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# Being a first-year student during the COVID-19 pandemic

## Abstract

Starting with the summer term of 2020, most higher education programmes in Germany could only be offered digitally due to the Corona pandemic. For some students, this situation can be problematic for various reasons such as technical problems or psychosocial challenges. So first-year students in particular need to be generally supported in coping with the challenges of HE and especially for the challenges of teaching online. Self-efficacy is an important personal resource that helps people to manage subjective stress and to deal with challenges that arise from a situation such as distance learning. In this context, the effectiveness of a social-cognitive intervention to increase self-efficacy in a distance setting was tested. The intervention is intended to influence the assessment process of challenging situations.

## Keywords

self-efficacy, higher education, first-year students, intervention

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# 1 Introduction

Often, discussions about the disruptive transformation of teaching and learning during COVID-19 centre on innovative and experimental pedagogies and, most importantly, digital technologies. However, the radical change to online distance learning has implications beyond teaching and learning processes, requiring students to become more self-directed and bringing the danger of social isolation (e. g., HAMZA, EWING, HEATH & GOLDSTEIN, 2021; TRAUS, HÖFFKEN, THOMAS, MANGOLD & SCHRÖER, 2020). In this paper, we present our effort to provide support for first-year students whom we considered particularly challenged by total online distance learning. We developed a relatively small-scale intervention intended to support students' self-efficacy to deal with the challenges of studying in general and exams in particular.

The transition to higher education (HE) has always been a challenge (CLERCQ, MICHEL, REMY & GALAND, 2019). A variety of factors, such as uncertainty about one's own study financing or negative experiences with social and academic integration, can generate stress for beginning students impact future academic performance, and even lead to dropout (ISLEIB, WOISCH & HEUBLEIN, 2019). Coping with a university education, therefore, requires not only the development of appropriate cognitive and metacognitive skills, but also those such as resilience and psychological resistance (FUGE, 2016). Such skills can be acquired and actively influenced through the interaction between students and their environment (BANDURA, 1997). In this regard, the increasing heterogeneity of students represents a further challenge in the study entry phase. Depending on their personal background and resources such as cognitive and self-regulation capabilities, motivation and self-efficacy, students experiences study related challenges very differently (CLERCQ, JANSEN, BRAHM & BOSSE, 2021; BRAHM et al., 2014).

The radical (i. e., instantaneous, and total) change to online distance learning during the COVID pandemic requires a high level of motivation, effort and perseverance on the students' part (DELEN & LIEW, 2016). Thus, while the Corona pandemic acted as a catalyst for developing and implementing open distance learning formats, it also brought the risk of exacerbating the challenges of the transition to HE. In particular, it can be assumed that the 'Corona mode' of studying has increased existing inequalities between students' personal prerequisites for studying (such as resilience

to stress, motivation, or being able to cope with study-related anxiety). As online settings offer less social and spatial structure, they require more self-regulation and motivation, and at the same time, make it harder to access peers or other support structures such as counselling. These challenges apply especially to those students, who began their studies in the ‘Corona mode’ and, therefore, had not had the chance to build a peer network and orient themselves in the world of studying. We therefore assume that a transition phase that has to rely purely on online distance learning will increase inequalities among students and further penalize already disadvantaged students.

To mitigate such developments, we designed and tested an intervention that would support first-year students by increasing their study-related self-efficacy. The aim was for the intervention to be applicable to the conditions of online distance learning and to fit the context of a large cohort of first-year management students. The results of our controlled intervention study show that the intervention did not have a significant effect for the overall student cohort. Analysing different student subgroups, however, we found statistically and practically significant effects showing that disadvantaged students benefitted from the intervention.

In this paper, we first argue for the importance of self-efficacy for a successful transition to HE. We then report on our study, investigating the effects of a brief online intervention to support students’ self-efficacy. Finally, we discuss our findings, stressing that (a) the fit between the characteristics of student subgroups and an intervention is key to its effectiveness and that (b) the discourse on pedagogical ‘innovation’ in the wake of the Corona pandemic should not overlook the potential dangers and inequalities that may also arise.

## 2 Self-efficacy as a core resource for beginning students

The transition phase confronts first-year students with various challenges, which can lead to stress. In addition to external objective conditions, however, stress primarily arises from the processing and evaluation of situations in a person's subjective thinking and perception (EISELE, 2016). Accordingly, the challenges in the study entry phase are only perceived as threatening if not enough individual coping resources are available or can be applied (FUGE, 2016). In this context research on the transition to HE has tackled both preventive and interventional interventions in order to reduce dropout risks and support academic achievement. Psychological resources such as motivation, positive emotions, and self-efficacy play a special role in possible measures (BRAHM, JENERT & WAGNER, 2017). Self-efficacy, in particular, is regarded as a powerful resource to help students cope with challenges in their study environment (e. g., BRAHM et al., 2014). According to BANDURA (1997), self-efficacy is understood as a person's conviction that he or she can successfully overcome challenges and difficult situations by his or her own efforts. It can be influenced by verbal beliefs and the perception of one's own feelings (BANDURA, 1997). VAN DINTHER, DOCHY AND SEGERS (2011) analysed that those interventions based on BANDURA's (1997) social cognitive theory demonstrated greater effects in terms of influencing self-efficacy in students.

Self-efficacy has been identified as a personal resource for coping with stressors and, consequently, in various studies as a central resource for successfully overcoming challenges during studies (BRAHM et al., 2014; JERUSALEM & SCHWARZER, 1992; KOMARRAJU & DIAL, 2014). For example, it is noted that high self-efficacy is related to intrinsic motivation and low self-efficacy is associated with test anxiety (PRAT-SALA & REDFORD, 2010). Furthermore, HSIEH, SULLIVAN, SASS & GUERRA (2012) consider that there is a direct relationship between test anxiety and self-efficacy. In addition, self-efficacy is highlighted as a moderator of coping with stressors (MAITZ, 2012).

In the context of an investigation regarding the tendency to drop out of studies, self-efficacy was found to be a significant main effect for the perceived difficulty in studying (FELLENBERG & HANNOVER, 2006). In addition, the self-efficacy expectancy could be identified as a significant mediator for a tendency to change the

study program due to study difficulties (FELLENBERG & HANNOVER, 2006). For the context of business education JENERT & BRAHM (2021) found self-efficacy to be a main factor distinguishing different student subgroups. Moreover, the level of self-efficacy at the beginning of their studies was predictive for students' achievement throughout the first year in HE (WAGNER & BRAHM, 2017; BRAHM et al., 2014; JERUSALEM & SCHWARZER, 1992).

All in all, previous research suggests that self-efficacy is a powerful resource for first year students to cope with the challenges of the transition phase. Considering that the 'Corona mode' adds hitherto unknown challenges, we argue that supporting students' self-efficacy could be a fruitful way to mitigate negative effects of radical online distance education.

## **3 Present study**

### **3.1 Research question and hypothesis**

Intervention studies often find that positive effects occur only among subgroups that are classified as 'at-risk' based on prior performance or, for example, demographic characteristics (SCHWARTZ, CHENG, SALEHI & WIEMAN, 2016). For example, it can be hypothesized that interventions that focus on self-efficacy will increasingly target those with lower levels of self-efficacy. According to JERUSALEM & MITTAG (1994), students who indicate low self-efficacy expectancies interpret failure internally, which in turn influences a person's expectations of success, resulting in increased anxiety about future testing (SATOW, 1999).

Therefore, the present study addresses two questions: 1. Can first-year students be divided into different groups based on their study-related self-efficacy? 2. Can first-year students with disadvantageous study preconditions benefit from an intervention?

### 3.2 The intervention

Our study was designed as classical 2x2 (pre- and post-test, intervention, and control-group) design. We developed a self-efficacy intervention and a dummy intervention on reading strategies, both of which comprised a duration of approximately one hour. Each intervention was divided into three phases. The first phase aimed at motivating the first-year students and gaining their interest in the current training. The second phase was the main component. Here the theory was explained to the freshmen and the direct implementation and application of the presented method was performed. The third phase was used for collective reflection.

The focus of the intervention is on positive self-verbalization, in which negative thoughts and evaluations regarding the upcoming exams are to be identified and reformulated. The underlying social cognitive model assumes that emotions and behaviours of individuals are influenced by the interpretation and perception of a situation (EINSLE & HUMMEL, 2015). The basis of this training is the rational-emotive behavioural therapy of ELLIS & HOELLEN (2004), in which the focus is less on knowledge and more on the attitude of a person in the context of the development of emotions (SPÖRRLE, 2006). The intervention, therefore, motivates students to express their concerns about study-related situations that create stress and anxiety, such as exams. To increase their self-efficacy expectancy and reduce anxiety, they are then asked to formulate self-affirmative messages and expectations of success (SATOW, 1999). Both ERGENE (2003) and FLIEGEL (2011) were able to demonstrate effects on the reduction of anxiety through cognitive restructuring with positive self-verbalization.

## 4 Method

We collected data in a quasi-experimental control group design at two measurement points. The data were recorded by an online questionnaire for first-year business students at a German university. The first data collection took place at the beginning of the first-year students' lectures in November 2020, the intervention was implemented in January 2021, and the second data collection took place after the intervention in January/February 2021, but before the examination period.

### 4.1 Participants and Procedure

The study was based on a total sample of 521 first-year students at the Department of Business Administration and Economics at a German university, where 705 freshmen started their studies in the respective year. The students participated in a peer mentoring program, whereby they were divided into small groups. Based on these groups, they were randomly assigned to the treatment and control groups, resulting in a quasi-experimental study design. The interventions were conducted in small groups of 7 to 17 participants in a digital environment. The pre-test was completed by the participants at the beginning of the study, the intervention was implemented before the examination phase, and the post-test was conducted after the intervention and before the examinations. For the pre-test 340 (65%) and for the post-test 197 (38%) data sets could be analysed.

### 4.2 Measures and Analysis

The data were analysed using SPSS and MPlus. To check the reliability of the scales, discriminatory power and reliability analyses were carried out. For the social integration scale, one item was not included in the analyses due to insufficient discriminatory power. Furthermore, correlation analyses were carried out. For differences between the groups, both t-tests and ANOVAs were performed. To identify different student subgroups, a latent class analysis (LCA) was conducted.

The questionnaire uses psychometric scales which are rated with 6-point Likert scale. Digital media self-efficacy is included as an important control variable for the developments and possible impact of the intervention on the academic self-efficacy.

Table 1: Scales used in the questionnaire

Scale	Items	Source		Cronbach's $\alpha$	
			Cronbach's $\alpha$	<i>t 1</i>	<i>t 2</i>
Study-related anxiety	3	Assessment of Students' Attitudes towards Studying (ASAtS), (BRAHM & JENERT, 2015)	.61-.79	.75	.67
Self-efficacy (SE)	5	ASAtS	.72-.79	.75	.83
Extrinsic motivation	3	ASAtS	.63-.73	.67	.76
Intrinsic motivation	3	ASAtS	.73	.81	.86
Task-value	3	ASAtS	.7-.72	.65	.59
Digital media SE	7	PUMPTOW & BRAHM, 2020	.92	.89	.92
Atmosphere among students	4	ASAtS	.68-.78	.65	.68
Social integration	6	CHE-Quest, Leichsenring, Sippel, & Hachmeister, 2011	.76	.82	.84

## 5 Results

### 5.1 Descriptive Analysis

For the longitudinal evaluations, 136 (26%) data sets can be used. The descriptive data of the samples regarding socio-demographics are presented in Table 2. In spite of the slightly different percentages between the groups in terms of migration background and an academic parental home, no significant differences were found.



Table 2: Sample description of both groups

Variable	Intervention group ( <i>n</i> = 81)	Control group ( <i>n</i> = 55)	Total ( <i>n</i> = 136)
Gender distributions	62% female/ 38% male	56% female/ 44% male	60% female/ 40% male
Mean age <i>M</i> ( <i>SD</i> )	19.68 (2.0)	20.04 (2.5)	19.82 (2.2)
Migration back-ground	38%	24%	33%
Parental home academics (at least one parent academic)	34%	42%	37%
Completed vocational training	19%	16%	18%

## 5.2 General mean differences

The following table shows the significant general developments of the psychometric constructs from the pre-test to the post-test. While there are important developments over time, we found no significant differences between the treatment and the control group.

Table 3: General mean differences Pre- and Posttest

Variable	T1		T2		t	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Task-value	5.08	0.79	4.68	0.76	5.224**	0.913
Digital media self-efficacy	4.07	0.98	4.46	0.99	-5.087**	0.886
Study-related anxiety	3.44	1.08	3.86	1.00	-4.772**	0.824
Atmosphere among students	4.92	0.78	4.63	0.99	3.563**	0.686
Intrinsic motivation	4.34	0.91	4.16	0.99	2.138*	0.371
Self-efficacy	4.12	0.78	4.01	0.91	1.547	0.130

\*\*  $p < .01$ ; \*  $p < .05$

### 5.3 Latent class analysis

Overall, we found no significant differences between the treatment and control groups regarding their development over the semester. As we had aimed our project at 'disadvantaged' students, we wanted to test whether those particular students might profit from the intervention. Therefore, we conducted further analysis, using latent class analysis to identify subgroups of students. The LCA was conducted to divide the first-year students into subgroups based on their self-efficacy and to identify possible differences based on this. As the following table shows, in the present sample the 2-class solution fits best to the data of the first measurement time point. The model quality was evaluated based on the BIC value<sup>2</sup>.

<sup>2</sup> BIC = Bayesian Information Criterion

Table 4: Relative Model-fit of the LCA

	<b>2-Class-Solution</b>	<b>3-Class-Solution</b>	<b>4-Class-Solution</b>
BIC	<b>5064.204</b>	5120.481	5236.019
LMR <sup>3</sup> (p-Value)	<b>p&lt;.001</b>	p=.5366	p=.7699
BLRT <sup>4</sup> (p-Value)	<b>p&lt;.001</b>	p<.001	p<.001

The assignment probability to the different classes also provides acceptable values, as shown in the following table. Therefore, in the end, the analysis was continued with two classes.

Table 5: Probability of assignment to the different classes by class membership in the 2-class solution

	<b>Class 1 assignment</b>	<b>Class 2 assignment</b>
Class 1 membership	<b>0.946</b>	0.054
Class 2 membership	0.068	<b>0.932</b>

## 5.4 Intervention effects in the two student sub-groups

Regarding the effects of the intervention, a univariate ANOVA, showed a slide increase for the lower self-efficacy class in the treatment group (t1: M=3.66; t2:M=3.71), but a slide decline in the control group for the lower self-efficacy class (t1:M=3.75; t2:M=3.73). The increase for the lower self-efficacy class in the treatment group was significant. For the higher self-efficacy classes in the treatment group (t1:M=4.75; t2:M2=4.42) as well as in the control group (t1:M=4.72; t2:M=4.34), self-efficacy decreases significantly. So, only for the higher self-efficacy classes, the time factor seems to have led to significant mean differences ( $F[1,55]=14.54$ ,  $p<.01$ , partial  $\eta^2=.0.209$ ).

3 LMR = Vuong-Lo-Mendell-Rubin Likelihood Ratio Test

4 BLRT = Parametric Bootstrap Likelihood Ratio Test

Table 6: Development of the variable self-efficacy based on the LCA classes

LCA group	Intervention group				Control group				time x group	
	T1		T2		T1		T2			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Higher self-efficacy	4.75	0.33	4.41	0.80	4.73	0.64	4.38	0.80	5.19	.025
Lower self-efficacy	3.63	0.68	3.74	0.89	3.75	0.53	3.73	0.91	2.302	.135

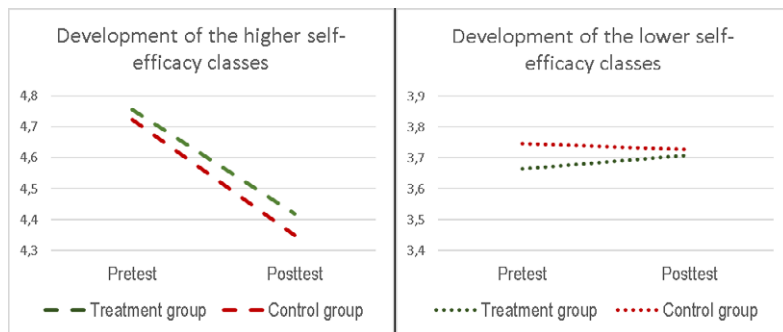


Figure 1: Differences by subclasses based on self-efficacy

Looking into the characteristics of the two groups, the subgroup with lower self-efficacy shows a significantly higher proportion of women but no significant differences on some of the other sociodemographic characteristics

Table 7: Descriptive descriptions of the class with higher and lower self-efficacy in comparison (SE= self-efficacy)

	Percentage of the respective class	
	Higher SE ( <i>n</i> =58)	Lower SE ( <i>n</i> =78)
Male	44.8% ( <i>n</i> =26)	37.2% ( <i>n</i> =29)
Female	55.2% ( <i>n</i> =32)	62.8% ( <i>n</i> =49)
With Migration background	31% ( <i>n</i> =18)	33.3% ( <i>n</i> =26)
Parental home academics (At least one parent academic)	37.9% ( <i>n</i> =24)	32% ( <i>n</i> =25)
Completed vocational training	19% ( <i>n</i> =11)	16.7% ( <i>n</i> =13)
Gainfully employed students	43.1% ( <i>n</i> =25)	41% ( <i>n</i> =32)

## 6 Discussion and conclusion

We started our research based on the theoretical argument that the total online distance mode of studying during the COVID-19 pandemic would exacerbate existing inequalities in the personal resources of first-year students. Many of the findings of our intervention study tie in well with previous research on student transition as well as theoretical frameworks dealing with the relationship between human agents and their environment such as social cognitive theory.

First, the longitudinal developments between the pre- and post-tests results indicate that generally students' stress level increases before the exam phase and that self-efficacy, i. e., the ability to cope with upcoming challenges, decreases. As already shown in other studies (e. g., BUSSE, 2013; BRAHM et al., 2017), students' intrinsic motivation decreases before the exams, and the study-related anxiety increases significantly. This shows the close relationship between situational aspects of the study context and students' psychosocial developments. Furthermore, our results emphasize once more that examinations play a crucial, albeit negative, role for the development of personal resources in a digital semester.

Second, our study shows that defining subgroups of students based on their self-efficacy, reveals significant differences regarding further personal characteristics and resources. Here, two findings are of particular interest and should be further discussed. On the one hand, students are not distributed equally between the two subgroups. In our study, female students are overrepresented in the subgroup with lower self-efficacy which overall had less overall psychological resilience and resources and was more challenged. This is in line with previous research on female students in business and economics contexts (e. g., WAGNER & BRAHM, 2017; BRAHM et al., 2014). While women tend to exhibit lower self-efficacy expectancy, the finding that specific sub-groups are disadvantaged in a study context can inform a reflexive and critical discussion regarding the structures and the culture within a study program, respectively an academic subject.

Third, with the help of a specific intervention, the group with lower self-efficacy can be supported in such a way that self-efficacy increases here. In neither the control nor the treatment group with higher self-efficacy could an increase in self-efficacy be determined. The subgroup with lower self-efficacy seems to be generally more insecure at the beginning of the study since anxiety is clearly higher here than in the subgroup with higher self-efficacy. At the same time, this group seems to have been more responsive to the intervention. This indicates that a supportive intervention should be tailored to the needs of a specific target group in order to achieve an effect. This finding supports the notion that research on learner development in general and student transition in particular should put an emphasis on the interaction between individual and contextual diversity (CLERCQ et al., 2021). In our case, we may assume that the students in the lower self-efficacy subgroup are more responsive to the kind of intervention we designed, i. e., they are more willing and able to reflect about their challenges, anxieties, and resources as they are confronted with such notions. Thus, the personal characteristics, which in this specific first-year context may be rather detrimental, could turn into a resource.

Finally, our study may also contribute a critical perspective to the discourse on ‘innovative’ pedagogies originating during the COVID-19 pandemic. Regarding the two subgroups identified in our studies, the online distance situation was a bigger challenge for those students in the lower self-efficacy subgroup. The lack of social contact and the need to deal with a very uncertain and novel learning environment on top of the general stress of transitioning to HE penalizes those with less psycho-

social resources. This may easily be overlooked in situations such as the COVID pandemic, where innovation has to be rapid and often improvised to cope with the imminent crisis. Our research shows that it is important to focus not only on immediate problem solutions, i. e., developing working online distance settings, but also keep an eye on non-intentional side-effects of such innovations.

Thus, the discussion of pedagogical innovation should never omit the perspective of learner resources and inequalities. Specific pedagogies and technology-enhanced learning environments may be great from an educational design point of view; not addressing student prerequisites and heterogeneity, however, brings the danger of exacerbating inequalities. This should be kept in mind as at least one generation of future freshmen will have experienced extended periods of distance learning during their school days. On a positive note, our research established that a relatively small intervention offers the possibility of supporting disadvantaged subgroups and mitigate negative effects of online distance education in the study entry phase.

## **6.1 Limitations**

The present study could not prove that our intervention influenced the overall treatment group in terms of self-efficacy. Similarly, a study using positive self-verbalization (comparable with our approach) found no significant effects (MAITZ, 2012). Only by distinguishing between groups of higher and lower self-efficacy by means of the latent class analysis, effects could be observed in those who showed lower self-efficacy at the beginning of this study. As discussed above, we consider this finding to be theoretically valid and important; yet it could also be seen as a limitation.

Furthermore, experimental mortality (BORTZ & DÖRING, 2016) may have had an impact on the results. It is possible that only participants motivated to participate in the intervention completed the questionnaire at the second measurement time point. In this case, the identified effects would result from non-random panel mortality rather than the intervention. We addressed this issue by comparing demographics between the measurement points, finding no significant differences. It still remains to be considered when interpreting the results. Since only two measurement points are currently available, individual developments cannot be mapped well, which makes it difficult to take measurement errors into account. The interpretation of the

developments must therefore be evaluated with caution. The panel under investigation only includes business and economics students. Considering the relationship between person and context discussed above, the intervention may well have different effects in other contexts.

## **6.2 Future research avenues and implications**

The effectiveness of an intervention “depends on a precise understanding of people’s psychological reality – what it is like to be them and how they construe themselves and their social world” (WALTON, 2014). Certainly, due to the new context of the Corona pandemic, further research should be conducted on the learning and motivational processes in this context to understand the background and, based on the findings, another intervention to support the study entry phase should be developed.

Against the current backdrop of the Corona pandemic, the study provides the opportunity to make teaching and the start of studies easier for first-year students by offering more communication and exchange opportunities. A more in-depth analysis of other aspects of digital teaching could provide further insights into the design of first-year courses under pandemic conditions. The digital transformation of universities in general, and the digital semester in particular, therefore, require active involvement and commitment to improve the collaboration between teachers and students in order to reduce the barriers to entry for first-year students and prevent dropout. Furthermore, programs should be developed that specifically address those first-year students who start their studies with lower self-efficacy and other associated weaker personal resources.



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## Appendix

Table 8: Differences between the treatment and the control group (ANOVA)

Variable		Treatment group		Control group		F	p
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Study-related anxiety	T1	3.4	1.01	3.47	1.18	0.159	.691
	T2	3.96	1.01	3.7	0.96	2.264	.135
Self-efficacy (SE)	T1	4.09	0.79	4.19	0.76	0.498	.482
	T2	4.02	0.91	4.02	0.91	0.001	.980
Extrinsic motivation	T1	3.84	1.21	3.96	1.22	0.344	.558
	T2	3.98	1.29	.87	1.18	0.265	.608
Intrinsic motivation	T1	4.39	0.95	4.28	0.84	0.504	.479
	T2	4.19	0.95	4.11	1.06	0.241	.624
Task-value	T1	5.01	0.88	5.14	0.62	0.861	.355
	T2	4.71	0.74	4.64	0.788	0.285	.594
Digital media SE	T1	3.94	1.03	4.25	.86	3.298	.072
	T2	4.42	1.06	4.51	0.86	0.272	.603
Atmosphere among students	T1	4.98	0.71	4.74	0.86	2.680	.104
	T2	4.57	1.02	4.64	0.95	0.129	.720
Social integration	T1	3.54	1.2	3.74	1.19	0.819	.367
	T2	3.55	1.33	3.65	1.2	0.159	.691

Table 9: Mean differences in study-related anxiety across the subclasses for higher and lower self-efficacy (SE)

Subclass	T1 (M/ SD)	T2 (M/ SD)	t	Cohen' s d
Higher SE	2.97/1.03	3.54/1.14	-3.972**	0.522
Lower SE	3.79/0.99	4.1/0.81	-2.808**	0.32

\*\* p<.01; \* p<.05