Self-Efficacy, Motivation and Learning Strategies in Germany and Japan

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ARTICLE INFO	ABSTRACT
	Learning strategies are important factors for students' academic success. Motivation and self-efficacy influence the choice and the use of specific learning strategies (Entwistle & Ramsden, 1983). In this study, we want to assess how these three factors and their interaction are determined by the cultural setting (eastern vs. western culture). Therefore, we tested 271 Japanese students (198 men, age: M = 19.74, SD = 1.39) and 300 German students (177 men, age: M = 21.84, SD = 1.83). The results show that Japanese students have lower motivation and self-efficacy and choose different learning strategies from German students. Even when (it is) not totally fitting the theoretical construct, the choice of learning strategies can be better explained in Japan (R^2 = .10 to .33) by motivation and self-efficacy than in Germany (R^2 = .01 to .26). In summary, it is shown that the cultural setting has an influence on the three components and also on their interaction.

1. Introduction

1.1. Self-regulated Learning

In the last years the interest on self-regulated learning was constantly high, since self-regulated learning plays an important role while studying (Wei et al., 2022). In this kind of learning people choose based on their own motivation different learning strategies to get to a specific goal. This is a clear constrast to earlier approach of purely behaviorist learning theories, in which a person is seen as a black box, who acts with a reaction according to a stimulus. Now people are seen as as self-regulated individuals who consciously use certain learning strategies depending on their motivation (see Gruber, 2011). According to the Self-regulation Model of Zimmermann (2008) people set themselves goals based on their self-efficacy, expectations, values and goal orientation, consciously control these and observe the achievement of goals, then reflect on their behavior and change it. Wild and Schiefe (1994) define self-regulated learning as "the totality of learning strategies that a student can use to cope effectively and flexibly with the demands of a learning task (p. 185)". Therefore, in the following it seems important to first clarify what learning strategies are.

1.2. Learning Strategies

Learning strategies are described by Streblow and Schiefele (2006) as a series of efficient learning techniques that are applied flexibly and with a goal in mind. In time, they are applied in an increasingly automatic manner, but remain a conscious act. Authors such as Garcia and Pintrich (1994) differentiate between cognitive, meta-cognitive and Resource management strategies. Cognitive learning strategies, according to the authors, consist of rehearsal, elaboration, and organization. These are accompanied by critical thinking. Meta-cognitive learning strategies, on the other hand, watch over, control, and regulate one's own cognitive

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activities and actions (Artelt, 2000; Sungur, 2007). According to Garcia and Pintrich (1994), meta-cognition consists of planning, self-monitoring, and regulation. Resource management strategies refer to the management of one's time and study environment (Pintrich et al., 1991).

Since the 1970s, different authors (Entwistle et al., 1974; Biggs, 1979; Entwistle & Ramsden, 1982) included concepts of motivation in their theories of learning and learning strategies. So they assume a deep approach which is a connection of intrinsic motivation and deep cognitive as well as metacognitive learning strategies and a surface approach which is a connection of extrinsic motivation and surface learning strategies, which is rehearsal. Therefore in the next step a look at motivation should be taken.

1.3. Motivation

When we talk about motivation it should be noted that motivation is what moves as towards an action. Deci and Ryan (1993) differed this in their self-determination theory. The reason for this could be differenced in the following, that people do something because they really it like it (intrinsic motivation) or because of an external reward or punishment (extrinsic motivation). So it has to be differed, where the initiator of the motivation is, in the person self or in the environment.   According to the model of Schiefele (2009), it is not only possible to divide intrinsic and extrinsic motivation but also to distinguish between long-term and short-term time perceptive of the motivation (see figure 1). This means for example that someone either wants to get a good grade in the actual test (extrinsic short-term) or to get a good job and money (extrinsic motivation long-term) or that some one learns because he or she is interested in the subject (intrinsic short-term) or because he or she will receive a job he or she likes (intrinsic long-term).
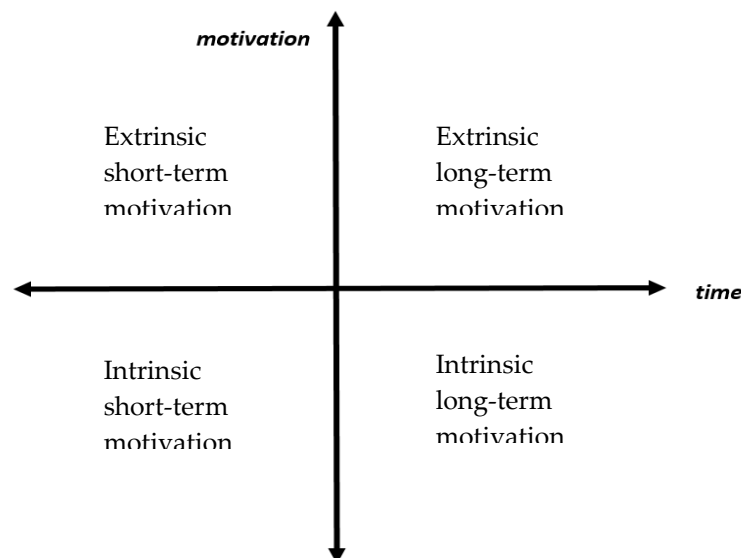

Figure 1: *Motivational Components according to the Model of Schiefele* (2009).

1.4. Self-Efficacy

As described earlier, self-efficacy is an essential role in self-regulated learning (Zimmermann, 2008). In this context, it is also necessary to deal with what self-efficacy is. Bandura (1997) defines it as the "certain beliefs about how capable they are to do what is needed to achieve various goals" (p. 71). This means that individuals believe they can make a difference based on their own ability. This has an impact on how individuals feel and are motivated to act (Gruber, 2011). For example, individuals with high self-efficacy choose more appropriate learning strategies because they are convinced that they can accomplish something. People with low self-efficacy do not believe in their own abilities. Furthermore, it is important to independently perform certain behaviors in order to be able to learn directly from failures and successes. If this is not possible, there is also the possibility of model learning, where the model and the person should have similar characteristics (Bandura, 1977; cited in Gruber, 2011). Self-efficacy plays an important role in self-regulated learning as it influences the goals and values of the selection of learning strategies and behavioral execution. It also has an impact on emotions and motivation (Wild, 2000; cited in Gruber, 2011).

1.5. Relationship of Motivation, Self-efficacy and Learning Strategies

There have been assumptions of relationship between motivation and learning strategies. For example, Biggs, Kember and Leung (2001) assumed that instead of dividing learning strategies and motivation, there are two approaches to learning and studying, each consisting of motivation and learning strategies: surface approach and deep approach. The surface approach is related to extrinsic motivation and related to narrow target strategies like simple rehearsal, while the deep approach is related to intrinsic interest and deeper learning strategies like elaboration, which allows to get a better understanding of the meaning of the subject. Originally, they also had a third approach: the achievement approach, which should be related to time management and resource-orientated learning strategies in general. In factorial analysis they found out that the achievement motivated people are too mixed with deep and surface approach and so preferred a two-factor structure with only deep and surface approach.

On the other hand, Entwistle and Ramsden (1983) also assumed that, based on the underlying motivation concept, a student chooses specific motives. They also did not divide motivation and learning strategies, but stated, like Kember and Leung (1998), that deep learning approach is related to interest in ideas, seeking for meaning, use of evidence and relating ideas, which is contextually similar to the deep learning strategies, elaboration and critical thinking. On the other hand, the surface (also called apathetic) approach consists of the strategy unrelated memorizing, which clearly is rehearsal in learning strategies. Entwistle and Ramsden (1983) also had a third approach, the so called strategic approach, which should be related with achieving motivated and organized studying and time management.

1.6. Cultural Differences

A system of rules, norms and values, which are valid in a society, is known as "culture" (Thomas, 2007.). According to Hofstede et al. (2010), culture plays a role in motivation because it doesn't only influence actions, but also the reasoning behind one's own actions. In this study, the authors will compare the motivation, learning strategies and self-efficacy of students in two different cultures, Germany and Japan. Cultures can be described for instance by Hofstede's five cultural dimensions (2001): Power distance, Individualism vs. collectivism, Masculinity vs. femininity, Uncertainty avoidance, Long-term vs. short-term orientation.

When looking at the individualism dimension, Germany, like most industrial societies, has a mostly individualistic culture, which stands for an independent self. In individualistic cultures, independence, self-realization and one's personal opinion are considered important (Hofstede, 2001). This could suggest that intrinsic motivation might be viewed highly in studying and that, since independence is highly valued, self-regulation strategies might be used frequently.

Despite its high level of industrialization, a collectivistic culture is widespread in Japan. In contrast to individualistic cultures, which place a high importance on the individual person, collectivistic cultures highlight the community or society. Group membership, family orientation and care for others have a higher value in these cultures (Hofstede, 2001).

Studies of learning strategies in collectivistic cultures often test the hypothesis that students in these cultures are rather extrinsically motivated and passive learners who use surface strategies. This is usually connected with fear of failure due to expectations of parents and society in Confucian society. Studies like that of Pillay, Purdie and Boulton-Lewis (2000) or Chong (2007) support the idea that fear of failure and the desire to save face motivate the use of self-regulation strategies in Asian students.

However, this doesn't allow the conclusion that students from collectivistic cultures use only surface strategies in learning while those of individualistic cultures use deep strategies. Different studies, such as those from Zhu et al. (2008), Neber et al. (2008) and Chiu et al. (2007) show that there is no difference in the use of memorization by Asians and non-Asians. Even in studies where a difference was found (Purdie & Hattie, 1996; Zimmermann & Martinez-Pons, 1986), the use of memorization had no effect on the academic achievement. A study by Tran (2013) showed that many Asian students mentioned memorization as a learning strategy but didn't make a difference between memorization and understanding. According to this study, the subject matter was seen to be needed to be understood, before it could be memorized, or the students tried to understand the subject matter while memorizing. Authors like Biggs (1998) suggest that learning strategies

such as memorization, which are seen as surface strategies in western cultures, should not necessarily be seen so in Asian cultures.

Hypothesis 1: It is expected, as reported in Kurahashi-Friedmann (2016), that learning strategies in Japan and Germany differ

Hypothesis 2: It is expected, as Japanese are more eastern cultured, that self-efficacy and motivation are lower in Japanese students than in German students.

Hypothesis 3: It is expected that the inter-correlations between motivation and self-efficacy are similar in Germany and Japan

Hypothesis 4: There is no cultural influence of motivation and self-efficacy on learning strategies

2. Methodology

2.1 Research Model

The research model is a comparative and correlative model, which analyzes differences between Japanese and German students regarding expected correlations

2.2 Research Sample

276 Japanese students (200 male, aged between 18- and 23-years $M = 19.74$ years, $SD = 1.387$) and 275 German students (170 male, aged between 19 and 37 years, $M = 21.82$, $SD = 1.832$) joined the test. All were studying economics: the German students in the 4th semester ($M = 3.92$, $SD = 1.278$) and the Japanese in the 3rd semester ($M = 3.22$, $SD = 1.200$).

2.3 Data Collection Tools and Procedure

To assess learning strategies in the German sample, we used the inventory of learning strategies in higher education (LIST; Wild & Schiefele, 1994). It was developed as a translation and modification of the Motivation Strategies for Learning Questionnaire (MSLQ; Pintrich., Smith, García, & McKeachie, 1991). It assesses the three areas: cognitive, metacognitive and resource-based learning strategies. 12 scales are used: rehearsal (9 items), organization (10 items), elaboration (8 items), critical thinking (8 items), planning (4 items), control (7 items), time management (6 items), environment (5 items), literature (5 items), internet (6 items), effort management (8 items), collaboration (7 items) on a likert scale from 1 to 5. For motivational component assessment, the questionnaire of Wild, Krapp, Schiefele, Lewalter and Schreyer (1995) was used. It assessed different aspects of extrinsic and intrinsic motivation. Using 10 scales for this study, we picked out the four components that represent long lasting and short lasting intrinsic and extrinsic motivation: For long-lasting extrinsic motivation we used "material orientation", for long-lasting intrinsic motivation it was "professional orientation", short extrinsic motivation was represented by the scale "challenging competition" and short intrinsic motivation by the scale "studying interest". Both questionnaires were translated into Japanese and have sufficient reliability and validity (Gruber, 2011, Kurahashi-Friedmann, 2016). The assessment in both countries was done in groups tests, each consisting of 10 to 50 students. Everyone received eight pages consisting of the instruction, where the test procedure was described, a short questionnaire for demographic data (age, gender, studying subject and learning time), the questionnaire for learning strategies and thereafter the motivational questionnaire. Overall, this lasted about 45 to 60 minutes. The students didn't get any financial rewards but received candy as a little thank-you.

2.4 Data Analysis

We made a t-test for independent sample to analyze the difference of learning strategies, motivation and self-efficacy in Japanese and German students. Furthermore, we made Bravais -Pearson correlations and correlation comparisons. Thereafter, we made a regression analysis of motivations and self-efficacy on learning strategies to assess the influence. The power- analysis for both evaluation methods, showed in both cases with an medium effect of .3 sufficient power (1-ß = .94 for the t-test, and 1-ß = .99 for the correlations).

2.5 Ethical

In this study, all rules stated to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed.

3. Findings

The independent groups t test findings regarding the difference in learning strategies between students in Germany and Japan are presented in Table 1.

Table 1: *Difference of Learning Strategies Between Students in Germany (N = 275) and Japan (N = 276)*[2]

	Germany		Japan				
	M	*SD*	*M*	*SD*	*t(549)*	*p*	*d*
Rehearsal	3.274	0.666	3.326	0.895	-0.782	0.435	-0.039
Organisation	3.042	0.661	2.620	0.808	6.709	0.000	0.345
Elaboration	2.897	0.712	2.895	0.874	0.021	0.983	0.001
Critical thinking	2.873	0.719	2.480	0.831	5.946	0.000	0.341
Planing	2.330	0.791	3.028	0.890	-9.736	0.000	-0.621
Control	3.953	0.742	2.877	0.756	16.857	0.000	1.055
Time management	3.410	0.653	2.396	0.883	15.326	0.000	0.750
Environment	4.146	0.666	3.574	0.844	8.826	0.000	0.451
Literature	3.204	0.904	2.938	0.873	3.505	0.000	0.275
Internet	3.104	0.860	3.160	0.827	-0.781	0.435	-0.058
Effort management	3.088	1.000	3.168	0.788	-1.038	0.300	-0.101
Collaboration	3.731	0.672	3.175	0.796	8.853	0.000	0.470

The results show that there is no difference for rehearsal in German (M = 3.274, SD = .666) and Japanese students (M = 3.326, SD = .895, t (549) = -.0782, p = .435, d = -.039). There were furthermore no differences in elaboration ($M_{Germany}$ = 2.897, $SD_{Germany}$ = .712, M_{Japan} = 2.895, SD_{Japan} = .874, t (549) = 0.921, p = .983, d = .001), internet $M_{Germany}$ = 3.104, $SD_{Germany}$ = .860, M_{Japan} = 3.160, SD_{Japan} = .827, t (549) = -.781, p = .435, d = -.058), and effort management. German students show higher scores in organization ($M_{Germany}$ = 3.042, $SD_{Germany}$ = .661, M_{Japan} = 3.042, SD_{Japan} = .661, t (549) = 6.709, p = .001, d = .345), critical thinking ($M_{Germany}$ = 2.873, $SD_{Germany}$ = .719, M_{Japan} = 2.480, SD_{Japan} = .831, t (549) = 5.946, p = .001, d = .341), control ($M_{Germany}$ = 3.953, $SD_{Germany}$ = .742, M_{Japan} = 2.877, SD_{Japan} = .756, t (549) = 16.857, p = .001, d = 1.055), time management, environment ($M_{Germany}$ = 4.146, $SD_{Germany}$ = .666, M_{Japan} = 3.574, SD_{Japan} = .844, t (549) = 8.826, p = .001, d = .451), literature ($M_{Germany}$ = 3.204, $SD_{Germany}$ = .904, M_{Japan} = 2.938, SD_{Japan} = .873, t (549) = 3.505, p = .001, d = .275), and collaboration ($M_{Germany}$ = 3.731, $SD_{Germany}$ = .672, M_{Japan} = 3.175, SD_{Japan} = .796, t (549) = 8.853, p = .001, d = .470). Japanese students on the other hand have higher scores in planning ($M_{Germany}$ = 2.330, $SD_{Germany}$ = .791, M_{Japan} = 3.028, SD_{Japan} = .890, t (549) = -9.736, p = .001, d = -.621).
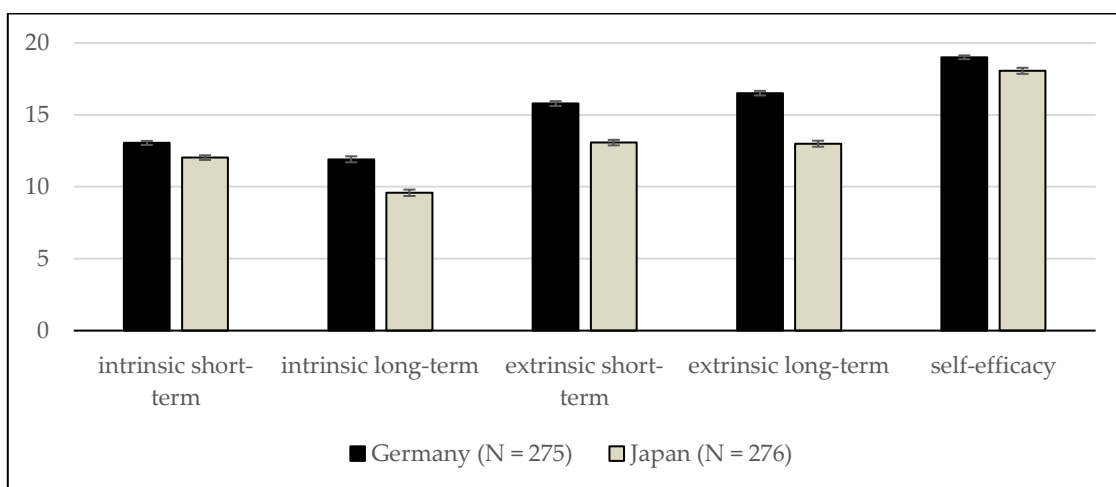

Figure 2: *Difference of Motivational Components and Self-Efficacy between Students in Germany (N = 275) and Japan (N = 276), Bars Represent Standard Errors*

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[2] Some of these results were already presented in Tomoko Kurahashi-Friedman's thesis

Figure 2 shows lower short-term intrinsic motivation in Japanese students (M = 11.967, SD = 3.650) than Germans (M = 13.051, SD = 3.585, t (549) = -3.515, p = 0.001, d = .276). Japanese are also lower in intrinsic long-term motivation (M = 9.551, SD = 2.642) than in the German students (M = 11.913, SD = 2.427, t (549) = -10.926, p = 0.001, d = .967). Even the extrinsic motivation is lower in Japanese students in short-term (M_{Japan} = 13.029, SD_{Japan} = 3.159; M_{German} = 15.789, SD_{German} = 2.871, t (549) = -10.733, p = 0.001, d = .921) and in long-term duration (M_{Japan} = 12.964, SD_{Japan} = 3.314, M_{German} = 16.513, SD_{German} = 2.645, t (549) = -13.636, p = 0.001, d = 1.166).

Japanese students have also a slightly lower self-efficacy (M = 18.044, SD = 3.626) compared with German students (M = 19.007, SD = 2.31, t (549) = 3.717, p = 0.001, d =.329).

Table 2: *Correlations of Self-Efficacy and Motivation in German (N = 275; above the diagonal) and Japanese Students (N = 276; beneath the diagonal)*

	1	2	3	4	5
1) Intrinsic short-term		.438**	.455**	.092	.315**
2) Intrinsic long-term	.474**		.445**	.416**	.237**
3) Extrinsic short-term	.475**	.566**		.321**	.252**
4) Extrinsic long-term	.267**	.615**	.529**		.132*
5) Self-efficacy	.376**	.334**	.364**	.317**	

Note: * p <.05, ** p <.01

Table 2 shows that the intercorrelations of motivation and self-efficacy are almost the same in both countries.

Table 3: *Beta-coefficients for the Regression Analysis of Motivation on Learning Strategies in Japanese students (N = 276) and German Students (N = 275)*

	German students (N= 275)						Japanese students (N= 276)					
	IS	IL	ES	EL	SEF	R^2	IS	IL	ES	EL	SEF	R^2
Rehearsal	.063	-.061	.240**	.026	.037	.056	-.040	.145°		.111	.064 .216**	.135
Organisation	.054	-.023	.095	-.067	.148*	.027	.152*	.172*		.009	-.096 .265***	.163
Elaboration	.185**	-.103	.012	.050	.248**	.096	.233***	.100		-.004	.032 .245***	.208
Critical thinking	.190**	-.101	-.001	.035	.268**	.106	.202**	.033		.042	-.049 .177**	.098
Planing	.242**	-.026	-.042	-.135	.205**	.108	.226**	.208**		-.064	-.012 .188**	.184
Control	-.074	.056	.216**	.071	.220***	.120	.128	.149*		.011	-.029 .258***	.154
Time management	.094	.133*	.084	.041	.347***	.238	.164*	.088		.083	-.007 .138*	.111
Environment	-.059	.127	.166*	.031	.050	.049	-.008	.113		-.015	.132 .266***	.138
Literature	.090	.011	.094	.075	.155*	.066	.191*	.140°		-.008	.037 .267***	.219
Internet	-.035	.082	-.011	.017	.024	.001	.085	.116		.125	.055 .154*	.142
Effort management	.096	.072	.054	-.060	.144*	.047	.124*	.142*		.107	.006 .375***	.329
Collaboration	.119°	.014	.248***	.049	.293***	.256	.057	.202**		-.039	.079 .307***	.216

Note: IS = intrinsic short-term, IL = intrinsic long-term, ES = extrinsic short-term, EL = extrinsic long-term, SEF = self-efficacy, °= p = .05, * = p <.05, ** = p <.01, *** = p <.001

In table 3 the assumption is tested that motivation and self-efficacy influence learning strategies. The results show that German as well as Japanese students who are intrinsic short term motivated use critical thinking, planning, and elaboration; Japanese students who are long term intrinsic motivated use more rehearsal, organization, elaboration and planning compared to German students. Especially long-term motivation has less influence on learning strategies in Germany compared to Japan. In Germany, there is also a clear connection of extrinsic motivation and rehearsal, as assumed. This is less seen in Japan. Here, intrinsic motivated people also use rehearsal. In a similar way, collaboration is used in Germany when people are short term extrinsic motivated, but it is used in Japan when students are intrinsic long term motivated.

4. Conclusion and Discussion

First, it was tested if as reported in Kurahashi-Friedmann (2016), that learning strategies in Japan and Germany differ. The results mostly confirm our hypothesis that learning strategies in Japan and in Germany differ. Like in Kurahashi-Friedmann (2016), the only learning strategies which were similar in both countries were rehearsal, elaboration, use of internet and effort management. The similarities in rehearsal were already described by various authors (Zhu et al., 2008; Neber et al., 2008; Chiu et al., 2007). Kurahashi-Friedmann

(2016) tries to explain the differences that were found in each individual learning strategy that was examined. Overall, we can assume that many differences in learning strategies come from differences in the learning culture of both countries. For example, the Japanese method of instruction doesn't give room for critical thinking. Instead, students are expected to respect the opinions of others, especially those of higher rank (instructors). This can possibly be traced back to the Confucian philosophy (Kurahashi-Friedmann, 2016). However, differences in learning strategies can perhaps also be explained by different ways classes are organized (Kurahashi-Friedmann [2016] describes weekly schedules which are distributed to Japanese pupils that may accustom them early to the learning strategy of planning) or simply by the usual way of living in both cultures (Kurahashi-Friedmann [2016] states that Japanese students often have smaller living spaces than their German counterparts and thus may place less importance on a good learning environment). Another explanation for the differences in learning strategies may be the difference in test styles in Germany and in Japan. While the tests in Germany often require pupils and students to produce their own texts and state their own opinions (which would require more critical thinking and organization), tests in Japan are often multiple choice or require pupils or students to reproduce that which was learned. Kurahashi-Friedmann (2016) explains similarities in learning strategies such as rehearsal partly through the fact that the benefits of these strategies have been given more attention in western education in the past years.

Next it was expected, as Japanese are more eastern cultured, that self-efficacy and motivation are lower in Japanese students than in German students. This was also found. Japanese showed both lover short-term and long-term intrinsic and extrinsic motivation than German students. Also the self-efficiacy was lower. This could be explained due to the cultural context (Hofstedte, 2001). In the German culture there is more self-efficiacy and more ego orientation, in Japane as an example for eastern culture there is more social orientation.

It was expected that the inter-correlations between motivation and self-efficacy are similar in Germany and Japan, which speaks for the validity of both instruments in Germany and Japan. Gruber (2011) tested the validity of the motivation scales for both German and Bachelor and Master students and found this structure to be valid. Also Justus (2011) tested this in Russian context and found the structure to be valid. There should high intercorrelations of intrinsic and extrinsic scores especially with self-efficacy.

Last, it was expected that there is no cultural influence of motivation and self-efficacy on learning strategies. This could only particularly be attested. According to Biggs (1979) as well as Entwistle and Ramsden (1998), intrinsic motivation should be correlated to metacognitive and deep cognitive learning strategies as well as planning, while extrinsic motivation should be related to rehearsal. In part it was found, that both groups German and Japanese students, who use critical thinking, planning and elaboration, which speaks for the assumptions of Biggs (1979) and Entwistle and Ramsden (1998). A special result was that Japanese students also use rehearsal when they are intrinsic motivated, while in Germany only extrinsic motivated students use rehearsal strategies. This may also cause on the educational system. In Japan people learn better from rehearsal, when they want to know things deeply like they do calligraphy or other exercise to get the meaning of a word deeply. This is also similar what Tran (2013) found, that many Asian students mentioned memorization as a learning strategy but didn't make a difference between memorization and understanding. So the before something can be understood it should be memorized.

So the assumptions of Biggs (1979) Entwistle and Ramsden (1998), which are inspired from western culture, fit better to German than to the Japanese context. Furthermore there were clear differences of collaboration. Collaboration was more used in Japanese than in German students when they were intrinsic motivated. This may also cause on the fact that Japanese is based on eastern culture of collaboration and therefore they also use collaboration to get a deeper insight into things.

5. Recommendations

In summary, It was found that German and Japanese students differ from the fact how they learn and how they learn, when they are different motivated. Culture here has an influence not only on the choice of learning strategies but also on underlying motivational components

Especially it was found that Japanese show less self-efficacy and more social learning. This can be traced back to a more social character of the eastern culture compared with Germany, which is western culture. It is also interesting to note that Western concepts such as the deep and surface approach (Biggs, 1979; Entwistle &

Ramsden, 1983) can only be partially transferred to Eastern culture. Moreover, in concordance with other research findings, it was shown that the strategy of repetition in particular plays an essential Role in the Asian region (Zhu et al, 2008; Neber et al., 2008; Chiu et al., 2007). This could be an impetus for further research, for example in the primary area in schools, how learning strategies already differ between Western and Eastern culture. In addition, a broader comparison between other cultures, such as America or China, would also be useful.

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