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Nils Sagolla, Andreas Seifert, Carla Bohndick & Heike M. Buhl

Skills Help, but They Don't Help All at Once: Changes in the Relationship Between Study-Relevant Skills and Student Stress as Well as Study Satisfaction During the First Two Years of Teacher Education

Abstract

Despite substantiated knowledge on study-relevant skills predicting academic achievement, it remains open whether the importance of study-relevant skills changes after the first year of study. In order to investigate this issue, the relationship of study-relevant skills and student stress, study satisfaction and dissatisfaction with study conditions was analyzed in a repeated-measures design of N = *144 teacher training students studying in their first and third year at university. Comparisons show that the relevance of study-relevant skills differed significantly over time for student stress and study satisfaction, but not for dissatisfaction with study conditions. Most notably, over time the importance of cooperation declined, whereas coping with stress and procrastination gained relevance. Implications for curricular planning, student instructions and student counselling are discussed.*

Corresponding Author: Dr. Nils Sagolla, Department of Educational Psychology and Developmental Psychology, University of Paderborn, Warburger Str. 100, 33098 Paderborn, Germany
e-mail: nils.sagolla@dialogueatwork.de, ORCID: 0009-0008-6197-354X

Dr. Andreas Seifert, Department of Educational Psychology and Developmental Psychology University of Paderborn, Warburger Str. 100, 33098 Paderborn, Germany
e-mail: andreas.seifert@uni-paderborn.de, ORCID: 0009-0008-4232-4077

Prof. Dr. Carla Bohndick, Hamburger Zentrum für Universitäres Lehren und Lernen (HUL), Universität Hamburg, Jungiusstraße 9, 20355 Hamburg, Germany
e-mail: carla.bohndick@uni-hamburg.de, ORCID: 0000-0003-1079-8098

Prof. Dr. Heike M. Buhl, Department of Educational Psychology and Developmental Psychology, University of Paderborn, Warburger Str. 100, 33098 Paderborn, Germany
e-mail: heike.buhl@uni-paderborn.de, ORCID: 0000-0002-1001-492X

Keywords
Teacher training student, first-year student, study-relevant skills, study satisfaction, student stress

Fähigkeiten helfen, aber sie helfen nicht alle auf einmal: Veränderungen im Zusammenhang zwischen studienrelevanten Fähigkeiten und studentischem Stress sowie der Studienzufriedenheit während der ersten beiden Jahre des Lehramtstudiums

Zusammenfassung
Trotz fundierter Erkenntnisse darüber, dass studienrelevante Fähigkeiten Prädiktoren für den Studienerfolg sind, bleibt offen, ob sich die Bedeutung studienrelevanter Fähigkeiten nach dem ersten Studienjahr verändert. Um diese Frage zu untersuchen, wurde der Zusammenhang zwischen studienrelevanten Fähigkeiten und studentischem Stress, der Studienzufriedenheit sowie der Unzufriedenheit mit den Studienbedingungen in einem messwiederholten Design mit bei N = *144 Lehramtsstudierenden im ersten und dritten Studienjahr analysiert. Die Ergebnisse zeigen, dass sich die Relevanz studienrelevanter Fähigkeiten im Zeitverlauf für studentischen Stress und Studienzufriedenheit signifikant verändert. Insbesondere nimmt die Bedeutung der Kooperation im Laufe der Zeit ab, während der Umgang mit Stress und Prokrastination an Relevanz gewinnen. Implikationen für die Lehrplanplanung, die Studierendenberatung und die Studienberatung werden diskutiert.*

Schlagworte
Lehramtsstudierende, Studienanfänger, studienrelevante Fähigkeiten, Studienzufriedenheit, studentischer Stress

1. Introduction

Due to the continuing shortage of teachers in schools, universities need to find ways to maintain the rate of graduates that are suitable to manage the demands needed on the job. This can be either achieved by making more efforts to recruit new students or by focusing on those students who have already decided on teaching as a career, but do not succeed in their studies. Student dropout is a common occurrence in teacher education. For example, the dropout rates in German samples of teacher education are sizable for bachelor studies (10% to 20%), master studies (16%) and teacher induction programs (16%) alike (Gülen, Müller & Schmid-Kühn, 2023; Heublein, Hutzsch & Schmelzer, 2022; Statistisches Bundesamt, 2022). Moreover,

student dropout is often caused by achievement-related issues. For example, 49% of students affected by an actual dropout of study, named achievement-related issues as the main reason to leave their study programs (Heublein & Wolter, 2011). Therefore, teacher training can contribute meaningfully to the challenge of graduating more teacher training students, by enabling students to finish their studies. Due to the fact that student dropout in teacher training is an ongoing phenomenon, challenges for first-year students who are still adapting to the demands of a study have to be addressed as well as challenges for students who have already mastered the initial hurdles and still need to continue their studies successfully. In order to enable students to be successful in their studies, skills that relate to academic achievement (i.e. study-relevant skills) play an essential role, as they can be integrated into the curriculum of a study. Several study-relevant skills such as learning strategies, cooperation, coping with stress and low procrastination have been identified to have a positive impact on academic achievement (Richardson, Abraham & Bond, 2012). Similarly, learning strategies, social competence, self-control and resilience are relevant factors for student retention (Brandstätter, Grillich & Farthofer, 2006; Schiefele, Streblow & Brinkmann, 2007). With respect to teacher students it is important to note that these competencies are important beyond studying as they are also necessary to meet the professional demands of a teaching career.

Even though, there is a substantial knowledge of factors contributing to student success in general (e.g. Schneider & Preckel, 2017), there is still a lack of understanding of students' experience regarding these factors. This shortcoming is especially relevant when promoting study-relevant skills in teacher education. From a student's viewpoint, study-relevant skills may help to mitigate student stress, increase study satisfaction and they may even help to decrease dissatisfaction with study conditions. Thus, studies addressing these relationships are equally important for curricular planning, lecturers and student counseling. Furthermore, these relationships may change over time, because first-year students are in different study situations than advanced students. Since existing research largely builds on cross-sectional studies there is a lack of research on differences between beginning and advanced students in general. Using a repeated-measures design allows for a distinct comparison of students' educational needs over time. From a practical viewpoint these findings help to adjust educational offers more closely to the educational needs of students. Also, student counseling benefits of these findings as well as they also help to better understand typical educational hurdles and consequently how to utilize this knowledge in order to guide students more effectively when they need counseling.

In order to investigate both of these issues, the importance of study-relevant skills for student stress, study satisfaction and dissatisfaction with study conditions was analyzed in a repeated-measures design capturing differences between students in their first year and their year of study.

2. Changes in Educational Challenges of Beginners and Advanced Students

Students who start to study have to face numerous challenges that extend well beyond novel academic demands. For example, first-year students have to structure their study life themselves, develop an orientation towards their studies and navigate new social environments (Credé & Niehorster, 2012; van der Zanden, Denessen, Cillessen & Meijer, 2018). Therefore, first-year students cope with and manage a multitude of intra- and interpersonal challenges when adapting to the expectations of the university environment. This is in line with findings showing that organized and self-confident students, who are able to cope with stressors and receive social support, are more successful when adapting to the demands of a study (Credé & Niehorster, 2012). However, few studies have contrasted first-year students with students who already adapted to university and therefore, there is a need to contrast both types of students with respect to their achievement structure, their social situation and their experience of stress.

Willcoxson, Cotter and Joy (2011) compared first-year students with second- and third-year students in a cross-sectional design when analyzing factors influencing dropout intention. Interestingly, there was a wide variety of factors contributing to dropout intention for first-year students, but significant factors for dropout intention for second- and third-year students were focused rather narrowly on the achievability of the study program. The subjective ability to succeed in their study however, was a significant negative factor for dropout intention for all three years of study. This finding illustrates that first-year students and advanced students may differ due to adapting processes to university, but there is little difference when it comes to meeting the academic demands of the study itself. Thus, studies focusing on academic achievement in the beginning of a study found that previous academic achievement, effort, self-efficacy and study skills to be important factors, which are also resembled by studies focusing on academic achievement irrespective of the number of semesters studied (Schneider & Preckel, 2017; van der Zanden et al., 2018).

Starting to study often coincides with relevant changes for students in their social environments and naturally, it is important for students to be socially and academically integrated in order to maintain student commitment (e. g. Tinto, 1975). Notably, social support by peers and by university staff is just as relevant for adaption to university as social support by parents (Credé & Niehorster, 2012). Additionally, social support by all three sources is also positively related to academic achievement for first-year students (van der Zanden et al., 2018). Together, these findings highlight the importance of building and keeping social networks in the beginning of study. Contrary to that, one study showed that networking was neither correlated to academic achievement nor to student satisfaction for teaching students, most of whom were already advanced in their studies (Bohndick & Buhl,

2014). It is likely that social networks of advanced students are already built and thus they do not need any further effort in order to benefit here additionally.

Considering that beginning a study degree is accompanied by an orientation phase, realistic expectations about the course of study as well as the content of study are relevant factors for student satisfaction (Hasenberg & Schmidt-Atzert, 2013). Also, students starting their studies experience that certain tasks are more strenuous and less rewarding than initially expected. Therefore, performance-related experiences made during the start of a study, have a negative impact on students' motivation and ultimately on student satisfaction as well (Benden & Lauermann, 2022). Consequently, there are experiences in the beginning of a study that necessitate some level of self-regulation in order to adjust to university (e. g. Johnson, Gans, Kerr & LaValle, 2010). It is in line with the respective emotional needs, that social, emotional and practical ways of being supported positively contribute to university adjustment (Ramsay, Jones & Barker, 2007). Also, support received from faculty or staff members that matched the need of the beginning students was a significant factor for lower stress levels (Maymon, Hall & Harley, 2019). In general, coping behavior in the first year of study is relevant for mitigating stress, and increasing well-being alike (Ciarrochi & Scott, 2006; Gan & Zhang, 2010). The argument can be made that advanced students have overcome those hurdles connected to the study entry phase. Yet, those studies that do not differentiate between study phases nonetheless find stress to be a negative predictor for academic achievement (Richardson et al., 2012). Thus, the relevance of stress and respective coping skills are not limited to the beginning phase when focusing on academic achievement. From a logical perspective, advanced students are possibly even more in need of self-regulatory skills, because they have been committed to their studies for a long time already.

3. Corresponding Educational Needs of Beginners and Advanced Students

In order to address corresponding educational needs, skills and abilities are relevant factors for universities, because they can be addressed as educative goals in the study program. This is in particular important for teacher students as they not only study in order to successfully complete their studies, but also in order to meet the professional demands of a teaching career at the end of study. A comparison of teacher students with other students revealed that teacher students are less satisfied with their studies than students in other degree programs and feel that there is less of a fit between their academic interests and their study environment (Besa, 2020).

In fact, the central discussion led in teacher education revolves around skills and competencies that are needed for the teaching profession (e. g. Baumert & Kunter, 2009; Blömeke & Kaiser, 2014; Frey, 2014) and not about those needed for study success. A competency-orientated approach is an overall benefit for teaching educa-

tion (Schaper, 2009) and at the same time it is important to note that study-relevant skills and teaching competencies are by no means mutually exclusive. Instead, both fields of research overlap. Consequently, study-relevant skills such as learning strategies, cooperation, self-management and coping skills should be explicitly addressed when they are relevant to the teaching profession as well.

Learning strategies are important to first-year student learning behavior and therefore also for academic success (Jansen & Suhre, 2010). Meta-analyses that do not differentiate by semester have shown that various learning strategies, such as repetition strategies, elaboration strategies, critical review or metacognitive learning strategies are relevant for academic success (Richardson et al., 2012). Additionally, learning strategies are also connected to retention as well (Schiefele et al., 2007). Beyond the relevance for studying, learning achievements of pupils are viewed as the central goal of teacher actions (Helmke, 2012; Schaper, 2009). Meta-cognitive and cognitive learning processes in turn, are among the strongest predictors for pupils' learning achievements (Wang, Haertel & Walberg, 2003). Given that pupils need to be taught learning strategies by teachers, this underscores the necessity of teaching students to understand and master learning strategies themselves. The act of learning and respective learning strategies is crucial throughout the course of a teacher study. Thus, learning strategies should stay relevant for first-year students and advanced students alike. Since teaching students have to study several different subjects, this characteristic itself is of utmost relevance in this discussion. Therefore, coping with different subjects is included as an additional skill in this study.

Cooperating in learning and performance-related collaborations such as small learning groups contributes to achieve a better academic performance and higher persistence (Springer, Stanne & Donavan, 1999; Richardson et al., 2012). Similarly, first-year students who prefer to work alone, academically achieve less (Friedman & Mandel, 2011). In addition, possible consequences of successful cooperation, such as social involvement or perceived social support, are also predictors of the final grade and retention (Robbins et al., 2004). Social competencies in general are central to the teaching profession given their daily work with children, colleagues and parents alike. In particular, the lacking ability to teach cooperation to pupils was criticized by experienced colleagues discussing competencies of trainee teachers (Bohndick, Kohlmeyer & Buhl, 2015). Taken together, cooperation is a relevant skill throughout teacher study and profession. When contrasting first-year students and advanced students, it is however likely that beginning students are more in need of being cooperative as their social networks are not established yet.

Procrastination has a negative impact on academic achievement irrespective of the phase of study (Richardson et al., 2012). In light of the fact that first-year students who plan and manage their tasks well, and also persist in their studies achieve better academically (van der Zanden et al., 2018), thus procrastination is counterproductive to academic achievement in the beginning of a study. As discussed before, advanced students may however be more in need of educative mea-

sures addressing procrastination, given that they are in a more demanding situation than first-year students due to the length of their study.

Coping with stress is a relevant positive factor and stress itself is a relevant negative factor for academic achievement in general (Richardson et al., 2012). Considering that the teaching profession is emotionally demanding, coping with stress is an advantageous skill among teachers as well (Schaarschmidt, 2005). Also, coping with stress is beneficial to first-year students considering the specific hurdles of an orientation phase. At the same time, for advanced teaching students coping with stress is a relevant factor for student satisfaction (Bohndick & Buhl, 2014). Taken together, coping with stress is relevant for all phases of a teaching career and yet coping with stress is relevant for different reasons as first-year students need to apply this skill in a larger variety, whereas advanced students are more focused on their study process.

Overall, study-relevant skills play a central role for the study process as well as for the teaching career. Considering the large body of research analyzing predictors of study satisfaction and student stress, we found out that most characteristics of students and the study ultimately relate either to the perceived feasibility of study or the anticipated preparation for the desired profession. It is therefore reasonable to assume that student satisfaction depends on whether students perceive themselves as competent in terms of their studies and their professional preparation or not (Sagolla, Seifert, Bohndick & Buhl, 2024). However, some of these skills are of different importance when contrasting study phases of first-year students and advanced students. Literature targeting this difference directly is scarce and therefore it needs exploratory approaches when analyzing possible changes over time. According to that, it can be hypothesized that the relationship of study-relevant skills and student stress, study satisfaction and dissatisfaction with study conditions does change over the course of study.

4. Research Questions and Hypotheses

Research question: Does the relationship of study-relevant skills and student stress, study satisfaction and dissatisfaction with study conditions change over the course of study?

Hypotheses:

H1. The pattern of study-relevant skills explaining for student stress should change over time. A path-model allowing for different skills explaining for student stress in each measurement should explain the data significantly better than a model not allowing for different patterns in each measurement.

H2. The pattern of study-relevant skills explaining for study satisfaction should change over time. A path-model allowing for different skills explaining for study satisfaction in each measurement should explain the data significantly better than a model not allowing for different patterns in each measurement.

H3. The pattern of study-relevant skills explaining for dissatisfaction with student conditions should change over time. A path-model allowing for different skills explaining for dissatisfaction with student conditions in each measurement should explain the data significantly better than a model not allowing for different patterns in each measurement.

5. Methods

5.1 Sample Characteristics

In order to recruit teacher training students at the beginning of their studies, an online survey was conducted as mandatory part of introductory courses in educational science in October 2019. Students were given the opportunity to choose an alternative task, but this option was rarely chosen throughout the study. Since only first-year students were the scope of this study, only those $N = 543$ students studying in their first or second semester were included for further analyses (t_1). Two years later a follow-up survey was conducted under the same conditions addressed above in advanced courses in educational science administered in two semesters in October 2021 and in May 2022 (t_2). Additionally, all students who had participated in the first study, were invited by mail and incentivized to participate again by a lottery. Matching participations, $N = 144$ students could be identified as participants of both studies. This subsample of the study will be referred to as the longitudinal subsample throughout the text. Respectively, the portion of the baseline sample ($n = 399$) administered at t_1 that could not be recruited for the survey at t_2 dropped out of study and will be referred to as the cross-sectional subsample.

At the beginning of the survey, the age of the students of the longitudinal subsample was $M = 19.6$, $SD = 1.72$ and $n = 129$ (89.6%) studied in their first semester, whereas $n = 15$ (10.4%) studied in their second semester. 113 (78.5%) participants were female and 31 (21.5%) male. 40.3% were studying to become teachers at high schools, 41.7% were studying to become teachers at lower secondary schools and 18.1% were studying to become primary school teachers. A dropout analysis on t_1 revealed no significant differences between subgroups on demographics, personality characteristics (Rammstedt & John, 2005), motivational variables (Watt et al., 2012) and those factors included in the subsequent analysis (cf. Table 1).

5.2 Instruments

Student stress, study satisfaction and dissatisfaction with study conditions. All three criterion variables were assessed by the scales of Westermann et al. (1996).

Study relevant skills. In order to assess learning strategies, 17 items regarding organizational strategies, elaboration strategies, repetition strategies and critical examination strategies were used (Wild & Schiefele, 1994). Coping with different subjects was assessed by a four-item measure of our own. Cooperation was assessed by a 9-item measure taken from the Richter (2000) scale. A scale by Klingsieck and Fries (2012) was used to assess procrastination. For coping with stress, one item from the scale "problem-oriented, active coping" (Schwarzer & Jerusalem, 1999) and three items from the subscales "Active Coping", "Using Emotional Support" and "Using Instrumental Support" of the "Brief Cope" (Carver, 1997) were used.

Table 1: Measurement instruments and descriptive statistics at two measurement points

Instruments	Item example	k	Range	α_{t1}	M_{t1}	SD_{t1}	α_{t2}	M_{t2}	SD_{t2}
Student Stress	I often feel tired and exhausted because of my studies	3	0–100[a]	.83	46.19	23.23	.82	46.34	23.56
Study Satisfaction	I really enjoy what I am studying	3	0–100[a]	.91	70.59	18.26	.88	69.95	17.09
Dissatisfaction with study conditions	I wish the study conditions at the university were better	3	0–100[a]	.83	38.69	23.58	.82	48.07	23.19
Learning strategies	I also critically examine what I learn	17	1–5[b]	.82	3.60	.50	.83	3.48	.52
Coping with different subjects	Mentally I can combine the different subjects fairly well	4	1–5[b]	.58	3.50	.67	.58	3.83	.63
Cooperation	I enjoy participating in study groups	9	1–5[b]	.86	3.42	.69	.88	3.23	.78
Procrastination	I usually complete all the things I had planned during the day (rec.)	9	1–5[b]	.89	2.79	.74	.94	2.90	.90
Coping with stress	I have actively acted to improve the situation	4	1–5[b]	.74	3.74	.74	.71	3.41	.71

Notes: a) Response scale 0 = strongly disagree, 100 strongly agree (11-point Likert scale, imitating percentages); b) Response scale 1 = strongly disagree, 5 = strongly agree; k = number of items; α = Cronbach's alpha; M = mean; SD = standard deviation; t1 = first measurement point; t2 = second measurement point.

5.3 Procedure and statistical analyses

Due to the method of conducting this survey as a mandatory part of course participation, the longitudinal subsample consists mainly of those students who studied within the curricular time schedule given by the university and did not postpone course participation to another semester, whereas students of the cross-sectional subsample must have chosen to either drop out of study or postpone course participation to another semester. In line with that, students of the cross-sectional subsample may yet reveal differential relationships when compared to students of the longitudinal subsample on t_1 that allow for deeper insights in individual differences when discussing the students' perspective in achievement related settings. It is therefore important to analyze whether there are differences between groups regarding those regression paths predicting the criterion variables. This need is addressed by conducting individual regression analyzes for both subsamples (cf. Table 2).

The path-analyses were conducted with the R-Packages lavaan and SemTools. As the missing values within the models do not correlate with each other (MCAR test according to Little: $\chi^2_{(85)} = 74.13$, $p = .794$), they could be supplemented using the full maximum likelihood method (FIML).

For the actual analyses, three baseline models were conducted for student stress, study satisfaction and dissatisfaction with study conditions. In these models, all variables on t_1 predicted their respective variables on t_2. The models allowed for the study relevant skills to covary freely with each other at t_1 and at t_2, respectively. Additionally, all study-relevant skills predicted the criterion variable on both test times. Those study-relevant skills that did not yield significant paths at each of the test times were excluded from the model in order to ensure a more accessible interpretation of the data. Subsequently, these models were tested again for their fit values and significance of the paths. Then, these baseline models were compared to the same models with additional restrictions on those paths that predict the criterion variable on t_1 being equal to their counterparts predicting the criterion variable on t_2. A baseline model that explains the data significantly better than its restricted model, indicates that there is a change in the relationship of study-relevant skills and the criterion variable over time.

6. Results

Comparison of the subsamples. In order to compare the cross-sectional subsample and the longitudinal subsample, regression analyses for student stress, student satisfaction and dissatisfaction with study conditions were conducted individually for each subsample, and the resulting standardized regression coefficients were compared to one another (cf. Table 2). This comparison showed two noteworthy differences between subsamples relevant to the study. First, learning strategies are a significant factor for study satisfaction in the longitudinal subsample but not in

the cross-sectional subsample. Second, procrastination is relevant for student stress and study satisfaction in the cross-sectional subsample but not in the longitudinal subsample. When considering changes in time, it therefore needs to be included that there are differences between groups as well.

Table 2: Regression coefficients for student stress, study satisfaction, and dissatisfaction with study conditions at t_1

	Student stress		Study satisfaction		Dissatisfaction with study conditions	
	Longitudinal	Cross-sectional	Longitudinal	Cross-sectional	Longitudinal	Cross-sectional
Predictors	β	β	β	β	β	β
Learning strategies	.24**	.11*	.29**	.08	.15	.05
Cooperation	-.25**	-.18**	.20**	.15**	-.17*	-.17**
Coping with different subjects	-.34**	-.32**	.25**	.33**	-.19*	-.24**
Procrastination	.00	.14*	.01	-.12*	.04	.09
Coping with stress	.05	.01	.13	.06	-.03	-.07
Explained Variance in %	19.6%	17.2%	26.2%	21.7%	7.4%	12.3%

Notes: β = standardized regression coefficient; longitudinal subsample: n = 144; cross-sectional subsample: n = 399; Explained variance refers to R^2 in percent; $p < .05$, ** $p < .01$; t_1 = first measurement point.

Hypothesis 1. The administered baseline-model predicting student stress shows a good model fit ($\chi^2_{(30)} = 30.41$; $p = .445$; CFI = 1.00; TLI = 1.00; SRMR = .05; RMSEA = .01) and can therefore be used for interpretation (cf. Figure 1). In order to test our first hypothesis, the baseline-model was compared to the restricted model ($\chi^2_{(35)} = 44.38$; $p = .133$; CFI = .97; TLI = .95; SRMR = .06; RMSEA = .04) by a likelihood-ratio test showing that the unrestricted model represented the data significantly better than the restricted model ($\Delta_{\chi^2(5)} = 13.97$, $p = .016$). Consequently, the general relationship of study related skills and study stress does change over time, which confirms hypothesis 1. However, this effect does not seem to be caused by all skills since the relevance of learning strategies does not change over time ($\beta_{t1} = .25$, $p = .004$; $\beta_{t2} = .27$, $p = .001$). The positive relationship of learning strategies and student stress suggests that students who are more engaged in learning activities, also experience student stress more intensely. Similarly, coping with different subjects is significant on both times as well ($\beta_{t1} = -.34$, $p < .001$; $\beta_{t2} = -.33$, $p < .001$). Despite that, cooperation is a significant negative predictor at first, but it is not significant later on ($\beta_{t1} = -.25$, $p = .002$; $\beta_{t2} = .06$, $p = .409$). In strong contrast to that, procrastination is not significant at first, but it is significant at t_2 ($\beta_{t1} = .00$, $p = 1.00$; $\beta_{t2} = .23$, $p = .003$). Similar to that, coping with stress is a significant negative predictor at t_2 only ($\beta_{t1} = .04$, $p = .623$; $\beta_{t2} = -.17$, $p = .003$).

Hypothesis 2. Administering the baseline-model predicting study satisfaction, procrastination showed no significant paths on each of the test times and was

Figure 1: Baseline path model showing study-relevant skills predicting student stress at two measurement points. Arrows indicate hypothesized relationships from predictors (learning strategies, coping with different subjects, cooperation, procrastination, coping with stress) to student stress.

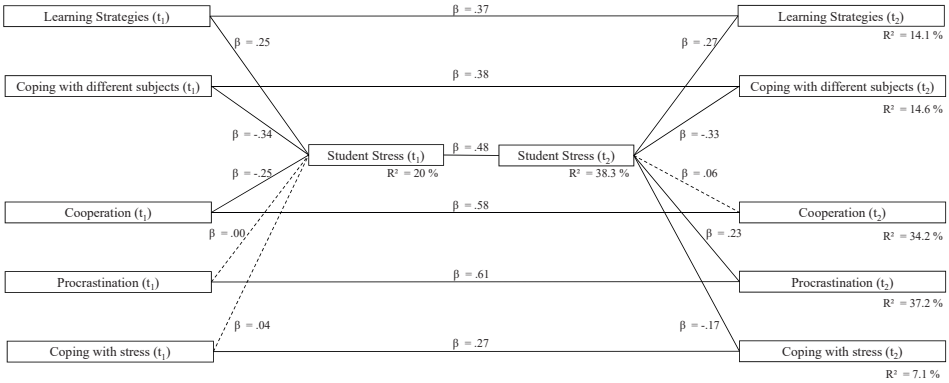
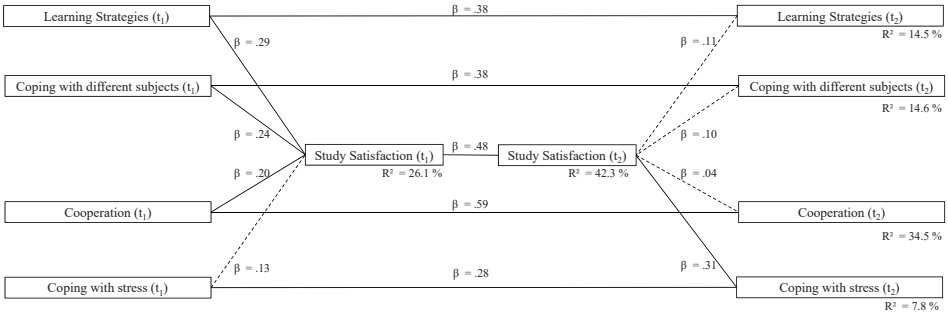
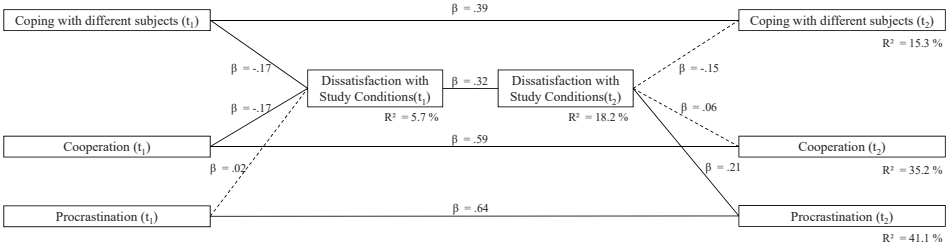


Figure 2: Baseline path model showing study-relevant skills predicting study satisfaction at two measurement points. Arrows indicate hypothesized relationships from predictors (learning strategies, coping with different subjects, cooperation, coping with stress) to study satisfaction.



therefore excluded from the model. The resulting model shows a good model fit ($\chi^2_{(20)} = 18.77$; $p = .537$; CFI = 1.00; TLI = 1.00; SRMR = .05; RMSEA = .00) and can therefore be used for further analysis (cf. figure 2). In order to test our second hypothesis, the baseline-model was compared to the restricted model ($\chi^2_{(24)} = 29.62$; $p = .198$; CFI = .96; TLI = .96; SRMR = .06; RMSEA = .04) by a likelihood-ratio test showing a significant difference between the models ($\Delta_{\chi^2(4)} = 10.85$, $p = .028$). Consequently, the general relationship of study-relevant skills and study satisfaction does change significantly over time, which confirms hypothesis 2. It is noteworthy that learning strategies ($\beta_{t1} = .29$, $p < .001$; $\beta_{t2} = .11$, $p = .120$), coping with different subjects ($\beta_{t1} = .24$, $p = .001$; $\beta_{t2} = .31$, $p = .189$) and cooperation alike ($\beta_{t1} = .20$, $p = .009$; $\beta_{t2} = .04$, $p = .553$) show significant paths to study satisfaction at t_1, but not at t_2. Contrary to that, coping with stress is not significantly related to study satisfaction at t_1 and significantly related at t_2 ($\beta_{t1} = .13$, $p = .09$; $\beta_{t2} = .31$, $p < .001$).

Figure 3: Baseline path model showing study-relevant skills predicting dissatisfaction with study conditions at two measurement points. Arrows indicate hypothesized relationships from predictors (coping with different subjects, cooperation, procrastination) to dissatisfaction with study conditions.



Hypothesis 3. Administering the baseline-model predicting dissatisfaction with study conditions, learning strategies and coping with stress showed no significant paths on each of the test times and were therefore excluded from the model. The resulting model shows a good model fit ($\chi^2_{(12)} = 27.07$; $p = .620$; CFI = 1.00; TLI = 1.00; SRMR = .03; RMSEA = .00) and can therefore be used for further analysis (cf. figure 3). In order to test our third hypothesis, the baseline-model was compared to the restricted model ($\chi^2_{(15)} = 12.71$; $p = .624$; CFI = 1.00; TLI = 1.00; SRMR = .05; RMSEA = .00) by a likelihood-ratio test showing no significant difference between the models ($\Delta_{\chi^2(3)} = 6.42$, $p = .09$). Consequently, the general relationship of study-relevant skills and dissatisfaction with study conditions does not change significantly over time, which falsifies hypothesis 3. Coping with different subjects is a predictor of similar strength despite a difference in significance ($\beta_{t1} = -.17$, $p = .039$; $\beta_{t2} = -.15$, $p = .006$). Nonetheless, cooperation is a significant predictor at first, but not at t_2 ($\beta_{t1} = -.17$, $p = .034$; $\beta_{t2} = .06$, $p = .466$), whereas procrastination is no significant predictor at t_1, but at t_2 ($\beta_{t1} = .02$, $p = .859$; $\beta_{t2} = .21$, $p = .007$).

7. Discussion

This study investigates changes in the relationship between study-relevant skills and student stress, study satisfaction and dissatisfaction with study conditions among student teachers in their first and third year in order to identify respective changes in educational needs. Surveys of $n = 144$ student teachers participating at the beginning of their bachelor studies and again two years later were analyzed using a SEM approach. All in all, the findings indicate that the relationship of study-relevant skills and student stress as well as study satisfaction is nuanced in three respects. First, even though all study-relevant skills are relevant for actual student achievement (Richardson et al. 2012), their relevance was not the same for student stress and study satisfaction. Thus, instead of simply perceiving student experience as one factor, it is beneficial to differentiate between student stress and study satisfaction in order to provide for a more sophisticated insight in the benefits and shortcomings of a particular skill to the student. As demonstrated in the follow-

ing chapter, this approach can be further utilized for teacher training when planning and communicating interventions as well as student counseling when assessing individual hurdles and respective solutions. Second, the relevance of individual study-relevant skills changed over time for both, student stress and study satisfaction. Most notably, the relevance of cooperation decreased, whereas the relevance of procrastination and coping with stress increased over time. In the first place, these results suggest that future bachelor programs can and should adapt to the specific needs of students according to their phase of study. Third, our results suggest that the relationship of study-relevant skills and student stress as well as study satisfaction differs between those students that make faster progress in their studies compared to those students that prolong their study. Even though it is not the scope of this study to assess and analyze group differences, some inferences can be drawn and used for a more careful interpretation of the data. The most important findings and their implications are discussed below.

7.1 Findings and Practical Implications

Learning strategies are a positive factor for study satisfaction. Despite that, they also have a positive relationship to student stress. Thus, learning strategies are relevant for students in order to connect to their subjects they aim to study and at the same time, applying learning strategies is related to higher levels of student stress. From a practical viewpoint it is therefore important for counselors and lecturers alike to address learning strategies as means to engage in a subject of study, but not as means to lessen the burdens of studying. Considering the differences in time, learning strategies seem to have a stable characteristic of contributing to student stress, but their relevance for study satisfaction is only significant in the orientation phase of a study. This finding highlights the relevance of learning strategies as means to orientate oneself toward the content of study. Additionally, learning strategies are not relevant for study satisfaction in the cross-sectional subsample, even though the relation to student stress is still significant. Arguably, students used learning strategies, but they did not do so successfully. Thus, beginning students need to get the means to use learning strategies effectively at an early point of their studying career which needs to be included in curricular planning.

Being able to cope with different subjects is a negative factor for student stress as well as dissatisfaction with study conditions, and is also a positive factor for study satisfaction. Therefore, coping with different subjects can be addressed explicitly in student counseling when teacher students choose or reconsider their choice of subjects. Over time, the effect of coping with different subjects was stable for student stress and dissatisfaction with study conditions. However, its effect lessened for study satisfaction over time. Similar to learning strategies, coping with different subjects is primarily important for first-year students in order to engage with their choice of subjects successfully.

Cooperation is a beneficial factor for all three criteria as well, even though this effect occurs only for first-year students. This finding implies that productive relationships with fellow students help to manage study subjects, mitigate student stress and help to manage the organizational conditions of a study more successfully. Consequently, students who are at the beginning of a study are more inclined to being taught social skills in order to engage with one another on a professional basis, whereas advanced students already have overcome this phase.

Procrastination is as well a positive factor for student stress and for dissatisfaction with study conditions. Interestingly, this effect only occurred for the advanced phase of study. This finding suggests that students may not suffer the consequences of procrastination at first, but when handling the challenges of enduring the demands of a study over a longer period of time, procrastination becomes a more relevant aspect. Accordingly, this skill can be best addressed at a later point in their studying career, because advanced students can better relate to the content of training. In contrast to that, we found mixed evidence linking procrastination to study satisfaction. The longitudinal subsample yielded no significant associations between procrastination and study satisfaction at each of the test times, whereas procrastination and study satisfaction showed a significant negative association for the cross-sectional subsample. In simple terms, procrastination may already prove as a challenge for beginning students when engaging in study subjects. Taken together, these results seem to suggest that procrastination differs among students with respect to its causes and consequences. In turn, this is a particular challenge for teacher education, because different needs of students need to be met adequately. It is therefore important for student instructions, development of trainings and student counseling alike to address procrastination with respect to its specific negative outcome for the individual student.

Coping with stress is a negative factor for student stress and a positive factor for study satisfaction for advanced students only. Thus, those skills addressing stress related challenges also help to engage in the process of studying. However, this finding does not apply for beginning students. Similar to procrastination, coping with stress can be therefore addressed at an advanced state of study.

7.2 Implications for Further Research

Despite encouraging results that are relevant to teaching practices and counseling in universities, our study is limited in some aspects. Most importantly, the comparison of the longitudinal subsample and the rest of the sample administered at t_1 revealed that there are some differences between groups implying that procrastination and an absence of useful learning strategies place additional hurdles for students early on. This finding gives rise to the idea that screening procedures aiming to identify those students who need more support by universities in order to become successful in their studies and ultimately in their careers may be identifiable by analyzing those correlational patterns addressed in this study, instead of simply

assessing students' mean values of motivational or skill-related scales. Further research is needed in order to expand on these findings. Most importantly, this approach should be backed by student interviews in order to gain a more precise understanding of the relationship of abilities and subjective success.

Beyond specific group differences it is plausible that this finding is also applicable to students in general as teacher students and any other types of students are primarily interested in successfully completing their studies. Yet, teacher students may also be more concerned about their professional competencies as they already have a precise idea of their professional demands after studying. This distinction can be built on by analyzing differences in the goal structures of students and possible consequences on the relationship of their abilities and student satisfaction as well as student stress.

In general, our results support the idea that there is a shift from a beginning phase toward a more achievement-orientated phase over time. Due to the method applied however, the question of how long each of the study phases are and if there are differences within each semester remains open. Further, our findings do not imply that advanced students remain in one phase until the end of their studying career. Instead, it is more likely, that there might be further changes toward the end of a studying career. Accordingly, further research inlcuding the end of a studying career and beyond that the beginning of a career in teaching could provide valuable information in order to better provide for students' educational needs at a later stage of their careers.

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