in the age range 35-40 (MR =59.17).

**Table 5.** *The Effect of the Seniority Variable on MPCK Scores*

| | Seniority | N | Mdn | $\bar{X}$ | MR | $X^2$ | Sd | p |
|---|---|---|---|---|---|---|---|---|
| | 1-5 years | 154 | 1,00 | 1,47 | 181,54 | 3,397 | 3 | ,334 |
| | 6-10 years | 98 | 2,00 | 1,62 | 196,14 | | | |
| Number | 11-15 years | 71 | 1,00 | 1,45 | 180,13 | | | |
| | 16 years or more | 42 | 1,00 | 1,26 | 162,56 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 2,00 | 1,90 | 207,73 | 17,932 | 3 | ,000*** |
| | 6-10 years | 98 | 1,00 | 1,42 | 162,26 | | | |
| Pattern | 11-15 years | 71 | 2,00 | 1,59 | 178,02 | | | |
| | 16 years or more | 42 | 1,00 | 1,28 | 149,13 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 2,00 | 1,56 | 196,67 | 6,224 | 3 | ,101 |
| | 6-10 years | 98 | 2,00 | 1,42 | 175,71 | | | |
| Ordering | 11-15 years | 71 | 1,00 | 1,32 | 166,56 | | | |
| | 16 years or more | 42 | 2,00 | 1,42 | 177,69 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 2,00 | 1,73 | 189,37 | 3,125 | 3 | ,373 |
| | 6-10 years | 98 | 2,00 | 1,68 | 182,99 | | | |
| Shape | 11-15 years | 71 | 2,00 | 1,66 | 179,89 | | | |
| | 16 years or more | 42 | 2,00 | 1,54 | 164,92 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 2,00 | 2,15 | 192,56 | 3,194 | 3 | ,363 |
| | 6-10 years | 98 | 2,00 | 2,00 | 170,02 | | | |
| Spatial skill | 11-15 years | 71 | 2,00 | 2,05 | 180,43 | | | |
| | 16 years or more | 42 | 2,00 | 2,07 | 182,57 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 1,00 | 1,15 | 191,06 | 6,951 | 3 | ,073 |
| | 6-10 years | 98 | 1,00 | 1,04 | 175,14 | | | |
| Comparison | 11-15 years | 71 | 1,00 | 1,15 | 193,28 | | | |
| | 16 years or more | 42 | 1,00 | 0 ,90 | 154,38 | | | |
| | Total | 365 | | | | | | |
| | 1-5 years | 154 | 10,00 | 9,97 | 203,20 | 12,515 | 3 | ,006** |
| | 6-10 years | 98 | 9,00 | 9,18 | 172,10 | | | |
| Total MPCK | 11-15 years | 71 | 10,00 | 9,24 | 176,58 | | | |
| | 16 years or more | 42 | 9,00 | 8,50 | 145,21 | | | |
| | Total | 365 | | | | | | |

***p<,01, *** p<,001, Note: Total MPCK: Total score obtained from the Survey of Pedagogical Content Knowledge in Early Childhood Mathematics*

According to Table 5, the result of the Kruskal Wallis H test performed to determine whether the pedagogical content knowledge scores of pre-school teachers in pre-school mathematics differed according to their seniority, there were no significant differences in the number ($X^2$=3,397, p>,05), ordering ($X^2$=6,224, p>,05), shape ($X^2$=3,125, p>,05), spatial ($X^2$=3,194, p>,05), and comparison ($X^2$=6,951, p>,05) sub-dimensions. Contrary

to this finding, the pattern sub-dimension ($X^2$=17,932, p<,05) and MPCK total scores ($X^2$=12,515, p<,05) differed significantly according to teachers' seniority. Mann Whitney U test was performed to determine the source of the difference. It was concluded that the pattern scores obtained by the teachers with 1-5 years seniority and 6-10 years seniority (U=5678,500, p<,05), the teachers with 1-5 years seniority and 11-15 years seniority (U=4548,000, p<,05) and the teachers with 1-5 years seniority and 16 years or more seniority (U=2212,000, p<,05) differed significantly.

Based on mean rank, these differences in pattern scores were in favor of teachers with 1-5 years seniority between the teachers with 1-5 years seniority (MR =138,63) and the teachers with 6-10 years seniority (MR =107,44); in favor of teachers with 1-5 years seniority between the teachers with 1-5 years seniority (MR =118,97) and the teachers with 11 -15 years seniority (MR =100,06) and finally in favor of the teachers with 1-5 years of seniority between the teachers with 1-5 years seniority (SO=105,14) and the teachers with 16 years or more seniority (MR =74,17).

It was found that the total MPCK scores of the teachers with 1-5 years seniority and 6-10 years seniority ((U=6242,500, p<,05) and the total MPCK scores of the teachers with 1-5 years seniority and over 16 years seniority (U=2207,000, p<,05) differed significantly. Based on mean rank, these differences were found to be in favor of the teachers with 1-5 years seniority between the teachers with 1-5 years seniority (MR =134,96) and the teachers with 6-10 years seniority (MR =113,20) and in favor of the teachers with 1-5 years seniority between the teachers with 1-5 years seniority (MR =105,17) and the teachers with 16 years or more seniority (MR = 74,05).

**Table 6.** *Teachers' ATMT and ATM Levels*

| | N | Min. | Max. | $\bar{x}$ | Sd |
|---|---|---|---|---|---|
| ATMT | 365 | 1,27 | 8,00 | 5,90 | 1,60 |
| ATM | 365 | 1,00 | 8,00 | 5,69 | 1,65 |

*Note: ATMT: Attitudes towards mathematics teaching, ATM: Attitudes towards mathematics*

Table 6 shows that the arithmetic means value of the attitude levels of pre-school teachers towards teaching mathematics was 5,90 (above the average) and the arithmetic mean value of the attitudes toward mathematics was 5,69 (above the average).

**Table 7.** *The Effect of the Age Variable on ATMT and ATM Scores*

| | Age | N | Mdn | $\bar{X}$ | MR | $X^2$ | sd | p |
|---|---|---|---|---|---|---|---|---|
| ATMT | Between 20-25 | 80 | 78,50 | 74,37 | 174,05 | 1,247 | 4 | ,870 |
| | Between 25-30 | 110 | 79,50 | 77,05 | 189,91 | | | |
| | Between 30-35 | 89 | 79,00 | 76,16 | 186,22 | | | |
| | Between 35-40 | 49 | 78,00 | 75,14 | 179,49 | | | |
| | 40 or older | 37 | 80,00 | 75,91 | 178,70 | | | |
| | Total | 365 | | | | | | |
| ATM | Between 20-25 | 80 | 62,50 | 59,86 | 177,56 | 3,571 | 4 | ,467 |
| | Between 25-30 | 110 | 63,00 | 62,04 | 193,86 | | | |
| | Between 30-35 | 89 | 66,00 | 60,47 | 188,01 | | | |
| | Between 35-40 | 49 | 62,00 | 58,30 | 175,78 | | | |
| | 40 or older | 37 | 57,00 | 57,24 | 159,99 | | | |
| | Total | 365 | | | | | | |

*Note: ATMT: Attitudes towards mathematics teaching, ATM: Attitudes towards mathematics*

According to Table 7, the result of the Kruskal Wallis-H test performed to determine whether the ATMT scores of pre-school teachers differed according to their ages indicated no statistically significant difference between the mean rank of the groups ($X^2$=1,247; p>.05). Similar to this finding, there was no statistically significant difference between ATM scores and the age variable ($X^2$=3,571; p>.05).

**Table 8.** *The Effect of the Seniority Variable on ATMT and ATM Scores*

| | *Seniority* | *N* | *Mdn* | $\bar{X}$ | *MR* | $X^2$ | *sd* | *p* |
|---|---|---|---|---|---|---|---|---|
| ATMT | 1-5 years | 154 | 78,00 | 75,34 | 178,64 | 5,510 | 3 | ,138 |
| | 6-10 years | 98 | 83,00 | 78,71 | 199,01 | | | |
| | 11-15 years | 71 | 73,00 | 71,21 | 163,37 | | | |
| | 16 years or more | 42 | 80,00 | 79,11 | 194,85 | | | |
| | Total | 365 | | | | | | |
| ATM | 1-5 years | 154 | 62,00 | 60,34 | 179,73 | 11,318 | 3 | ,010* |
| | 6-10 years | 98 | 67,00 | 63,56 | 207,76 | | | |
| | 11-15 years | 71 | 56,00 | 54,36 | 153,15 | | | |
| | 16 years or more | 42 | 63,50 | 61,64 | 187,67 | | | |
| | Total | 365 | | | | | | |

*p<,05, Note: ATMT: Attitudes towards mathematics teaching, ATM: Attitudes towards mathematics*

According to Table 8, there was no statistically significant difference between the mean ranks of the groups based on the Kruskal Wallis-H test, which was conducted to determine whether the pre-school teachers' ATMT scores differed according to seniority ($X^2$=5,510; p>.05). Contrary to this finding, it was determined that the pre-school teachers' ATM scores differed according to their seniority ($X^2$=11,318; p<.05). Mann Whitney U test was performed to determine the source of this significant difference. A significant difference was observed between the ATM scores of the pre-school teachers with 1-5 years seniority and 6-10 years seniority (U=6362,000, p<,05) and between the ATM scores of the pre-school teachers with 6-10 years seniority and 11-15 years seniority (U=2520,500, p<,05). Based on mean rank, this difference was found to be in favor of the teachers with 6-10 years seniority between the teachers with 1-5 years seniority (MR =118,81) and 6-10 years seniority (MR =138,58) and similarly in favor of the teachers with 6-10 years seniority between the teachers with 6-10 years seniority (MR =94,78) to 11-15 years seniority (MR =71,50).

**Table 9.** *Relationships between MPCK, ATMT, and ATM*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| ATMT (1) | r | 1,00 | | | | | | | | |
| | p | . | | | | | | | | |
| | N | 365 | | | | | | | | |
| ATM (2) | r | ,865** | 1,00 | | | | | | | |
| | p | ,000 | . | | | | | | | |
| | N | 365 | 365 | | | | | | | |
| Number (3) | r | ,110* | ,110* | 1,00 | | | | | | |
| | p | ,036 | ,036 | . | | | | | | |
| | N | 365 | 365 | 365 | | | | | | |
| Pattern (4) | r | ,166** | ,161** | ,127* | 1,00 | | | | | |
| | p | ,001 | ,002 | ,015 | . | | | | | |
| | N | 365 | 365 | 365 | 365 | | | | | |
| Ordering (5) | r | ,110* | ,143** | ,164** | ,232** | 1,00 | | | | |
| | p | ,036 | ,006 | ,002 | ,000 | . | | | | |
| | N | 365 | 365 | 365 | 365 | 365 | | | | |
| Shape (6) | r | ,054 | ,053 | ,044 | ,154** | ,119* | 1,00 | | | |
| | p | ,308 | ,315 | ,405 | ,003 | ,023 | . | | | |
| | N | 365 | 365 | 365 | 365 | 365 | 365 | | | |
| Spatial skill (7) | r | ,250** | ,197** | ,088 | ,284** | ,193** | ,143** | 1,00 | | |
| | p | ,000 | ,000 | ,095 | ,000 | ,000 | ,006 | . | | |
| | N | 365 | 365 | 365 | 365 | 365 | 365 | 365 | | |
| Comparison (8) | r | ,083 | ,051 | -,028 | ,211** | ,126* | ,106* | ,125* | 1,00 | |
| | p | ,112 | ,334 | ,594 | ,000 | ,016 | ,042 | ,017 | . | |
| | N | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | |
| Total MPCK (9) | r | ,242** | ,229** | ,557** | ,694** | ,530** | ,341** | ,540** | ,374** | 1,00 |
| | p | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | ,000 | . |
| | N | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 |

*p<.05, **p<,01, Note: Total MPCK: Total score obtained from the Survey of Pedagogical Content Knowledge in Early Childhood Mathematics

Table 9 presents the results of the Spearman correlation analysis performed to determine the relationship between the MPCK, ATM, and ATMT scores of pre-school teachers. The findings are listed below:

- No significant correlation was found between ATMT and shape (r=,054; p>,05) and comparison scores (r=,083; p>,05).
- No significant correlation was found between ATM and MPCK shape sub-dimension (r=,053; p>,05) and comparison scores (r=,051; p>,05).
- ATM and number (r=,110; p<,05), pattern (r=,166; p<,05), ordering (r=,110; p<,05), spatial (r=,250; p<,05) and MPCK total scores were positively correlated with low levels of significance (r=,242; p<,05).
- Positive low-level significant correlations were found between ATM and number (r=,110; p<,05), pattern (r=,161 p<,05), ordering (r=,143, p<,05), spatial (r=,197, p<,05), and MPCK total score (r=,229, p<,05).
- A high level of positive correlation was found between ATMT and ATM (r=,865; p<,05).

## 4. Conclusion and Discussion

This investigation has yielded several results. First, the MPCK level of preschool teachers was found to be below average regarding the number dimension but, above-average regarding the pattern, ordering, shape, spatial, and comparison dimensions and regarding the overall MPCK level.The highest values were found for shape and spatial dimensions. In contrast to the results of this study, there are studies in the relevant literature that show that teachers have low MPCK (Bates et al., 2011; Dağlı, 2019; Pekince & Avcı, 2016). However, although MPCK was generally low in these studies, research findings were inconsistent across sub-dimensions. While some studies concluded that teachers had low levels in the dimensions of number, pattern, and space, high levels were found in the dimensions of order, shape, and comparison (Argın, 2019), and some of these studies concluded that teachers had higher levels in the dimensions of number and shape compared to other dimensions and tended to have low levels in the dimensions of space and comparison (Lee, 2010).As stated above, this study concluded that pre-school teachers' MPCK level was below average in the number dimension; but above average in pattern, ordering, shape, spatial and comparison dimensions, and total MPCK levels. There are differences between the results obtained in this study and the results in national and international studies. In addition, according to studies in the literature, teachers mostly associated mathematics with the number concept and gave priority to number and counting activities (Baki & Hacısalihoğlu Karadeniz, 2006; Tarım & Bulut, 2006; Thiel, 2010). Although it was anticipated that teachers would have greater pedagogical content knowledge regarding the number and counting dimension due to the fact that mathematics focuses more on content standards such as number and counting and that teachers have positive attitudes toward mathematics and mathematics education, the findings indicate the opposite. The lowest level of pedagogical content knowledge found in this study was in the number and counting sub-dimension. Therefore, further studies should be conducted in this regard. Based on the result of the findings related to the age variable, it was determined that although the ages of the teachers did not affect the number, shape, spatial, and comparison levels of MPCK, age had an effect on the pattern and ordering sub-dimensions and on the total MPCK level.

Although significant differences were observed in the form of different effects in different age ranges, examination of the age groups demonstrated that this significance was generally in favor of the teachers in the lower age range. Similarly, the total MPCK level of teachers in older age groups was lower than in other age groups. This result suggests that young teachers' knowledge and skills are up-to-date and that teachers who have been working for a long time cannot closely follow up-to-date studies in which they can improve their knowledge and skills. Research results in the relevant literature are mixed in this regard. For example, while studies conclude that the age variable did not affect MPCK (Demirbaş, 2019), many studies did not investigate the age variable (Anders & Rossbach, 2015; Dunekacke et al., 2015; Figueiredo et al., 2018; Li, 2021; Parpucu & Erdogan, 2017). In addition, MPCK may differ according to different age ranges (Argın, 2019). Considering the research results in the literature and the result reached in this research; no pattern emerged between teachers' age and MPCKs. Therefore, it is clear that further qualitative research is needed to examine these variables.

Examination of the obtained results regarding participating teachers' seniority demonstrated that the level of knowledge about the number, ordering, shape, spatial, and comparison dimensions was not affected by seniority. However, seniority was determined to be the variable affecting the pattern dimension and total MPCK level. The results show that teachers with 1-5 years seniority significantly differed from other groups. This result may be because new teachers' knowledge is more current and up-to-date than that of more senior teachers. The research results are compatible with the Turkish literature. The MPCK level of teachers with a low level of seniority can be expressed as higher than the MPCK level of teachers with a high level of seniority (Argın, 2019; Bilgen, 2019; Hacıibrahimoğlu & Akman, 2021). Contrary to Turkish literature, internationally the MPCK level was found to increase as the seniority increased (Dewi et al., 2020; Lee, 2010; Lee, 2017). Therefore, examining the reasons for this fundamental cultural difference may be suggested.

The research results in the literature are mixed in this regard. While there are studies in which the relationship between seniority and MPCK level could not be determined (Dağlı, 2019); some studies reported differences in the level of MPCK in favor or against teacher groups with certain seniority brackets (Argın, 2019; Bilgen, 2019; Hacıibrahimoğlu & Akman, 2021). In some groups, the MPCK level was found to increase as the seniority increased (Dewi et al., 2020; Lee, 2010; Lee, 2017). MPCK was also found to be directly proportional to experience (Dewi et al., 2020). Therefore, studies conducted in Turkey should examine why the MPCK levels of younger age groups and pre-school teachers with low levels of experience decrease and the possible variables that make up this difference. Here, it can be thought that the high MPCK levels of preschool teachers when they start working after their undergraduate education may be due to their fresh knowledge and skills and their ease of remembering. The reason for this situation is that MPCK levels do not develop due to the fact that they are not supported by in-service training, courses, or seminars over time, or the decrease in their individual efforts to support their professional development. In addition, it can be thought that the fact that in the pre-school period teachers gave greater importance to supporting areas such as the arts, language, and social skills other than the field of mathematics. Therefore, it can be suggested that new research should focus on the main international and domestic differences and the sources of these differences.

Based on the findings related to the attitudes, it was concluded that teachers' attitudes towards mathematics teaching and mathematics were above the average. Examination of the relevant literature demonstrated that many studies reached similar conclusions (Chen et al., 2014; Keleş et al., 2016; Markovits & Forgasz, 2017; Şeker & Alisinanoğlu, 2015). Previous studies were conducted with both pre-school teachers (Chen et al., 2014; Şeker & Alisinanoğlu, 2015) and pre-school teacher candidates (Keleş et al., 2016; Markovits & Forgasz, 2017). The attitudes of both pre-school teachers and pre-school teacher candidates towards mathematics and mathematics teaching are similar to the results obtained in this study. Therefore, it can be argued that teachers' attitudes towards mathematics and their attitudes towards mathematics teaching are generally at medium and high levels.

According to another finding obtained in the study, the age of pre-school teachers did not affect their attitudes towards mathematics and mathematics teaching. In other words, teachers' ATM and ATMT scores did not differ according to their age. When the relevant literature was examined, no studies were found that reached similar results with pre-school teachers. It is reported in the literature that teachers' attitudes towards mathematics improved as they grew older (Thiel, 2010); but some studies reported that teachers' attitudes decreased with age (Çelik, 2017a) or there were differences in favor of teachers in certain age ranges (Tokgöz, 2006). Although the age variable was proven to affect the attitudes towards mathematics and mathematics teaching in the literature, the fact that the effect of the age variable was not significant in this study may be due to different variables that were not investigated in this study.

It was concluded that teachers' ATMT did not change according to seniority, but seniority affected ATM. The ATM level of teachers with 6-10 years of seniority was higher than other seniority categories. Although studies in the relevant literature reported that pre-school teachers' seniority affected their attitudes towards mathematics and mathematics teaching, this significance varied in different samples. Some studies concluded that pre-school teachers' attitudes improved as their seniority increased (Sumpter, 2020). However, some studies reported decreases in teacher attitudes when teachers had higher seniority (Çelik, 2017a). Other studies reported differences in attitudes in seniority brackets compared to others (Tokgöz, 2006). In this study, the seniority of the teachers did not influence their attitudes toward mathematics, and the attitudes of teachers with 6 to 10 years of experience were higher than those of other teachers. This may be due to the characteristics

of the study group. As a result, it can be argued that the variable of seniority has different effects on different groups. Therefore it is difficult to make a common inference about the effect of pre-school teachers' seniority on their attitudes towards mathematics and mathematics teaching. Therefore, it is clear that studies on different and large samples are needed to determine the effect of seniority more understandably.

The result of the analysis performed to determine the relationships between pre-school teachers' MPCK, ATM, and ATMT levels, the main problem statement of this research, demonstrated low level and positive correlations between ATMT levels and the number, pattern, ordering, and spatial dimensions and total MPCK scores and between ATM level and the number, pattern, ordering and spatial dimensions and total MPCK scores. In other words, as teachers' number, pattern, ordering, spatial, and total MPCK levels increase, both ATMT and ATM levels increase. Many studies have similar findings in the relevant literature (Anders & Rossbach, 2015; Demirbaş, 2019; Işıtan, 2020; Lee, 2005). In addition, a high level of positive correlation was found between ATMT and ATM. Studies with similar results are available in the literature (Benz, 2012; Lema, 2019). In addition, studies report that different variables such as anxiety, self-efficacy perception, and belief are associated with variables such as attitude, achievement, and content knowledge (Aslan et al., 2013; Cook, 2017; Jenßen, 2022; Jenßen et al., 2020; White et al., 2005). In this context, it is important to examine the variables that affect attitudes together in future studies.

A study in the literature found that pre-school teachers placed special emphasis on early childhood mathematics education. However, it was presented that they did not feel ready to teach mathematics to the same extent that they considered it important to teach mathematics (Kaçan & Karayol, 2017). However, it is known that children's mathematics achievement increases as pre-school teachers' content knowledge and beliefs about mathematics increase (Gündoğan & Aslan, 2020), and teachers' pedagogical content knowledge levels affect their classroom practices (Dewi et al., (2020). The view that teachers should have the mathematical pedagogical content knowledge to provide quality mathematics education in the pre-school period is supported by studies in the literature (Dunekacke et al., 2016; Godoy et al., 2021). However, many research results reveal teacher shortcomings in mathematical pedagogical content knowledge (Björklund & Barendregt, 2016; Korkmaz & Şahin, 2019; Li, 2021; Torbeyns et al., 2020). In support of these findings, some studies revealed that teachers do not realize the mathematical learning opportunities that develop naturally in the classroom and that they are far from using these opportunities effectively due to their limited content knowledge (Costa et al., 2021; Figueiredo et al., 2018; Reimer, 2020).

Studies suggest that pre-school teachers' attitudes toward mathematics and their mathematical pedagogical content knowledge are effective on children's mathematical development. Based on the results of this study and previous research, it can be argued that when pre-school teachers have a high level of mathematical knowledge and confidence in their mathematical abilities, their attitudes toward mathematics improve and they are able to comprehend the significance of early mathematics education.Teachers who believe that they can effectively support children's mathematical skills and have high pedagogical content knowledge can plan more and better quality mathematics activities in their classrooms. They can make a point of using different teaching methods and techniques, taking into account children's developmental and individual characteristics (Chen & McCray, 2012; Gervasoni et al., 2012; MacDonald et al., 2012; NCTM, 2000; Rovegno, 1992; Smith & Neale, 1989). Thus, it will be possible to support the mathematical skills of children exposed to mathematics in daily life and through quality activities. In addition, teachers need the training to learn how to use spontaneous mathematics opportunities in classroom environments in fun ways and how to open spaces for children's mathematics learning to develop and support children's mathematical thinking skills.

## 5. Limitations and Recommendations

There are many limitations to this research. In the first place, the number of pre-school teachers who participate in the research and the way in which they were chosen can be expressed. In addition, the lack of observation of the research data can be explained as another limitation. Furthermore, there are deficiencies when evaluating the content and scope of the measurement tools used based on the content of initial mathematics education. Therefore, one of the limitations is not examining other content that is not included in the measurement tools. The fact that the gender distribution among teachers does not adequately represent both genders can be considered a limitation. In summary, this study is a one-way measurement. Another limitation is that the effects of teachers' MPCK, ATMT, and ATM on children's mathematical ability were not

examined.Several suggestions have been developed based on the research results. More studies should be conducted on different and larger samples to reach a higher amount of pre-school teachers to determine how pre-school teachers' mathematical pedagogical content knowledge, their attitudes towards mathematics and mathematics teaching are affected by different variables related to participant demographic characteristics such as seniority, age, gender, and the status of receiving mathematics education. In addition, longitudinal studies may be conducted in the future in addition to qualitative or mixed-method research that includes techniques such as observation and interview to reach multiple data on teachers' mathematical pedagogical content knowledge and attitudes towards mathematics and mathematics teaching.

This study found low-level positive relationships between pre-school teachers' mathematical pedagogical content knowledge, and their attitudes towards mathematics and mathematics teaching. For this reason, it is believed that pre-school teachers should have a high-level MPCK, ATMT, and ATM to provide quality mathematics education. It is suggested to support teachers and teacher candidates through teacher training programs and in-service and post-service training by providing training on mathematical content knowledge, pedagogical knowledge, and attitude (Cook, 2017; Markovits & Forgasz, 2017; Torbeyns et al., 2020). It is important to increase the applied courses of teacher candidates (Cook, 2017; Torbeyns et al., 2020) in the pre-school education undergraduate program in Turkey and to review the differences between the undergraduate program renewed in 2018 from the previously applied undergraduate program in terms of practice and course hours. In addition, measures such as increasing the credits and hours of the mathematics education course in undergraduate education and reorganizing the conditions used in undergraduate admissions of teacher candidates (equal weight score type) are considered vital for early mathematics education.

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# An Assessment of Pre-Service Mathematics Teachers' Techno-Pedagogical Content Knowledge regarding Geometry

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ABSTRACT

Despite the significance of incorporating technology into geometry instruction, many teachers still find it difficult to teach geometry using technology. This study employed a techno- pedagogical content knowledge (TPACK) survey of 70 pre-service mathematics teachers (29 males, 41 females) from a public university. The goal was to determine which domains, if any, were open for development so that a course could be designed to meet these needs. The data was analysed thematically according to the TPACK sub-domains. The results showed that the pre-service teachers were confident in the areas of pedagogy knowledge, content knowledge, and pedagogical content knowledge (90% confidence) and open to improvement in the areas of technology, technological content, and technological pedagogy knowledge (70% confidence). As a result, we suggest creating a 14-week course to increase pre-service mathematics teachers' TPACK of these components in the hopes of bridging the knowledge gap identified in this study.

Keywords:
Geometry teaching, pre-service mathematics teachers, survey research, TPACK

## 1. Introduction

Teachers are one of the key factors in students' learning; they shape the future of their students. Research has argued that teacher knowledge affects how they teach and how students learn (Shulman, 1986; 1987). Although there is an ongoing debate about whether or not teacher knowledge can or should be categorised, teacher knowledge is still categorised in order to improve in many fields (Mishra & Koehler, 2006; Niess, 2005, 2011). Geometry research has consistently revealed a lack of teacher knowledge in teaching geometry with technology (Ball et al., 2008; Mishra & Koehler, 2006; Niess, 2008; Saralar-Aras, 2022; Young et al., 2019). Indeed, The UN Agenda stressed that by 2030, the goal is substantially increasing the supply of qualified teachers in terms of values, knowledge, and skills (The United Nations, 2015). Teaching with and through technology has become more popular with the COVID-19 pandemic. Given this lack of knowledge, it is critical to improve lessons to assist future teachers in improving their technology, pedagogy, and content knowledge (shortly TPCK or TPACK).

TPACK is a framework Mishra and Koehler (2006) designed to evaluate teachers' knowledge. It started as a technology extension of Shulman's (1986) pedagogical content knowledge (PCK). TPACK framework has seven sub-knowledge domains, each emphasizing different knowledge and corresponding skills for teachers. These components are technology knowledge (TK), pedagogy knowledge (PK), content knowledge (CK), pedagogical content knowledge (PCK), techno-pedagogical knowledge (TPK), technological content

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knowledge (TCK), and finally techno-pedagogical content knowledge (TPACK). It is important to state the definitions of each of these components for this study.

- Pedagogy knowledge (PK) is "the knowledge about the processes and practices or methods of teaching and learning" (Koehler & Mishra, 2009, p.64). It is regarding the issues on understanding teaching and learning processes, techniques, and approaches.
- Technology knowledge (TK) is "the knowledge about standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital video. In the case of digital technologies, this includes knowledge of operating systems and computer hardware, and the ability to use standard software tools such as word processors, spreadsheets, browsers, and e-mail" (Mishra and Koehler, 2006, p. 1027). It is about the knowledge of basic and advanced technology, such as books, chalk, and blackboards, as well as the Internet and digital video. This involves understanding operating systems and computer hardware and the ability to utilise common software tools such as word processors, spreadsheets, browsers, and e-mail in the case of digital technologies
- Technological pedagogy knowledge (TPK) is "the knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using particular technologies" (Mishra & Koehler, 2006, p.1028). It is the knowledge of the presence, elements, and potential of various technologies as they are utilised in teaching and learning contexts, as well as how teaching could change due to employing certain technologies.
- Content knowledge (CK) is "subject matter knowledge of a teacher to be learned or taught" (Koehler & Mishra, 2009, p.63). It is the subject area expertise of a teacher to acquire or explain to others.
- Pedagogical content knowledge (PCK) is "the content knowledge that deals with the process, including how the subject matter is presented and formulated to make it understandable to others" (Shulman, 1986, p.9). It covers issues related to the subject knowledge that concerns the teaching process, such as how to describe and formulate the subject so that others can understand it.
- Technological content knowledge (TCK) is "the knowledge about how technology and content are reciprocally related" (Mishra & Koehler, 2006, p.1028). In other words, it includes the knowledge concerning how technology and content are mutually connected and affect each other.
- Technological pedagogical content knowledge (TPACK) is related to the types of knowledge (4.1 to 4.6) teachers must have to successfully integrate technology into the classroom

Today, TPACK is an integral part of the education system, as it incorporates the increasing need for technology in the classroom, and the continued emphasis on curriculum and how we teach it. It then creates education for the future and the establishment of pre-service teachers (PSTs) for their future.

Geometry is a branch of mathematics which studies the properties and relations of points, lines, surfaces, solids, and higher dimensional analogues (Saralar-Aras, 2022). Learning mathematics is an essential competency for students for their future lives because of various reasons including working in occupations that require maths such as accounting and mathematics teaching and, basic life requirements like paying for a bill (Bottge, 1999; Gutstein, 2003; Lochhead & Whimbey, 1987; Skemp, 1987). To illustrate, mathematics, specifically geometry, has a lot in common with natural sciences, where natural scientists use geometric knowledge and skills; thus, it can be used by many disciplines, including architecture, biology, chemistry, physics, engineering, geology, and medicine (Skemp, 1987). Geometry has always been regarded as an essential topic for study (Clements, 2003; Lindquist & Clements, 2001; Tahta, 1980; Tutak & Adams, 2015). Fractal geometry, for example, has an important impact for architecture. The sample review demonstrates that architecture is not designed to be isolated but to anticipate changes in the surroundings using geometry (Lu et al., 2012). Interpretations of plane geometry also have been widely used in biology and genetics for ultrasound and MRI scans, which are vital for our lives (Gu et al., 2016; Haji et al., 2016).

Although there are many motivations for teaching geometry, there are also many variables that influence teaching this discipline, such as human factors (e.g., ability and motivation), social factors (e.g., gender and socioeconomic status), and pedagogical/instructional factors (e.g., curriculum policies and teaching staff) (Saralar-Aras & Esen, 2021). Researchers (e.g., Darling-Hammond, 2006; Hew & Brush, 2007; Sahlberg, 2012; Smith et al., 2016; Wright et al., 1997) report that teachers are the most influential element in students' success through their teaching activities. They all suggested that it is worth researching the principles and priorities

of teachers, since teaching could be defined as an engaging experience between students and teachers, and teaching involves the understanding and thinking of teachers, hence teachers' perceived knowledge domains are important. It is widely known that TPACK is context-bound (Mishra & Koehler, 2006), a teacher's or a pre-service teacher's gender (e.g., Koh & Chai, 2011), age (e.g., Lin et al., 2013) or grade level (e.g., Jang, 2021) have all been found to be relevant constructs for their perception of TPACK. Despite the fact that related literature has shown that gender is a non-significant variable (e.g., Koh & Chai, 2011; Schmid et al., 2021; Wang, 2022), how PSTs' perceptions differ based on their grade levels and teaching and course experiences (e.g., courses related to mathematics teaching methods and educational technologies) opened up a new world of wonder for us (Saralar-Aras, 2022; Scherer et al., 2018; Schmid et al., 2021).

Learning pre-service teachers' conceptions on their TPACK is valuable for future teachers. Particularly, in the researched context, there needs to be a course designed to close the gap in pre-service teachers' TPACK.

Moreover, technology is an important part of our lives. Future teachers will be required to teach with or through technology, especially considering the COVID-19 pandemic. According to Voogt and McKenney (2017) basic hardware and software knowledge can be called basic technology literacy, which is the technology knowledge in the TPACK framework. When these issues are handled in the wider context of TPACK, knowing the distinction between hardware and software determines teachers' use of technology: the tools to prioritise and integrate effectively into the necessary steps of the lessons (Voogt & McKenny, 2017), which is associated with technological content knowledge (Mishra & Koehler, 2006). The distinction between hardware and software is seen as valuable in the context of early literacy.

This study looked at pre-service mathematics teachers' techno-pedagogical content knowledge with a special interest in researching technology integration into geometry teaching. The results of the study will feed into the design of an elective course for pre-service teachers to improve their techno-pedagogical content knowledge. The longer-term goal of this work is to improve pre-service mathematics teachers' techno-pedagogical content knowledge by giving them the opportunity to practice teaching through the designed elective course in the coming cycles, so that pre-service teachers can better cope with classroom problems in the future by having the necessary TPACK knowledge.

### 1.1. TPACK Studies in Mathematics Education (and Geometry in Particular)

Research evidence shows that TPACK studies in the related literature are mainly conducted by adding other mathematics topics such as ratio and proportion rather than geometry specific (see Za'ba et al., 2020). Furthermore, when we checked the significant databases establishing the journals from high impact factors (e.g., Web of Science), the sample geometry specific TPACK studies from the last five years came up with the following in Table 1.

Our rationale for studying pre-service mathematics teachers on their TPACK, particularly in geometry topics, is threefold. First, in the research of teacher education, the research design of the studies is frequently in quantitative methodologies (50%), then qualitative (37%), and instructional design (13%). We realised the quantitative approach to TPACK in geometry is preferred in the related literature. Second, the study groups were found to be frequent (50%) with pre-service mathematics teachers. However, in terms of geometrical topics, the studies seemed to fluctuate in that very few explicitly mentioned specific topics such as polygons or quadrilaterals. The studies tend to construct their methodology on geometrical cognition tools such as GeoGebra or Geometer's SketchPad, the effect of instructional designs. Instead of TPACK knowledge, beliefs, and from the views of pre-service teachers, efficacy levels, the research did not point out TPACK dimensions deeply grounded by Mishra and Koehler (2006). We came up with the notion that literature review in TPACK studies, particularly in geometry education, has been currently missing the determination of PSTs' needs on which dimension of TPACK skills. Then, we could design an instruction, apply a treatment or do other educational analyses. With these ideas in mind, we sought an answer to the perceived TPACK levels and sub-levels of pre-service mathematics teachers in their third and fourth (senior) years, and whether there is any gender difference in these scores.

**Table 1.** *Limited Number of TPACK Studies*

| Researchers | Research design | Study group | Geometry topics | Dependent variables |
|---|---|---|---|---|
| Abunda (2021) | Qualitative (Instructional design) | Maths teachers | Coordinate geometry | Development of teacher module and its evaluation |
| Galanti et al. (2021) | Mixed (Survey design and end of term reflection) | Primary school teachers, coaches and specialists from multiple K-12 school | Use of dynamic geometry tools such as GeoGebra and Cabri for geometry content | Maths learning trajectory |
| Zambak & Tyminski (2020) | Qualitative (Exploratory case study) | Pre-service maths teachers | Use of dynamic geometry tools: GeoGebra or Geometer's SketchPad in general | Development of an assessment rubric to measure PSTs geometry MKT for teacher educators |
| Açıkgül & Aslaner (2020) | Quantitative (True Experiment as 2 x 2 factorial design) | Maths teachers | Polygons | TPACK efficacy and self-efficacy perception levels |
| Açıkgül & Aslaner (2019) | Quantitative (Correlation study) | Pre-service maths teachers | Polygons | TPACK efficacy level and self-efficacy perception |
| Saralar et al. (2018) | Qualitative (Descriptive case study) | Pre-service maths teachers | 3D shapes | TPACK knowledge during practicum |
| Alizadeh-Jamal et al. (2018) | Quantitative (Experimental design with pre- post-lesson survey) | Maths teachers | Polygons, circle, and coordinate systems | TPACK knowledge and belief |
| Farrarrello et al. (2017) | Quantitative (Experimental design) | High school teachers and their students | Quadrilaterals | Overall assessment of the course, self-assessment of skills and personal comments |

### 1.2. The Significance of the Study

Mathematics, particularly geometry, is one of the fields in the world where students' success in national and international exams is lower than expected (Saralar-Aras & Esen, 2021). Even adults believe they are not successful enough in basic mathematical literacy in their daily lives. Some of the reasons for this include seeing the fields as an abstract concept; the intensity of curricula; inability to use in problem-solving, inadequate use of diverse teaching methods; insufficient use of field-specific teaching approaches (Larkin & Jorgensen, 2016; Saralar-Aras, 2022).

It is seen that K-12 students may have mathematical anxiety, and hence attitudinal and emotional constructs towards those fields (Barroso et al., 2021; Dowker et al., 2016; Frenzel et al., 2007; Lee & Koo, 2020). Now, with the exponential development of technology, the fact that technology literacy does not progress at a similar pace, the lack of knowledge, skills and anxieties in the use of technological tools continue to increase this under achievement and inequality in educational opportunity. In teacher education, it is seen that most teacher educators transfer their teaching approach to pre-service teachers and so the pre-service teachers tend to use these approaches in their teaching in real classrooms. These pre-service teachers start to teach the way they were taught (Birgili et al., 2016; Saralar et al., 2018). Studies by Van Petegem et al. (2005), and Cancino et al. (2020) show that pre-service teachers use these methods and approaches in their teaching in the same way as they were taught to integrate technology, pedagogy and content knowledge and skills in the lessons of their faculties of education. However, as Santos and Castro (2021) noted: "Using technology may change the way

teachers teach" (p. 2). What makes this process successful is not learning how technology is taught but using technology as an effective tool in the courses. That is to say, studies stress that pre-service teachers to learn how technology can help to enhance students' learning in mathematics instead of learning how to teach technology.

As previously noted, a few review studies highlight the TPACK model and its usefulness (Koehler & Mishra, 2009; Niess, 2005, 2008) and adoptions of TPACK to different disciplines, including science and foreign language teaching (Kaur et al., 2021; Li, 2021; Shin et al., 2021). Some discuss the importance of TPACK on in-service teachers' professional development including studies on these teachers' perceived TPACK (Harris & Hofer, 2009; Harris, 2016). But the development of a field does not depend only on theoretical development. TPACK as a field of study is progressing with scientific results by collecting data from the field with multi-dimensional and evidence-based approaches. In those areas, not only quantitative (e.g., Koh & Chai, 2014) but also qualitative (e.g., Huang et al., 2021) and mixed methods (e.g., Hwang & Lajoie, 2021; Kaya & Elster, 2019) studies have been implemented with pre-service, in-service teachers and even experts such as teacher educators (e.g., Voogt & McKenney, 2017). Up to the current date, the number of studies conducted with pre-service teachers (e.g., Balgalmış, 2013; Mourlam et al., 2021; Thohir et al., 2020) seems to be slightly higher than those conducted with in-service teachers (e.g., Choi & Young, 2021; Harris & Hofer, 2009; Harris, 2016). Since, although teachers gain experience in content knowledge and pedagogical knowledge over the years, it has been discussed in studies that increasing the skills of teachers in educational technologies while they are novices allows them to improve their TPACK in the following years. For example, Jang and Tsai (2012) studied with in-service elementary mathematics and science teachers in Taiwan. They investigated how to enhance in-service teachers' ability to utilize educational technology, focusing on the relation between TPACK and their use of interactive whiteboards (IWB). They were specifically interested in gender and subject area differences between teachers. The teachers were asked to complete an IWB-TPACK survey developed by Jang and Tsai (2012). Interestingly, the study results showed that the year of seniority in the field is a significant variable for the teaching and learning process; varying years of teaching experience affect the efficiency and effectiveness of the teaching and learning process, hence teachers' TPACK. For this reason, it is important to study the development of technology, pedagogy, and content knowledge with the participants who have similar levels of knowledge, and if there are pre-service teachers who do not have well-developed technology, pedagogy, and content knowledge as yet, these probably are a good fit for such research to evaluate their technology, pedagogy, and content knowledge and develop instructional designs for the improvement of their TPACK, accordingly. Last but not least, although many studies used surveys as data collection tools, they mostly analysed pre-service teachers in terms of different descriptive variables in the context of TPACK. In addition, these studies revealed that TPACK was preferred to be used as a metric for pre-service teachers' technology integration during a course design (e.g., Harvey & Caro, 2017). The profound analysis of these studies signifies that there is still a need to examine pre-service teachers' TPACK components during COVID-19 times to develop a research-based course design because very few up-to-date studies (e.g., Hall et al., 2020; Harvey & Caro, 2017) developed a course based on predefined TPACK components.

Mathematics, science, social studies, English language teaching, and other branches in the teacher education department have been the popular subject areas in which researchers aimed to explore pre-service teachers' perceptions, views, and experiences regarding TPACK (e.g., Kaur et al., 2021; Li, 2021, Shin et al., 2021). For instance, Harris and Hofer (2011) conducted a study with social studies in-service teachers, Kaur et al. (2021) and Li (2021) with English language teachers, Huang et al. (2021), and Jang and Tsai (2012) worked with elementary mathematics and science in-service teachers, and Shin et al. (2021) with science teachers. Different from these studies, as mentioned previously, we believe that pre-service teachers are a good fit for our study; hence, we selected pre-service mathematics teachers as a study group to investigate their perceived TPACK regarding the geometry subject area. Moreover, geometry is particularly chosen as it is not considered a hot topic as much as other branches in mathematics (e.g., numeracy, statistics), and studies in this field are progressing with more limited groups. In addition, we aimed to deal with all TPACK sub-dimensions in detail, which was not common in the reviewed literature hence we aimed to fill this gap in the field. Therefore, the research questions of the study are the following:

- What are the perceived TPACK levels of pre-service mathematics teachers?
- What are the perceived TPACK sublevels of these teachers? Namely:

  - pedagogy knowledge,
  - content knowledge,
  - pedagogical content knowledge,
  - technology knowledge,
  - technological pedagogy knowledge, and
  - technological content knowledge.
- Is there a gender difference in TPACK scores?

## 2. Methodology

### 2.1. Research Model

This study followed a survey research approach as a research methodology because we aimed to determine the specific characteristics of the study group (Fraenkel et al., 2014) so that we can design a course to help them improve in the knowledge domains where the participants think they need improvement (Herrington et al., 2007). To achieve this goal, participants in a descriptive survey were asked the same questions about TPACK as in Bulut and Işksal (2019)

### 2.2. Research Sample

The data were generated from 70 (29 males, 41 females) undergraduate students from the department of mathematics education. 41.4% of the participants were male (n = 29) and 58.6% of them (n = 41) were female. A purposeful sampling method was used to choose the sample according to the needs of the study (Fraenkel et al., 2014). We chose purposeful sampling as the longer aim of this research is to develop a course for those in the sample from the same university; hence, to meet their needs with the course, the researchers will continue accessing to the participants. The participants were the third or last year students of a university's Elementary Mathematics Education programme; they are also called pre-service mathematics teachers who will become middle school mathematics teachers in two years. The study sample corresponds to approximately 20% of the population (response rate).

Further descriptive information about the participants revealed that more than half of them attended a teaching practicum (n = 41, 58.6%) and half of them attended a teaching methods course (n = 35, 50%), while almost a quarter of the participants attended an advanced teaching methods course (n = 17, 24.35%). Finally, one-third of the participating pre-service teachers attended a school experience course (n = 23, 32.9%). This information is important for the current study as the effects of these variables (courses and experiences) were further analysed.

### 2.3. Data Collection Tools and Procedure

The Technology, Pedagogy and Content Knowledge (TPACK) Survey was prepared to evaluate the Technology, Pedagogy, and Content Knowledge of the students (pre-service teachers) studying at the Faculty of Education, Mathematics Education program as of the 2020-2021 academic year. The questions were from Bulut and Işıksal's (2019) survey. We chose Bulut and Işıksal's (2019) perceived geometry TPACK levels survey for various reasons. The fırst reason is that the survey was designed for the Turkish context, hence, no adaptation is needed, and from the introduction part to the open-ended items, it fits the goals of our study. Therefore, no amendments were needed. Secondly, the survey was designed in participants' language; hence, we did not need any translation or further work related to translation for the data collection. Finally, the survey was valid and reliable. For the survey, three expert opinions were taken for face validity, semi-structured and an exploratory factor analysis was conducted for the construct validity concerns. Then, the necessary changes on the items were made after evaluating opinions and analyses. Some items in the survey were unclear, so we amended the language for these items. These issues were related to the translation from English to Turkish, so the validity and reliability of the survey was checked. For reliability analysis of the survey, the Cronbach alpha coefficient was calculated for the whole instrument (0.96) and for each item (ranging from 0.83 to 0.92) by Bulut and Işıksal (2019). During the research process, the survey was found to be valid and reliable.

The survey consisted of two parts. In the first part, participants were asked to answer questions about their perceived TPACK (51 questions); in the second part, participants were asked to fill in demographic information (7 questions). Demographic questions were about their age, gender, grade level, courses they took

on teaching methods, courses they took on technology, teaching experience, and future plans on technology integration. We asked for this information to see whether any of these affect their TPACK. The number of items (out of 51) which were related to each of the sub-dimensions was noted in order here, and described in detail and reported in the findings: pedagogy knowledge (items 1-8), technology knowledge (items 9-15), technological pedagogy knowledge (items 16-23), content knowledge (items 24-29), pedagogical content knowledge (items 30-37), technological content knowledge (items 38-43), and, techno-pedagogical content knowledge (items 44-51). The reliability value for our study was found as 0.97 for all items; and 0.88 for PK, 0.88 for TK, 0.92 for TPK, 0.82 for CK, 0.93 for PCK, 0.88 for TCK and 0.92 TPACK. There was a compelling match between the reliabilities of the source and the current study reflected the consistency of the results. A commonly accepted rule is that 0.6-0.7 indicates an acceptable level of reliability, and 0.8 or greater is a very good level; hence, these were all very good levels of reliability (Fraenkel et al., 2014).

### 2.4. Data Analysis

The TPACK framework was used to analyse of the survey (Mishra & Koehler, 2006). The framework had seven components, and there were 6 to 8 items for each component: pedagogy knowledge (8 items), technology knowledge (7 items), technological pedagogy knowledge (8 items), content knowledge (6 items), pedagogical content knowledge (8 items), technological content knowledge (6 items), and technological pedagogical content knowledge (8 items

As a reminder, all study participants were pre-service teachers even though some definitions include a teacher as the object. No other changes were needed to specify these definitions for our study; we used original definitions. We reported the survey data using these knowledge domains as the themes of our study.

Agreement percentages were calculated by adding the percentages of somewhat agree, agree and strongly agree; and disagreement percentages were calculated by adding the percentages of somewhat disagree, disagree and strongly disagree.

In addition to the Likert-type items, the findings present results of the open-ended items, hence it is important to describe how the data from such open-ended items were coded. The coding was done by rereading the answers a few times and then reporting the results in percentages. We measured the level of agreement between the raters to see the consistency to report reliability. The inter-rater consistency coefficient for coding the open-ended items was 92% which was high enough to report reliability. This was obtained by dividing the total number of ratings by the number of ratings in an agreement between two raters.

Finally, statistical analysis techniques such as t-tests and ANOVAs were used to determine the effects of mathematics teaching methods, educational technology, and internship courses on participants' TPACK scores. We looked at whether there was a gender difference (i.e, independent variable, IV) in terms of the sub-components of the TPACK as well as the overall TPACK scores (i.e., dependent variables, DV). Given that the literature suggested no gender difference in TPACK, we looked at whether there was any difference in the sub-components of TPACK.

### 2.5. Ethical

Upon granting permission by the Human Subjects Ethics Committee of the first author's university and subsequently by the Provincial Directorate of National Education, the study did not cause any concerns for the committee.

## 3. Findings

In this study, we analysed the participants' responses to the questions about TPACK (51 questions). This paper presents the findings of the survey with 70 pre-service mathematics teachers. The survey results are presented under seven components of the TPACK framework, namely pedagogy knowledge (section 4.1), technology knowledge (section 4.2), technological pedagogy knowledge (section 4.3), content knowledge (section 4.4), pedagogical content knowledge (section 4.5), technological content knowledge (Section 4.6), and technological pedagogical content knowledge (section 4.7). While reporting, we chose to use positive language where we reported the "agreement" results. That is, if 60% of participants partially agreed, agreed, or strongly agreed that "they were able to effectively integrate necessary technologies into their geometry instruction," we

reported that percentage in our results rather than saying, 40% of participants think "they did not effectively integrate necessary technologies into their geometry instruction."

First of all, note that we found no gender difference neither in sub-components of TPACK (PK: $p$ = .98, CK: $p$ = .08, PCK: $p$ = .63, TK: $p$ = .32, TCK: $p$ = .96, TPK: $p$ = .32), nor in total TPACK scores ($p$ = .83). Hence, this guided us to provide a comprehensive course suitable for both genders. Course structure is provided in Appendix A to share an insight for teacher educators who aim to design a TPACK course. Secondly, we looked at associations between grade level and TPACK total & subcomponent scores. We did not found any significant difference between the PSTs who were junior ($M$ = 30.87, $SD$ = 9.53), and senior grade level ($M$ = 32.81, $SD$ = 6.73) in terms of their TPACK scores; t(67) = -.99 , $p$ > .05.

With an interest in the course and teaching experience, we further analysed the relationships between doing internship, teaching experience, and studying educational technology courses, and TPACK scores. Relying on independent sample t-test results,we found non-significant difference between the TPACK scores of PSTs who attended a teaching experience/ an internship course ($M$ = 32.81, $SD$ = 6.73), and those who did not attend any ($M$ = 30.87, $SD$ = 9.53); t(67) = .99, $p$ > .05). Moreover, there was no difference in scores of those studying a mathematics teaching methods course ($M$ = 32.97, $SD$ = 6.60), and those who did not study ($M$ = 30.62, $SD$ = 9.70); t(64) = 1.20, $p$ > .05). Lastly, we found that there was no difference between TPACK scores of PSTs who attended an educational technology course ($M$ = 32.04, $SD$ = 7.51), and those who did not attend ($M$ = 31.13, $SD$ = 10.05); t(37) = .39, $p$ > .05) related to TPACK total. We also did the same analyses as 2x2 ANOVA, which gave similar results. For this, we first checked the assumptions: independent observation, normality and homogeneity of variance for, teaching experience (an IV), method course (an IV) and TPACK total scores (DV). All but the homogeneity of variance assumptions was not violated. F(3,66) = 4.10, p= .01 < .05. There was no interaction between teaching experience and method course variables which means that the effect of teaching experience does not depend on the levels of the method course. Then, a 2X2 ANOVA was conducted to evaluate the effects of teaching experience and enrolling in a method course on TPACK total scores. The analysis indicated no significant interaction between teaching experience and method course, F(1,66) = .01, p >.05, but significant main effect for teaching experience F(1,66) = 4.66, p = .04 < .05, $\eta 2$ = .07 and method course, F(1,66) = .78, p > .05. As results indicated, PSTs who had teaching experience (M=.34.76, SD=7.93) tended to have different TPACK scores than those who did not have (M= 30.04, SD=8.27). Because there were only two variables, post-hoc analysis was not required, and the results showed that PSTs who had teaching experience had significantly higher TPACK scores.

The following provides the case in each of the components of TPACK. In each sub-components of the 51-itemed survey, we visualised our data with effective use of 100% stacked bar (Wilke, 2019) in the following subtitles of the findings.

### 3.1. Pedagogy Knowledge

According to Item 1, nearly four-fifths of the PSTs reflected their pedagogical knowledge that they are able to evaluate their students in-class performances (88.6%). Items 2, 3, 4, 5, 6, 7, and 8 indicated that a similar proportion of participants also adapt their teaching method to their students' needs (93.6%), organize their teaching method in accordance with their students' learning levels and individual differences (91.4%), select effective resources and activities to enrich their learning (94.3%), use different instructional methods (91.4%), manage their class effectively while lecturing (87.1%), and use different instructional methods.

Overall, the participants' perceived pedagogy knowledge levels were ~90%. These findings showed that most of the pre-service mathematics teachers (almost 80% on average) perceived themselves as proficient in terms of pedagogical knowledge (see Figure 1).

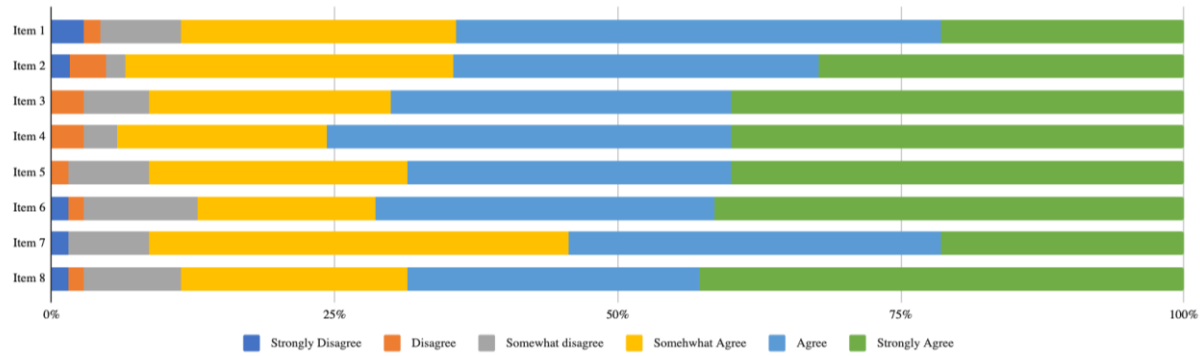


**Figure 1.** *Descriptive for the Pedagogical Knowledge Dimension of the Scale*

### 3.2. Technology Knowledge

Figure 2 shows the percentages of participants according to their answers to the perceived TPACK survey's technology knowledge dimension.

Items 11 and 12 showed that around four-fifths of the pre-service mathematics teachers believed that they could use basic computer software such as Windows and Office Tools (84.3%) and presentation tools such as projector and smartboard (82.9%) effectively. According to Item 9, more than two-thirds of the participants believed that they knew how to solve a technical problem while working on the computer (61.5%) although as item 10 indicated, only half of the PSTs reported that they knew the basic computer hardware parts including Video Card, Motherboard, Main Memory, and RAM, and their functions (52.8%). When it comes to software-related problems particularly (Item 15), nearly half of the PSTs thought that they could easily solve a software problem that they encountered on the computer (45.7%). Most participants thought they could easily learn to use newly encountered technologies, whether hardware or software (Item 13; 81.5%). Finally, as Item 14 showed, almost three-quarters of the participants believed they could easily find audio-visual technologies (animation, simulation, etc.) they were looking for via the Internet or by purchasing (74.3%).

Overall, the participants' perceived technology knowledge levels were ~60%. These items indicated that most of the participating pre-service mathematics teachers (69% on average) perceived themselves as proficient in technological knowledge although only half of them believed that they could solve software-related problems (see Figure 2).

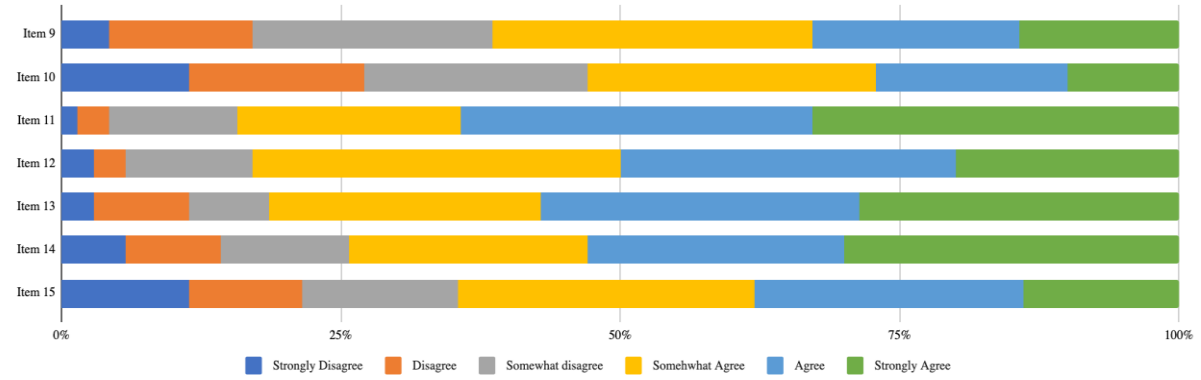


**Figure 2.** *Descriptive for Technology Knowledge Dimension of the Scale*

### 3.3. Technological Pedagogy Knowledge

Items 16, 19, and 21 respectively showed that around four-fifths of the PSTs believed that they could choose technologies that would make their teaching method effective (84.2%) and enrich the content of their course (82.8%) and that they could evaluate the practicality of a new technological tool in education (79.9%). Items 18, 20, 22, and 23 indicated that the participants believe that they can plan technology-based activities for their lessons (90%), that they could manage the classroom during technology-based activities (90%), that they could plan a lesson in a way that allows them to use technology effectively (88.6%), and that they have sufficient knowledge about teaching with technology (92.8%). Finally, and a little lower than the other percentages in

this theme, around seven-tenths of the participants considered that they could determine the appropriate hardware or software technologies for the teaching method that they would use in their lessons (72.9%).

Overall, participants' perceived technology education knowledge level was ~70%. These results showed that almost all of the participating pre-service teachers (85.2% on average) considered themselves proficient in technological pedagogy knowledge (see Figure 3).

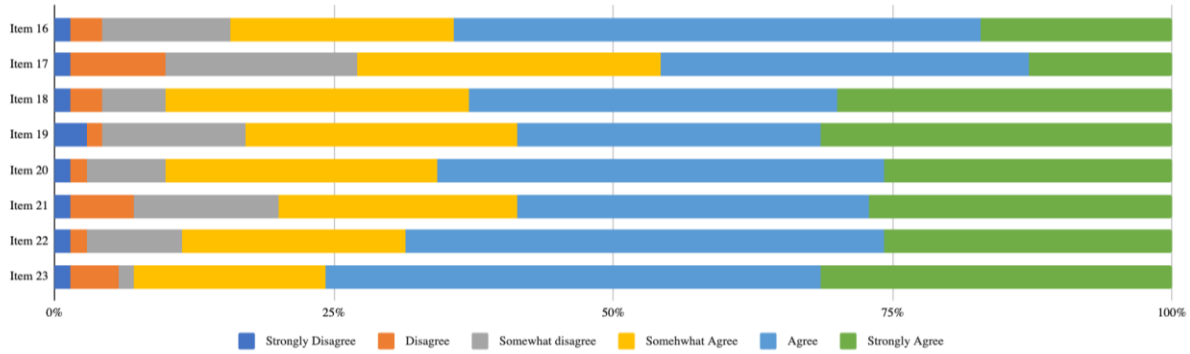


**Figure 3.** *Descriptive for Technological Pedagogical Knowledge Dimension of the Scale*

### 3.4. Content Knowledge

Almost nine-tenths of the PSTs reflected their content knowledge that in line with Items 24, 25, 26 and 27 respectively, they can answer questions about geometry topics (90%) easily, relate geometry topics to daily life (91.4%), associate mathematics with other learning areas and different disciplines including (e.g., Science and Technology, [National] Language, Social Studies, etc.) (92.9%), and do research to improve themselves (92.9%). According to Item 28, more than half of them reflected that they can explain mathematical concepts in geometry (e.g., line, point, angle) within the middle school mathematics curriculum (95.7%). Finally, Item 29 showed they can do proofs in the geometry topics within the middle school mathematics curriculum (81.4%).

Overall, the participants' total perceived content knowledge levels were ~85%. These findings showed that nearly all of the pre-service mathematics teachers (90.3%) perceived themselves as very proficient in terms of content knowledge in geometry (see Figure 4).

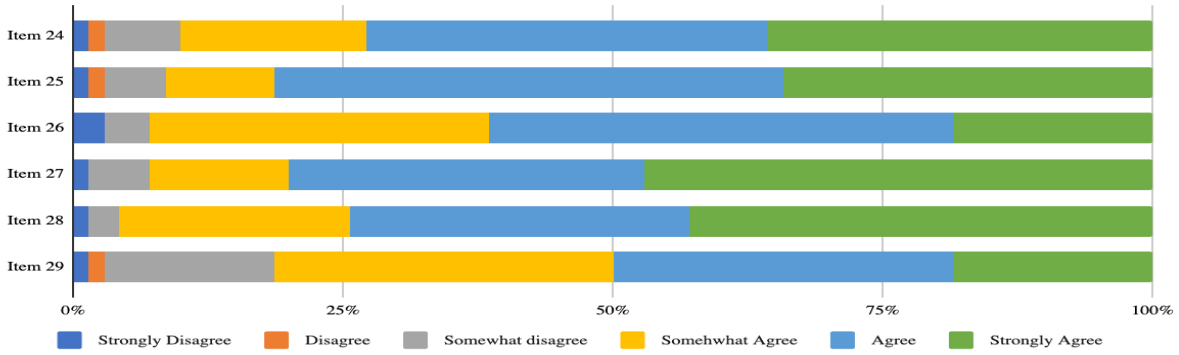


**Figure 4.** *Descriptive for Content Knowledge Dimension of the Scale*

### 3.5. Pedagogical Content Knowledge

Nearly 80% of PSTs showed that teachers had the pedagogical content knowledge to select teaching methods that would aid students in learning geometry topics (91.4%), to identify students' misconceptions about geometry (87.1%), to determine the reasons for students' misconceptions about geometry (84.3%), to do a lesson plan about geometry that would motivate their students to learn (92.9%), and to prepare activities that would help students apply what they had learned (92.9%). In addition, item 36 showed that most of them reflected that when they become a teacher, they can relate geometry to other mathematics subjects while teaching (92.9%). Moreover, item 32 and item 34 indicated that nearly all of the PSTs reflected that they can easily use different teaching methods (e.g., problem-solving) when teaching geometry (92.9%) and could measure their students' learning in geometry (97.1%).

Overall, total perceived pedagogical content knowledge levels of the participants were ~90%. These findings showed that most of the PSTs (91.1%) perceived themselves as very sufficient in terms of pedagogical content knowledge in geometry (see Figure 5).

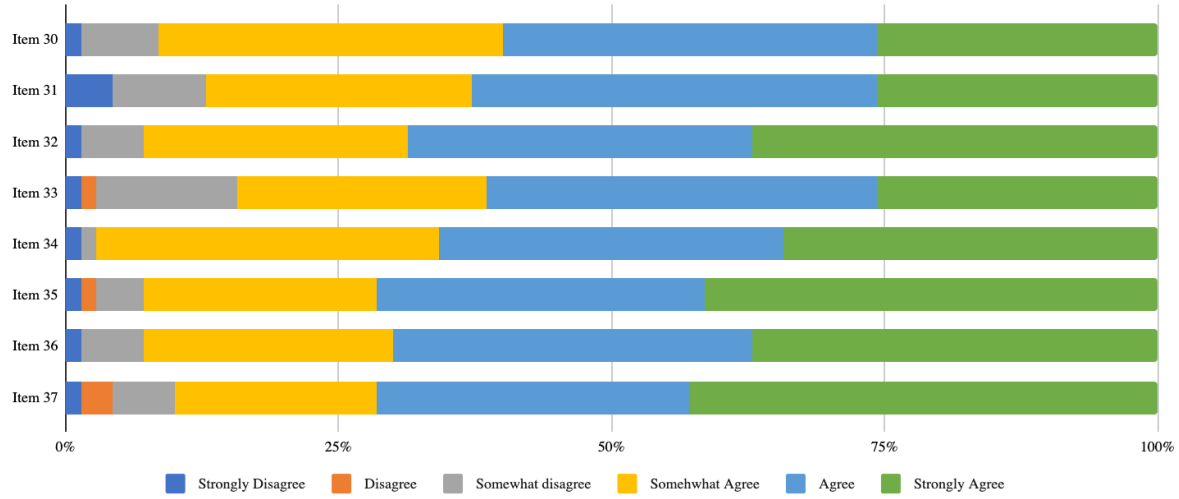


**Figure 5.** *Descriptives for Pedagogical Content Knowledge Dimension of the Scale*

### 3.6. Technological Content Knowledge

Items 38 and 39 indicated that around two-thirds of the PSTs believed that they knew what kind of technologies (computer, software, material, etc.) were used in geometry (71.4%) and which computer software (e.g., Geometer's Sketchpad, Logo, GeoGebra, C.A.R.) were available for geometry subjects (57.2%). From all the TCK items, these were the ones where agreement in responses was lowest. Items 40, 41, and 43 showed that 80% of participants knew which hardware technologies (projector, calculator, smartboard, etc.) could be used in geometry problems, 78% could effectively combine technology and their teaching method when teaching geometry, and 78% could assist other teachers in doing the same. Lastly, according to item 42, most PSTs tended to think that in the geometry course, they could choose technologies that would enrich their students' learning and teaching (90%). Item 42 was the only item in the TCK theme with more than 80% of the participants choosing the options in the "agreement" part.

Overall, the participants' perceived technological content knowledge levels were ~70%. The results indicated that most of the participating pre-service maths teachers (75.9% of them on average) perceived their technological content knowledge at the medium level (see Figure 6).

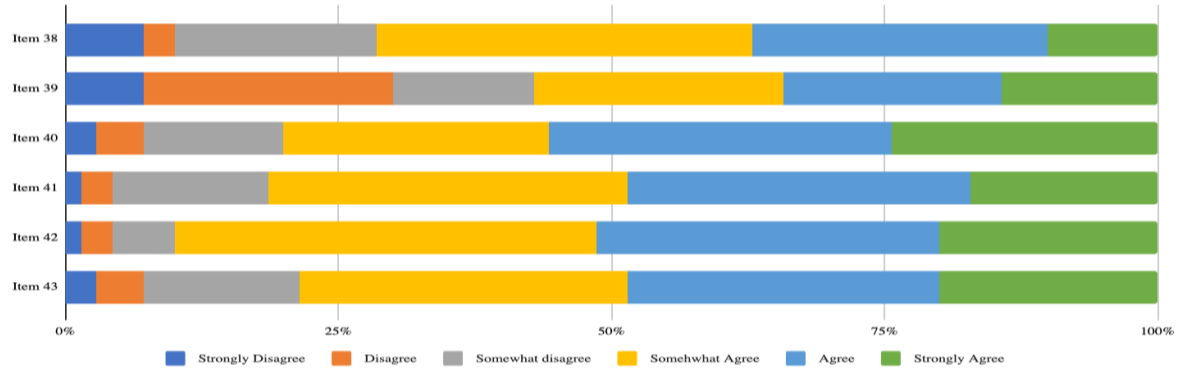


**Figure 6.** *Descriptive for Technological Content Knowledge Dimension of the Scale*

### 3.7. Techno-pedagogical Content Knowledge (TPACK)

In this context, TPACK implied pre-service mathematics teachers' awareness of the connections between technology, pedagogy, and the content of geometry. According to items 44, 45, 47, and 51, more than three quarters of the pre-service maths teachers believed that they could effectively explain geometry topics using technology and various teaching methods (84.3%), visual and auditory technologies (animations, simulations, etc.) during geometry lessons with ease (84.3%), can plan their geometry lesson using an effective combination

of technology and their chosen teaching method (80%), and can effectively assess student learning levels using dynamic geometry and math software during geometry lessons (75.7%). Items 46 and 50 indicated that more than two-thirds of the PSTs thought they could easily solve a problem (hardware or software) that students encounter when using technology in geometry teaching (64.2%) and using dynamic geometry and mathematics software to teach geometry subjects (67.1%). For item 48, half of the PSTs stated that they knew how to use dynamic geometry and mathematics software (Geometer's Sketchpad, GeoGebra, Cabri, etc.) effectively (50%). Finally, according to item 49, two-fifths of the PSTs declared that they knew how to solve a problem using dynamic geometry and maths software (40.1%).

Overall, participants' perceived TPACK level was ~60%. These findings indicated that most of the participating pre-service maths teachers (68.2% of them on average) perceived their technological pedagogical content knowledge at the medium level (see Figure 7).

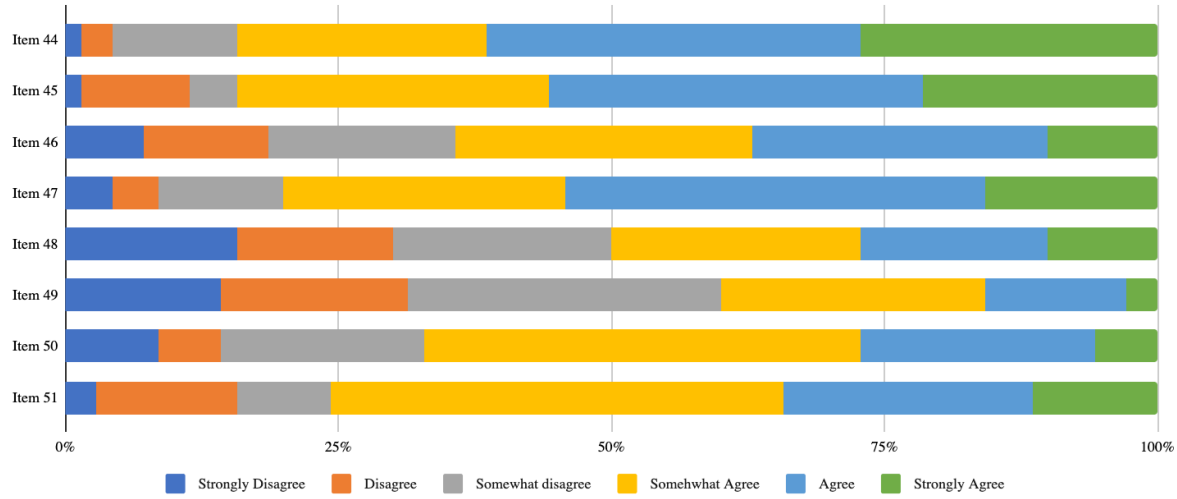


**Figure 6.** *Descriptive for General TPACK Dimension of the Scale*

In general, the findings showed that pre-service teachers were aware of the necessity of the technological pedagogical content knowledge (TPACK), and the effective integration of its components. The participating pre-service teachers indicated they preferred to frequently use technology in their future teaching experiences (n= 44, 62.9%). In comparison, 27.1% of them prefer to use technology "often", 7.1% of them prefer to "always" use technology, and 2.9% of them prefer to use technology "rarely" (see Figure 8).

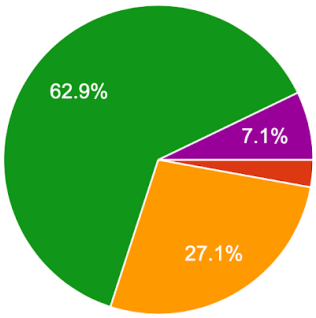


**Figure 8.** *Technology Use*

## 4. Conclusion and Discussion

To conclude, we can infer from the findings that pre-service teachers may not have the full teaching experience in practicum schools. Despite the practicum courses, most participants still feel inexperienced in teaching. This sets the environment for our second cycle, where we plan to design a course to provide such an experience.

In general, although pre-service teachers has enjoyed the idea of integrating technology into their lessons (Corkett & Benevides, 2015), we found that pre-service teachers need extra support for all of the TPACK sub-

components, but particularly for those including technology component: technology knowledge, technological content knowledge, technological pedagogy knowledge and TPACK itself. This finding mostly confirmed the wider literature which helped us develop a course students and those who need similar competencies in other contexts (Agyei & Voogt, 2015; Koh & Chai, 2011; Tondeur et al., 2019). It gave us hope for further adaptations for use in classes of wider Europe and America when we consider the results of the studies conducted in these contexts (Bayaga et al., 2021; Niess, 2008).

Contrary to the literature, one of the intesting results of this study was that the TPACK scores of the PSTs who enrolled in a method course, technology course, and internship course were similar to those who did not. However, Mouza et al. (2017) explained to us in detail the effect of the computer technologies course on TPACK scores. In addition, Huang and colleagues (2021) expressed the relation between attending technology courses with TPACK-related skills. As mathematics teachers who have graduated from a faculty of education, we know that taking regular courses allows us to keep the information up to date. We actively participate in the lesson, listen to the instructor, and do homework. However, if daily life examples related to the course content are not shared (Çam & Erdamar-Koç, 2021), the knowledge cannot be kept up-to-date.

Today, the fact that the faculties of education is subject-based and still mostly traditional (İlter, 2014) does not work for current needs of PSTs. The education provided by the faculties in Turkey is mostly theory-based (Çakıroğlu & Çakıroğlu, 2003). The development of TPACK skills and PSTs' own perception regarding TPACK can be attributed to the integration of technology in the faculty courses (Yıldız Durak, 2021) and their enrichment with activities and daily life examples (Çam, 2018; Mourlam et al., 2021). The courses enrolled by the PSTs may not have included this kind of instructional design sufficiently. In addition, it is a salient finding that the courses offered by instructors who have low content knowledge or pedagogic knowledge and teach only technology-based do not increase the TPACK score of the students (Mishra & Kochler, 2006). Hence, in this study, perhaps the courses opened in various faculties in Turkey are still being prepared traditionally and theoretically, and may even have been offered by instructors who did not train themselves in TPACK.

Moreover, confirming the literature, we did not find any gender difference in TPACK (Al-Abdullatif, 2019; Altun, 2019; Koh & Chai, 2011; Schmid et al., 2021). We further analysed gender difference for sub-components of TPACK in case there was any difference in subcomponents. The findings for subcomponents were no different than those for total TPACK, with no gender difference. Although adding to the literature about the analysis of the sub-components (Adalar, 2021), we could conclude that as in most cases, there was also no gender difference in case of TPACK subcomponents in mathematics.

Finally, all of the participating pre-service teachers reflected on their teaching practices, which is argued to be a factor affecting students' mathematics performance. Research has shown that students' errors in mathematics might occur because students have difficulties in understanding teachers' instruction methods (Confrey, 1990; Saralar-Aras, 2022). Our study confirmed previous studies (Çelik, 2013; Dönmez et al., 2021; Gür & Seyhan, 2006), and found that pre-service teachers value teaching practices, including how they received and delivered instruction.

## 5. Recommendations

First of all, a purposive sampling method was used to choose the sample according to the needs of the study. Using a non-random sampling method limited the generalizability of research (Fraenkel et al., 2014). However, the longer-term goal of this study was to design a course that would meet the needs of the participants in each context. Still, the study with the same survey might be repeated in other contexts in Turkey and wider Europe, and with a greater number of participants to add to these results. Secondly, the participants were selected from the third and fourth (senior) pre-service mathematics teachers of a university's elementary mathematics education program. The study can be replicated with the first and second-year pre-service teachers to see whether there is any difference in the TPACK at the beginning and end years of their teacher education. Lastly, the content knowledge in this study was limited to geometry, as we focussed on this and used Bulut and Işıksal's (2019) survey, specifically designed to assess perceived TPACK in geometry. As a result, it was a limitation, and a replication of this study with different contents via surveys tailored to these contents could be proposed.

### 5.1. Implications

This study has various implications for pre-service mathematics teachers, teachers, teacher educators, and researchers. First, we observed the TPACK knowledge domains pre-service teachers thought they had difficulty. Based on the analysis of the results, we will design a teaching experience course for them to improve their knowledge in the missing domains. We plan to ask about their experiences of teaching, in addition to assessing their TPACK. Such research in real teaching settings might help not only pre-service teachers to gain necessary practice and knowledge, and gain self-awareness about their practices but also allow students to take lessons from teachers who have necessary techno-pedagogical knowledge and related skills (TPACK) as Mishra and Koehler (2006) suggested. Reflecting on their knowledge and thinking about their future practices might also be argued to be a factor which might help pre-service teachers to improve their future teaching practices and prevent their students' possible errors and misconceptions in geometry (Confrey, 1990; Leijen et al., 2020; Lim, 2011; Pusey, 2003).

Moreover, the related literature shows that pre-service teachers' TPACK increases with the teaching experience (Balgalmış, 2013; Jang & Tsai, 2012; Saralar et al., 2018). The results of this study showed that pre-service teachers do not have the necessary teaching experience in real classrooms before they start their in-service teaching. When the PSTs are provided with such experience through a designed course, they might have increased technological, and pedagogical content knowledge.

We also believe that technology teachers can participate in mathematics classes at middle schools for just one hour a week with collaborative work and teach mathematics teachers and their students basic technological tools. During the guidance course hour in the weekly program, mathematics teachers can research, learn and practice geometry focus software packages, focusing on their professional development (while their students are doing assignments at the same time). Then, they can use it in the in-class teaching in the following weeks. Technology teachers can be invited as guest speakers during elective mathematics hours. They can discover novice geometry-focused hardware and software tools in collaborative work as a workshop study. Thus, teachers' and pre-service teachers' technology literacy, awareness, and self-confidence in TPACK knowledge and frequency of usage of those skills can be increased in line with Voogt and McKenney's (2007) findings. They can easily solve a problem (hardware or software) students encounter when using technology in geometry teaching.

Finally, teacher educators could use the same survey and design similar settings for pre-service teachers at their universities, and then expand on this research with larger samples in geometry education, other branches of mathematics such as algebra and calculus, and other fields of education such as science education and language education.

**Declaration:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## 7. Appendices

### Appendix A.

Table 2. *Course Design Outline for Development of TPACK in Geometry*

| Weeks | Weekly Hour | Learning Themes | Issues to Discuss |
|---|---|---|---|
| 1-3 | 3 (x3 weeks) | Technology knowledge | Use of standard sets of software tools such as word processors, spreadsheets, as well as browsers, and e-mail |
| 4-7 | 3 (x4 weeks) | Technological pedagogy knowledge | Existence, components, and capabilities of various technologies (e.g., as assessment tools such as Kahoot and Socrative) as they are used in teaching and learning settings with particular teaching methods, e.g., inquiry learning, project-based learning and problem-based learning |
| 8-10 | 3 (x3 weeks) | Technological content knowledge | Work on discovering how technology and content are reciprocally related and they support each other through tools that are specifically designed for geometry such as GeoGebra and Cabri |
| 11-14 | 3 (x4 weeks) | Technological pedagogical content knowledge | Micro-teaching on how to use a chosen technology (e.g., GeoGebra) to teach a particular geometry topic from the middle school maths programme of the in Turkey (e.g., polygons) through a chosen teaching method (e.g., discovery learning) |

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# Using Literary Works to Teach Psychopathology: A Qualitative Document Analysis Regarding Alcohol Use Disorder

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ABSTRACT

Bringing real-life cases to the educational environment and presenting them to students is one of the main goals of psychology. However, this is unfortunately not as easy as it is said, both ethically and practically. Since the educational materials to be offered to students on this subject are insufficient, academics and lecturers recommend that their students read case studies in psychopathology lessons or watch videos depicting certain disorders. While the use of films in both national and international literature in psychology and psychological counselling theories and practices is increasing, it is thought-provoking that there is no similar interest/attempt in reading literary works. Despite the (not)reading rates, the using literary works in students' education is overshadowed by films constitutes the main motivation of this studyusing literary works in students' education is overshadowed by films, which constitutes this study's main motivation. In this sense, the main purpose of the research is to provide an example of how literary works can be used in psychopathology teaching. Accordingly, Jean-Louis Fournier's book entitled "My daddy never killed anybody" was examined in terms of both causal factors and DSM criteria by using document analysis, which is one of the qualitative research methods, to delineate "alcohol use disorder.Accordingly, Jean-Louis Fournier's book named "My daddy never killed anybody" was examined in terms of both causal factors and DSM criteria by using document analysis, which is one of the qualitative research methods, to delineate "alcohol use disorder". In conclusion, it is thought that analysing literary works in terms of psychopathology and actively discussing them in front of a class will make the teaching process more creative and permanent.

Keywords:
Psychopathology, literature, teaching psychopathology, alcohol use disorder

## 1. Introduction

American Psychiatric Association defines mental disorders as "a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation, or behaviour that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning" (APA, 2013). Psychopathology is a discipline that examines the causes, bases, diagnosis, and treatment of these disorders. In this sense, it can be seen that it is sometimes used synonymously with abnormal psychology (APA, 2021). The concept of psychopathology is a concept that is at the heart of psychological counseling because psychotherapy or counseling is based on understanding mental disorders (Rudd, 2013). The practice of any mental health professions like clinical and counseling psychology, psychiatry, and social work largely depends on recognizing and conceptualizing multiple forms of mental disorders. Therapists, regardless of their professional background and theoretical orientation, should be aware of the various manifestations of

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psychopathology (Castonguay et al., 2013). For this reason, knowledge of psychopathology can be considered as a significant guide for intern psychotherapists not to get lost in the psychology maze (Rudd, 2013). On the other hand, it is asserted that both the quality and quantity of psychopathology training are inadequate, and those trainee psychotherapists require additional training and clinical supervision under the supervision of a clinician (Stanghellini & Fiorillo, 2015).

### 1.1. Why Use Literary Works?

One of the main goals of psychology is to present real-life cases to students in an educational setting. However, this is unfortunately not as easy as it is said, ethically and practically. Therefore, it can be stated that the educational material offered to students is insufficient (Derin & Yıldız, 2018). Due to this deficiency, academics who wish to close the gap attempt to teach their students how to characterize mental disorders by recommending that they read case studies or watch videos depicting particular disorders during psychopathology lectures (Balsis et al., 2006). Psychology is especially significant in analysing literary works because there is almost no literary work in which there is no "individual" at its centre.

For this reason, it is thought important to draw students' attention to psychological novels in psychopathology teaching. Stanghellini and Fiorillo (2015) define psychopathology as a discourse (logos) about the pains (pathos) affecting the human mind (psyche). It is clear that psychology, which aims to study this discourse and psychic processes, can be based on the study of literature because the human soul is the womb of all sciences and arts (Jung, 2011). In this sense, there is a sturdy relationship between literature and psychology. Both deal with people's reactions (perceptions of the world, misery, wishes, desire, fear, conflicts and compromises, etc.) (Aras, 2015).

### 1.2. Reading vs. Watching: Their Effect on Human Life

In literature, many films (Derin & Yıldız, 2018; Nittoli & Guiffrida, 2018; Scholl et al., 2014) and a small number of literary works (Whipple & Tucker, 2012) have been studied from the counseling theories perspective. Similarly, some films deal with the psychopathological process (Lis & Tuineag, 2017; Tobia et al., 2013), but it seems that there is a need for studies in which novels or other literary works are handled and analysed as "a possible case" in the psychopathological process. While the use of films in both national and international literature in psychology, counseling theories, and practices is increasing, it is thought-provoking that there is no similar interest/attempt in reading literary works. Of course, it is a desirable situation that films actively attract students to education, which positively affects learning (Nadir, 2013). However, scientific studies on the effects of watching television (TV) demonstrated that this act is not so innocent. Many scientific studies are revealing that TV has negative effects on children (Nathanson & Rasmussen, 2011; Takeuchi et al., 2015), youngster (Christakis & Zimmerman, 2009; Hoang et al., 2016), adults, and the elderly (Fancourt & Steptoe, 2019) in academic, social, physical or cognitive terms. It has been determined that watching TV harms intellectual abilities (Takeuchi et al., 2015) and verbal intelligence (Christakis & Zimmerman, 2009) and that TV predicts an increase in aggressive behaviour longitudinally (Anderson & Bushman, 2002). Similarly, a study conducted in Japan (Takeuchi, 2013) found that watching television negatively affects the frontopolar area located in the frontal lobe of the brain (This area is the region that plays an active role in the evaluation of produced information and the execution of the functioning in the prefrontal region. ), promotes aggressive behavior, and impairs verbal intelligence. Hoang et al. (2016) also stated that long-term TV viewing in early adulthood could cause cognitive ageing even before middle age. On the other hand, many scientific studies can be mentioned that emphasize that regular reading habits contribute to the bio-psycho-social development of individuals. In particular, reading literary fiction has been proven to improve brain development (Houston et al., 2014; Kidd & Castano, 2013), and enhances intellectual skills and empathy (Kidd & Castano, 2013). For example, Berns et al. (2013) asked 21 participants to read a thriller novel (Pompeii by Robert Harriss) in their study to reveal the effects of reading book on the human brain. They then took these individuals into functional magnetic resonance imaging (fMRI) scans for 19 consecutive days and examined the effect of the novel being read on the connections in the brain. At the end of the study, the researchers found that the connections in the brain regions associated with story comprehension increased and increased activation in the sensory-motor cortex. To sum up, although it is stated that reading case studies/novels and watching movies/videos can be beneficial for students, it is a crystal-clear fact that reading books is far ahead in the development of the individual. When looking at the studies comparing the advantages and disadvantages of watching television

and reading books, it is seen that the result is clearly in favour of "reading books". (Berns et al., 2013; Nathanson & Rasmussen, 2011). However, unfortunately, "the act of reading books" ranks 235 in the requirement list of people in Turkey in which the average time spent on reading a book per day is one minute, while the time spent watching TV is six hours (Cnnturk, 2017; Timeturk, 2017). On the other hand, while the average time of watching TV in all European countries is three hours and 43 minutes, the rate of reading books varies between two and 13 minutes (Statista, 2018a, 2018b). Despite the detailed scientific findings expressed above and the rates of (not) reading, the use of literary works in education is overshadowed by movies constitutes the main motivation of this study. In this sense, the study aims to provide an example of how literary works can be used in teaching psychopathology and to analyse this in line with Diagnostic and Statistical Manual of Mental Disorders (DSM) and causal factors that may provoke the disorder. Also, this study, though not directly, aims to facilitate the learning process by enabling each student or trainee who learns psychology, counseling and psychopathology courses to look at each book as a possible case, and to contribute to their intellectual knowledge. It is known that nosological classifications such as DSM and ICD develop a system based on diagnosis, not etiopathogenesis (causative factors of psychopathology) (Linden & Hewitt, 2018). This means that DSM alone is not the most effective assessment guide in understanding which psychopathological process an individual is going through (Kaya & Yıldırım, 2021). Therefore, in this study, it is emphasised that focusing on "etiopathogenesis" is also important besides DSM in teaching psychopathology. Since giving the equivalents of both DSM criteria and all of the causal factors in the literary work will increase the volume of the study more than necessary, a model proposal will be presented in line with the purpose of the study by trying to give some of the DSM criteria and causal factors of alcohol use disorder (AUD).

## 2. Method

### 2.1. Research Model

The main purpose of the study is to present a "bio-psycho-socio-cultural" model on how literary works can be used in teaching psychopathology. The best way to achieve this goal is to use "document analysis" which is one of the qualitative research methods because document analysis is a qualitative research approach aimed at systematically reviewing printed or online documents (Bowen Glenn, 2009). Like in other qualitative approaches, this approach requires interpreting the data to discover implicit meanings, research, and understand the process (Altheide, 2000). Accordingly, the Turkish translation[2] of the book named "My daddy never killed anybody" by the French author Jean-Louis Fournier (2016) was accepted as the document.

### 2.2. Why This Book?

As is known, psychopathology is a field in which many psychological/psychiatric disorders are examined. For this reason, it is a significant issue to carefully select the literary works that are planned to be analysed and recommended to students. For example, recommending an excessively lengthy novel for a single psychological disorder may decrease the motivation of students to attend lectures and learn.Also, another major issue is to choose the appropriate book content for the disorders to be taught. In this sense, it is considered that Fournier's book is at the ideal length (84 pages) for teaching psychopathology (AUD). Also, the book is considered valuable in that it covers a significant part of the diagnostic criteria and reveals how an alcoholic father looks from his son's point of view (this is important for understanding and summarising the bio-psycho-socio-cultural dimension of the disorder). Finally, the author's humorous language that does not bother the reader can be shown among the reasons for choosing this work.

### 2.3. Data Analysis

Fournier's book was discussed by the following the criteria of "AUD" in DSM V (APA, 2013) and "bio-psycho-socio-cultural" causal factors (Butcher et al., 2017) that may cause this disorder. The data were analysed using the content analysis method. Four of the 11 items constituting AUD were determined as sub-themes in the analysis process. Merriam (2016) suggested that researchers use the literature to determine the themes during content analysis. After the sub-themes were decided (See Figure 1. for the theme and sub-themes), passages thought to correspond to these sub-dimensions/criteria in the text were coded using NVivo 12.0 qualitative data analysis software.

[2] This author's book has not been translated into English yet.

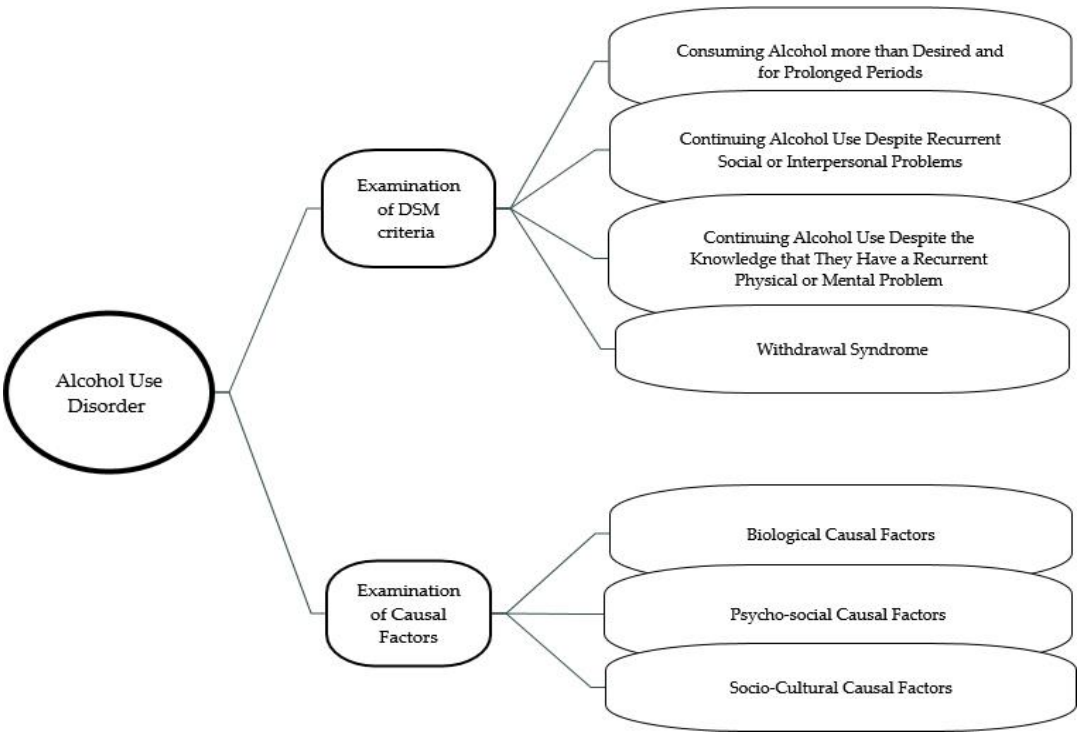


**Figure 1.** *Themes/ Sub-Themes Regarding the Alcohol Use Disorder*

### 2.4. Validity and Reliability

Validity and reliability for qualitative research mean that the subject to be investigated should be handled as objectively as possible. Thus, meticulous reporting of the data obtained by researchers is an essential criterion for research validity. For example, reporting direct quotations in line with the purpose of the research is a significant step towards validity (Yıldırım & Şimşek, 2016). Examination of the data by another independent researcher is another technique that increases both reliability and validity (Merriam, 1995). In this regard, a psychiatrist provided support for the compliance of the extracted analyses and quotations with the DSM criteria. In addition, Whittemore et al. (2001) state that the use of computer software such as NVivo and MAXQDA increases the reliability of qualitative studies. NVivo 12.0 qualitative data analysis software was used in this study to make coding more systematic. Finally, the accessibility of the document examined is another factor affecting the accuracy of it, and so is the validity and reliability of the study. Researchers should not leave unanswered questions of the report analysed such as date, author etc. (Merriam & Tisdell, 2015). Therefore, the identity of the document examined in this study is given in Table 1.

**Table 1**. *Document Identity*

| | |
|---|---|
| The Name of the Book | My daddy never killed anybody |
| Author | Jean-Louis Fournier |
| Original Language | French |
| Translator (to Turkish) | Zafer Demez |
| Original Name of the Book | Il a jamais tué personne, mon papa. |
| Date of Issue | 2016 |
| Publisher | Yapı Kredi |
| Place Published and Edition | Istanbul – 2nd Edition |
| Page Number | 84 |
| Book content with one sentence | A hero, protective, playful, humble, problematic image from the eyes of a child: Father (Back cover of the book) |

## 3. Findings

In this section, after the analysis of the book named “My daddy never killed anybody” in the context of "AUD", quotations that are thought to be in accordance with DSM V criteria and the etiopathogenesis of the disorder are included.

### 3.1. Alcohol Use Disorder (AUD): Examination of DSM criteria

In DSM V, there are 11 items under the AUD criteria. It is sufficient for at least two of these items to create an alcohol use pattern that causes clinically significant problems for the diagnosis (APA, 2013). Only four of the DSM criteria will be included under this main theme/title:

#### 3.1.1. Consuming Alcohol more than Desired and for Prolonged Periods

AUD is a medical condition characterized by an inability to control alcohol use and has negative effects on an individual's work, social, and health life (NIAAA, 2020). Individual alcohol consumption has been increasing daily and is becoming an increasingly global problem. Manthey et al. (2019) conducted a study on alcohol consumption tendency in 189 countries and found that alcohol consumption increased by approximately 70 percent between 1990 and 2017. In the same study, it is predicted that half of the adults in the world will consume alcohol by 2030. Although it is stated that controlled alcohol consumption is harmless (Kunzmann et al., 2018), researchers have declared that the global destruction caused by alcohol, which causes approximately 3 million deaths per year, is growing, and there is no safe limit to drinking alcohol (Griswold et al., 2018). In the analysed book, the author expresses that his father could not control alcohol consumption as follows:

> *... (my father's) work had taken a long time, and I had seen my father drinking his first and then the second glass between the curtain of the house. Then I had honked the horn in the middle of the steering wheel. My father came in very angry. He had known immediately that I was honking the horn. He had said I should not have disturbed him while he was working. Then I left him to work. My father worked so hard in the evening that he could not walk properly."* (Fournier, 2016, p.68).

The author stated that excessive alcohol use caused the death of his father in the following tragic words:

> *"...One morning, my mother came into my room very early. 'I think your father is dead!' she said. I remember saying 'Again ?'. I had seen my father so dead drunk that I would not know the difference between a real dead and a dead drunk. Then my father was a doctor, and a doctor wouldn't die. 'This time it's real. Come on, get up!' My mother said. I got up. I went to his room. He fell by the bed, his mouth was full of blood. He didn't scold me, and he was really dead."* (Fournier, 2016, p. 76).

#### 3.1.2. Continuing Alcohol Use Despite Recurrent Social or Interpersonal Problems

AUD plays an important role in experiencing domestic violence, such as partner violence, child abuse (Lander et al., 2013), and social problems that cause serious accidents and injuries (Oliveira et al., 2020; Papalimperi et al., 2019). In the following statements taken from the analysed book, the author summarises how his father became a problematic individual both within the family and in society:

> *"My father was treating people who were not rich, and these people often did not pay, but they offered a drink in return because my father liked to have a glass, even many. When he returned home in the evening, he was very tired. Sometimes he said he would kill my mother, and sometimes he would say this to me...*
>
> *He nearly killed people with his car, but nearly. He crushed many chickens and ducks. He did not crush any cows, only sheep. One day he dived into a herd with his car, injured many sheep, but did not crush the shepherd, he stopped right in front of him*." (Fournier, 2016, pp. 15,31).

Alcohol is seen as an important risk factor for almost all kinds of injury events, whether intentional (fighting with someone, suicide, etc.) or unintentional (poisoning, falling, burning, traffic accident, etc.) (WHO, 2018). While sometimes, excessive alcohol consumption experienced even once can cause irreversible consequences (Moss, 2013), alcohol-dependent individuals continue to do this repeatedly, even in situations that may be dangerous. The following statements of the author support how an alcohol-addicted individual persistently continues these risky actions are remarkable.

> *"...My father had to pay the price of compensation for many accidents. One day, to someone telling that my father caught his clothes while driving, another time for a whole lamb crushed by him then for a wheelbarrow loaded with flower pots that overturned, for a man shortened his leg because of him and for many other accidents...*

*On one occasion, my father probably was very tired (drank), couldn't take the bend before the bridge and fly into the river with his bike."* (Fournier, 2016, pp.68,31)[3]

### 3.1.3. Continuing Alcohol Use Despite the Knowledge that They Have a Recurrent Physical or Mental Problem

The clinical picture is not pleasant at all for individuals who consume excessive alcohol. Alcohol is a traumatizing disorder that kills or cripples individuals at a young age. It is one of the main causes of many diseases like liver cirrhosis and sexual problems, especially cancer (stomach, pancreas, larynx, etc.) (WHO, 2018). The liver absorbs approximately 95% of the alcohol consumed, and the remaining part is excreted through urine and sweating (Papalimperi et al., 2019). As it can be seen, since the liver is the organ responsible for the metabolization of alcohol, a large amount of alcohol ingested forces the liver to work above its capacity and eventually causes severe damage to the organs (Butcher et al., 2017). The following statements show strikingly how the individual walked to death despite the fatal harm caused by alcohol use:

*"Alcohol and tobacco inflicted great damage to my father's lungs. One day he had to go to the mountain to treat his lungs. He found himself in a sanatorium on the Schlucht Mountain gorge in the Vosges region in western France. My father received treatment but also managed to escape from the sanatorium while the cure continued. He was walking with his slippers on the snow for a drink in the only cafe in the village. His lungs were healing, but his real illness was not."* (Fournier, 2016, p.71).

### 3.1.4. Withdrawal Syndrome

According to the World Health Organization (WHO, 2018) data, approximately 2.3 billion people in the world consume alcohol, and 283 million suffer from AUD. A global effort is also being made to minimise this rapidly increasing global problem (WHO, 2010). However, many obstacles such as political (Peer, 2017), socio-cultural (Eashwar et al., 2020) and neuro-psychological (Fernández-Serrano et al., 2010) that prevent to reach maximum efficiency from these efforts. Withdrawal syndrome is one of the neuropsychological factors that negatively affect this process. This syndrome, which creates many physical and psychological negative effects, particularly affects the body's stress response system (Becker, 2008). Thus, the individual cannot think of something other than alcohol. The author expresses his father's efforts to quit alcohol and how this effort failed as follows:

*"My dad used to be sad at home. I had a feeling that he was not interested in anything. He was no longer reading or listening to the radio. We felt something was missing. He was like a patient who had not taken his medication... I remember one day he went through a grave madness crisis. He filled loads of cigarettes in his mouth with a cigar in the middle. His head was like a dandelion flower. He walked around the house in this state, but nobody wanted to laugh. The situation was serious and did not know what he was doing."* (Fournier, 2016, pp.29-75)

## 3.2. Alcohol Use Disorder (AUD): Examination of Causal Factors

As emphasised before, the causal factors related to alcohol use have been analysed under three subtitles/themes as biological, psycho-social and socio-cultural in line with the "bio-psycho-socio-cultural" approach.

### 3.2.1. Biological Causal Factors

AUD is defined as a "relapsing brain disease" that continues to be used despite the negative consequences caused by alcohol (Kamarajan et al., 2020; Zhu et al., 2017). This definition emphasises that the brain plays the main role in the realisation of addiction. In particular, dopamine pathways and brain reward circuit (Ventral tegmental area; VTA, Ventral Striatum; VS, Nucleus accumulator; NAc etc.) play a significant role in the activation of neurochemical processes at the base of addiction (Uhl et al., 2019). After drinking alcohol, the stimulation of this reward system causes this behaviour to be reinforced, and thus addiction occurs (Horseman & Meyer, 2019). Long-term drinking with addiction causes severe mental health problems such as "Korsakoff Syndrome" (Ritz et al., 2021) and "Delirium Tremens" (Calvo et al., 2018). Especially "delirium tremens", also known as alcohol withdrawal syndrome, occurs after the individual suddenly reduces or quits alcohol, so

[3] The quotation here also directly meets the expression of another diagnostic criterion of the AUD that is "Repetitive use of alcohol in potentially dangerous situations". Just as here, it should be stated to students that citations from books may refer to more than one diagnostic criteria from time to time.

alcohol addiction becomes more lethal (Sørensen et al., 2019). The author explains below, using a funny memory, that his father diagnosed this in one of his patients as follows:

> *"Another time my mother opened the door to another customer, the woman did not seem very happy. She was very angry with my father because he told her that her husband was a very thin man's ass*'. The lady client was trying to explain that this was not true. My father had said that her husband had 'delirium tremens'. What they said was in Latin. It means trembling delusion and is a very serious illness seen in alcoholics, a kind of madness.*
>
> ** Translator's Note: The French equivalent of 'a very thin man's ass' is 'Deryerdom tromens'. The woman got it wrong because its pronunciation was similar to the 'delirium tremens'."* (Fournier, 2016, p. 28).

When alcohol inhibits glutamate, one of the neurotransmitters in the brain, it causes a decrease in brain functioning and impairment of functions such as learning and judgment. This situation causes individuals to lose control over the impulses they can normally control and the perceptions become blunted. In such a case, individuals bravely expose the issues that previously disturbed them (Butcher et al., 2017). The author expresses the reaction of his father, who lost control after consuming excessive alcohols to the grandmother as follows:

> *"My father would sometimes be angry or furious, then call the police. The gendarmes always would come and try to calm my father, who talked nonsense. One day, my father said that my grandmother wanted to rape her. I did not know what it meant, but it must have been something serious. I had seen that word in a newspaper. I think it meant killing a woman, or worse."* (Fournier, 2016, p.53).

### 3.2.2. Psycho-social Causal Factors

AUD is defined as a relapsing brain disorder; this definition has been a matter of debate as it ignores the psycho-social aspect and importance of AUD because this definition adopts a reductionist approach instead of a holistic approach (Cunningham & McCambridge, 2012). However, it is emphasized that even genetics, which is known to have a very high effect (60%) on addiction, is crucial in its interaction with the environment (NIAAA, 2020). It is stated that this disorder hidden in genetics cannot occur without exposure to a psycho-socially negative environment that will pave the way for the emergence of addiction (Butcher et al., 2017). For this reason, it is essential to carefully consider the "psycho-social" approach to understanding any psychopathological situation. Many different or similar psycho-social causative factors can be mentioned that trigger AUD and other psychopathological disorders. For example, having alcoholic parents (Omkarappa & Rentala, 2019), marital conflict (Windle & Windle, 2019), parents' attitude toward alcohol (Tael-Öeren et al., 2019), individuals' psychological vulnerability (Gowin et al., 2017) can be shown among the psycho-social problems that trigger AUD.

The lifestyles of parents, who are the most important role models in life for the individual, have a significant impact on children's future lives. For example, Lander et al. (2013) emphasize that the fact that only one of the parents experiences AUD increases the possibility of children being affected emotionally and mentally, causing psychological problems. Another study (NIAAA, 2020) revealed that those who started using alcohol before the age of 15 had five times more AUD than those who started using alcohol at the age of 21 or later. In the book examined, the author expresses how his father offered him a drink many times in a cafe despite all the problems he had due to alcohol use as follows:

> *"On a Sunday, my father took me to a cafe, where he offered me an aperitif as if I were an adult.I drunk a Martini because Martini is a little sweet. There was a piece of lemon peel floating on it. They presented it in a very thick glass like a lens, so it looked like it had a lot of Martini in it, but it was not like that. The glass had emptied too quickly. I was feeling good. My ears burned a little by the martini effect. I found everyone very pleasant. Then my father repeated "Martini" many times, and the pleasantness faded."* (Fournier, 2016, p.70).

It is possible to find many studies (Birditt et al., 2018; Bresin et al., 2020) on the problematic relationships between spouses and families of individuals with AUD. In particular, research findings reveal that alcohol use seriously impacts marital satisfaction and relationship quality in marriage (Windle & Windle, 2019). While mild drinking was associated with increased quality and length of the relationship, pathological drinking was associated with low marital satisfaction and a high divorce rate (Collins et al., 2007; Homish et al., 2009; Kendler et al., 2017). Worse still, it is stated that alcohol use causes both physical and psychological violence

against the partner (Bresin et al., 2020). The author describes how his father, who suffered from alcohol use, used psychological violence against his mother as follows:

> *"We would not really want my dad to have an automatic gun because sometimes weird ideas used to form in his mind. Many times, he would say that he would kill my mother. We would think he said this just for fun, but he was not joking at all."*

The author expresses the attitude of his mother, who is tired of his father's situation, as follows:

> *"One day, my mother was fed up, really fed up. Living with my father was very difficult, even impossible... My mother locked the door to prevent my father from entering the house, and we went to bed. We would finally be able to sleep well."* (Fournier, 2016, pp. 33,64).

One of the most significant problems caused by AUD is self-harm and suicide attempts. It is known that repetitive self-harm behaviour increases, especially with the onset of alcohol abuse (Ness et al., 2015). In a study by Griffin and her colleagues (2018) conducted in Ireland, it was found that approximately 43% of self-harm cases admitted to the hospital were due to alcohol use. Also, the increased amount of alcohol consumed constitutes a risk factor for suicide. Meta-analysis studies revealed that individuals with AUD have three times the risk of suicide comparing those without (Conner & Bagge, 2019). Below, the author describes his father's repetitive suicide attempts and self-harming behaviour as follows:

> *"My father used to like committing suicide. He has attempted this many times. He usually attempted suicide on Sundays, when everyone was there, preferably at the festive meals. My father would take his scalpel and cut a vein from the inside of his elbow. We were afraid at first, not wanting him to die. My mother, who was used to this situation, would pretend nothing had happened and continued talking to us. She used to ask us about our school and our friends as the blood flowed. Seeing that we were not taking care of him, my father used to worry and rush into his study room for dressing his wound."* (Fournier, 2016, p.19).

### 3.2.3. Socio-Cultural Causal Factors

It is known that culture, religions, customs, and traditions affect alcohol consumption. For example, from a cultural perspective, alcohol is seen as a part of social life in western civilisation (Butcher et al., 2017). In celebrations, social events, and easing tensions, alcohol is often regarded as a "social lubricant" (Capito et al., 2017). In addition to the culture, it is stated that religious beliefs also affect addictions, but this effect has a more protective role, contrary to the example given above (Baena et al., 2019). For example, researchers have indicated that the rate of alcohol consumption is much lower in Muslim countries where alcohol consumption is religiously prohibited (Assanangkornchai et al., 2016). Similarly, a study conducted in Spain found that religiosity is efficient in low alcohol consumption, and non-believers consume much more alcohol than Catholics (Baena et al., 2019). In the book analysed, the author also states that his dad tried to get help from a priest to benefit from this positive effect of religion on alcohol use, and how the priest avoided using alcohol as follows:

> *"Everything has been tried to make my father quit drinking; prayers, nine days of worship, rituals… Even one of the priests made lots of effort in this regard. He was a very likeable young vicar. His name was Peter Lesage. He would accompany my dad on his medical visits, read the prayer book while waiting for his visit in the car and bring my father home in the evening. Initially, my dad did not dare go to the cafe because of the father. At least he went less often..."* (Fournier, 2016, p.48).

## 4. Consclusion and Discussion

This study aims to show how a good literary work can contribute to the teaching and understanding of psychological disorders. In this respect, the daily life of a father suffering from alcohol use disorder was evaluated in the context of problems caused by alcohol use, diagnostic criteria of the DSM, and causal factors. The main character of the book is a funny, humble, but alcohol-addicted, problematic father. The book shows how alcohol use disorder destroyed the father's family, work and social life. In this sense, this study aims to provide a guide/idea of how a mental health professional can approach/analyse this (similar) case.

Jung (2011) stated that psychology and art studies would always need each other, and one would not override the other. Similarly, Noam Chomsky emphasised that literature is one of the most important tools for obtaining information about people and their lives, unique experiences, and values. He even went one step further and stressed that much more could be learned about human life and personality from novels than from scientific psychology (Aras, 2015).

This study tried to emphasize how literature is a valuable field that should be evaluated for mental health professionals using scientific psychology teachings. Using this field is considered important in teaching and examining all other psychopathological disorders, as in AUD. Examining "bio-psycho-socio-cultural" causal factors in literary works is one of the most necessary stages of investigating the psychopathological process. To fully understand the underlying causes of psychopathology, recent studies stress the need for a more holistic approach rather than a single approach. Therefore, using the "bio-psycho-socio-cultural" approach is important in determining the underlying causes of both normal and abnormal behaviour (Butcher et al., 2017). Again, it is thought that reading and analysing the texts in literary works by considering DSM criteria will make the process more understandable by embodying and thus increase the intellectual accumulation of students with the books read.

Also, it is thought that conducting this process over heroes in the books before meeting a real client will minimise both the possibility of students making mistakes in practical applications and the anxieties that may arise from ethical processes, making the learning more permanent. It is believed that this will also increase students' participation in practice lessons more self-confident in the following years. Similarly, Korkut and Aktaş (2019) state that some complex phenomena examined and evaluated during undergraduate and graduate education will contribute to the students' ability to overcome many negative situations they may encounter in the future.

## 5. Strength, Limitation, and Future Research

The goal of this study is to contribute to a better understanding of the psychopathological process by analyzing a literary character and to start scientific debates about the needs of "lecturers and students, theorists and clinicians" when it comes to teaching psychopathology. In this sense, with the mission of this paper, lecturers, researchers, and practitioners who are interested in teaching psychopathology can contribute to the development of this intellectual approach by directing their thoughts, criticisms, and suggestions regarding this approach. The efficacy of this approach may be evaluated and further improved in line with students' opinions, ideas, and suggestions. Analyzing and actively discussing literary works can make the teaching process more creative. For example, assigning each psychopathology topic to groups of four to five people and setting up a platform where these group members can discuss their analyses in front of the class can make the learning process more permanent (Whipple & Tucker, 2012). Therefore, research like this that enhances the educational environment and provides experience-based learning might be recommended for mental health practitioners teaching psychopathology. Academics should also use literary works while teaching other psychological disorders to enrich the theoretical course materials. For example, examining other psychopathological diseases through document analysis may be helpful. Reviewing the book and drawing on the latest research on alcohol use disorders is one of the study's strengths. It is thought important for both lecturers and (intern) students to try to demonstrate such an approach with a review and through a case (literary works). Finally, conducting the research with a qualitative method only and handling single psychopathology are among the limitations of this study. Similar studies can be conducted to reveal the effect of this approach in teaching psychopathology.

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# Investigation of the Relationship between Curriculum Literacy and Teacher Performance

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ABSTRACT

This study aims to determine the relationship between curriculum literacy and teacher performance among Turkish language teachers. With a quantitative research design, a correlational survey model was utilized for this study. The study was conducted with 200 secondary school Turkish language teachers. This study used the Curriculum Literacy Scale and Teacher Performance Evaluation Scale as data collection instruments. The obtained data were transferred to the statistical program Jamovi 2.2.5, where statistical operations were performed. Standard deviation, mean, frequency, and percentage were used during data analysis. The relationships between dependent and independent variables were examined using the independent samples t-Test and one-way analysis of variance (ANOVA). Correlation analysis (Pearson product-moment correlation coefficient) was conducted to determine the relationships between scales and their dimensions. Utilizing linear regression analysis, the predictive role of curriculum literacy in teacher performance was determined. Results demonstrated a positive and highly significant correlation between curriculum literacy and teacher performance; curriculum literacy was a significant predictor of teacher performance. In addition, curriculum literacy did not differ significantly by gender or professional experience. There was also a significant difference in teacher performance in favor of female Turkish language teachers, but there was no significant difference in teacher performance based on their professional experience.

Keywords:
Curriculum literacy, teacher performance, Turkish teaching, Turkish language teacher

## 1. Introduction

The form and content of teaching have constantly been changing so far. Teaching, which rises to prominence with its role of transmitting knowledge in the behavioural approach, has had the chance of being a guide during the developmental process of students' various skills with the constructivist approach. Besides, teaching has transformed into a performance profession where knowledge is transformed into a skill thanks to advanced instructional technologies. This transformation has also accelerated the expectations of societies and institutions from teachers. Many countries have affirmed the emerging problems in teaching as a profession and teacher training process along with the necessity of making the profession qualified in order to overcome these problems, especially since the 1980s (Buyruk, 2014).

Increasing success and providing a quality educational experience for all students is the most significant result expected from schools for a long time (Elliot, 2015). This can be exemplified by preparing many reports in Australia in the late 1980s and early 1990s focusing on the need to improve teacher quality, education, and professional development (Ingvarson, 2010). Since the late 1990s and the beginning of the 2000s, significant changes have emerged in the teachers' education, employment, and working conditions in Turkey with similar

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regulations (Buyruk, 2014). Changes in teacher education and curricula since 2000s are considered as one of the most significant indicators of this situation.

Student achievement depending on teacher performance relates to whether the teacher's content knowledge is satisfactory, and thus the sufficiency of the curriculum knowledge becomes crucial. The Turkish Education Association (TEA, 2009) report suggests that knowing and understanding the curriculum and subject area in the teaching-learning process has a significant place among the competencies teachers should have. Therefore, it has become a prerequisite for the teacher to carry out a planned and prepared lesson process while displaying the skills and performance required by the teaching profession in the classroom environment. In this vein, teachers should know the curriculum of the course that is the source of their branch and should be able to use the curriculum in lesson planning, since the curriculum provides an overarching framework that specifies what will be taught, and it is a guide for the activities that teachers decide to design and enact in the classroom (Remillard, 2005). It might be accomplished by being a literate in a curriculum.

The accurate perception of the defined experiences that will guide the learning-teaching processes by the teacher or pre-service teacher and their use in accordance with their purpose necessitate being curriculum literate teachers or pre-service teachers (Bolat, 2017). In this regard, curriculum literacy refers to a competency related to understanding all work and actions in the processes of understanding, implementing and evaluating a curriculum (Akyıldız, 2020). According to Aslan (2019), "curriculum literacy" refers to an understanding of the curriculum's structure and features, including the relationship between the objectives, content, learning-teaching process, and evaluation dimensions; the consistency between these; and the determination of whether or not these dimensions are prepared in accordance with the requirements of the age and the readiness of the educators to implement them. Kahramanoğlu (2019) reported that the teacher is the main factor in the reflection of the curricula in the learning and teaching process, and hence it is fundamental for teachers to be curriculum literates to reflect the curricula in the learning and teaching process. This can be seen as an antecedent to teacher performance, as the projection of curriculum competence onto the learning-teaching process can have a direct impact on teacher performance.

One of the three essential basic elements of the education system and especially the implementer of the curriculum, teacher performance significantly impacts educational activities. Therefore, teacher performance will be important in increasing the quality as it affects the education process (Çekten & Özkan, 2018). Taylor and Tyler (2012) noted that teacher evaluation in education has become a dominant issue in the last decade and that good performance evaluation in education can be effective for teachers' professional development. The Organization for Economic Cooperation and Development (OECD, 2005) states that teacher quality is the most important variable influencing student achievement in school (p. 26). In addition, OECD (2009) emphasizes that raising teacher performance will likely lead to substantial gains in students' learning. The Ministry of National Education (MoNE, 2017) highlights general teacher competencies as professional knowledge, professional skills, attitudes and values within the Teaching Profession General Competencies. Among these competencies, the professional skill (planning, creating a learning environment, managing the learning and teaching process, measurement and evaluation practices) is directly related to teacher performance. Teacher competency puts great emphasis on ensuring students' achievement by improving their positive attitudes towards learning and increasing their motivation to learn (Ashton, 1985; Ashton & Webb, 1986; Guskey & Passaro, 1994). This reveals the idea that students' achievement can be achieved with teacher performance related to teacher competency. In this vein, it is most likely to underline the significance of evaluating teacher performance. Figure 1 depicts the pattern/cycle designed by Yoon, Duncan, Lee, Scarloss, and Shapley (2007, p. 4) on how professional development affects student achievement.

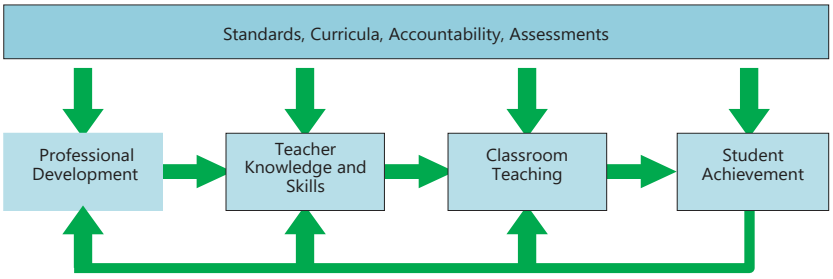


**Figure** 1. *The Effect of Professional Development on Student Achievement*

As shown in Figure 1, curricula are one of the four basic variables that play a significant role in professional development and student achievement. Besides, it is right to mention the presence of a linear relationship between professional development and student achievement. Professional development depends on knowledge and skills, and student achievement is raised using this knowledge and skill in the classroom environment. Teachers' knowledge and skills about a course curriculum also may be related to their teaching/teacher performance in the classroom (Yoon, Duncan, Lee & Shapley, 2007). Thus, teacher professional development, teacher knowledge and skills, and the performance of the teacher in the classroom environment may be crucial elements for students' achievement. It is unlikely to consider teacher performance, which is significant for student achievement, independently of the curriculum taught in the classroom, necessitating teachers to be curriculum literates.

Turkish course is a versatile course that is related to different disciplines and includes various skills (Sulak & Süğümlü, 2020). Teachers need to possess two elements for skill teaching. The first of these is to know the curriculum at a satisfactory level, while the second is that Turkish teachers' teacher performances for teaching language skills in the classroom environment are at a good level. Therefore, it is remarkable that Turkish teachers' curriculum literacy and teacher performances be related to each other.

Turkish teaching as a field is constructed on teaching four basic language skills: listening/watching, speaking, reading and writing (Ministry of National Education [MoNE], 2019). Among these skills, listening/watching and reading are based on understanding, while speaking and writing on narration (Şahin, 2020). The Turkish Language Curriculum is crucial for teaching these four basic language skills (MoNE, 2019). Teaching skills and performance can be directly affected by having comprehensive knowledge of the curriculum (Girgin, 2011; Süğümlü & Doğan, 2021), which is the teacher's guide. Because the Turkish Language Curriculum (MoNE, 2019) is a functional program to help students acquire key competencies with its approach, objectives, learning areas (four basic language skills), themes and subjects, gains, text and activities in the textbooks (Süğümlü, 2021). As a result of the literature review, there is no such study specifically published on examining the relationship between the Turkish language teachers' curriculum literacy and teacher performance in Turkey. In addition, there is no such research specifically published on the Turkish teachers' curriculum literacy. Likewise, no research was conducted directly on the teacher performances of Turkish language teachers. The studies are generally built on curriculum literacy of all teachers, curriculum literacy of pre-service teachers, and overall teacher performance (Akman, 2018; Arslan & Yengin Sarpkaya, 2020; Aslan & Gürlen, 2019; Aslan, 2019; Büyükgöze & Özdemir, 2017; Demir & Toraman, 2021; Erdem & Eğmir, 2018; Güneş Şinego & Çakmak, 2021; Kahramanoğlu, 2019; Kana, Aşçı, Zorlu Kana & Elkıran, 2018; Koç, Yazıcıoğlu & Hatipoğlu, 2009). The relationship between Turkish language teachers' curriculum literacy and teacher performance may also open new gates for conducting studies in other subject area. Therefore, this study is expected to fill a gap in the relevant literature.

The study was grounded on a hypothesis that curriculum literacy might affect teacher performance. The study's independent variable was identified as curriculum literacy and the dependent variable as teacher performance. This study aims to determine the relationship between Turkish language teachers' curriculum literacy and teacher performance. Besides, the study also investigated the determinants of Gender and professional experience on curriculum literacy and teacher performance. In this regard, answers to the following questions were sought:

- Is there a relationship between Turkish language teachers' curriculum literacy and teacher performance?
- Does the Turkish language teachers' curriculum literacy predict their teacher performance?
- Does the Turkish language teachers' curriculum literacy significantly vary across their Gender and professional experience?
- Does the Turkish language teachers' teacher performance significantly differ across their Gender and professional experience?

## 2. Methodology

### 2.1.Research Model

This study aims at determining the relationship between Turkish language teachers' curriculum literacy and teacher performance. Hence, the study employed a correlational survey method, one of the quantitative research designs. To examine the relationships between two or more variables without attempting to influence the variables themselves, researchers can use relational survey models (Christensen et al., 2015) to measure the degree of relationship between two or more variables using correlational statistical analyses (Creswell, 2012; Fraenkel et al., 2012). The purpose of this study is to shed light on the connection between curriculum literacy and teacher performance among Turkish language educators, as well as to draw conclusions about the potential magnitude of that connection

### 2.2. Research Sample

This study was conducted with 200 participants working as Turkish language teachers in public and private secondary schools affiliated to the Ministry of National Education in Turkey during the spring semester of the 2020-2021 academic year. The convenience sampling method (Creswell, 2013; Cohen, Manion, & Morrison, 2007), which is one of the non-probability sampling methods, was used to determine the participants. The current COVID-19 pandemic was an influential factor in choosing the convenience sampling method. Among the participants, 120 (60%) are female, and 80 (40%) are male. 94 (47%) of Turkish language teachers have 0-9 years of teaching experience, 83 (41.5%) 10-19, and 23 (11.5%) 20-29 years of teaching experience.

### 2.3. Data Collection Tools and Procedure

The study utilized two data collection tools: the Curriculum Literacy Scale to determine the Turkish language teachers' curriculum literacy and the Teacher Performance Evaluation Scale to identify their teaching performance. Necessary permissions were obtained from the researchers about the use of the scales.

Curriculum Literacy Scale (Akyıldız, 2020) consists of 36 items and four dimensions, including objectives, content, learning experiences, measurement, and assessment. It is a five-point Likert-type scale ranging across never (1), rarely (2), sometimes (3), often (4), and always (5). The Cronbach $\alpha$ reliability coefficient of the tool was determined as 0.97. Within the scope of this study, the Cronbach $\alpha$ reliability coefficient of the scale was found to be 0.96.

Teacher Performance Evaluation Scale (Özgenel, 2019) encompasses 34 items and five dimensions, including field knowledge, preparation of the learning-teaching process, communication, execution of the learning-teaching process and professional development, professional attitudes, and values. It is a five-point Likert-type scale ranging across very little (1), less (2), medium (3), good (4), and very good (5). The Cronbach $\alpha$ reliability coefficient of the scale was identified as 0.96. As for this study, the Cronbach $\alpha$ reliability coefficient of the scale was determined to be 0.94.

Two scales were used to collect the research data. The researcher informed the Turkish teachers before filling out the scales. The participants were asked to check the appropriate options for the items in the scales. The scales were sent to the teachers online. A voluntary consent form was obtained online from participants stating that they were volunteers. It took one month to complete the scales and collect data.

### 2.4. Data Analysis

The obtained data were transferred to the Jamovi 2.2.5 statistics program (The jamovi project, 2021) and statistical analyses were performed via this program. Standard deviation, mean, frequency and percentages were used during data analysis. Afterwards, skewness and kurtosis coefficients were examined to identify whether the data demonstrated normal distribution. If the skewness and kurtosis coefficients are within the limits of +1 and -1, then the scores do not show a significant deviation from the normal values (Büyüköztürk, 2018). Moreover, Tabachnick and Fidell (2007) reported that the skewness and kurtosis coefficients between -1.5 and +1.5 are sufficient for normality.

The analysis results showed that the skewness coefficient of the curriculum knowledge scale was -0.124 and the kurtosis coefficient was -0.304; the skewness coefficient of the teacher performance evaluation scale was determined to be -0.482 and the kurtosis coefficient was -0.143, which means that the data are normally

distributed and parametric tests can be used.. Independent samples t-Test and one-way analysis of variance (ANOVA) were used to examine the relationships between variables and scales. The effect size was calculated for the independent samples t-Test. In addition, Tukey Post-Hoc Test was used to investigate which of the means were different. Correlation analysis (Pearson product-moment correlation coefficient) was performed to analyse the relationships between scales and dimensions. The correlation coefficient obtained as a result of the correlation analysis was interpreted according to the intervals given by Cohen, Manion, and Morrison (2007, p. 536) as 0.20-0.34, 0.35-0.64, 0.65-0.84, and 0.85 and above. Linear regression analysis was conducted to determine at what rate curriculum literacy predicted teaching performance. Before deciding on the linear regression analysis, the bilateral relations between the variables were examined and great attention was paid to the absence of multicollinearity. Therefore, the autocorrelation status was firstly examined with the Durbin-Watson value, and the values were noted to be within the normal limits. In the second step, the variance inflation factor (*VIF*) and the tolerance value *(1-R²)*, which is the variance rate that the independent variable could not explain, were examined (Field, 2013). The tolerance value *(1-R²)* and variance inflation factor (*VIF)* revealed the absence of a multicollinearity problem. The level of significance was accepted as .05 during data analysis. The findings were presented and interpreted in tables and figures.

Table 1 depicts the mean and standard deviation values of the Turkish language teachers' scores obtained from the scales.

**Table 1.** *Arithmetic Mean and Standard Deviation Values regarding Curriculum Literacy and Teacher Performance*

| Scales | $\bar{X}$ | *SD* |
|---|---|---|
| 1. Curriculum Literacy Scale | 4.25 | 0.433 |
| 1.1. Objectives | 4.29 | 0.473 |
| 1.2 Content | 4.19 | 0.524 |
| 1.3. Learning Experiences | 4.23 | 0.490 |
| 1.4. Measurement and Assessment | 4.32 | 0.484 |
| 2. Teacher Performance Evaluation Scale | 4.43 | 0.368 |
| 2.1. Field Knowledge | 4.13 | 0.535 |
| 2.2 Preparation of Learning-Teaching Process | 4.17 | 0.591 |
| 2.3. Communication | 4.57 | 0.466 |
| 2.4. Executing the Learning-Teaching Process and Professional Development | 4.25 | 0.557 |
| 2.5. Professional Attitudes and Values | 4.80 | 0.288 |

### 2.5. Ethical

Ethics committee approval dated 28.04.2021 and decision numbered 2021-82 was taken from Ordu University Social and Human Sciences Research Ethics Committee. Scientific and Ethical principles were ensured during the data collection process.

## 3. Findings

### 3.1. The Relationship between Curriculum Literacy and Teacher Performance

Table 2 depicts the results of the correlation analysis performed to determine the relationship between the Turkish language teachers' curriculum literacy and teacher performance.

**Table 2**. *Correlation Analysis regarding Curriculum Literacy and Teacher Performance*

| Scales | CLS 1 | CLS 2 | CLS 3 | CLS 4 | CLS | TPES 1 | TPES 2 | TPES 3 | TPES 4 | TPES 5 | TPES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CLS 1 | — | | | | | | | | | | |
| CLS 2 | 0.738* | — | | | | | | | | | |
| CLS 3 | 0.681* | 0.762* | — | | | | | | | | |
| CLS 4 | 0.546* | 0.643* | 0.681* | — | | | | | | | |
| CLS | 0.814* | 0.903* | 0.921* | 0.830* | — | | | | | | |
| TPES 1 | 0.386* | 0.496* | 0.486* | 0.519* | 0.548* | — | | | | | |
| TPES 2 | 0.478* | 0.481* | 0.580* | 0.401* | 0.563* | 0.616* | — | | | | |
| TPES 3 | 0.373* | 0.437* | 0.456* | 0.429* | 0.491* | 0.487* | 0.498* | — | | | |
| TPES 4 | 0.482* | 0.527* | 0.571* | 0.397* | 0.573* | 0.497* | 0.628* | 0.660* | — | | |
| TPES 5 | 0.248* | 0.259* | 0.321* | 0.313* | 0.332* | 0.373* | 0.350* | 0.459* | 0.411* | — | |
| TPES | 0.521* | 0.573* | 0.635* | 0.513* | 0.650* | 0.721* | 0.814* | 0.780* | 0.881* | 0.643* | — |

Note: *p <.001, CLS 1: Objectives, CLS 2: Content, CLS 3: Learning Experiences, CLS 4: Measurement and Assessment, CLS: The Overall Curriculum Literacy Scale, TPES 1: Field Knowledge, TPES 2: Preparation of Learning-Teaching Process, TPES 3: Communication, TPES 4: Executing the Learning-Teaching Process and Professional Development, TPES 5: Professional Attitudes and Values, TPES: The Overall Teacher Performance Evaluation Scale.

As shown in Table 2, significant relationships were identified between curriculum literacy and teacher performance, between the dimensions of curriculum literacy and teacher performance, and between the overall curriculum literacy and teacher performance scales. A positive and high-level (strong) significant relationship (Cohen, Manion, & Morrison, 2007, p. 536) was noted across the overall curriculum literacy and teacher performance ($r = 0.650, p < .01$). In this regard, the higher the curriculum literacy is, the higher the teacher performance becomes. Figure 1 displays the general correlation matrix of Turkish language teachers' curriculum literacy and performance.

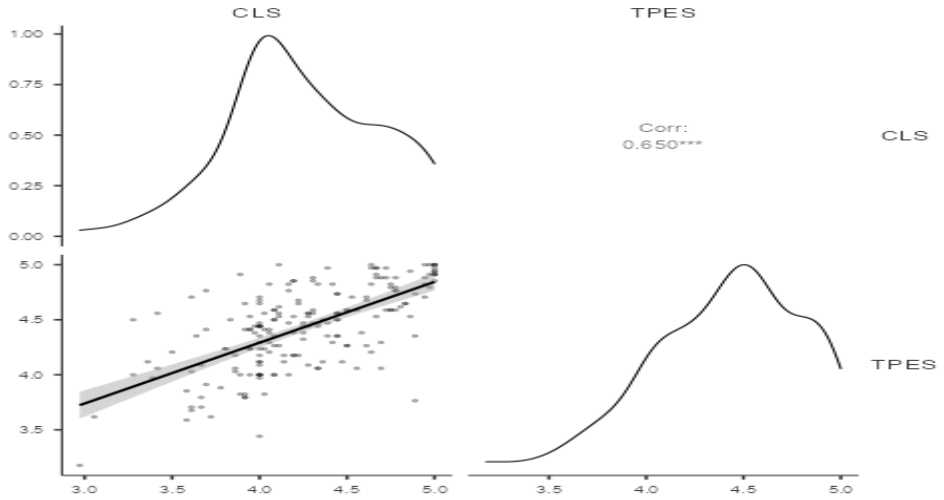


**Figure 2**. *Correlation Matrix regarding Scales*

Figure 2 suggests the positive and high-level relationship distribution between Turkish language teachers' curriculum literacy and teacher performance. This distribution indicates that the lines of curriculum literacy and teacher performance are close to each other and move in the same direction.

### 3.2. The Predicting Power of Curriculum Literacy on Teacher Performance

The results regarding the linear regression analysis conducted to analyse at what rate Turkish language teachers' curriculum literacy predicted teacher performance are presented in Table 3.

**Table 3**. *The Predictor of Teacher Performance*

| Model | B | Standard Error | β | t | *p* |
|---|---|---|---|---|---|
| TP Stable | 2.080 | 0.1960 | | 10.6 | < .001 |
| CL | 0.553 | 0.0459 | 0.650 | 12.1 | < .001 |

Note: TP: Teacher Performance, CL: Curriculum Literacy, $R$= .650, $R^2$=.420 $F_{(1,198)} = 145, p < .001$)

Upon analyzing Table 3, curriculum literacy was found to explain 42% of the total variance of teacher performance ($F_{(1,198)} = 145, p < .001$), and its contribution to the regression model was significant (ß = $0.650, p < .001; \%95\ CI = 0.554, .757$). According to the standardized (β) coefficient and t values, curriculum literacy was noted to be a significant predictor of teacher performance.

### 3.3. The Relation of Gender to the Curriculum Literacy and Teacher Performance

Table 4 shows the results of independent samples t-Test conducted to determine whether the Turkish language teachers' curriculum literacy significantly varied across gender.

Table 4 reveals that the overall curriculum literacy scale $\left(t_{(198)} = 0.849,\ p > .05\right)$ and the dimensions of objectives ($t_{(198)} = 0.792,\ p > .05$), content ($t_{(198)} = 1.028,\ p > .05$), learning experiences ($t_{(198)} = 0.968,\ p > .05$), measurement and assessment ($t_{(198)} = 0.106,\ p > .05$) were free from a significant difference across gender. Nevertheless, female Turkish teachers were found to have higher mean scores than males in general and all dimensions of the curriculum literacy scale.

**Table 4**. *t-Test Results regarding Gender (Curriculum Literacy)*

| Scales | Gender | N | $\bar{X}$ | $SD$ | $df$ | $t$ | $p$ | $d$ |
|---|---|---|---|---|---|---|---|---|
| Objectives | Female | 120 | 4.31 | 0.454 | 198 | 0.792 | 0.429 | 0.1144 |
| | Male | 80 | 4.25 | 0.502 | | | | |
| | Total | 200 | | | | | | |
| Content | Female | 120 | 4.22 | 0.502 | 198 | 1.028 | 0.305 | 0.1484 |
| | Male | 80 | 4.14 | 0. 556 | | | | |
| | Total | 200 | | | | | | |
| Learning Experiences | Female | 120 | 4.26 | 0.486 | 198 | 0.968 | 0.334 | 0.1397 |
| | Male | 80 | 4.19 | 0.496 | | | | |
| | Total | 200 | | | | | | |
| Measurement and Assessment | Female | 120 | 4.32 | 0.477 | 198 | 0.106 | 0.916 | 0.0153 |
| | Male | 80 | 4.31 | 0.498 | | | | |
| | Total | 200 | | | | | | |
| Curriculum Literacy (Overall) | Female | 120 | 4.27 | 0.415 | 198 | 0.849 | 0.397 | 0.1225 |
| | Male | 80 | 4.22 | 0.461 | | | | |
| | Total | 200 | | | | | | |

Note: *p<.05

The mean scores of the female Turkish language teachers' curriculum literacy in terms of gender are presented in Figure 3.

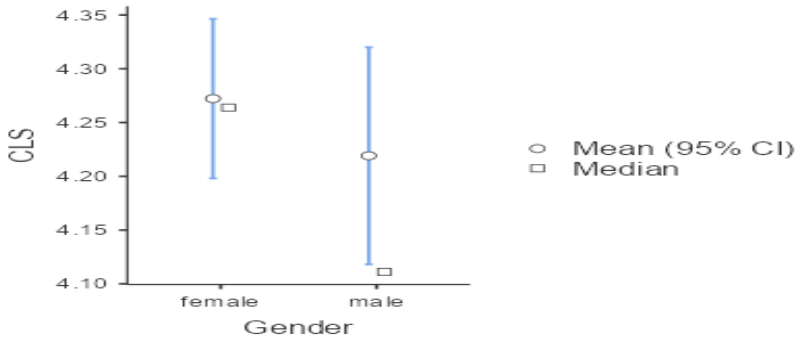


**Figure 3**. *Curriculum Literacy Mean Scores related to Gender*

Table 5 shows independent samples t-Test results on whether the Turkish language teachers' teacher performance significantly differed across their gender.

**Table 5**. *t-Test Results regarding Gender (Teacher Performance)*

| Scales | Gender | N | $\bar{X}$ | $SD$ | $df$ | $t$ | $p$ | $d$ |
|---|---|---|---|---|---|---|---|---|
| Field Knowledge | Female | 120 | 4.14 | 0.536 | 198 | 0.202 | 0.840 | 0.0291 |
| | Male | 80 | 4.12 | 0.553 | | | | |
| | Total | 200 | | | | | | |
| Preparation of Learning-Teaching Process | Female | 120 | 4.21 | 0.622 | 198 | 1.066 | 0.288 | 0.1539 |
| | Male | 80 | 4.11 | 0.541 | | | | |
| | Total | 200 | | | | | | |
| Communication | Female | 120 | 4.62 | 0.476 | 198 | 1.631 | 0.105 | 0.2353 |
| | Male | 80 | 4.51 | 0.445 | | | | |
| | Total | 200 | | | | | | |
| Executing the Learning-Teaching Process and Professional Development | Female | 120 | 4.31 | 0.551 | 198 | 2.043 | 0.042* | 0.2948 |
| | Male | 80 | 4.15 | 0.555 | | | | |
| | Total | 200 | | | | | | |
| Professional Attitudes and Values** | Female | 120 | 4.85 | 0.260 | 198 | 3.174 | 0.002* | 0.4581 |
| | Male | 80 | 4.72 | 0.312 | | | | |
| | Total | 200 | | | | | | |
| Teacher Performance Evaluation (Overall) | Female | 120 | 4.48 | 0.362 | 198 | 2.186 | 0.030* | 0.3155 |
| | Male | 80 | 4.36 | 0.369 | | | | |
| | Total | 200 | | | | | | |

Note: *p<.05, ** Welch's t was performed since variance homogeneity could not be ensured.

Table 5 revealed a statistically significant difference across the overall teacher performance ($t_{(198)} = 2.186$, $p < .05$) and the dimensions of executing the learning-teaching process and professional development ($t_{(198)} = 2.043$, $p < .05$), professional attitudes and values ($t_{(198)} = 3.174$, $p < .05$) in terms of gender. However, the dimensions of field knowledge ($t_{(198)} = 0.202$, $p > .05$), preparation of the learning-teaching process ($t_{(198)} = 1.066$, $p > .05$) and communication ($t_{(198)} = 1.631$, $p > .05$) did not significantly vary across gender. Although the dimensions of field knowledge, preparation of the learning-teaching process and communication did not significantly differ across gender, the mean score of female Turkish language teachers was higher than that of males. The mean scores indicating the difference in teacher performance in favour of female Turkish language teachers are demonstrated in Figure 4.

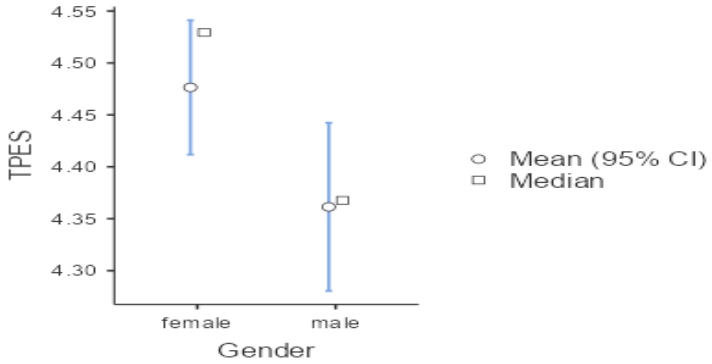


**Figure 4**. *Teacher Performance Mean Scores related to Gender*

### 3.4. The Relation of Professional Experience to Curriculum Literacy and Teacher Performance

Table 6 illustrates the results of the one-way analysis of variance (ANOVA) conducted to identify whether the Turkish language teachers' curriculum literacy significantly differed across their professional experience.

**Table 6**. *ANOVA Results regarding Professional Experience (Curriculum Literacy)*

| Scales | | Sum of Squares | df | Mean of Squares | F | p | Tukey Post-Hoc Test |
|---|---|---|---|---|---|---|---|
| Objectives | Betw. Groups | .392 | 2 | .196 | | | |
| | Within Groups | 44.173 | 197 | .224 | 0.874 | 0.419 | |
| | Total | 44.564 | 199 | | | | |
| Content | Betw. Groups | .233 | 2 | .116 | | | |
| | Within Groups | 54.412 | 197 | .276 | 0.422 | 0.657 | |
| | Total | 54.645 | 199 | | | | |
| Learning Experiences | Betw. Groups | .723 | 2 | .361 | | | |
| | Within Groups | 46.995 | 197 | .239 | 1.515 | 0.222 | |
| | Total | 47.718 | 199 | | | | |
| Measurement and Assessment | Betw. Groups | 1.578 | 2 | .789 | | | |
| | Within Groups | 45.026 | 197 | .229 | 3.451 | 0.034* | 1-3 |
| | Total | 46.603 | 199 | | | | |
| Curriculum Literacy (Overall) | Betw. Groups | .463 | 2 | .232 | | | |
| | Within Groups | 36.892 | 197 | .187 | 1.236 | 0.293 | |
| | Total | 37.356 | 199 | | | | |

Note: *p<.05, 1: 0-9 Years of Professional Experience, 2: 10-19 Years of Professional Experience, 3: 20-29 Years of Professional Experience

Table 6 figures no significant difference across the overall curriculum literacy scale ($F_{(2,197)} = 1.236, p > .05$) and its dimension of objectives ($F_{(2,197)} = 0.874, p > .05$), content ($F_{(2,197)} = 0.422, p > .05$), learning experiences (($F_{(2,197)} = 1.515, p > .05$) in terms of their professional experience. Concerning the Turkish language teachers' curriculum literacy, only the dimension of measurement and assessment ($F_{(2,197)} = 3.451, p < .05$) differed significantly across the professional experience. Tukey pairwise comparison analysis was used to determine which of the means were different. Accordingly, a significant difference was pointed across the Turkish language teachers with 0-9 years of professional experience and those with 20-29 years of professional experience in favour of teachers with 20-29 years of professional experience. Moreover, Figure 5 also shows that the overall curriculum literacy scale did not differ across professional experience, yet the mean

score of Turkish language teachers with 20-29 years of professional experience was higher than that of the teachers with 0-9 and 10-19 years of professional experience.

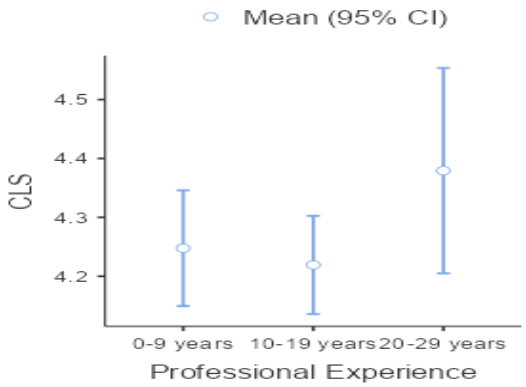


**Figure 5**. *Curriculum Literacy Mean Scores related to Professional Experience*

The results of the one-way analysis of variance (ANOVA) used to evaluate whether the Turkish language teachers' teacher performance significantly differed in terms of their professional experience are presented in Table 7.

**Table 7**. *ANOVA Results regarding Professional Experience (Teacher Performance)*

| Scales | | Sum of Squares | df | Mean of Squares | F | p | Tukey Post-Hoc Test |
|---|---|---|---|---|---|---|---|
| Field Knowledge | Betw. Groups | .898 | 2 | .449 | 1.577 | 0.209 | |
| | Within Groups | 56.094 | 197 | .285 | | | |
| | Total | 56.992 | 199 | | | | |
| Preparation of Learning-Teaching Process | Betw. Groups | .732 | 2 | .366 | 1.047 | 0.353 | |
| | Within Groups | 68.850 | 197 | .349 | | | |
| | Total | 69.582 | 199 | | | | |
| Communication | Betw. Groups | .457 | 2 | .228 | 1.053 | 0.351 | |
| | Within Groups | 42.717 | 197 | .217 | | | |
| | Total | 43.174 | 199 | | | | |
| Executing the Learning-Teaching Process and Professional Development | Betw. Groups | .643 | 2 | .322 | 1.037 | 0.357 | |
| | Within Groups | 61.127 | 197 | .310 | | | |
| | Total | 61.771 | 199 | | | | |
| Professional Attitudes and Values | Betw. Groups | .138 | 2 | .069 | 0.827 | 0.439 | |
| | Within Groups | 16.402 | 197 | .083 | | | |
| | Total | 16.540 | 199 | | | | |
| Teacher Performance Evaluation (Overall) | Betw. Groups | .274 | 2 | .137 | 1.012 | 0.365 | |
| | Within Groups | 26.705 | 197 | .136 | | | |
| | Total | 26.980 | 199 | .137 | | | |

Note: *p<.05, 1: 0-9 Years of Professional Experience, 2: 10-19 Years of Professional Experience, 3: 20-29 Years of Professional Experience

In the analysis of Table 7, no significant difference was found between teachers' overall performance (F_((2,197) )=1,236,p >.05) and the dimensions of field knowledge (F_((2,197) )=1,236,p >.05), preparation of the learning-teaching process (F_((2,197) )=1,236,p >.05), communication (F_((2,197) )=1.236,p >.05),

implementation of the teaching-learning process and professional development (F_((2,197) )=1.236,p >.05), professional attitudes and values (F_((2,197) )=1.236,p >.05) related to their professional experience. In addition, Figure 6 also suggests that the overall teacher performance scale did not significantly differ across their professional experience, yet the mean score of Turkish language teachers with 20-29 years of professional experience was higher than that of the teachers with 0-9 and 10-19 years of professional experience.

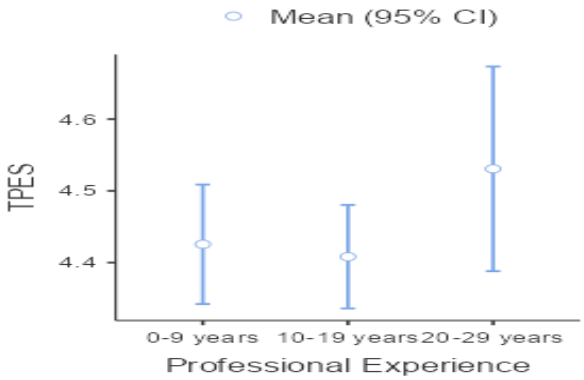


**Figure 6**. *Teacher Performance Mean Scores related to Professional Experience*

## 4. Conclusion and Discussion

In order to discuss the results of the present study, the authors conducted a literature review on the relationship between Turkish language teachers' curriculum literacy and teacher performance in Turkey. Due to the absence of a study specifically examining the Turkish language teachers' curriculum literacy and teacher performance, the results on teachers'/pre-service teachers' curriculum literacy, teacher performance, self-efficacy, and other variables were discussed (Akman, 2018; Arslan & Yengin Sarpkaya, 2020; Aslan & Gürlen, 2019; Aslan, 2019; Büyükgöze & Özdemir, 2017; Demir & Toraman, 2021; Erdem & Eğmir, 2018; Güneş Şinego & Çakmak, 2021; Kahramanoğlu, 2019; Koç, Yazıcıoğlu & Hatipoğlu, 2009; Şeref & Çinpolat, 2021).The study revealed a positive and high level (strong) significant relationship across the Turkish language teachers' curriculum literacy and teacher performance. Namely, the higher the curriculum literacy, the higher the teacher performance. Besides, curriculum literacy was reported to significantly predict teacher performance. Curriculum literacy is one of the teacher competencies (Bolat, 2017). Thus, it is most likely to stress that curriculum is regarded as among the most substantial guides on conducting quality education and training (Çetinkaya & Tabak, 2019); therefore, curriculum literacy is a significant indicator of teacher performance. Teacher performance is related to knowing and applying the curriculum at a satisfactory level is an expected result of the present study since teacher performance is an element that cannot be considered independently of the curriculum.

The relevant literature includes various studies on the relationship between different variables and teacher performance despite indirectly related to curriculum literacy and teacher performance. Büyükgöze and Özdemir (2017) reported a medium level and positive relationship between teachers' job satisfaction and their job performance levels; besides, job satisfaction was determined to be a significant predictor of teacher performance. In the study by Koç at al. (2009), a strong positive relationship was pointed out between teachers' job satisfaction and performance levels. Arslan and Yengin Sarpkaya (2020) found a significant relationship between teachers' organizational climate perceptions and their performance perceptions. In another study conducted by Akman (2018), positive, low and medium level significant relationships were noted across organizational justice, job motivation and teacher performance. Şeref and Çinpolat (2021) investigated the relationship between teaching self-efficacy related to teaching performance and Turkish language teachers' ability to use methods and techniques. The present study also revealed a positive and significant relationship between Turkish language teachers' method and technique use skills and teacher self-efficacy, and that teachers' method and technique use skills were a significant predictor of teacher self-efficacy. The results of the studies in the relevant literature are congruent with those of this study (Akman, 2018; Arslan & Yengin Sarpkaya, 2020; Büyükgöze & Özdemir, 2017; Koç at al., 2009; Şeref & Çinpolat, 2021). However, it is required to do research on the subject to discuss the relationship between curriculum literacy and teacher performance. Along with quantitative research, qualitative research may contribute to the related literature.

Another study result suggested that curriculum literacy did not significantly vary across gender and professional experience. It is desirable that curriculum literacy does not differ significantly in terms of gender as knowing and applying the curriculum at a satisfactory level is expected from all teachers, regardless of their gender. However professional experience may be expected to differ significantly in terms of curriculum literacy. Still, the result of the study indicating that curriculum literacy is free from a significant difference in terms of professional experience is considered positive. In terms of the quality of school instruction, the close relationship between curriculum knowledge and practice is remarkable among those with more or less experience in the teaching profession.As it is a fact that some schools hold more teachers who have just started their profession, while others embody those with more professional experience. Kahramanoğlu (2019) concluded that female teachers' curriculum literacy differed significantly compared to males, whereas their professional experience did not. Demir and Toraman (2021) affirmed that teachers' curriculum literacy levels did not significantly vary across their gender and seniority. In the study conducted by Güneş Şinego and Çakmak (2021), gender and seniority were not significantly effective in teachers' curriculum literacy levels. Likewise, Aslan and Gürlen (2019) outlined that the secondary school teachers' curriculum literacy levels did not differ significantly in terms of their gender and years of service. In the study conducted on the pre-service teachers' curriculum literacy, Aslan (2019) reported that pre-service teachers' curriculum literacy did not vary across their gender. A similar layout was noted in the study carried out by Erdem and Eğmir (2018). The results of these studies in the literature are in conjunction with those of this study. Evaluating these results in general, it may be wise to mention that gender and professional experience are not the determinants of curriculum literacy. However, it is undeniable that there is a need for research on the subject to review curriculum literacy in terms of gender and professional experience. Both quantitative and qualitative studies are expected to contribute to the relevant literature.

This study clarified that there was a significant difference in teacher performance in favor of female Turkish language instructors, but not in terms of professional experience. The fact that the number of female teachers exceeds the number of male teachers may facilitate the emergence of a gender-based performance disparity among teachers. Besides, female teachers may assume that they are more inclined toward teaching. In their study, Arslan and Yengin Sarpkaya (2020) concluded that teachers' perceptions of performance evaluation did not significantly differ across their gender and years of service. In a similar vein, Büyükgöze and Özdemir (2017) pointed out that teachers' performance levels did not significantly differ in terms of their gender and years of service. Şeref and Çinpolat (2021), on the other hand, found that teaching self-efficacy related to teacher performance varied significantly in favour of male Turkish language teachers, but that is not the case for their professional experience. The results of the studies in the literature are mainly similar to those of this study. Based on these results, gender and professional experience may not be determinants of teacher performance. It is important to conduct more research on the relation between gender and professional experience with teacher performance.

## 5. Limitations of the Study and Recommendations

The research is limited to the 2020-2021 academic year, 200 Turkish language teachers who voluntarily participated in the study, the COVID 19 pandemic process, and the convenience sampling method. Increasing the number of participants, conducting research with different teaching fields, having a probabilistic sample method and collecting data when the impact of the COVID 19 pandemic is decreasing will impact the research results. Therefore, the removal of those mentioned above and limiting factors as well as conducting new research will contribute to the determination of the relationship between the curriculum literacy of teachers in general and Turkish language teachers in particular and teacher performance.

Based on the findings, various recommendations were provided:

- Studies could be carried out to enable pre-service teachers to acquire curriculum literacy skills within teacher training framework. Since curriculum literacy is a significant predictor of teacher performance, developing pre-service teachers' curriculum literacy is essential.
- In-service trainings should be conducted to improve teachers' curriculum literacy skills and performance.
- Educators appointed as educational institutions' administrators should be informed that teacher performance can be improved by knowing and applying the relevant teaching field well.

- Conducting research by revealing the relationship between the curriculum literacy and performance of teachers from different branches will contribute to the relevant literature.

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# Gender and Age Differences in the Relationship between Sensation-Seeking and Sexual Risk-Taking Behavior among Adolescents

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ABSTRACT

The study examined gender and age differences in the relationship between sensation seeking and sexual risk behaviors among secondary school students in Kenya. The study was conducted in Kisumu Municipality. Kisumu was chosen as it is one of the leading regions in HIV prevalence, estimated at 15%. The HIV prevalence was assumed to indicate a positive relationship between sensation seeking and high sexual risk-taking behavior. A sample size of 357 adolescents (44% males and 56% females) was drawn using a stratified sampling method from a population of 10,278 secondary school students. Descriptive statistics were used to analyze quantitative data, while the qualitative data was summarized thematically. The study's findings indicated that about half the adolescents were highly sensational seekers predisposing them to take risks. There also existed significant gender differences in the prevalence of sensation-seeking and sexual risk-taking behavior, with the male adolescents being higher risk-takers than their female counterparts. Similarities in the prevalence of sensation-seeking were also reported. However, this varied across ages and different gender. Female adolescents' sensation-seeking increased earlier in life than their male counterparts.Further, the study indicated gender differences in the adolescents' tendency to indulge in sexually risky behaviors due to their sensation-seeking. This behavior tendency was higher for males than for female adolescents. Additionally, the results indicated significant age differences, with the susceptibility to indulge in such risky behaviors increasing with advancement in age.

Keywords:
Gender differences, age-related differences, sensation seeking, sexual risk-taking

## 1. Introduction

As a transitional period from childhood to adulthood, adolescence is often characterized by the heightened potential for recklessness and sexual risk-taking behaviors (National Research Council, 2007; Papalia et al., 2004). The neurological gap caused by the immature prefrontal cortex (PFC) and a developed limbic system, leading to several different developmental disorders, has been suggested to explain the propensity for risk-taking in adolescents (Bednar & Fisher, 2003; Ben Zur & Reshef - Kfir, 2003; Berk, 2007; Berns et al., 2009; Steinberg, 2008). These developmental inadequacies manifest themselves in risky decision-making processes and behaviors characteristic of adolescence. Additionally, it has been reported that the temporal gap resulting from these differing neurological developmental timelines propagates the need for increased sensation seeking among adolescents (Donohew et al., 2000; Zuckerman, 1994). For example, Zuckerman (1994) defines sensation seeking as a trait characterized by seeking varied, novel, complex, and intense situations and experiences, suggesting that neurological gaps increase adolescents' willingness to take physical, social, and

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financial risks for the sake of doing so of such experience. Research evidence, however, shows that high sensation seekers are more likely than low sensation seekers to be involved in risky situations indicating that the high sensation seekers are more risk enticed (Donohew et al., 2000; Greene et al., 2000; Zuckermann, 1991(b)). Donohew et al. (2000), in their study on the increase in risky sexual taking behavior among adolescents in the U.S., found out that impulsive decision making and high sensation-seeking behavior were contributing factors to sexual risk-taking behaviors that were common amongst adolescents. This finding is likely to be propelled by the differing yet important neurological development timelines that are important in decision-making decisions.

Other studies to determine the relationship between sensation seeking and sexual risk-taking confirmed a significant relationship. For example, Chandra et al. (2003), in their research to establish the relationship between high-risk sexual behavior and sensation-seeking, affirmed that indeed sensation seeking was an essential factor that contributed to high-risk sexual behavior. Similarly, in their study examining impulsivity, sensation seeking, and risk behaviors among HIV-positive and HIV-negative heroin users, Paydary et al. (2016) found that HIV-positive individuals scored high on the Barrat Impulsivity Scale and the Sensation Seeking Scale. They concluded that impulsivity and sensation-seeking are likely to render individuals susceptible to the practice of more risky behaviors. However, the generalizability of the results is limited because they rely on specific groups, such as heavy alcohol users and heroin addicts, who formed the sample of their study. According to the Kenya Health Demographic Survey (KDHS) of 2008, adolescents in Kenya aged 13-19 are sexually active, and 50% of the new HIV/AIDs infections occur among adolescents aged 15-24 (KNBS & ICF Macro, 2010). In addition, 1% of women and 9 % of men had more than one sexual partner during the last year preceding the survey (KNBS & ICF, 2010). Besides, 48% of all abortion cases are reportedly among girls aged 14 – 24 years (The Republic of Kenya, 2010). Ragnarsson et al. (2001), in their study carried out in Kenyan urban informal settlements, found that 28% of the women used condoms inconsistently and had multiple partners. These practices predisposed them to HIV/AIDS infections and unwanted pregnancies).

Prevalence of HIV and AIDS has widely been used to estimate the extent of sexual risk-taking (TICH, 2005). Although the HIV and AIDs prevalence in Kenya has reduced to 5.1 %, with that of young women aged 15 – 24 being 5.6 %, this prevalence is still considered high due to the detrimental consequences associated with the disease (Kenya National Bureau of Statistics (KNBS) & ICF Macro, (2010 ). Further, this situation signals the likelihood of unsafe sexual practices like non-condom use and multiple sexual partners among adolescents despite increased awareness and interventions against sexually risky behavior (Ragnarsson et al. 2001). These incidences indicate the existence of sexual risk-taking among adolescents. Thus, there is a need to examine the underlying relationships between factors that influence sexual risk-taking, providing necessary interventions to address the situation.

A study by Nyende (2011) examining the factors that predispose boys' risk-taking behavior in day secondary schools in Kisumu Municipality found that sexual risk-taking was the riskiest behavior boys engaged in, and that of all aspects of peers provided the most significant incentive for sexual risk-taking. This perspective was also supported by Nyasoro (2011), who carried out a study examining sexual activity among adolescent girls. However, Nyende's study was carried out among adolescent boys, while Nyasoros' was carried out among girls in Kisumu. The current study sought to explore more profound insights into the gender and age differences in the relationship between sensation seeking and sexual risk-taking behaviors amongst adolescents. This view would enrich the understanding of the sexual risk-taking behavior among adolescents and is, therefore, more likely to provide valuable information for policy formulation to address this concern.

As highlighted earlier, adolescent sexual risk-taking behavior is Kenya's leading reproductive health concern. This concern results from increased new HIV/AIDS infections among the youth aged 15-24 years and sexual irresponsibility characterized by increased abortion and unwanted pregnancy cases (The Republic of Kenya, 2010). Importantly, sexual intercourse has been pointed out as is the leading mode of HIV and AIDS infection (Raffaelli & Crocket, 2003; The Republic of Kenya, 2010). The increased HIV/AIDS infection is exacerbated by risky sexual behaviors such as early sexual debut, inconsistent use of condoms during sex, and multiple sexual partners (The Republic of Kenya, 2010). In Kisumu Municipality, the high prevalence of HIV/AIDs (11.2%) has been attributed to increased risky sexual behavior (TICH, 2005; The Republic of Kenya, 2009). This prevalence could be a manifestation of sexual irresponsibility (Njue et al., 2009).

Gender differences have widely been reported to moderate adolescents' sensation seeking and sexual risk-taking. For example, a study by Cross et al. (2013) indicated that male adolescents were more likely to venture into novel seeking behaviors, predisposing them to risk-taking behavior. They attributed these gender differences to culturally transmitted social norms and psychological mechanisms, promoting novel-seeking behaviors among male adolescents. These findings have been supported by several other researchers (Coulter, 2007; Rahmani & Lasarani, 2012; Rosenblit, 2001; Steinberg et al., 2008).

Similarly, age differences have been an important factor in adolescent sensation seeking, encouraging sexual risk-taking behavior. Steinberg et al., 2008 in their study examining age differences in sensation seeking and impulsivity, found out that age differences in sensation-seeking followed a curvilinear pattern, with sensation-seeking increasing in early adolescence and declining after that. The Kenya Health Demographic Survey of 2014 indicated that sexual risk-taking varied across the ages, with younger male adolescents being twice likely to engage in sexual risk-taking as their female counterparts (The Republic of Kenya, 2015).

This paper explores the age and gender differences in the relationship between secondary school students' sensation-seeking and sexual risk-taking behavior. This study is prompted by the existing research evidence, which indicates that the two variables are essential in adolescents' sexual risk-taking. However, most studies have examined these variables independently. Exploring the two variables, gender, and age will undoubtedly provide a richer insight for developing an intervention framework for adolescent sexual risk-taking behavior. The study will enrich the existing body of research by providing helpful information on the role of gender and age in moderating the relationship between adolescents' sensation seeking and their indulgence in sexual risk-taking behavior. The specific objectives of the study were:

- To establish the prevalence of secondary school students' sensation-seeking by gender and age.
- To establish the prevalence of sexual risk-taking among secondary school students by gender and age
- To determine the relationship between sensation-seeking and sexual risk-taking behavior among secondary school students by gender.
- To determine the relationship between sensation-seeking and sexual risk-taking behavior among secondary school students by age.

## 2. Methodology

### 2.1. Research Model

The study adopted descriptive surveys and correlational designs to collect and analyze data on secondary school students' sensation-seeking and sexual risk-taking behavior. The correlational design was used to determine the relationship between sensation seeking and sexual risk-taking behavior. Further, logistic regression was used to analyze the relationships since the dependent variable (sexual risk-taking) was dichotomous.

### 2.2. Research Population and Sample

The total population of the study included 10,278 students enrolled in 31 secondary schools within Kisumu Municipality. A sample of 384 students was drawn using stratified random sampling, with the type of school as the strata. Out of a sample of 384 student respondents, 27 cases with missing information on any indicator were dropped from the study, leaving a sample size of 357 student respondents from 10 schools in Kisumu Municipality, which translated to a nonresponse rate of 7 .03 %. The male respondents comprised 43.7 % (156) of the sample, while the female respondents were 56.3 % (201). Of all the respondents, 126 (35.3 %) were from single-sex schools, while 231 (64.7 %) were drawn from mixed schools.

### 2.3. Data Collection Tools and Procedures

The constructs of interest in the study were; sensation seeking and sexual risk-taking. Using Zuckerman's sensation scale V, sensation seeking was measured while risk-taking behavior was measured using a researcher-made questionnaire. Two focused group discussions and key informant interview schedules were used to supplement information on the constructs being measured by the instruments. The specific tools used to collect the relevant data are described below.

*Adapted Zuckerman's Sensation Seeking Scale V (SSS V):* Zuckerman's sensation seeking scale was used to measure the sensation-seeking behavior of adolescents in the secondary schools within the municipality. The Zuckerman Sensation-seeking Scale V is a forty (40) item scale developed by Zuckerman (1994) to assess sensation seeking. This scale measures the four subscales of sensation seeking: thrill and adventure seeking, disinhibition, boredom susceptibility, and experience seeking. The scale has 40 paired items. The items are answered as either true (coded 1) or false (coded 0). Some of the items in the scale were modified to reflect the Kenyan setting; for example, items on skiing, diving were replaced with swimming or boat riding. This modification did not affect the inter-item reliability of the scale, which was $\alpha$= .72 before modification and $\alpha$=.74 after modification. The scale was scored 1 point for every high sensation seeking option; thus, the highest possible score was 40. A score of 40 represented a high sensation-seeking individual, while a score of zero would represent very low sensation-seeking behavior. In the study, respondents scoring above 20 on the scale were categorized as high sensation seekers, while those scoring between 10 and 19 were classified as moderate sensation seekers and those below ten as low sensation seekers.

*Risky Sexual Behavior Scale:* This was a researcher-made questionnaire to determine adolescents' indulgence in risky sexual behavior. The questionnaire had ten items that focused on four sexual behaviors; sexual debut, number of sexual partners, sexual experience, and consistent use of condoms as protection during sex. Respondents who reportedly had ever engaged in high-risk sexual behavior were coded '1', and those who had never/had been involved in less risky behaviors were coded '0'. The five variables were added to obtain the composite variable for sexual risk-taking. Respondents coded '1' in the variables were categorized as high risk, while those coded as '0' were classified as low risk.

The researcher obtained the necessary approvals from the National Council of Science, Technology, and Innovations (NACOSTI), the Ministry of Education, and the School of Graduate Studies, Maseno University. The researcher then visited the sampled schools and informed the school administrators about the research and the timeline of when the research instruments could be used. During the scheduled days for data collection, the selected students were briefed on the study and informed about their voluntary participation, after which they individually filled in the questionnaires. Focus group discussions were organized during lunch breaks and in the evenings after the lessons with participants, the researcher took notes and moderated the discussion to keep the participants in focus. Verbatim responses were recorded in writing by the researcher with the respondents' permission, who felt uncomfortable with their voices being recorded. Since most of the respondents were below 18 years, the school administration was approached for the consent as 'local parentis' for parental consent to participate in the study. Two research assistants were trained to assist in data collection.

### 2.4. Data Analysis

Descriptive statistics were used to present the prevalence of sensation-seeking and indulgence in sexual risk-taking behavior by age and gender. In addition, logistic regression analyses were conducted to examine the relationship between variables in the study.

### 2.5. Ethical

The participants in the study were assured of confidentiality. Participation in the study was voluntary, and the questionnaires were anonymous. Respondents were asked not to give their name or the name of their school. Respondents unwilling to participate in the study were not forced to participate. Respondents were informed of the expectations and procedures of the study. The headteachers of the selected schools also signed to provide consent on behalf of the participants willing to participate in the study since most of them were from various locations outside the study area, and it would have been challenging to conduct parents for each participant.

## 3. Findings

The respondents' age ranged from 13 years to 19 years (M=16.2, SD= 1.6). The male respondents were 156 (43.7%), while the female respondents were 201 (56.3%). Of all the respondents, 126 (35.3%) were from single-sex schools, while 231 (64.7%) were drawn from mixed schools.

57 (16%) were low sensation seekers among the respondents, while 50 (14%) were high sensation seekers. Further, the data was split by gender to compare the prevalence of sensation seeking between female and male respondents.

**Table 1.** *Prevalence of Sensation Seeking by Gender*

| Category | Low Sensation seeking | High Sensation seeking |
|---|---|---|
| *All* | 57 (16.0%) | 50 (14.0%) |
| *Male* | 17 (10.9%) | 33 (21.2%) |
| *Female* | 40 (19.9%) | 17 (8.5%) |

Figure 1 shows the prevalence of sensation-seeking by age and gender. Table 1 indicated that sensation seeking was higher for male respondents (21.2%) than female respondents (8.5%). These differences were tested for significance using the Mann-Whitney U test since the data was ordinal; the results indicated that sensation seeking was significantly different across gender ($p < .05$).

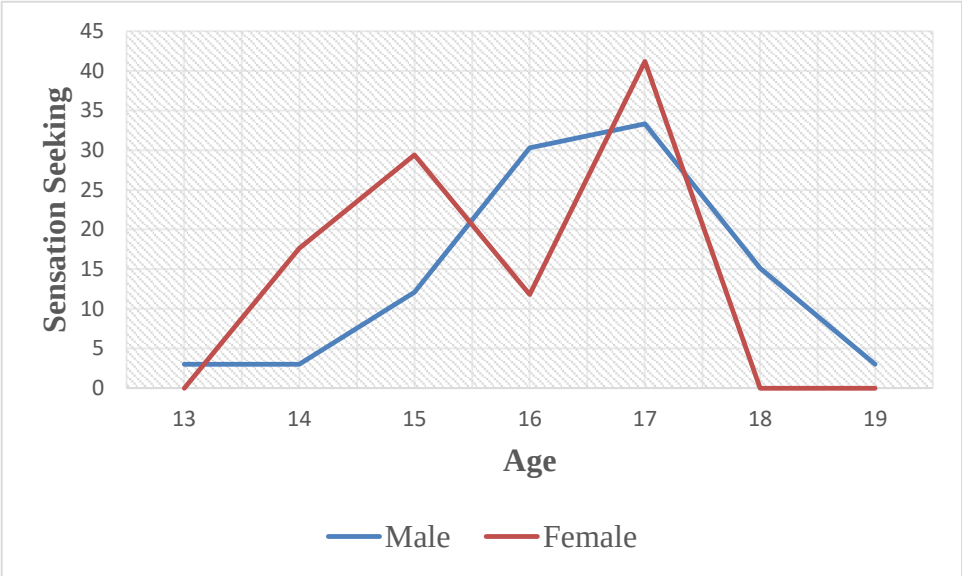


**Figure 1**. *Prevalence of Sensation-Seeking by Age and Gender*

From Figure 1, sensation-seeking for the male students was negatively skewed, increasing steadily from age 13 to a peak at 17 years, from where it steadily declined. Thus, sensation-seeking for boys was most pronounced at ages 16 and 17 years. Sensation-seeking girls had a bimodal distribution, with one group falling between ages 15 to just below age 16 and the other from age 17 upwards. Worth noting is that girls aged 18 and 19 displayed no sensation-seeking behavior. These results indicate varied implications for the consequences of sensation-seeking among secondary school students in Kisumu Municipality.

In the study, sexual risk-taking was conceptualized as a multidimensional concept reflecting four different behaviors: lifetime sexual experience, sexual debut, condom use, and multiple sexual partners. Table 2 presents the prevalence of the variables by gender. The gender differences for all the aspects were significant, as indicated by the Mann-Whitney U test of significance.

**Table 2**. *Prevalence of Sexual Risk-taking Variables*

| *Sexual risk-taking indicators* | *Male* | | *Female* | | *Total* | | *Mann-U Sig.* |
|---|---|---|---|---|---|---|---|
| | *Non-Risk* | *Risky* | *Non-Risk* | *Risky* | *Non-Risk* | *Risky* | |
| Sexual Experience | 84(53.8%) | 72(46.2%) | 153(76.1%) | 48(23.9%) | 237(66.4%) | 120(33.6%) | .000 |
| Sexual Debut | 26(36.1%) | 46(63.9%) | 20 (41.7 %) | 28(58.3%) | 46(38.3%) | 74(61.7%) | .000 |
| Condom use | 42(58.3%) | 30(41.7%) | 29 (60.4%) | 19(39.6%) | 71(59.2%) | 49(40.8%) | .008 |
| Number of Partners | 38(52.8% | 34(47.2%) | 28 (58.3%) | 20(41.7%) | 66(55%) | 54(45%) | .000 |

Exploration of the prevalence of the four aspects of sexual risk-taking measured in the study, i.e., Sexual experience, condom use, sexual debut, and the number of sexual partners, indicated that all four aspects resulted in a negatively skewed distribution. This finding implied that male students' engagement in risky

sexual behaviors increased from around 14 years, steadily peaked at 17 years, and after that declined (See Fig. 2).

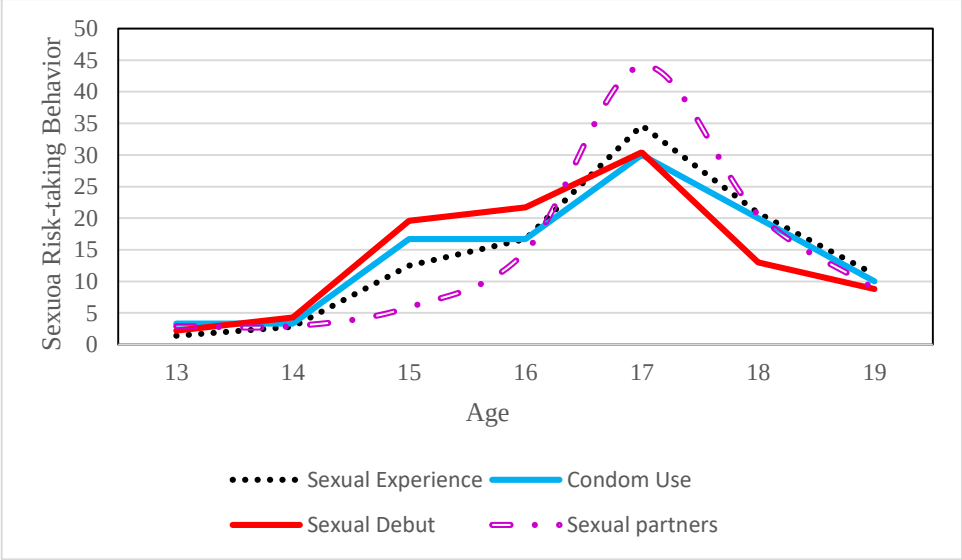


**Figure 2**. *Prevalence of Sexual Risk-taking Behavior among Boys*

The prevalence of sexual risk-taking behavior among boys is presented in Figure 2. The findings indicate that the modal age for each of the four risk-taking behaviors for boys is 17 years, i.e., that the prevalence for all the four aspects of sexual risk-taking was highest at age 17. In addition, the results indicated that more boys aged 17 years were most likely to engage in sex with multiple sexual partners.

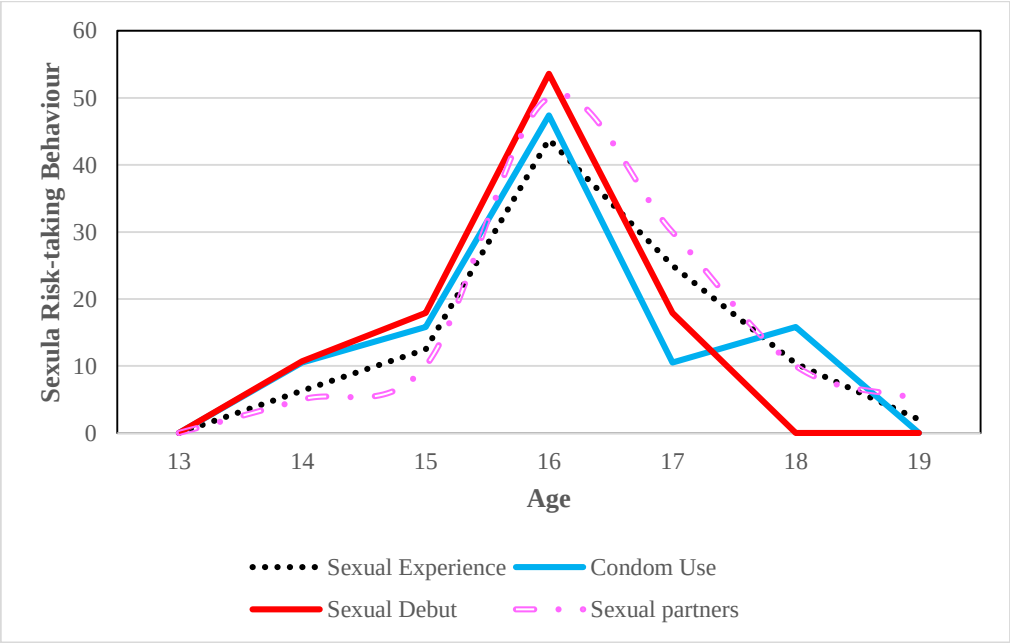


**Figure 3.** *Prevalence of Sexual Risk-taking Behavior among Girls*

All the four aspects included in the study to define sexual risk-taking (Sexual debut, condom use, sexual experience, and the number of partners) exhibited a steady increase until age 16, followed by a decline as the girls approached 19 years. This result indicated a slightly younger age for girls to indulge in sexual risk-taking than the boys, whose peak was 17 years. Furthermore, whereas sexual risk-taking behavior among boys exhibited a negatively skewed distribution with a peak at 17 years, that of girls resulted in a near-normal distribution with a peak at 16 years (See Fig. 3). This result implies that girls are more likely to indulge in sexual risk-taking behaviors than boys at a relatively lower age. Therefore, the consequences are likely to be more detrimental for girls than boys.

From Bivariate correlations (See Table 3), it is evident that all the aspects of sexual risk-taking correlated positively with sensation-seeking. Furthermore, among the four aspects of sexual risk-taking examined in the

study, the number of sexual partners correlated highest with sensation seeking, .223 (p <.05). This finding implies that increased sensation-seeking was likely to increase indulgence in sexually risky behaviors.

**Table 3**. *Bivariate Correlations*

| *Variables* | *1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|
| 1. Age | 1.00 | | | | | | |
| 2. Gender | -.294** | 1.00 | | | | | |
| 3. Sexual experience | .262** | -.234** | 1.00 | | | | |
| 4. Sexual debut | .062 | -.190** | .719** | 1.00 | | | |
| 5. Condom use | .085 | -.141** | .561** | .501** | 1.00 | | |
| 6. Sexual partners | .268** | -.240** | .941** | .652** | .592** | 1.00 | |
| 7. Sensation-seeking | .066 | -.197** | .188** | .170** | .118* | .223** | 1.00 |

***. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).*

Further, the Bivariate correlations indicated that age correlated positively and significantly with sexual experience (r=.262, p<.01) and the number of sexual partners (r=.268, p<.01). This finding implied that as age advanced, the likelihood of indulgence in sex increased and the likelihood of having multiple sexual partners. The correlation coefficients for sexual debut and condom use were insignificant; the sexual debut being aged linked variable could not significantly correlate with age. All the sexual risk-taking aspects correlated negatively and significantly with gender. This finding implied that male adolescents coded lower ('0') were more likely to engage in all the investigated aspects of sexual risk-taking than female adolescents coded higher ('1').

**Table 4**. *Relationship Between Sensation Seeking and Sexual Risk-Taking by Gender*

| | *H-L test* | *Pseudo $R^2$* | *Wald Statistic* | *Sig.* | *Exp(B)/ OR* | *-2LL* | *% of correct prediction* |
|---|---|---|---|---|---|---|---|
| Sensation seeking | .023 (p>.05) | .048 | 11.483 | .001 | 2.175 | 407.474 | 73.1 |
| Boys | .538 (p>.05) | .036 | 3.989 | .046 | 1.847 | 203.732 | 63.5 |
| Girls | 1.458 (p>.05 | .028 | 3.366 | .067 | 1.941 | 191.412 | 81.1 |

Logistic regression results indicated that sensation seeking significantly predicted sexual risk-taking among adolescents. The regression model with sensation seeking as a predictor correctly predicted 73.1 % of sexual risk-taking (See Table 4). EXP(B) value indicated that when sensation seeking is raised by one unit, an adolescent was 2.175 times more likely to engage in sexual risk-taking behavior (OR= 2.175 (95 % CI: 1.388 – 3.409)).

The model was found to be fit, $\chi 2$ (1) = .023 (p<.05), indicating that sensation seeking was a reliable predictor of sexual risk-taking among adolescents. In addition, the Wald statistic also indicated that sensation seeking made a significant contribution to the prediction of adolescents' sexual risk-taking behavior among the adolescents, $\chi 2$ (1) = 11.483, p <.05, See Table 4

When the results were analyzed by gender, the results indicated that sensation seeking significantly contributed to sexual risk-taking among male adolescents but not for female adolescents. Among male adolescents, the full model was significant compared with a constant-only model ($\chi 2$ (1) = 3.989, p <.05), indicating that sensation Seeking made a significant contribution to predicting male adolescents' sexual risk behaviors (p <.05). However, among female adolescents, it made no significant contribution ($\chi 2$ (1) = 3.366, p >.05), indicating that sensation Seeking made no significant contribution to predicting female adolescents' sexual risk behaviors (p = .067). The odds ratio indicated that a male adolescent was 1.847 times more likely to engage in sexual risk-taking behavior when a unit raised his sensation seeking (OR= 1.847 (95 % CI: 1.011 – 3.373).

Further, logistic regression analysis was conducted with sensation seeking and age as predictors of sexual risk behavior to determine age differences in the relationship between sensation seeking and sexual risk-taking behavior. From the test of the full model against a constant-only model, the results indicated that the full model was significant, indicating that the predictors as a set reliably distinguished between risk-takers and non-risk takers, $\chi 2$ (3) = 29.646, p <.001 (See Table 5). This finding confirms the significant positive correlation between age and the aggregated sexual risk-taking variable, .159, p<.01, as indicated in Table 4.1

Nagelkerke's R2 of .115 indicated a positive relationship between prediction and the grouping. Generally, the model's overall prediction was 73.7 %, indicating that the model with age and sensation seeking predicted 73.7 % of adolescents' sexual risk-taking behavior (See Table 5). The Wald criterion demonstrated that all the predictor variables significantly contributed to the prediction. EXP(B) value indicated that when sensation seeking is raised by one unit, the odds ratio was 1.084 as large, and thus an adolescent was 1.084 more times likely to engage in sexual risk-taking behavior (OR= 1.084 (95 % CI: 1.031 – 1.140)). Further, the model indicated a significant Wald statistic for age (9.540, p<.005). The EXP(B) value was 1.334, indicating that when age was raised by one unit, an adolescent was 1.334 more times as likely to engage in sexual risk-taking (OR= 1.334 (95 % CI: 1.111 – 1.601)).

**Table 5**. *Relationship between Sensation seeking, Age, and Sexual Risk-taking Behavior*

| | H-L test | Pseudo $R^2$ | Wald Statistic | Sig. | Exp(B)/ OR | -2LL | % of correct prediction | 95% CI for or Lower | Upper |
|---|---|---|---|---|---|---|---|---|---|
| Sensation seeking | 19.82(p>.05) | .115 | 10.007 | .002 | 1.084 | 397.383 | 73.7 | 1.031 | 1.140 |
| Age | | | 9.540 | .002 | 1.334 | | | 1.111 | 1.601 |
| Constant | | | 18.740 | .000 | .001 | | | | |

When the analyses were split by gender, the results indicated that the model for the male adolescents was not fit. However, the model for the female adolescents was fit $\chi 2$ (2) = 9.057, p <.05, correctly predicting 81% of adolescent sexual risk-taking. Similarly, the Wald criterion demonstrated that all the predictor variables, sensation seeking and age, contributed significantly to predicting the female adolescents' sexual risk-taking. EXP(B) value indicated that when sensation seeking is raised by one unit, the odds ratio was 1.098 as large, and thus an adolescent was 1.098 more times likely to engage in sexual risk-taking behavior (OR= 1.098 (95 % CI: 1.011 – 1.192)). Further, the model indicated a significant Wald statistic for age (9.540, p<.005). The EXP(B) value for age was 1.364, indicating that when age was raised by one unit, a female adolescent was 1.364 more times as likely to engage in sexual risk-taking (OR= 1.364 (95 % CI: .098 – 1.889).

## 4. Conclusion and Discussion

The current study found that although sensation seeking existed for both genders, the prevalence of sensation seeking for male adolescents was higher than that of their female counterparts. This finding implied that the tendency to take up risky behavior due to the sensation it produces was higher for males than for female adolescents; that more male adolescents were likely to be sensation seekers as opposed to female adolescents. This finding would mean that male adolescents are more likely to venture into novel seeking behaviors, which would predispose them to risk-taking behavior, than female adolescents. Cross et al. (2013) assert that this is likely to have been occasioned by the social-cultural context within which the adolescents grow, which presents more permissiveness for the boy child than the restrictiveness exerted on the girl child. These findings corroborate those of the study by Rosenblitt et al. (2001), whose findings indicated higher sensation-seeking levels for male adolescents than their female counterparts. Rosenblitt and colleagues assert that this gender difference can be explained by evolved psychological mechanisms or culturally transmitted social norms, which seem to be permissive for male adolescents (Cross et al., 2013).

Comparison of sensation-seeking by age indicated variation across the ages, a trend that differed across the genders. For female adolescents, indulgence in the novelty of the experiences they produced began early. The trend increased steadily, adopting a bimodal distribution, with peaks at ages 15 and 17 before declining. At ages 18 and 19, girls displayed minimal sensation-seeking behavior. On the contrary, the prevalence of sensation seeking among male adolescents exhibited a negatively skewed distribution, increasing across the ages and rising to a peak at 17 years of age. The increase among male adolescents was less steep than that of female adolescents. The findings suggested an increased likelihood of sensation seeking-instigated consequences among female adolescents than their male counterparts since their susceptibility to sensation-seeking began early in life in female adolescents. These findings are equivalent to those of Steinberg et al. (2008), who found that sensation seeking followed a curvilinear pattern, increasing between ages 10 and 15 and declining thereafter. These results indicate varied implications for the consequences of sensation-seeking among secondary school students in Kisumu Municipality. This finding is pivotal in formulating age and gender- appropriate policies addressing adolescents' sensation seeking.

Further, the study indicated gender differences in the adolescents' tendency to indulge in sexually risky behaviors due to their sensation seeking. These results are further supported by Zuckerman's earlier findings (Zukerman, 1994) that indicated that men value risk-taking or sensation-seeking significantly more than women due to socialization, where women are socialized to "repress" sensation-seeking behaviors. In contrast, men are socialized to "express" themselves without recourse to the risks involved. Steinberg et al. (2008) and Rahmani and Lasarani (2012) also reported significantly greater sensation among males than females. These differences can be linked to what Paus (2009) described as sex differences in the cognitive abilities occasioned by the greater absolute volume of the grey and white matter among males than that of females. He further observed an age-related increase in the white matter volume of the left inferior frontal gyrus among boys but not girls. This increase is a possible explanation for boys' heightened inclination to sensation seeking during adolescence, likely to prompt risk-taking.

When examining the four aspects of sexual risk-taking (sexual experience, sexual debut, condom use, and the number of sexual partners) across genders and ages, it was found that male adolescents were more likely to engage in risky sexual behavior than their female peers, and this increased steadily across ages. This trend, combined with the increase in novel experience-seeking, is likely to explain the worrying trend of adolescents' indulgence in sexually risky behavior. Steinberg et al. (2009) corroborate this finding, as they concluded that sensation seeking was at its peak during adolescence. They explained that the differing timelines occasion this situation between developing the self-regulation system and the brain's impulse control. They concluded that vulnerability to risk-taking was the product of high sensation seeking and low impulse control.

These findings are congruent to Donohew et al. (2000), who established that sensation-seeking and impulsive decision making were strongly related to sexual risk-taking behaviors. Similarly, the findings corroborate Schweitzer (2011) that sensation seeking is a significant predictor of sexual risk-taking behavior, especially among males likely to have multiple sexual partners. Suggestively, sensation-seeking seemed to drive adolescents to want to have multiple sexual partners, probably because Zuckerman (1994) points out that sensational seekers are attracted to varied and arousing stimuli, and multiple sexual partners would be viewed as varied experiences for a sensation-seeking adolescent.

When examining the relationship between sensation seeking and sexual risk behavior using the logistic regression analyses, the study found that sensation seeking significantly predicted sexual risk behavior among adolescents. However, further analyses indicated that sensation seeking contributed significantly to sexual risk-taking behavior among male adolescents but not among female adolescents. The difference may be due to social and behavioral pressure to conform to the prescribed gender roles, as suggested by Booth and Nolen (2009), as well as culturally transmitted norms that encourage males to be more willing to take up novel/intense activities for the pleasure involved (Cross et al., 2013).

The study's findings contradicted those of Saxena and Puri (2013), which indicated a non-significant relationship between risk-taking ad sensation-seeking behavior among adolescents in the National cadet corps. In their view, this deviation is likely to have resulted from the sample used in the study. The sample comprised cadets trained to be patient and only be aggressive at suitable demands of the situation, not merely because of novel seeking (Saxena & Puri, 2013). Further, it is notable that Saxena and Puri examined risk-taking from a general perspective without narrowing it down to specific aspects of risk-taking, which is likely to have affected the study results. The current study narrowed down to sexual risk-taking as a specific aspect of risk-taking and explored a sample from a population not under any aggression/patience-focused training.

When the relationship between sensation seeking and the sexual risk-taking behavior aspects adopted in the study was examined, all the aspects correlated positively and significantly with sensation seeking. The correlation between sensation seeking and the number of sexual partners was highest, implying that high sensation seekers adolescents were likely to have multiple sexual partners. This finding suggested that sensation seeking appeared to drive adolescents to have multiple sexual partners, probably, as Zuckerman (1994) points out, because sensational seekers are attracted to varied and arousing stimuli. Multiple sexual partners would be viewed as varied experiences for a sensation-seeking adolescent. These results correspond to the findings of Zuckerman (1994) and Corsini (1999). They point out that sensation seekers underestimate or accept risk as the price for the reward provided by the sensation of the experience. That risk is not an essential motivation for the behavior but rather the experience the behavior provides. This inclination could

be the reason behind the relatively higher correlation between sensation seeking and multiple sexual partners, as that would provide the excitement so often sought by sensation seekers.

The results indicated that age was a significant predictor of adolescents' sexual risk-taking, with the tendency to indulge in sexual risk-taking increasing as adolescents advanced in age. In addition, as their susceptibility to sensation seeking increased, so did their likelihood of engaging in sexually risky behaviors.

In conclusion, the study found that more boys than girls tend to engage in sensation-seeking and risk-taking sexual behavior. Therefore, it is of utmost importance that appropriate measures are taken to channel their energies in positive, constructive ways. Further, it was established that sensation seeking correlated highest with the number of sexual partners among the indicators of sexual risk-taking. Therefore, it was concluded that although sensation seeking contributed significantly to secondary school students' sexual risk-taking behavior, it was likely to contribute most to engaging in sex with more than one partner.

Concerning age differences, the study established that the high sensation seeking began early for the girls. Consequently, the study concluded that the influence of sensation seeking was likely to be more detrimental for girls than boys. Therefore, preventive measures need to be adopted and exposed to the girls in early adolescence.

The relationship between sensation-seeking and sexual risk-taking indicated that sensation-seeking was a better predictor of sexual risk-taking behavior among boys than girls. The study concluded that boys who were sensation seekers were also likely to indulge in sexually risky behaviors. Since sensation-seeking promotes sexual risk behavior in boys, it is essential to develop prevention strategies differentiated by gender. Among the four indicators of sexual risk-taking, sensation-seeking accounted for the highest variance in the number of sexual partners. Adolescent students who were high on sensation seeking were also likely to have multiple sexual partners, a risk factor, especially for the spread of HIV.

The relationship between sensation-seeking and sexual risk-taking had significant differences across the ages, with advancement in age predisposing a stronger relationship between the two variables. Therefore, the study concluded that since age was a significant factor, the preventive measures/ strategies should be age differentiated.

## 5. Recommendations

The study suggested the following recommendations ;

- There is a need for the Secondary School Managers to diversify channels where secondary school students can redirect their energies to less risky activities to curb sensation-seeking behavior, which is likely to lead to sexually risky ventures.
- To effectively address secondary school students' sexual risk-taking behavior, it would be more effective for the Ministry of Education to develop and promote behavioral interventions embedded in their decision-making capacity rather than developing a list of do's don'ts.
- Since gender differences were eminent in prevalence and the relationships between sensation seeking and sexual risk-taking, the study recommended that the Ministry of Education develop and promote sexual risk-taking interventions that are gender-specific.
- That Educational stakeholders need to promote gender and age-specific behavioral interventions and communication on sexual risk-taking.
- The Ministry of Education should develop and promote sexual risk-taking interventions differently across the ages.
- The study recommends further research focussing on;
    - The neurological basis for increased sexual risk-taking due to sensation-seeking among boys compared to girls and the resultant age differences in the relationship between the two variables.
    - Adolescents outside school.

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# Burnout in Secondary School Teachers: The Contribution of the Work Environment

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ABSTRACT

Burnout can be defined as a distressing psychological state that an individual experiences from extreme and prolonged job stress. The present study explores the work climate factors contributing to teacher burnout at secondary schools in Bangladesh. A cross-sectional online survey was used to collect data from 300 teachers. Maslach Burnout Inventory- Educators Survey MBI-ES and Perceived Work Climate Survey (PWCS) survey were used to measure burnout and perception of work climate. The results from the multiple regression analysis revealed 3 three work climate factors: Innovation, Professional growth, and Recreation, which significantly influence at least one of the three components of teacher burnout and the overall burnout score. The study has implications for understanding the burnout-inducing factors and ensuring a better work climate for teachers in Bangladeshi schools.

Keywords:
Burnout, secondary school, well-being, work climate.

## 1. Introduction

In recent years, psychological burnout has become a research topic among scholars, particularly those interested in the field of work. Burnout is a distressing psychological state that an individual experiences from extreme and prolonged job stress (Gabriel, 2013). It is usually a frustrating feeling that comes from chronic job stress, which could result in attrition (Jackobson, 2016). Herbert Freudenberger first did a comprehensive research on burnout where he systemically described and analyzed the mental condition of burnout (Heinemann & Heinemann, 2017). In his original article, burnout is "to fail, wear out, or become exhausted by making excessive demands on energy, strength, or resources" (Freudenberger, 1974, p. 159). Freudenberger posited burnout signs regarding physical symptoms, bihavioral symptoms, and personality traits. Physical symptoms are- exhaustion, fatigue, frequent headaches, gastrointestinal disorder, insomnia, short breath and lingering cold. Regarding behavioral symptoms- irritation, frustration, mood swing, paranoia, overconfidence, excessive use of tranquillizers and barbiturates, rigidity, stubbornness, inflexibility, cynicism and depression are prominent. According to Freudenberger, dedicated and committed personality traits are more prone to burnout as they often think they are not giving enough (Freudenberger, 1974). Later, Christina Maslach carried forward significant research in this field and developed Maslach Burnout Inventory (MBI), which widely measures burnout in people from different professions (Heinemann & Heinemann, 2017). According to Maslach, burnout can be characterized by emotional exhaustion, cynicism or an impersonal attitude toward people at the workplace, and a low sense of personal accomplishment towards one's job role (Maslach et al., 1996). Emotional exhaustion refers to feeling emotionally overextended by one's job (Maslach et al., 1996). Emotionally exhausted teachers usually feel tired and lethargic at work. Depersonalization includes cynical attitudes toward students, parents, and the workplace (Maslach et al., 1996). Finally, a low

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sense of personal accomplishment reflects a negative appraisal of one's worth and not seeing any contribution to one's work (Maslach et al., 1996).

Though burnout is not a new concern in the job industry, the upsurge of teacher burnout is a new phenomenon. Prior studies confirm that teachers are reported consistently at high risk of burnout worldwide compared to other professionals (Gabriel, 2013; Jacobson, 2016). Burnout among teachers has consequences on teachers and those with whom they work. The effects of teachers' burnout include but are not limited to absenteeism, poor job performance, anger toward students, lack of job motivation and commitment, which affects students' performance, teacher attrition, and quality education (Jackobson, 2016). Burned-out teachers merely apply new practice and knowledge in the class and are responsible for student apathy and low achievement (Ramberg et al., 2019). It also affects a teacher's classroom management skills as they tend to suffer from irritability, behave cynically toward students, and often take punitive action against the students to maintain discipline, which further increases student problem behaviours (Chang, 2009; Jacobson, 2016).

Previous studies investigated potential contributors to burnout through the lens of Bronfenbrenner's Ecological Model and found that school work climate significantly influences the likelihood of burnout (Grayson & Alvarez, 2008; Jacobson, 2016). According to the ecological model, teachers interact with four types of the educational environment. Initially, teachers deal with their immediate environment, which is students, school and family in the microsystem. These microsystems are interrelated in the mesosystem, as in students and family. Exosystem comprises school administration, Government education departments where teachers are not directly present. Finally, the macrosystem considers the larger social context, like, educational policy. When people confront stressful situations, successful coping strategies are connected to the supportive ecology (Ross, 2010). In a study by Grayson and Alvarze (2008), it was found that teachers often suffer from burnout due to inadequate support and an unsatisfactory working environment in public schools.

Further, school work climate factors like teacher-student relationship, peer-student relationship, and school management contribute to burnout (Grayson & Alvarez, 2008). Students' imprudent behavior and indiscipline led to teacher burnout (Shirom et al., 2015). Students' misbehaviors, inattention, and impudence trigger burnout among 22% of teachers from all grade levels. (Fernet et al., 2012). Hence, classroom management is strongly associated with burnout. Inadequate training on classroom management strategies impedes educators from understanding the realities. In turn, teachers struggle in the class as they lose a sense of control which further depletes self-efficacy regarding the impact on the student (Jacobson, 2016). Besides, excessive workload, low salary, inconsiderable paperwork, deadlines, and narrow scope of professional progress stress the teachers (Shirom et al., 2015). On top of that, the school's internal conflict regarding hierarchy and imposing policies set off teachers' burnout (Grayson & Alvarez, 2008). Furthermore, less cooperation from colleagues and the dysfunctional relationship with them, can grow isolation at times. One who is piling up this isolation inside gets burnout.

Bangladesh is heading toward ensuring quality education for achieving Sustainable Development Goals (SDG). Though several initiatives have been taken for education reform, inadequate attention has been given to our teachers who are executing these reforms (CAMPE, 2019). According to the study of Dufour & Marzano (2011), it has been found that quality education demands quality teachers the most. And burnout wears down teachers that directly fall off the quality of education (Grayson & Alvarez, 2008; Jacobson, 2016; Ramberg et al., 2019). A report by ADB (2015) revealed that one of the significant issues in secondary education in Bangladesh is poor teacher development programmes.

Moreover, teaching is often considered a less attractive job in Bangladesh (Rahman et al., 2011). In our country, many teachers suffer from a lack of motivation and job satisfaction (ADB, 2015); both are precursors to burnout. Burnout among teachers is suggested as one of the significant detrimental factors which affect the teachers' quality year after year and often remain unaddressed (Ramberg et al., 2019). A burned-out teacher can affect students' academic achievement, mental health, coworkers' well-being, and organizational environment, yet continue to work with symptoms of burnout, without even realizing it (Jacobson, 2016). However, the irony is that despite its devastating effect on teachers' quality, burnout among teachers has rarely been acknowledged in the teacher development programmes of Bangladesh. Most of teacher development programmes are confined to teachers' professional development and increasing subvention (CAMPE, 2019) leading to the psychological issues related to teachers' professional development being unnoticed.

Further, the constant pressure of incorporating the ever-changing curriculum and legislative guidelines in classroom practice, ensuring academic achievements for all students, and fulfilling a host of extra teaching assignments has put an extra strain upon teachers across the globe (Shen et al., 2017) and so as in Bangladesh. Long-term such pressure causing chronic stress may turn into psychological burnout among teachers (Gabriel, 2013). It is high time to look beyond the traditional focus of teacher development programs such as teacher training and prompt consideration of addressing teachers' burnout for more comprehensive development of teacher quality.

In Bangladesh, the scope of teacher development programs is still limited to their professional development, whereas the development of their mental health and overall well-being is rarely acknowledged in practice. In this regard, the study is important as it addresses one of the most important yet least acknowledged issues such as teachers' mental health by focusing on burnout among teachers in Bangladesh. Mounting evidence has suggested that work climate significantly influences teacher Burnout (Jacobson, 2016; Grayson & Alvarez, 2008; Shirom et al., 2015). In Bangladesh, the school, which is the primary work climate for the teachers, can be characterized by the high student-teacher ratio, lack of physical facilities for the teaching staff in the school, long work-hour, extra-teaching assignments, poor salary structure, which potentially might have made the teachers more vulnerable to burnout. Ironically, in there exist hardly any study which focuses on workclimate factor contributing to burnout. Hence, this study tries to explore the factors in the workplace that contribute to teachers' burnout. The study findings can guide the incorporation of teachers' mental issues in teacher development programs to address teacher burnout and increase teachers' wellness. It should be mentioned that students' wellness depends on teachers' wellness (Shirom et al., 2015). Therefore, addressing the issue of teacher burnout will benefit not only the individual teacher but also the students and the education system. In this regard, the present study is guided by the following research question; Which work climate level factors contribute to burnout among teachers?

## 2. Methodology

### 2.1. Research Sample

This quantitative study employed a cross-sectional survey method. A total of 300 teachers (Male =133, Female= 167) with mean age of 47.5 responded to a self-administered online survey. Table 1 shows the descriptive statistics of the study participants concerning the demographic variables.

**Table 1** *Demographic Data for the Participating Teachers*

| Groups | % | Groups | % |
|---|---|---|---|
| Gender | | Teaching experience | |
| Female | 44 | Below 3 years | 23.4 |
| Male | 56 | 3-6 years | 27.3 |
| Relationship status | | 7-10 years | 35 |
| Single | 41 | 11-14 years | 9 |
| Married | 58 | Above 14 years | 5.3 |
| Divorced | 0.6 | Number of classes (per day) | |
| Educational qualification | | 1-2 classes | 3 |
| Bachelors | 37 | 3-4 classes | 53 |
| Masters | 63 | 5-6 classes | 38 |
| Type of workplace/school | | 7-8 classes | 7 |
| Non-government school (Non MPO) | 51 | Working hours (per day) | |
| Non-government school (with MPO) | 36 | 2-3 hours | 5 |
| Government school | 5 | 4-5 hours | 12 |
| English medium school | 8 | 6-7 hours | 60 |
| Monthly salary | | 8-9 hours | 23 |
| ≥20,000/- | 72 | Involvement in extra-teaching assignment | |
| 21,000/- - 30,000/- | 22 | Involved | 56 |
| 31,000/- - 40,000/- | 5 | Not involved | 44 |
| <40,000/- | 0.7 | Intention to change the teaching profession | |
| Employment | | Yes | 57 |
| Permanent | 74 | No | 43 |
| Temporary/Contractual | 26 | | |

### 2.2. Data Collection Tools and Procedure

The questionnaire has two parts- part A included Maslach Burnout Inventory- Educators Survey MBI-ES (Maslach et al.,1996) measured burnout among teachers. Part B comprised Perceived Work Climate Survey (PWCS), a survey questionnaire to explore the factors that might potentially cause burnout. This self-report measure was adapted and piloted before applying it to the study sample. Regarding adaptation, the self-report measure was translated following the back-translated method suggested by Brislin (1970). A brief description of the questionnaires is given below.

The Maslach Burnout Inventory-Educators Survey (MBI-ES) is comprised of 22 items that have three subscales, namely: Emotional Exhaustion (EE), Depersonalization (DP), and a reduced sense of Personal Accomplishment (PA) (Maslach et al., 1996). The emotional exhaustion subscale assesses the feelings of being emotionally worn-out and drained due to one's job stress. An example of the EE subscale item is: "I feel fatigued when I get up in the morning and have to face another day on the job". The depersonalization subscale measures the feelings of being cynical or indifferent towards work and people (e.g., students, colleagues, staff, parents) at one's workplace. A sample item for this subscale includes "I feel I treat some students as if they were impersonal objects".

The reduced sense of personal accomplishment subscale indicates a sense of poor professional self-esteem or denying one's contribution to one's workplace. A sample item for this subscale includes: "I feel I'm positively influencing other people's lives through my work" (reverse coded). Each MBI-ES item is graded on a Likert scale based on the frequency of feelings, ranging from 0 (never) to 6 (often) (always). Scores falling above the median were regarded as high, whereas scores falling below the median were considered low. Scores falling in the middle were considered average. This survey has evidence of empirical validity and reliability in measuring burnout in academic settings across different cultural contexts. The Cronbach's alpha ($\alpha$) value for this survey has been reported to range from .71 to .90 in a previous study (Maslach, Jackson & Leiter, 1996). The 22-item Bangla version of the MBI was shown to be highly reliable in this study, with a Cronbach's alpha ($\alpha$) =.87, which was equivalent to the prior research's estimated range of Cronbach's alpha (0.71- 0.90).

The PWCS is developed in the light of two cross-culturally valid instruments for assessing job-related stressors as perceived by teachers, namely Sources of Stress Questions (Fimian 1984; Fimian & Fasteneau,1990) and the Work Environment Scale (WES) (Moos, 1994). The PWCS is 64- an item Likert type scale composed of eight subscales: Involvement (Sample item: "I feel proud to be a part of this school"), Work Pressure (Sample item: "The testing and pacing pressure is stressful for me"), Autonomy (Sample item: "I feel a lack of control over school decisions that affect my students and me"), Professional growth (e.g., "I do not see any future in this job"), Innovation (Sample item: "I am discouraged when I do things differently"), Physical Comfort (Sample item: "My workplace is crowded"), Coworker Cohesion (Sample item: "I do not feel "safe" to speak my mind with colleagues or administrators."), Recreation (Sample item: "The school arranges sports and cultural events for the teachers."). Each item of the PWCS is scored on a Likert scale in terms of frequency of experiences ranging from 0 (never) to 6 (always). All the items had an acceptable Cronbach's alpha value above .70 (Field, 2009). The Cronbach's alpha value for the whole scale was calculated to be high at ($\alpha$ = .916), indicating the high reliability of the measure, as suggested by field (2013).

### 2.3. Data Analysis

A multiple regression analysis was conducted using the statistical analysis software SPSS 20 to answer the key research question on aspects of work climate that cause burnout among teachers. Burnout scores were set as dependent variables, and perception of work climate factors (e.g., coworker cohesion) was set as independent variables to assess work climate factors contributing to the three dimensions of burnout. Before running the regression analysis, the assumptions for the test (including normally distributed data); a linear relationship between independent and dependent variables, and homoscedasticity of the variability in variance errors were checked. No multicollinearity among the independent variables was detected using bivariate correlation. A bivariate correlation analysis was also conducted between the independent variables (Involvement, Work Pressure, Professional growth, Innovation, Physical Comfort, Coworker Cohesion, Recreation) and the dependent variable (Emotional Exhaustion (EE); Depersonalization (DP) and a reduced sense of Personal Accomplishment (PA). In regression analysis, the Pearson correlation value indicates which

work climate factors correlate strongly with the burnout subscale scores. This analysis guides the choice of the predictive work climate factors to enter into the regression model for further multiple regression analysis. As recommended by field (2013), it is better to include a few potential variables instead of having many in a regression model. All the work climate factors were significantly correlated (*r* =.3-.4) with the burnout subscale scores. Therefore, all of them were entered into the regression model.

### 2.4. Ethical

The study was conducted following the 1964 Helsinki Declaration and its later amendments. Written informed consent was sought from the participants before participation.

## 3. Findings

A multiple linear regression using the forced entry method was conducted to determine the contribution (if any) of the work environment factors to burnout (Field, 2013). Given that the study is exploratory and there is a priori hypothesis about the order in which the variables are entered, the forced entry method was appropriate where all the chosen potential predictors are forced into the model simultaneously (Field, 2013). The work environment factors: Involvement, Co-worker Cohesion, Autonomy, Work Pressure, Innovation, Physical Comfort, Professional Growth, and Recreation were entered simultaneously as the independent or predictor variable with the MBI subscale scores. i.e., Emotional Exhaustion, Depersonalization, and reduced Personal accomplishment entered as the dependent or criterion variable. The following tables (1-4) present the results of regression analysis on the scores of burnout components: emotional exhaustion, depersonalization, and reduced personal accomplishment, as well as the overall burnout scores regressed against the work environment factors.

**Table 2** *Work Environment Predictors of Emotional Exhaustion*

| Work environment variables | *B* | *SE B* | *β* |
|---|---|---|---|
| Involvement | .009 | .273 | .004 |
| Autonomy | -.389 | .263 | -.222 |
| Work Pressure | .215 | .325 | .076 |
| Co-worker Cohesion | -.147 | .257 | -.059 |
| Innovation | -.547 | .278 | -.256* |
| Physical Comfort | .120 | .208 | .062 |
| Professional Growth | .464 | .267 | .163 |
| Recreation | -.578 | .279 | -.259* |
| $R^2$=.446, *F*=7.511** | | | |

*Note*: B= Unstandardised coefficient; S.E B= Standard error of B, *β*=Standardised coefficient*; ** p<.01, *p <.05*

Table 2 presents the work environment predictors of emotional exhaustion subscale scores of MBI. The regression analysis returned a result of $R^2 = .446$, $F(7, 76) = 7.511$, $p < .01$. This means that 44.6% of the variance of the emotional exhaustion scores in the sample can be accounted for by the linear combination of work environment variables in the regression model. The model found innovation and recreation as the significant predictors of emotional exhaustion. According to the β value both innovation ($\beta = -.256$, $p < .01$) and recreation ($\beta = -.259$, $p < .01$) made significant negative contributions to the emotional exhaustion scores. The finding referred that when teachers get the opportunity to demonstrate innovation and experience recreation in the work environment, they tend to feel less emotionally exhausted.

**Table 3.** *Work Environment Predictors of Depersonalization*

| Work environment variables | *B* | *SE B* | *β* |
|---|---|---|---|
| Involvement | .210 | .215 | .129 |
| Autonomy | .081 | .207 | .067 |
| Work Pressure | .053 | .255 | .028 |
| Co-worker Cohesion | -.267 | .202 | -.156 |
| Innovation | -.677 | .219 | -.464** |
| Physical Comfort | -.133 | .163 | -.101 |
| Professional Growth | .007 | .210 | .003 |
| Recreation | -.102 | .219 | -.067 |
| $R^2$=.301, *F*=3.65** | | | |

Table 3 presents the work environment predictors of depersonalization subscale scores of MBI. The regression analysis returned a result of $R^2 = .301$, $F\ (7, 76) = 3.65$, $p < .01$. This means that 30.1% of the variance of the emotional exhaustion score in the sample can be accounted for by the linear combination of work environment variables in the regression model. The model found innovation as the significant predictor of depersonalization. According to the β value innovation ($\beta = -.464$, $p < .01$) made a significant negative contribution to the depersonalization score. This means when teachers get the opportunity to demonstrate innovation in the work environment; they tend to experience less depersonalization.

**Table 4.** *Work Environment Predictors of Personal Accomplishment*

| Work environment variables | *B* | *S.E.B* | *β* |
|---|---|---|---|
| Involvement | .389 | .223 | .229 |
| Autonomy | -.052 | .215 | -.042 |
| Work Pressure | -.152 | .266 | -.075 |
| Co-worker Cohesion | .488 | .210 | .020 |
| Innovation | .305 | .228 | .200 |
| Physical Comfort | -.215 | .170 | -.156 |
| Professional Growth | .040 | .218 | -.272* |
| Recreation | .402 | .228 | .251 |
| $R^2$=.307, *F*=3.75** | | | |

Table 4 presents the work environment predictors of reduced personal accomplishment subscale score of MBI. The regression analysis returned a result of $R^2 = .307$, $F\ (7, 76) = 3.75$, $p < .01$. This means that 30.7% of the variance of the reduced personal accomplishment score in the sample can be accounted for by the linear combination of work environment variables in the regression model. The model found professional growth as the significant predictor of a reduced sense of personal accomplishment and made a significant negative contribution ($\beta = -.272$, $p < .01$) to the personal accomplishment subscale score. This means when teachers get less opportunity for professional growth; they tend to experience a reduced sense of personal accomplishment.

**Table 5** *Work Environment Predictors of Burnout*

| Work environment variables | *B* | *S.E.B* | *β* |
|---|---|---|---|
| Involvement | .607 | .434 | .187 |
| Autonomy | -.361 | .418 | -.150 |
| Work Pressure | .117 | .517 | .030 |
| Co-worker Cohesion | .074 | .409 | .022 |
| Innovation | -.919 | .443 | -.314* |
| Physical Comfort | -.227 | .330 | -.086 |
| Professional Growth | .510 | .424 | .131 |
| Recreation | -.278 | .443 | -.091 |
| $R^2$=.285, *F*=3.38** | | | |

Table 5 presents the work environment predictors of overall burnout score. The regression analysis returned a result of $R^2 = .285$, $F\ (7, 76) = 3.38$, $p < .01$. This means that 28.5% of the variance of the burnout score in the sample can be accounted for by the linear combination of work environment variables in the regression model. The model found innovation ($\beta = -.314$, $p < .01$) as the significant predictor, contributing significantly negatively to the overall burnout score. The results indicated that when teachers get the opportunity to demonstrate innovation in the work environment, they tend to experience less burnout.

## 4. Conclusion and Discussion

In this study, three work environment factors: Innovation, professional growth, and recreation, significantly negatively contributed to at least one of the three components of teacher burnout and the overall burnout score. The following section presents a discussion on how innovation, professional growth, and recreation impact psychological burnout among secondary school teachers in Bangladesh.

Innovation appeared to be the strongest work environment predictor, which significantly made a negative contribution to emotional exhaustion ($\beta = -.256$, $p < .01$), depersonalization ($\beta = -.464$, $p < .01$), and overall burnout ($\beta = -.314$, $p < .01$) score. The results indicate that the opportunity to demonstrate innovation in the

workplace reduces the likelihood of burnout among teachers. Innovation in teaching involves but is not limited to experimenting and applying new methods and techniques of teaching to the classroom (Moos, 1994). Opportunity and freedom to demonstrate innovation in teaching help the teachers to push their boundaries and take challenges to try something new to improve their performance in the classroom (Shirom et al., 2015). It brings dynamism to the job and helps the teachers stay motivated in their tasks. Freedom of demonstrating Innovation also gives the teachers a sense of autonomy and ownership to decide on their job tasks which perhaps decreases the experience of burnout (Ramberg et al., 2019). Also, teachers who are more experimental with their works are prone to be less depersonalized and emotionally exhausted (Evers et al., 2002).

Professional growth was found to make a significant negative contribution ($\beta$ = -.272, $p$ < .01) to the lack of personal accomplishment component of burnout. This indicates when teachers get the opportunity to grow professionally, they tend to experience less lack of personal accomplishment. This also potentially helps to lower the likelihood of experiencing burnout among the teachers. The finding carries empirical evidence from previous studies (Avalos, 2011; Khan et al., 2014; Özer & Beycioglu, 2010). It has been well-documented that teachers with a lack of professional knowledge and skills often fail to cope with the changing demand of the curriculum, students, and the ever-growing challenges and demands of the profession and experience burnout (Khan et al., 2014). Professional development brings the opportunity to learn new knowledge and skills and update and strengthen already learned skills (Avalos, 2011). It equips teachers to cope with the professional challenges and fulfil the demands of time, consequently putting a buffer against burnout (Khan et al., 2014). Limited autonomy to employ new instructional methodology may cause feeling reduced personal accomplishment among teachers (Rumschlag, 2017).

Recreation is another work environment factor that negatively contributes to the emotional exhaustion ($\beta$ = -.259, p < .01) of burnout. This means a teacher who gets the opportunity of recreation at the workplace tends to score lower on the emotional exhaustion subscale (Ramberg et al., 2019). Teaching is an emotionally demanding job involving diverse human interaction, often resulting in emotional exhaustion among the teachers (Chang, 2015). Gradually, they may feel emotionally drained. In this regard, recreational activities (e.g., medication, sports, and music can) may potentially work as an emotional booster and allow them to unwind and take a break from job stress (Ramberg et al., 2019).

Burnout is strongly connected with an organizational context and work environment (Heinemann & Heinemann, 2017). School work climate factors can ignite teachers' burnout (Ross, 2010). Deparsonalization and emotional exhaustion often stem from the limited scope for applying effective strategies in their classrooms and a scarcity of recreational activities (Evers et al., 2002).

## 5. Recommendations

The study findings have underscored some aspects of the work climate perceived by the teachers that negatively contribute to the burnout score. In other words, the work climate factors may potentially buffer against the experiences of burnout. In this regard, few recommendations for teachers, school administrators, and policymakers can be made in light of the study findings to decrease teacher burnout in Bangladesh. For example, it is high time for the government to take the lead in implementing a genuine professional development plan for school-level teachers, allowing them to advance and develop throughout their careers as educators. The Bangladeshi education system is highly centralized, with limited opportunities for the teachers to show professional innovation in their classroom and workplace. It is high time to consider teachers as active stakeholders of the education system and engage them in meaningful decision-making processes, including curriculum development and dissemination, teacher training, and classroom teaching practice. For example, teacher representatives should be in all central decision-making processes regarding education and teaching-learning. The concept of Teachers' Voice should be included and addressed in the education policy. Such meaningful engagement would empower teachers and enhance their ownership of the teaching profession, and reduces the chances of feeling burnout.

Further, school teachers usually remain overburdened with extra-teaching or non-teaching duties that leave hardly any time and energy for them to think about professional innovation. It is necessary to think twice about assigning non-teaching tasks to teachers. When assigning non-teaching responsibilities to teachers, special thought should be given to utilizing their faculties rather than tagging them with a job they do not

enjoy or find significant to their core work, which is teaching. In this regard, schools can seek teachers' opinions about their preferences regarding the non-teaching assignment they want to be involved in. A proper link between non-teaching assignments and teaching tasks can be planned too motivate teachers. For example, assigning the Math teachers to coordinate the Math Olympiad event in the school. He can be given extra incentives (e.g., extra pay) for preparing or training the students for the Math olympiad. Further, well-qualified and trained non-teaching staff should be recruited to support the administrative and non-teaching tasks. Most of the time, due to the lack of capability and qualifications of the non-teaching staff, teachers have to perform non-teaching tasks instead of them (Nath et al., 2019). The corruption in non-teaching staff recruitment opens the doors for incompetent people to the school human resources team, which eventually places work pressure upon the teaching staff(Nath et al., 2019).

Given the negative contribution of innovation to burnout, the present study recommended that the government should facilitate teachers' professional freedom and encourage their professional innovation through acknowledgement, promotion, and financial incentives. Finally, teachers' mental health and well-being should be addressed in teacher development programs. Along with existing pedagogical training, stress management, a pleasant work environment, and mental hygiene training should be introduced.

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