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University students' emotions, life-satisfaction and study commitment: a self-determination theoretical perspective

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ABSTRACT

Based on self-determination theory, this study seeks to explore whether a study environment that provides relevant conditions for students' basic psychological need-satisfaction can lead to more positive and less negative emotional experiences. It also addresses the question of how emotions experienced in the university context are related to students' overall life-satisfaction and study commitment. German students in teacher education programmes ($N=792$) participated in the study by completing questionnaires. The results (estimated by path-modelling) reveal that students' emotions can be predicted by a variety of environmental conditions associated with different basic psychological needs. Altogether, the model is able to explain 28.5% of the variance in positive emotions and 39.6% in negative emotions. The strongest predictor of students' positive and negative emotions was the perceived relevance of the study material, a factor related to the need for autonomy. This perceived relevance also had a direct impact on study commitment. Furthermore, positive relationships with peers proved to be of importance for positive and negative emotions as well as for overall life-satisfaction. As expected, emotions at university predicted life-satisfaction and study commitment, with a particularly strong association between positive emotions and study commitment. The results point to the necessity to support study conditions that facilitate the fulfilment of students' basic psychological needs in order to ensure students' emotional well-being and enhance study commitment.

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Introduction

The graduation rate in tertiary education is steadily rising worldwide (OECD 2015); however, statistics also show that many students do not complete their studies, which is costly from both an individual and an economic perspective (e.g. Lotkowski, Robbins, and Noeth 2014). In Germany, the country that serves as the context for the present study, the drop-out rate for students in bachelor programmes is 28% (Heublein 2014).

Students drop out in the first few semesters for a variety of reasons. Studies have shown that the adjustment to university is accompanied by many emotionally experienced challenges (Gerdes and Mallinckrodt 1994) that are likely to influence study success as well as the decision of whether or not to drop out. In addition, it is expected that emotions at university impact students' general well-being,

including their mental health. Issues pertaining to students' mental health have received increased attention during recent years, especially in the higher education (HE) systems in Anglo-American countries. Studies have revealed a relatively high prevalence of mental illnesses amongst HE students. Stressful experiences at university may be one factor (amongst many others) that contributes to the onset of mental illness (Kitzrow 2003; Robotham and Julian 2006; Universities UK 2015). In Germany, the mental health issues of HE students are not yet a priority policy issue; this is quite surprising, given the strong empirical evidence found in the HE systems of other countries.

Improving our understanding of student emotions and their antecedents is thus imperative in order to explain and predict student retention as well as students' (emotional) well-being. This research is timely, as affective factors in HE are still under-researched (Beard, Clegg, and Smith 2007; Trigwell, Ellis, and Han 2012). The present study examines the question of whether and how positive and negative emotions at university predict students' general life-satisfaction (an indicator of students' emotional well-being) and study commitment (a precondition of student retention), as well as how these emotions are affected by specific conditions of the university environment.

The focus is placed on undergraduates. In Germany, undergraduate students are typically on campus regularly, since many courses have compulsory attendance. These students thus differ from other HE student populations, such as students who are enrolled in distance or online-learning programmes. More specifically, we focus on students in teacher education, as there are several measures currently underway that seek to enhance the quality of HE in the field of teacher education in Germany (BMBF 2014). Consequently, an exploration of the conditions that influence teacher students' emotional experiences and commitment to their studies seems particularly relevant.

Our study follows an approach based on self-determination theory (SDT; Deci and Ryan 2002) complemented by assumptions from stage–environment fit theory (SEFT; Eccles et al. 1993), as outlined in the following section. After a description of SDT and SEFT, we give an overview of emotions in HE, briefly discussing the outcome variables of the present study – life-satisfaction and study commitment – which leads to the derivation of the research questions and hypotheses. In addition, as there is significant variability in HE systems across countries, an introduction to the German HE system is provided in order to better contextually frame our study.

Basic psychological needs

According to SDT, individuals are driven by three basic psychological needs – for autonomy, competence and relatedness – that, if fulfilled, positively affect their 'natural propensities for growth and integration, as well as for constructive social development and well-being' (Ryan and Deci 2000, 68). SEFT, which relies on person–environment fit approaches, posits that the learning environment can contribute to the well-being of students, enhancing their motivation and improving their emotional state by offering the environmental conditions necessary for need-fulfilment. If the environment does not meet the needs of an individual at a particular stage of development, a 'misfit' can occur (Eccles et al. 1993). Such a misfit is likely to negatively impact the individual's overall positive (psychological) functioning in the respective educational context, but also his or her general life-satisfaction.

Transferring this finding to learning experiences at university, it can be concluded that, in order to foster students' positive emotional experiences, the university environment should offer conditions that support their experiences of autonomy (e.g. by providing choices), competence (e.g. via fair grading practices) and relatedness (e.g. by ensuring a positive social climate). In the process, students' developmental phase, namely young adulthood, must be taken into account (Lietlaert et al. 2015).

Emotions

In this study, emotions are conceptualised based on an appraisal-theoretical approach, implying that emotions are evoked by the cognitive evaluation of the respective situation (Ellsworth and Scherer 2003). If, for example, a student judges a situation at university to be intrinsically relevant and controllable, it is likely that positive emotions (such as joy) will arise, whereas negative emotions (such as

anxiety) may be triggered if a situation is evaluated as important but uncontrollable. Thus, the same situation can lead to different emotions in different people, depending on the evaluation outcome.

Furthermore, emotions are complex phenomena, as reflected in two ways. First, emotions consist of various components. According to the multi-component approach to emotions (Scherer 2004), different facets work together when emotions are experienced. For example, if a person experiences joy, he or she feels the emotion 'joy' (affective component), exhibits physiological changes (physiological component), displays some 'joy-specific' emotional expression like a smile (expressive component) and experiences the specific cognitions and motivations that accompany the emotion (motivational and cognitive component). Second, emotions are reciprocally linked to various contextual and individual factors (e.g. Pekrun 2006), which necessitates theoretical assumptions that guide the specification of the constructs in relation to one another (e.g. whether the emotions are treated as outcomes or as independent variables in the research).

When investigating emotions in HE, the conceptual overlap with research on subjective well-being must be considered. In studies on subjective well-being, positive and negative affect as well as life-satisfaction frequently represent constitutive elements of well-being (Diener 2000), amongst others (for example, vitality and self-worth; Chen et al. 2015; Milyavskaya and Koestner 2011). Thus, the concepts of well-being and emotions must not be used interchangeably, as subjective well-being incorporates both affective components and other factors. In the present research, the focus is on emotions.

Thus far, empirical research on students' emotions in HE has mainly concentrated on students' experiences during the transition to university, including experiences during the first year (e.g. Christie 2009), student satisfaction as a specific emotional state (e.g. Elliot and Healy 2001; Mai 2005) or students' achievement emotions (e.g. Pekrun et al. 2002). Regarding the transition and adaptation to university, Beard, Clegg, and Smith (2007, 248) assessed the positive and negative feelings of British first-year students, finding evidence of the 'emotional journey' that students undergo in their first two semesters. A common topic that emerged from these descriptions was making friends at university, which was experienced very emotionally (both positively and negatively) by the students. Feelings of loneliness and homesickness were also found in the students' descriptions. This is in line with Rich and Scovel's (1987) conclusion that social integration with peers seems to be of importance in the prevention of feelings of homesickness and loneliness. Furthermore, in Beard et al.'s study (2007), students reported emotions related to financing their studies, their living arrangements, independent study and self-regulated learning, and receiving feedback on assignments and examinations.

Research on students' achievement emotions (Pekrun and Linnenbrink-Garcia 2014) focuses exclusively on achievement-related feelings (such as test anxiety, academic boredom and joy), typically relying on educational-psychological theories, most frequently control-value theory (Pekrun 2006). This field investigates the link between achievement-related emotions and achievement/learning-related outcomes, such as learning motivation, self-regulated learning and academic achievement. The empirical findings support a positive association between positive achievement emotions, positive learning motivation and learning behaviour that may ultimately lead to high(er) academic achievement (e.g. Mega, Ronconi, and De Beni 2014; Trigwell, Ellis, and Han 2012; Webster and Hadwin 2015).

Our study ventures beyond the scope of students' achievement emotions, as we are interested in students' overall affective experiences at university. We therefore include emotions other than the frequently explored study satisfaction and achievement emotions. The study also extends beyond research on first-year students' emotions, instead investigating the emotions of undergraduates who have already been enrolled in their study programme for more than one year. Emotions do not only arise in the first year of study; rather, they accompany students during their degree programmes, as emotions are naturally triggered when situations are highly relevant to people's lives (Ellsworth and Scherer 2003). The period of studying at university can be regarded as a key phase in an individual's life and is thus highly emotion-relevant throughout the years of study.

Life-satisfaction

Similar to emotions, life-satisfaction relies on a cognitive evaluation process, namely, the overall assessment of the quality of one's life, which is strongly connected to the degree of goal attainment. Students'

life-satisfaction, its precursors and consequences have been studied empirically for various purposes. Some research has focused on the association between life-satisfaction and dropping out of university (e.g. Tyler and Small 1990). Other studies have concentrated on the life-satisfaction of 'at-risk' students, such as students from ethnic minorities, disadvantaged students and international students, with the expectation of a negative association between life-satisfaction and these 'risk factors' (e.g. Lackland 2001; Ojeda et al. 2014). Lent's (2004) social-cognitive model of life-satisfaction is well established and has served as a theoretical framework in research on students' life-satisfaction (Lent et al. 2005, 2009).

Less is known about the link between basic need-fulfilment and life-satisfaction predicted by theoretical assumptions of SDT. One exception in this regard is a study conducted by Türkdogan and Duru (2012) that reveals the strong predictive power of need-satisfaction for Turkish HE students' well-being (including the sub-component of life-satisfaction). For secondary students, Diseth and Samdal (2014) have empirically demonstrated the positive association between an autonomy-supportive learning environment and students' life-satisfaction. Similarly, Sanjuán's study (2011) on Spanish adults in the workplace suggests a mediating effect of affect between the environmental conditions that are relevant for need-fulfilment and life-satisfaction.

However, empirical findings cannot be simply transferred from one context to another, as cultural-educational contexts vary across countries (Volet 2001). Consequently, further studies aimed at explaining life-satisfaction by means of SDT theoretical assumptions are warranted. In particular, the question of whether domain-specific emotions (e.g. emotions experienced at university) might function as a mediator between domain-specific need-fulfilment and general life-satisfaction requires clarification.

Study commitment

According to Gerdes and Mallinckrodt (1994, 281), study commitment 'has been extensively discussed but has not been clearly defined'. Generally speaking, study commitment describes a 'firm resolve to complete a college degree and a strong attachment to a particular institution' (ibid). The present research focuses on the first part of the definition – namely, students' determination to complete their studies. Commitment can be regarded as a relevant precondition of student retention and is negatively associated with student drop-out.

Tinto's model of student drop-out (1975, 1987, 1993), which describes academic and social integration as core elements that influence students' commitment and consequently the decision of whether or not to stay at university, can be useful in understanding student commitment. A lack of social and academic integration indicates 'insufficient interactions with others in the college and insufficient congruency with the prevailing value patterns of the college collectively' (Tinto 1975, 92). Similar to SEFT (Eccles et al. 1993), Tinto (1987) stresses the need for a match between the institutional environment and students' commitment: a good match leads to greater student integration into the academic and social context of university life, and thus to a higher probability of persistence (for an overview of predictors of student retention, see Lotkowski, Robbins, and Noeth 2014). Identification with institutional norms and values as well as the opportunity to establish satisfying relationships can thus be regarded as crucial for students' study commitment. Both factors can be linked to the fulfilment of basic needs: the identification with norms reflects the satisfaction of the need for autonomy, while positive relationships with significant others reflect the fulfilment of the need for relatedness. Consequently, we place an explicit emphasis on the question of whether satisfying relationships with peers and faculty contribute to the explanation of students' commitment (and affect). This is of particular importance as the quality of relationships between students and faculty in HE is still an under-researched topic (Hagenauer and Volet 2014; Walker and Gleaves 2016).

The context: the HE system in Germany and teacher education

As of the 2009/2010 academic year, German universities have completely switched to the two-level (bachelor–master) HE system in line with the objectives of the Bologna process. As a result, all students in Germany can now complete a bachelor's degree at one university and start a master's degree at a

different university. German universities must therefore apply more ‘customer-oriented’ strategies to try to retain their students (Hill 1995; Joseph, Yakhou, and Stone 2005). Helgesen and Nettet (2007) argue that retaining already enrolled students is now just as important as attracting and enrolling new students. Service quality and studies on student satisfaction are quite common in other HE systems (see, for example, Mai 2005 for the UK and the US), as student satisfaction is frequently an indicator that influences the rank of the respective university (The Complete University Guide n.d.); however, most German universities do not place as much emphasis on the concepts of service quality and student satisfaction – at least not explicitly, for example by implementing nation-wide evaluations.

Furthermore, in contrast to HE systems in the Anglo-American countries, the system in Germany has not distinguished between so-called ‘elite universities’ and ‘non-elite universities’ until recently. However, in 2005, the government enacted the ‘excellence initiative’ in an attempt to strengthen the position of Germany within the HE landscape (DFG n.d.). Comparable to the Research Excellence Framework (REF) in the UK and the Excellence in Research for Australia programme (ERA), the excellence initiative aims to ensure and enhance research quality and to provide benchmarks in terms of the performance of German HE institutions. Similar initiatives have been launched in France and Spain, and Finland has also established ‘national centres of excellence’ (Brusoni et al. 2014).

As a consequence, certain excellence-supporting programmes were established, funded and evaluated (e.g. graduate schools and clusters of excellence). Based on these evaluations, some universities have been awarded the title ‘University of Excellence’. At the moment, 11 German universities are honoured with this distinction. This innovation has led to strong competition and a strict hierarchy in the HE system distinguishing between Universities of Excellence and all other universities. However, the title is primarily awarded based on research output; indicators pertaining to teaching quality (especially in undergraduate education) are only marginally considered. Most Universities of Excellence are strong in the technical disciplines and the natural sciences; to date, no institution has been awarded the title on the basis of commitment to teacher education. Thus, studying at a University of Excellence does not automatically imply better study conditions (e.g. in terms of study support).

Teacher education in Germany falls under the jurisdiction of the federal states. In most states, teacher education takes place at the university level. In the federal state of Baden-Wuerttemberg, however, future teachers study at colleges of teacher education that offer more structured and practice-oriented programmes, similar to the curricula of universities of applied sciences (see König and Blömeke, 2013).

The present study: research questions and hypotheses

The aim of the present study was to explore the relevance of the study conditions that are expected to be strongly connected to the fulfilment of students’ basic psychological needs in relation to their emotions. Furthermore, we investigated the outcomes of student emotions – specifically, the relationship between emotions and study commitment as well as between emotions and general life-satisfaction.

Our study contributes to the literature on affective factors in HE education, a topic that is currently under-researched. We hope to enhance the understanding of the antecedents and effects of students’ emotions by introducing life-satisfaction and study commitment as outcome variables, thereby extending the scope beyond the achievement/learning-related factors typically examined in studies on achievement emotions (e.g. learning strategies). Instead, we raise the question of whether emotions can predict the general life-satisfaction of students and their overall willingness to complete their studies.

Three main hypotheses were proposed. First, in accordance with SDT (Deci and Ryan 2002), we expected a positive relationship between need-supporting study conditions and positive emotions, and a negative one between these conditions and negative emotions (Hypothesis 1). Second, as need-satisfaction and positive affect in relevant life-domains are likely to transfer to general well-being (e.g. Milyavskaya, Philippe, and Koestner 2013), we also predicted a positive association between positive emotions at university and general life-satisfaction, and the reverse association with negative feelings (Hypothesis 2a). In addition, because emotions affect motivation and behaviour, positive emotions should positively predict study commitment; again, the inverse relationship is expected for negative emotions (Hypothesis 2b). Third, we tested both a fully mediated model (study conditions → emotions

→ life-satisfaction, commitment) and a partial mediation model (MacKinnon 2008). Based on previous research on school students' emotions (Hagenauer and Hascher 2010), we expected that the partial mediation model would fit the data better (Hypothesis 3).

In addition to the proposed model, gender differences were tested, as emotion research has repeatedly shown gender effects in emotional experiences (for an overview, see Fischer 2000).

Method

Participants

The participants in the study were 792 German university students in teacher education. The majority of the students were studying at a university (80.7%, encompassing four different universities, of which one was a University of Excellence); 19.3% were studying at a teacher education college (two different institutions); 71.4% of the students were female, which reflects the usual gender distribution in teacher education. The mean age of the students was 22.62 years ($SD = 4.09$). The students were enrolled in various programmes in teacher education: 36.9% of them were studying primary education, 32.6% secondary education for high-track schools (*Gymnasien*), 21.1% secondary education for lower-track schools (*Haupt-, Real- and Regelschulen*) and 9.3% inclusive education. The mean number of completed semesters in the major subject was 3.51 ($SD = 1.71$), and the mean number of completed semesters overall at university/college was 4.39 ($SD = 2.99$). Only one student reported being in the first semester of study, indicating that the sample consisted almost entirely of students who were already somewhat adjusted to the context of studying at university. Nearly all of the students (97.8%) were born in Germany.

Measures and procedure

The data collection took place in April/May 2014, which is in the middle of the summer term in the German academic year. At all institutions except one, the students filled out the questionnaire during regular courses and lectures. The questionnaire, which was in German, was administered by trained research students, a procedure that supported the objectivity of the data-collection procedure. The research students also filled out a protocol documenting specific information about the data-collection conditions. A majority of the students in attendance filled out the questionnaire (return rate = 71%). Students were informed that participation in the questionnaire would support improvements in the quality of their degree programme; consequently, the return rate was relatively high. Nevertheless, there could be a sample bias resulting from the non-participation of those students absent from college/university or lectures on the day of data collection and those students who refused to fill out the questionnaire. This problem is endemic in studies involving voluntary participation. The data collection lasted roughly 35 to 45 minutes. The scales used for the investigation of the research question, which were part of a larger research project, are described in Table 1.

Data analysis

The calculations of descriptive statistics were carried out using SPSS 22, and the model estimation was conducted using the Mplus software program (Muthén and Muthén 1998–2012). Because complex models were tested, path-models were estimated using manifest variables to maintain a balance between the estimated parameters and the sample size. Due to the nested design, we adjusted for standard errors in order to account for institutional affiliation (type = complex). The model fit was assessed with the following coefficients: Comparative-Fit Index (CFI), Tucker–Lewis Index (TLI), Standardised Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA). CFI and TLI values above 0.95 and SRMR and RMSEA values below 0.06 indicate a satisfactory model fit (Kelloway 2015).

Table 1. Scales used in the study.

Scale	Sample item	Number of items	Min–max	A
University environmental conditions				
Relationships with peers (Kauper et al. 2012b + 2 newly developed items)	I feel comfortable with my fellow students	5	1–4	0.90
Interpersonal teacher–student relationship (Kauper et al. 2012b + 2 newly developed items)	My teachers are friendly and treat me with respect	5	1–4	0.76
Professional teacher–student relationship (self-developed scale)	The teachers answer questions regarding the study material patiently	5	1–4	0.75
Fair and transparent grading practice (Dalbert and Stöber 2002)	Grades are based on clear criteria	8	1–4	0.76
Transparent achievement demands (self-developed scale)	We know right from the beginning what we have to do in order to complete courses successfully	4	1–4	0.76
Achievement pressure (Schiefele, Moschner, and Husstegge 2002)	The pressure to achieve is high	4	1–4	0.74
Autonomy (Kauper et al. 2012b + 2 newly developed items)	I can organise my schedule relatively independently	5	1–4	0.81
Relevance of the study material (Kauper et al. 2012b)	What I learn at university is relevant for my occupational practice in the future	4	1–6	0.77
Student participation in the courses (self-developed scale based on Johannes et al. 2011)	University teachers encourage us to critically discuss study material	4	1–4	0.79
Student characteristics				
Positive emotions (Krohne et al. 1996; German translation of the PANAS scale)	How did you usually feel during the previous study semester at university: active, interested, enthusiastic...?	10	1–5	0.85
Negative emotions (Krohne et al. 1996)	How did you usually feel during the previous study semester at university: worried, angry, ashamed...?	10	1–5	0.84
Life-satisfaction (Stöber 2002, based on Dalbert 1992)	When I look back on my life, I am satisfied	8	1–6	0.88
Study commitment (Schiefele, Moschner, and Husstegge 2002)	I am sure that I want to finish my studies	7	1–6	0.82
Neuroticism (Kauper et al. 2012a)	I am emotionally stable. (–)	4	1–6	0.66
Stress (adapted from Greiner 2009)	I feel stressed due to mental and/or physical illness	5	1–4	0.64

Results

Descriptive statistics, correlations and gender differences

The mean scores, standard deviations and correlations of the variables are presented in Table 2. Most of the correlations are significant, as expected from theory. A subsequent MANOVA testing for gender differences in the dependent variables revealed a significant gender effect (Pillai's trace; $V = 0.05$, $F(4,749) = 10.24$, $p < 0.001$, $\eta^2 = 0.05$). Male students reported lower study commitment, $F(1,752) = 36.23$, $p < 0.001$, $\eta^2 = 0.046$, and general life-satisfaction, $F(1,752) = 7.87$, $p = 0.001$, $\eta^2 = 0.010$; in addition, their level of negative emotions was higher than that of their female colleagues, $F(1,752) = 8.90$, $p < 0.001$, $\eta^2 = 0.012$ (see Figure 1). In terms of the independent variables, a MANOVA revealed a weaker but still significant gender effect (Pillai's trace; $V = 0.03$, $F(9,732) = 2.36$, $p = 0.01$; $\eta^2 = 0.028$). Male students reported less-positive relationships with peers, $F(1,742) = 3.92$, $p = 0.048$, $\eta^2 = 0.005$, and also rated the study material as less relevant, $F(1,742) = 9.09$, $p < 0.05$, $\eta^2 = 0.012$. However, these effect sizes are very small, and no further gender differences could be detected with regard to the other study environmental conditions.

Table 2. Correlation matrix, means and standard deviations for the observed variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Commitment	–															
(2) Life-satisfaction	0.28	–														
(3) Positive emotions	0.39	0.36	–													
(4) Negative emotions	–0.20	–0.38	–0.20	–												
(5) Positive relationships with students	0.22	0.36	0.26	–0.31	–											
(6) Positive interpersonal relationships with teachers	0.15	0.29	0.26	–0.25	0.25	–										
(7) Positive professional relationships with teachers	0.11	0.24	0.27	–0.25	0.24	0.65	–									
(8) Achievement pressure	0.09	–0.06	–0.09	0.24	–0.02	–0.08	–0.14	–								
(9) Fair and transparent grading practice	0.15	0.23	0.26	–0.31	0.20	0.45	0.44	–0.07	–							
(10) Transparent achievement demands	0.08	0.16	0.21	–0.20	0.17	0.35	0.39	–0.16	0.44	–						
(11) Autonomy	0.04	0.18	0.25	–0.20	0.21	0.25	0.31	–0.28	0.18	0.21	–					
(12) Relevance of the study material	0.25	0.24	0.46	–0.30	0.16	0.20	0.27	–0.12	0.24	0.20	0.27	–				
(13) Student participation	0.20	0.14	0.24	–0.08	0.14	0.36	0.39	–0.03	0.25	0.26	0.22	0.27	–			
(14) Neuroticism	–0.10	–0.44	–0.22	0.46	–0.23	–0.21	–0.15	0.16	–0.15	–0.07	0.26	0.14	0.14	–		
(15) Stress	–0.14	–0.34	–0.14	0.31	–0.23	–0.27	–0.23	0.18	–0.32	–0.26	–0.13	–0.11	–0.08	0.25	–	
(16) Gender	–0.21	–0.10	–0.06	0.10	–0.08	–0.01	–0.01	–0.07	–0.02	–0.08	–0.02	–0.12	–0.05	–0.16	0.03	–
<i>M</i>	5.14	4.62	3.38	1.74	3.26	3.22	2.96	2.82	2.89	2.84	2.76	4.23	2.90	2.64	1.89	–
<i>SD</i>	0.81	0.86	0.59	0.60	0.58	0.50	0.50	0.52	0.44	0.54	0.55	0.99	0.54	0.86	0.59	–

Note: Numbers in italics indicate no significant correlations. All other correlations are significant ($p < 0.05, 0.01, 0.001$).

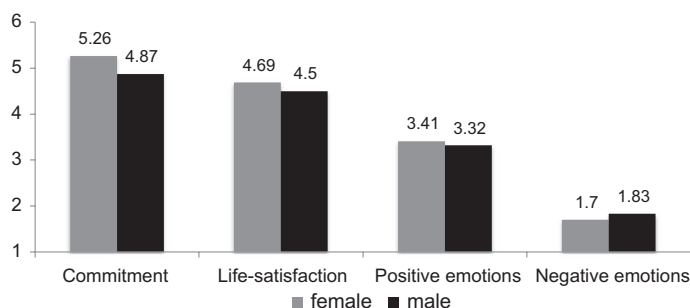


Figure 1. Gender differences in study commitment, general life-satisfaction and emotions at university.

Note: Commitment and life-satisfaction: Min = 1, Max = 6; Emotions: Min = 1, Max = 5; all differences between male and female students are significant, except for the experience of positive emotions.

Predicting emotions at university, study commitment and life-satisfaction by study environmental conditions: path-modelling

In order to explore the predictive role of environmental conditions for students' emotions, life-satisfaction and study commitment, two path-models were calculated and compared. The first did not estimate direct path coefficients between study conditions and life-satisfaction and commitment (suggesting a fully-mediated model), while the second accounted for these direct effects as well (suggesting partial mediation). Gender, neuroticism and stress were controlled for in both models, as these factors typically impact emotional outcome variables (e.g. for life-satisfaction, see Huebner 1991; Lounsbury et al. 2005; for gender, see Fischer 2000). Neuroticism and stress were regressed on all affective variables (emotions and life-satisfaction), and gender was additionally regressed on study commitment. In comparing the fit-indices, the second model showed a better fit than the first (Model 1: RMSEA = 0.058, SRMR = 0.024, CFI = 0.96, TLI = 0.89, chi-square = 73.93 (df = 21); Model 2: RMSEA = 0.023, SRMR = 0.004, CFI = 0.99, TLI = 0.98, chi-square = 2.795 (df = 2)). Model 2 was also the one that we had expected to do better on the basis of theoretical considerations. Thus, the second model was chosen to explain the associations between the variables. The model results are depicted in Figure 2.

Most of the associations were consistent with our predictions. Study commitment and life-satisfaction were best predicted (direct path) by students' positive emotional experiences at university; however, negative emotions also contributed to the explanation of these two indicators. In terms of life-satisfaction, good relationships with peers at university were also found to function as a relevant predictor. Furthermore, relevance of the study material and participation in class were positively associated with life-satisfaction, as were positive interpersonal relationships with teachers.

With regard to study conditions, study commitment was predicted by student participation, relevance of the study material and achievement pressure. The association between achievement pressure and commitment contradicted our expectations, as a positive association was found: the greater the achievement pressure, the greater the reported study commitment. This result cannot be traced back to a suppressor effect, since the bivariate correlations also point in the same direction.

Positive emotions at university were best predicted by the perception of studying relevant material at university, followed by positive interpersonal relationships with other students, fair and transparent grading practices, student participation and transparent achievement demands. Contrary to expectations, teacher–student relationships, autonomy and achievement pressure did not contribute to explaining positive emotions at university.

Finally, negative emotions were predicted by several factors in the study environment (beginning with the strongest predictor): the relevance of the study material (–), achievement pressure (+), positive relationships with other students (–), fair and transparent grading practices (–) and positive interpersonal relationships with teachers (–).

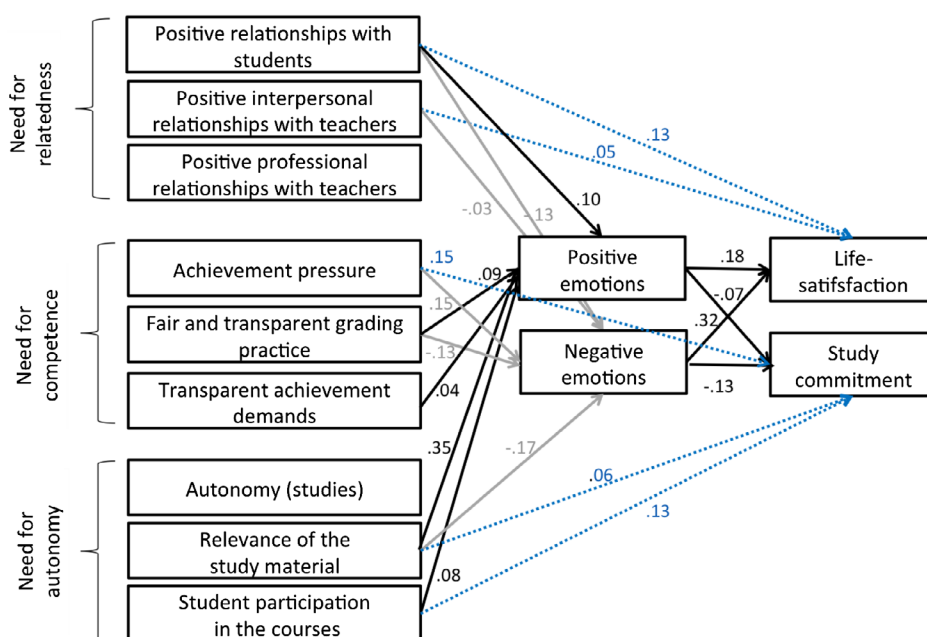


Figure 2. Path-model predicting emotions at university, study commitment and life-satisfaction by factors of the study environment.

Note: Path coefficients represent standardised beta coefficients. In order to enhance the readability of the graph, the paths are shown in different colours. Only significant path coefficients are shown in the model. Dotted paths illustrate the direct effects of study conditions on life-satisfaction and study commitment. Grey paths show effects on negative emotions; black paths show effects on positive emotions and between emotions and life-satisfaction and study commitment.

With respect to the control variables, the following associations were found: neuroticism predicted positive emotions ($\beta = -0.14$), negative emotions ($\beta = 0.37$) and life-satisfaction ($\beta = -0.31$). Higher neuroticism scores correlated with fewer positive emotions, more negative emotions and lower life-satisfaction. Male students reported a higher level of negative emotions ($\beta = 0.14$) and lower life-satisfaction ($\beta = -0.11$), as well as lower study commitment ($\beta = -0.15$). No association between gender and positive emotions was detected. Stress (e.g. due to physical complaints or mental illness) was a positive predictor of negative emotions at university ($\beta = 0.10$) and a negative predictor of life-satisfaction ($\beta = -0.16$), but did not predict positive emotions at university.

Altogether, the model is able to explain 28.5% of the variance in positive emotions, 39.6% in negative emotions, 36.2% in life-satisfaction and 25.6% in study commitment (see Figure 2).

Discussion

The present study examined student emotions in HE, investigating whether a study environment that supports the fulfilment of students' basic psychological needs (SDT; Deci and Ryan 2002) influences these emotional experiences. In addition, we explored whether students' emotions (domain-specific) were related to general life-satisfaction (domain-unspecific) and study commitment. We proposed three main hypotheses that were largely confirmed by the study. First (Hypothesis 1), a study environment that encouraged the fulfilment of basic psychological needs impacted students' emotions. More concretely, when students reported study environmental conditions that were regarded as important for the fulfilment of the three basic psychological needs of autonomy (e.g. relevance of the study content), competence (e.g. fair grading practices) and relatedness (e.g. positive relationships with peers), more positive and less negative emotions were experienced. However, not all indicators of the study environment exhibited an equally strong effect on emotions; some predictors had a non-significant association

with experiences. These somewhat unexpected results will be discussed in detail in the next section. Second (Hypothesis 2), domain-specific emotions related to studying at university affected general life-satisfaction and study commitment, indicating a particularly strong relationship between positive emotions and study commitment: the more positive and less negative emotions students reported, the higher their general life satisfaction and study commitment. Third (Hypothesis 3), partial mediation was confirmed, which indicates that study environmental conditions linked to the fulfilment of basic needs had a direct association with general life-satisfaction and commitment as well as an indirect one mediated through positive and negative emotions.

Thus, the results demonstrate that SDT (Deci and Ryan 2002) and, more specifically, basic psychological needs theory provide a fruitful framework for understanding HE students' emotions, suggesting that emotions function as partial mediators between need-supporting study conditions and general life-satisfaction and study commitment. Previous studies have shown a direct link between psychological need-satisfaction and life-satisfaction (Chen et al. 2015), but these researchers have not investigated the possible mediation of emotions. Furthermore, the study confirms the hierarchical organisation of affective experiences, indicating that affective experiences in a specific domain (e.g. studying at university) 'spread' to the individual's overall emotional well-being (Milyavskaya, Philippe, and Koestner 2013; Rice, Near, and Hunt 1980).

In the following sections, the results will be discussed in greater detail in terms of the three basic psychological needs, complemented by a discussion of the outcomes of emotions, including a discussion of gender differences. Finally, the limitations of the study as well as the implications for future research and HE institutions will be addressed.

The need for autonomy

With regard to the study conditions that were expected to affect the need for autonomy, one particularly strong predictor for positive emotions was found: when students viewed the study material as relevant to their future (occupational) life, they reported many positive emotions. The perception of the relevance of the study material additionally predicted negative emotions and study commitment. This finding can be explained theoretically by SDT (Ryan 1995; Ryan and Deci 2000). If students learn in an integrated-regulated fashion, which describes a form of learning motivation based on high identification with the learning content and thus high self-determination, it is likely that positive emotions will be evoked. Our results are also supported by Tinto's (1975, 1987) model of student drop-out, which describes 'academic integration' – a factor strongly related to identification with institutional norms and values – as an important precursor of commitment and drop-out. Previous empirical research has similarly found the theory–practice link to be one of the best predictors of students' study-satisfaction (which also incorporates affective aspects; Garcia-Aracil 2012; Naude, van den Bergh, and Kruger 2014).

Autonomy can also be fostered when students have opportunities to actively participate in class and feel that their opinions are appreciated and taken seriously. In our study, we found positive relationships between student participation and positive emotions and study commitment. This finding is consistent with SEFT (Eccles et al. 1993, 1997), which proposes that study conditions should match students' needs according to their developmental phase.

Interestingly, and counter to our expectations, the degree of autonomy in terms of choices in one's degree programme (e.g. different course options to choose from) and within particular courses (e.g. the opportunity to choose different foci based on individual interests) did not contribute to the explanation of affective outcomes and study commitment. This contradictory finding might be traced back to the student population in our sample – namely, students in teacher education. Such students might not expect such options due to the rather complex curriculum that covers the first and second subjects (courses on content knowledge and pedagogical content knowledge) as well as educational science. Furthermore, about 20% of our participants were enrolled at teacher education colleges, which typically have fixed curricula (comparable to universities of applied sciences). Again, students would not expect many curriculum options if they chose to attend a teacher education college. Another explanation

could be that students in teacher education are particularly fond of relatively 'fixed' school-related structures: they come from school and go back to school after their studies, and thus they feel 'emotionally at home' in a school-similar environment. However, these possible explanations have not yet been empirically tested, and further studies on students in other academic programmes are needed to determine whether this finding can be replicated across HE students in different domains.

The need for competence

With regard to indicators that typically affect the need for competence, fair and transparent grading practices and transparent achievement demands positively predicted positive emotions, whereas negative emotions were higher when the students perceived the grading practice as unfair or the achievement pressure as (too) high. These indicators are strongly connected to the controllability of the situation, a factor that appraisal-theoretical approaches to emotions (e.g. Lazarus 1991) regard as highly influential. More specifically, the practice of feedback impacts students' emotions, as has been recently shown by Pekrun et al. (2014). Because the grades students receive are a form of numeric feedback on their level of achievement, grading practices can be regarded as a key factor influencing students' emotions.

We found one relationship that contradicted our expectations: high experienced achievement pressure was associated with greater study commitment. This might be explained by the characteristics of the sample, specifically the fact that a majority of the students were accepted on to their programme in situations of 'numerous clausus' (limited places). These students are likely to have already experienced high achievement pressure in high school and were able to cope with it. This positive coping (high achievement under pressure) enabled them to obtain a place on a teacher training programme. The sample is therefore selective in this respect. Thus, it is likely that these students have a high need for achievement and consequently rate some achievement pressure positively (i.e. as controllable). From prior research, we know that there is a link between the high motivation to achieve and goal commitment (Hollenbeck, Williams, and Klein 1989). Furthermore, achievement pressure is often correlated with the structure of the study programme. Students in teacher training programmes must regularly hand in assignments and take exams; this does not allow them to procrastinate, and could thus be advantageous for students with limited self-regulatory skills. Highly structured classes accompanied by clear achievement objectives, even if they are demanding, might therefore have a positive effect on the study commitment of students with self-regulatory issues. As Schouwenburg (2004) discusses for procrastination, self-regulatory problems are prevalent among HE students. However, further empirical clarification is warranted. More concretely, future studies should consider students' achievement goal orientation as well as their self-regulatory skills in order to test the explanations that we have provided for the unexpected positive link between achievement pressure and study commitment.

The need for relatedness

As explained in the introduction, we are specifically interested in the quality of relationships, since positive relationships foster the integration of external values into one's own value system (according to organismic integration theory; Ryan 1995), as well as social integration, which should support positive emotional experiences (in accordance with Tinto's (1975) model of student drop-out). Our results indicate that relationships formed with peers predicted the affective outcome variables better than relationships formed with faculty. The relevance of relationships with peers in terms of students' emotions was expected, as previous studies have shown that making friends at university is one of the most crucial themes that emerge in connection with emotions (Beard, Clegg, and Smith 2007).

However, the low impact of the relationship with faculty on student emotions was somewhat surprising, especially because the teacher–student relationship strongly affects student emotions in the primary and secondary school context (Roorda et al. 2011). Furthermore, the link to emotions was only detected for the interpersonal dimension of the teacher–student relationship; no association

was found for the professional teacher–student relationship (Hagenauer and Volet 2014). The limited impact of the teacher–student relationship on affective outcomes might be partially explained by the cultural–educational context. As Hagenauer, Gläser-Zikuda, and Volet (2016) have recently shown, teacher–student relationships in the German academic context are more distanced in comparison to the relationships found in Australian universities (e.g. German HE teachers interact less frequently on an informal basis with their students), and thus they are likely to be less emotion-triggering (for the school context, see also Hoferichter et al. 2014). This assumption is supported by research on emotions in social relationships indicating that closer relationships evoke more intense emotional reactions (Fischer and Manstead 2008). Because cultural differences in emotions (e.g. Kormi-Nouri, Farahani, and Trost 2013; Markus and Kitayama 1991) as well as in teacher–student interactions are expected, studies on emotions and relationships across cultural–educational contexts are needed in order to clarify the links between the constructs.

Emotions, emotional outcomes and gender differences

Finally, the positive impact of emotions on general life-satisfaction and study commitment must be addressed. This finding can be interpreted as evidence that domain-specific emotions influence students' overall well-being, which is in line with theoretical frameworks (e.g. Milyavskaya, Philippe, and Koestner 2013) as well as with previous empirical findings (e.g. Heidemeier and Göritz 2013). However, previous research has mostly predicted general life-satisfaction by domain-satisfaction (e.g. study-satisfaction; Garriott et al. 2015); this results in a tautology and an empirical measurement problem, as domain-satisfaction can be regarded as a relevant part of general life-satisfaction. The present study focused on positive and negative emotions at university rather than using study-satisfaction as a predictor variable, thus resolving this difficulty.

Not only did emotions at university predict general life-satisfaction, but they were also related to students' study commitment. This was expected, as emotion theories assert that positive emotions trigger an approach motive (Abele 1995) accompanied by certain motivational, cognitive and behavioural outcomes (such as learning motivation or effort). Given the high drop-out rate in HE (Heublein 2014), positive emotions could thus be regarded as a resource that supports students' commitment to their studies.

This leads to the final aspect of our findings that requires attention: specifically, the gender differences we found in negative emotions, general life-satisfaction and commitment in favour of women, which suggests fewer positive 'emotional resources' for male students in teacher education. This was somewhat surprising, as previous research (for example, the study by Salmela-Aro and Tynkkynen (2010) on Finnish secondary students) has pointed to the reverse assumption, indicating higher life-satisfaction among men. Research on study-satisfaction typically also finds higher satisfaction among male students in comparison to female students (e.g. Garcia-Aracil 2012). The less positive emotions of the male students in our study may be due to their status as the minority group in teacher education. Minority groups have been identified as particularly vulnerable in terms of affective outcomes (e.g. Ojeda et al. 2014). In teacher education, male students are generally under-represented and may face certain challenges in forming friendships with other students or in identifying with the study material. Future studies might therefore explore whether inequities in gender distribution in particular study domains can explain differences in the affective outcomes (e.g. positive emotions) of male and female students in favour of the students who form the majority group.

Study limitations and future research

Some limitations of our study should be noted. First, the study was cross-sectional, which does not allow any causal relationships to be determined. Because we know that cognitive, emotional and motivational factors are strongly intertwined, reciprocal influences are likely to occur that typically require other designs for comprehensive investigation (e.g. longitudinal studies). Second, self-reports are often

subject to response biases, which should be considered as a source of possible measurement error when interpreting the results. Third, self-reporting requires a retrospective evaluation of the emotions experienced (during the previous study semester), which must be discussed critically; as Webster and Hadwin (2015, 21) argue: 'Emotions are something felt in the moment, and it is possible that delayed recollection of emotions actually distorts the nature or intensity of the emotion.' Experience-sampling methods would be an interesting alternative way of assessing students' emotions in real time and could be applied in future research instead of retrospective measures (for school students' emotions, see, for example, Becker et al. 2014). Finally, the results of the present study refer to students in teacher education in Germany. This particular study context shares certain characteristics with other contexts, but also entails a number of idiosyncrasies. Because we know that emotions are strongly context-bound (e.g. Volet 2001), future studies are needed to determine whether our results can be transferred to other student populations, taking into account different cultural-educational backgrounds and different study domains.

As noted above with regard to gender differences, future studies may also decide to focus on groups of students that differ in vulnerability in terms of positively adjusting to the university context. As the population of HE students steadily increases, with institutions seeking to attract students from under-represented societal groups (European Commission/EACEA/Eurydice 2015), it is necessary to explore whether students from such groups (e.g. working-class students and/or first-generation students) differ from more 'traditional' student groups (e.g. middle/upper-class students or non-first-generation students) with regard to adaptation to university, including their positive and negative emotional experiences (see, for example, McMillan 2014).

Implications for institutions

In conclusion, our results provide evidence of the relevance of need-supportive study conditions for students' positive and negative emotions at university, as they can have a significant effect on general life-satisfaction and study commitment. Creating a supportive study environment is important for the emotional well-being of individual students, and it is also likely to contribute to the achievement of relevant institutional goals (e.g. improvements in the retention rate, fostering mental health).

In practice, universities could implement comprehensive programmes that seek to promote students' basic psychological needs. For example, the programme described by Naude, van den Bergh, and Kruger (2014) aims at supporting the adaptation of students to university. Female African students in the programme reported positive emotional experiences when the learning content had some meaning for them, when it was connected to their experiences and when they could form positive interpersonal relationships with the instructors in the facilitation programme, all of which assisted in the creation of a secure, positive and respectful learning environment. The humanistic, student-centred approach (Rogers, Lyon, and Tausch 2014) applied in Naude, van den Bergh, and Kruger's (2014) programme could provide a productive avenue for universities that wish to enhance the positive affective experiences of their students.

However, teachers need to learn these high quality teaching approaches. Empirical results pertaining to the participation rate of HE teachers in faculty development are somewhat disillusioning. Fendler and Gläser-Zikuda (2013, for Germany) and Postareff, Lindblom-Ylänne and Nevgi et al. (2007, for Finland) claim that, although courses aimed at faculty development have been established, only a few HE teachers participated in these programmes. In Germany, positions at universities are typically awarded to scholars with outstanding research output; teaching excellence only counts marginally in hiring decisions. This has substantial effects on the motivation of academics to participate in programmes that address teaching quality. Thus, there is a general need for a shift in German HE policy towards increasing the value placed on high quality teaching practices, combined with effective strategies to support the improvement of HE teaching (Wright 1995). Enhancing teaching skills in a basic psychological need-supportive fashion facilitates the student-centred teaching approach, which is a central aim of the Bologna process (European Commission/EACEA/Eurydice 2015).

Universities should also evaluate and measure their students' (affective) experiences more comprehensively, especially if they seek to attract students for both bachelor and master's degree programmes. Measuring students' affective experiences offers universities the opportunity to reflect on quality differences in services and to develop changes in structure, staff management and study content (e.g. Browne et al. 1998; Gruber et al. 2010). Furthermore, increased knowledge about the affective experiences of HE students might support the establishment of a more comprehensive, target-oriented mental health support system (Quinna et al. 2009). Severe mental illnesses amongst HE students resulting from repeated negative affective experiences might thus be reduced or even prevented.

Taken together, many possible implications for universities can be envisioned, given that both emotions and life-satisfaction are not stable personality traits but can be influenced by the conscious creation of a basic psychological need-supportive study environment (for adolescent learners, see, for example, Salmela-Aro and Tynkkynen 2010). To motivate scholars to change their teaching practices accordingly presupposes a shift in German HE policy reflecting acknowledgement of affective factors in HE.

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No potential conflict of interest was reported by the authors.

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