Student dropout at university: a phase-orientated view on quitting studies and changing majors

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Abstract

Student dropout can be conceptualized as a decision-making process, consisting of different phases. Based on previous literature on student dropout, decision-making, and action-phases, we proposed that the process of developing dropout intentions includes the following phases: *non-fit perception*, *thoughts of quitting/changing, deliberation*, *information search*, and a *final decision*. In the present cross-sectional study, we empirically investigated if the assumed phases can be distinguished from each other, if the phases follow the presumed order, and whether each phase is associated with certain characteristics. Furthermore, we considered a strict separation between quitting studies completely and changing a major. For this purpose, we analyzed data of $N = 1005$ students (average age of 23.0 years; 53% female; 47% male) from a German University. By using confirmatory factor analyses, we found the supposed factor structure for the different phases concerning both kinds of dropout, quitting studies, and changing majors. In each process, structural equation modelling indicated positive relations between adjoining phases. The factor values correlated to a substantial amount with an assortment of variables associated with student dropout. On a theoretical level, the conception of different phases of student dropout helps to get a better understanding of regulatory processes in the context of student dropout.

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Student dropout from university is a major issue in higher education in many countries—international studies have revealed student dropout rates as high as 25 to 45% of first-year students never graduating (Heublein, 2014; Heublein & Wolter, 2011; OECD, 2017; Solberg Nes et al., 2009). According to Mashburn (2000), student dropout can be understood as a process, as a student's final decision to leave university can be predicted by cognitions of withdrawal, including thoughts of quitting, search intentions, and dropout intentions. Hence, student dropout seems to be based on a longer-lasting decision-making process. For instance, Heublein et al. (2017) found that German students, who quit their studies, are on average enrolled at university for four semesters.

So far, only a few studies have dealt with student dropout as an ongoing process with different phases. This research has, although insightful, frequently been descriptive, explorative, and qualitative (e.g., Heublein, 2014; Pascarella et al., 1986; Rivière, 1999). It has provided valuable and rich findings on cognitions, motivations, and emotions prior to and after student dropout, but has not considered different phases of the individual dropout process based on a quantitative hypothesis testing approach. This does not allow conclusions to be drawn regarding specific determinants of the phases. However, differentiated insights into this individual process can be helpful for an effective and early detection of students who potentially drop out from their studies and would profit from targeted support in this situation. Additionally, prior research on student dropout did not differentiate clearly between quitting studies (leaving studies before degree completion) and changing a major—although these two decisions may clearly fulfil different functions and may be associated with different consequences for the individual (Cope & Hannah, 1975; Kehm et al., 2019; Stratton et al., 2005).

Hence, the aim of the present research is to develop and test a differentiated model of the process of student dropout with a study in the German university context that specifies distinct phases and additionally distinguishes between quitting studies completely and changing one's major. Theoretically, we mainly refer to the decision-making model by Betsch (2005) and to the Rubicon model of action phases (Achtziger & Gollwitzer, 2010), which indicate that each phase is characterized by specific information processes. Hence, we want to contribute to a better understanding of the student dropout process from first perceptions of a non-fit between student and studying environment up to the final decision to drop out.

Conceptualizing student dropout

The literature provides a series of conceptualizations of student dropout using various terms (e.g., attrition, retention, persistence), which should not be used synonymously (see Berger & Lyon, 2005). In line with the definition of Berger and Lyon (2005), we refer to student dropout in the case of "a student whose initial goal was to complete at least a bachelor's degree, but did not" (p. 12). More comprehensive definitions reflect that dropout can be characterized by individual and environmental factors. Particularly, Tinto (1975) claimed that "dropout represents the failure of individuals, of given ability and goal commitment, to achieve desired educational goals" (p. 78). In line with this definition, student dropout is from an individual perspective associated with dysfunctional self-regulation (Achtziger & Gollwitzer, 2010; Bernardo et al., 2019; de la Fuente-Arias, 2017; Nota et al., 2004). Heublein and Wolter (2011) extended this view to a perspective that also considers environmental factors: The authors conceptualized student dropout as a complex event where individual, institutional, and social factors that affect studying are superimposed. Accordingly, student dropout can be seen

as a multicausal, ongoing process (see also Blüthmann et al., 2008), resulting from a dropout intention (Mashburn, 2000).

A successful completion of studies can have a great positive impact on a person, both for instance with regard to higher income and better health (Solberg Nes et al., 2009). On the contrary, student dropout can be associated with social and individual costs (De Lourdes Machado et al., 2011; Sarcletti & Müller, 2011; Thomas, 2002). For instance, it represents a big cost factor for society, existing relationships with fellow students can end, and life planning must be adjusted. In order to maximize student success probability and to reduce costs, it is necessary to identify dropout very early (Del Bonifro et al., 2020). Therefore, analyzing its conditions is becoming a focus of university research (Blüthmann et al., 2008).

Prior research predominantly investigated the relevance of various potential determinants of student dropout, such as family background, individual attributes, and precollege schooling experience (e.g., Arendt, 2013; Braxton et al., 2000; Heublein et al., 2003; Respondek et al., 2017). For example, in the German academic context, three main distal reasons for student dropout could be identified, including problems of financing studies, performance problems, and lack of study motivation (Heublein, 2014). Also, many international studies indicated the significant role that financial hardships play for student dropout and how financial aid could prevent this (e.g., Chen & Des Jardins, 2008; Melguizo et al., 2011; Scott et al., 2008). Moreover, deficient performance (e.g., Duque, 2014) and insufficient motivation (e.g., De Witte & Rogge, 2013; Litalien & Guay, 2015; Morrow & Ackermann, 2012; Vallerand et al., 1997) also proved to be essential causes of student dropout in international studies and might be the starting point for developing a dropout decision. Similarly, meta-analyses point out that student engagement is positively related to academic achievement (Lei et al., 2018), and certain motivational aspects such as academic goals and academic self-efficacy show besides academic-related skills moderate relationships with retention (Robbins et al., 2004).

Frequently, the term student dropout is used in a very broad sense. However, the term must be refined. Several researchers recommended differentiating between quitting studies completely and changing a major (e.g., Cope & Hannah, 1975; Kehm et al., 2019; Stratton et al., 2005; Wolter et al., 2014), as neglecting this differentiation can bias the results concerning student dropout. In the present paper, we consider both phenomena separately to avoid this bias, although the main focus is to examine the process of student dropout in terms of quitting studies completely.

Prior research on the process of student dropout

As of yet, the few existing studies on the process of student dropout mostly implicitly assume different phases and allocate certain causes to different phases of student dropout. For instance, Tinto's student integration model (1975) postulates that student dropout is determined by the degree of social and academic integration of a student within the academic system. Triggered by failed integration, the process of student dropout presumably already starts at the beginning of studying. Rivière (1999) also postulated this mechanism in his qualitative research. Here, student dropout was conceptualized based on three periods: pre-dropout, dropout, and post-dropout. In the pre-dropout phase, students experienced a maladaptation between themselves and the institution, resulting in decreased commitment to their studies, which can lead to actual dropout. The post-dropout phase is, according to Rivière, characterized by a moratorium in which self-reactualization can take place. Mashburn's (2000) model of the

psychological process of university student dropout adapted from an employee turnover model by Hom et al. (1992) implicitly models a process of student dropout as withdrawal cognitions proved to predict actual dropout. According to Mashburn (2000), these withdrawal cognitions present a higher single-factor of three aspects closely related in the student dropout process, namely thoughts of quitting, search intentions about alternatives to the actual major and dropout intentions. It becomes apparent that the process of student dropout involves self-regulatory processes, meaning that student dropout is driven and regulated from within (de la Fuente-Arias, 2017).

Taken together, prior studies give first evidence that developing a decision of student dropout is based on and can be conceptualized as a multi-staged process. However, researchers have not explicitly developed a differentiated process model. We therefore present in the following a detailed approach for understanding the process of student dropout that is based on the theoretical perspectives of decision-making and action-phase models.

Towards a differentiated process model of student dropout

Applying cognitive models of decision-making processes and an action-phase model can help to identify relevant phases of student dropout as the development of dropout intentions seems to be based on self-regulated long-term processes characterized by certain cognitive and behavioral patterns (such as the perception of a poor fit between student and institution, ruminating, and search for information). For the purpose of identifying phases of the student dropout process, two models seem to be especially helpful (see Fig. 1): The decision-making model of Betsch (2005) and the Rubicon model of action phases (Achtziger & Gollwitzer, 2010), since these models illustrate the processes of forming a decision or getting to an action in a differentiated way.

The decision-making model of Betsch (2005) focuses on individual decision-making as a process under control of a person and environment. Here, three decision-making phases are
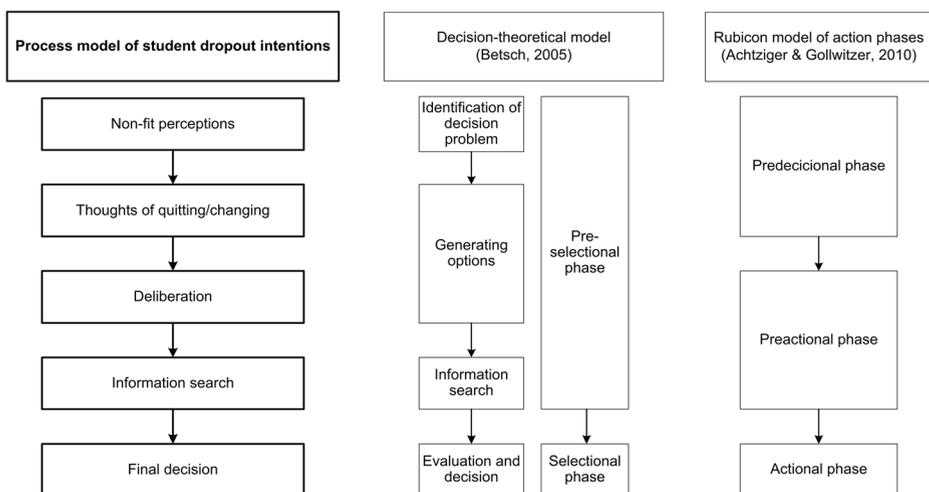
Fig. 1 Theoretical model of the process of student dropout intentions based on the decision-theoretical model by Betsch (2005) and the Rubicon model of action phases (Achtziger & Gollwitzer, 2010)

anticipated: A preselection, a selection, and a postselection phase. According to the ideal type model, the preselection phase is characterized by generating options followed by seeking decision-relevant information and eventually identifying decision-making situations. The selection phase involves assessing possible consequences and thereafter reaching a decision. Postselectively, the action is implemented (and feedback learning takes place). To gain a better understanding of the process of dropout intentions, considering the preselection phase and the selection phase of this model seems to be beneficial, as here, the process until the actual decision is well differentiated.

A different view that might illuminate the process of student dropout results from applying the general Rubicon model of action phases. A benefit of this model is the description of certain mindsets of each phase (see Ghassemi et al., 2017). It proposes a predecisional, a preactional, an actional, and a postactional phase (Achtziger & Gollwitzer, 2010). The predecisional phase is characterized by the contemplation of feasibility of certain wishes, and the desirability of potential outcomes with open-mindedness, ending in transforming the wish into a specific goal. Then, in the preactional phase, individuals consider how to best pursue the goal with cognitive tuning towards the information. This leads to enacting these plans in the actional phase where the focus of attention is on sustaining the course of action. Finally, an evaluation of the action outcome with an objective mindset takes place in the postactional phase. For the conception of our process model on dropout intentions, characteristics of the predecisional, preactional, and actional phases are especially interesting, since here the process until the action is well differentiated.

To understand the ongoing process of developing dropout intentions until the actual student dropout, we integrate the model of Betsch (2005) and the Rubicon model (Achtziger & Gollwitzer, 2010) into one model so that the process of student dropout can be differentiated sufficiently (Fig. 1). We assume that each phase includes specific information processes. As students have different alternatives after the decision to drop out from studies, we aim to differentiate in our model between intentions to quit studies completely and intentions to change a major. For both versions, we assume that the same order of processes takes place until the final decision.

It can be assumed that the process of developing intentions to quit studies completely (or intentions to change a major, respectively) starts with a perception of a non-fit between studying in general (or the specific study content and context) and the individual (*non-fit perception*; see Tinto, 1975; Suhlmann et al., 2018). This first sensing of incongruence between the student and studying may constitute the first phase of a dropout process, in which a wish for a change of the current situation develops. As a consequence, resistance as a decreased commitment to studying and unfavorable emotional experience could take place (Gollwitzer, 2012). This corresponds to the preselectional phase of Betsch's (2005) model as a decision-problem is now identified. For the individual, this may create a burden, thereby leading to unsystematic thoughts of quitting studies completely or changing a major, respectively. In this rather heuristic information processing, these thoughts might be unsystematic and widely spread (*thoughts of quitting/changing*). They might revolve around the feasibility of certain wishes and the desirability of potential action outcomes until this phase ends with a commitment to the goal to sort out the issue of quitting studies completely or changing one's major, respectively (see Achtziger & Gollwitzer, 2010; Gollwitzer, 2012). According to the model of Betsch (2005), different options can now be generated and a deliberation between these starts. As a consequence, this might initiate the next phase of the dropout process in terms of deliberating values and expectations—the student consciously weighs up between

remaining in the course of studies compared to alternatives (*deliberation*). Here, due to a focus on internal aspects, the assimilation of new information might be limited, focusing more on the specific goal. The Rubicon model postulates here a fiat tendency, meaning that the goal of quitting studies obtains liabilities. In line with the model of Betsch (2005), a targeted information search might happen after the generation of options, so we theoretically assume that informing through a targeted search for information about non-university activities (or other majors) could happen next (*information search*). In the Rubicon model of action phases, this step corresponds to the preactional phase as the planning of a concrete action (information search) has started and the student pursues a concrete goal (e.g., to find out more about alternatives). Finally, the process might end with a final decision to quit studies completely (or to change a major). Relief and feasibility orientation can take place before the final decision is implemented (*final decision*). This step corresponds to the selectional phase of Betsch's model (2005) as a decision is being made, as well as to the actional phase of the Rubicon model of action phases as the student starts to establish the action of quitting studies completely or changing a major in a goal-oriented way.

Correlates associated with student dropout

In order to test the assumptions of a process model of student dropout, it is important to consider a selection of possible correlates more closely in relation to the model. Here, focusing on individual determinants is particularly interesting, since these have a direct influence on the course of studies (Gensch & Kliegl, 2012). Especially individual determinants such as test anxiety or a lack of motivation in self-regulated learning have increasingly been analyzed in association with student dropout (Bardach et al., 2019; Bernardo et al., 2019; Blüthmann et al., 2008; Respondek et al., 2017; Schnettler et al., 2020a, b). Hence, it is of great interest to take a closer look at these correlates of student dropout when analyzing its process—as it can be assumed that different phases of developing a dropout intention relate to a different degree to them. Taking previously described models of student dropout into account (e.g., Bean & Metzner, 1985; Tinto, 1975), we consider a selection of possible correlates of student dropout more closely in relation to the model. They can be clustered into emotional (subjective well-being, anxiety), motivational (academic self-concept, subjective task value), behavioral (academic procrastination), and cognitive/affective variables (learned helplessness).

From an emotional perspective, high subjective well-being can be seen as a protective factor against student dropout as it relates to important study-relevant factors (such as academic procrastination and performance; Grunschel et al., 2016; Ruthig et al., 2007; Witter et al., 1984). Furthermore, academic emotions—especially anxiety—are closely related to academic achievement (e.g., Pekrun et al., 2002; Pekrun et al., 2009) and achievement anxiety is positively related to dropout intentions (e.g., Respondek et al., 2017).

Concerning motivational variables, academic self-concept (the composite view of oneself in an academic context, Bong & Skaalvik, 2003) and subjective task value affect student dropout (e.g., Chemers et al., 2001; De Witz et al., 2009). Additionally, if the expectation to successfully complete the studies and the value of studying decreases in the course of the semester, dropout intentions are increased (Dresel & Grassinger, 2013). In this way, these components of study motivation can be seen as robust and consistent predictors of academic success (Heublein et al., 2017; Robbins et al., 2004; Zajacova et al., 2005).

Taking a behavioral variable into account, academic procrastination (a voluntary delay of an intended action despite knowing about its negative consequences; Grunschel et al., 2016; Klingsieck et al., 2013; Simpson & Pychyl, 2009; Steel, 2007) was found to be positively linked to dropout intentions (Bäulke et al., 2018). As procrastination is associated with negative proactivity, procrastinating students might avoid the effort of self-regulation and are therefore more likely to develop dropout intentions (Bäulke et al., 2021; de la Fuente-Arias, 2017).

Finally, concerning a cognitive/affective variable, learned helplessness (the belief that a person has no control over what happens to them due to prior repetitive failure in a performance; Maier & Seligman, 1976) was taken into account in the present study. Krejtz and Nezlek (2016) found that it has a domain specific component, showing that learned helplessness in a certain subject leads to lower performance in this subject. Furthermore, as it results from an absence of self-regulatory behaviors, it can be assumed that learned helplessness is positively linked to student dropout (de la Fuente-Arias, 2017).

The current research

Until now, there is little knowledge on the process of developing dropout intentions. In order to understand the evolving process until the actual student dropout, this study aims to constitute the development of dropout intentions as an ongoing process under the perspectives of decision-making and action-phase models. On that account, we proposed a model, differentiating between intentions to quit studies completely and to change a major. Overall, we investigated three hypotheses.

First, based on the decision-theoretical model of Betsch (2005) and the Rubicon model of action phases (Achtziger & Gollwitzer, 2010), we hypothesized that our five assumed phases (*non-fit perception*, *thoughts of quitting/changing*, *deliberation*, *information search*, and *final decision*) exist. Additionally, we claim that these phases of intentions to quit studies completely and intentions to change a major are separate aspects and therefore distinguishable (Hypothesis 1).

Furthermore, we assume that students can be allocated to different phases and go through previous phases before moving on to the next phase of the process. Therefore, we hypothesize that theoretically adjoining phases are positively related—as well as next adjoining phases as the proposed model is based on the assumption that the phases build on one another. Additionally, we assume an indirect effect of *non-fit perception* to the *final decision, mediated through thoughts of quitting/changing*, *deliberation*, and *information search* (Hypothesis 2).

For substantiating the anticipated process model, we finally aim to investigate if the manifestations of the assumed phases correlate with the assortment of theoretically derived emotional, motivational, behavioral, and cognitive/affective variables associated with student dropout. As decision-theoretical models indicate, these variables are especially important in early predecisional phases. This is because in early decision-making phases, there is a wide receptiveness (as in the deliberating mindset in which a person openly weighs between value and expectancy of a certain goal; see Gollwitzer, 1990, 2012). However, in later stages, the focus of attention is narrowed (in an implemental mindset, a person only focuses on implementing the goal until information processing only happens in favor of the goal; Achtziger & Gollwitzer, 2010). Therefore, we expected a specific correlational pattern, namely decreasing correlation strength between these variables and dropout intentions with proceeding phases. It is to be assumed that the direction of the correlations of the phases of intentions to

quit studies completely and intentions to change a major are substantially positive with anxiety, academic procrastination, and learned helplessness, as well as substantially negative with subjective well-being, academic self-concept, and subjective task value (Hypothesis 3).

Methods

Procedure

We contacted all students (in total 19,318 students) of a university in southern Germany that offers a wide range of almost 90 majors in humanities and social sciences, economics and law, natural and technical sciences, and computer sciences, via e-mail. Students were invited to our online survey regardless of their major and semester. Participation was voluntarily and after completing the questionnaire, students could receive a voucher worth five Euros.

The study was conducted in full accordance with the Ethical Guidelines of the American Psychological Association. At the time the data was acquired, it was not customary at most German universities to seek ethics approval for survey studies on learning behaviors. No identifying information was acquired from participants, as the study made use of anonymous questionnaires.

Participants

A total of 1525 students started the online survey, and 1206 participants completed the questionnaire (7% of students contacted). In total, 201 participants were excluded due to unreasonable working time while completing the questionnaire (less than 1.5 s per item). As a consequence, $N = 1005$ (53% female; 47% male; mean age = 23.0 years, $SD = 3.5$) participants were included in the data analyses. The average processing time for completing the questionnaire was 22.0 min with a median of 21.0 min. The students were enrolled in different majors: The majority of participants were enrolled in the fields of economics and law (23%), followed by teaching (21%), mathematics and natural sciences (19%), social sciences (17%), cultural sciences (12%), and engineering (6%). They had completed an average of 4.54 semesters ($SD = 3.83$).

Variables and measures

To investigate our research questions, we newly developed items for measuring intentions to quit studies completely and intentions to change a major. As correlates associated with student dropout, subjective well-being, anxiety, academic self-concept, subjective task value, academic procrastination, and learned helplessness were assessed with established self-report scales. In the online questionnaire, the participants could only continue to the next page when they had completed all the current items.

Phases of intentions to quit studies completely and intentions to change a major

To measure the assumed phases of the process of intentions to quit studies completely and intentions to change a major, we newly developed two versions of a multifaceted scale, since no scales existed that strictly distinguish between different phases of the process of student dropout on the one hand, and between intentions to quit studies completely and intentions to change a

major on the other hand. Based on the model assumptions presented above, we distinguished between *non-fit perceptions*, *thoughts of quitting/changing*, *deliberation*, *information search*, and *final decision*. We assessed each phase by using three items (see full wording of sample items in Table 1) alongside 6-point Likert-scales ranging from 1 (*disagree completely*) to 6 (*agree completely*). The complete scales with all items can be found in the Appendix.

Subjective well-being

We assessed subjective well-being by using the German Single-Item Scale L1 (Beierlein et al., 2014). The item reads as: "How satisfied are you at the moment, all in all, with your life?" Responses to the item ranged from 1 (*entirely unsatisfied*) to 11 (*entirely satisfied*).

Anxiety

Measuring anxiety in a learning context, four items ("Thinking about my studies makes me feel uneasy") of the Achievement Emotions Questionnaire (AEQ), developed by Pekrun et al. (2005), were adapted to the academic context. They were presented on a 6-point Likert-scale ranging from 1 (*disagree completely*) to 6 (*agree completely*).

Academic self-concept

To assess academic self-concept, we used a five-item subscale from the German scales for the assessment of school's self-concept (SESSKO; Schöne et al., 2002), adapted to the academic context. The 5-point bipolar response scale of the items consisted of item pairs containing opposite statements (sample item pair: "Learning new things is hard … easy for me").

Subjective task value

We measured subjective task value with a six-item scale that we had already used in several prior studies (e.g., Daumiller & Dresel, 2019). A sample item reads as follows: "My studies have a personal benefit for me." The items were presented with Likert-type response scales ranging from 1 (*disagree completely*) to 6 (*agree completely*).

Table 1 Sample items of the newly developed scales for assessing different phases of intentions to quit studies completely and intentions to change a major

Phase	Intentions to quit studies completely	Intentions to change a major
	At the moment …	
Non-fit perception	… I don't feel suitable for studying.	… I don't feel suitable for my major.
Thoughts of quitting/changing	… I'm considering quitting my studies.	… I'm considering changing my major.
Deliberation	… I'm deliberating exactly what quitting my studies would mean for me.	… I'm deliberating exactly what changing my major would mean for me.
Information search	… I inform myself precisely about alternatives to studying at a university.	… I inform myself precisely about alternative majors.
Final decision	… I've decided to quit my studies completely.	… I've decided to change my major.

Note. The presented items are an English translation from the German original scales

Academic procrastination

Assessing academic procrastination, we used a short version of the German translation of the Tuckman Procrastination Scale (TPS, Stöber & Joormann, 2001; Tuckman, 1991) with ten items with high factor loadings (see Tuckman, 1991). A sample item reads as follows: "I needlessly delay finishing jobs in my studies, even when they're important." The response scale of the items ranged from 1 (*not correct at all*) to 5 (*fully correct*).

Learned helplessness

To measure learned helplessness in the academic context, we adopted and extended the helplessness scale of Breitkopf (1985), resulting in six items. A sample item reads as follows: "Even if I make an effort, I have no success in my studies." The item response scale ranged from 1 (*disagree completely*) to 6 (*agree completely*).

Descriptive statistics and internal consistencies all scales are displayed in Table 2.

Analyses

To examine our first hypothesis concerning the separability of the presumed phases, at first we conducted confirmatory factor analyses and compared model fit indices between different models (focusing on a ten-factor model that combines the five phases of intentions to quit studies completely and intentions to change a major and two separate five-factor models each for intentions to quit studies completely and intentions to change a major). In a next step, we compared five-factor models with models consisting of four factors, which were derived from the conflation of two factors each. To test our second hypothesis concerning the order of the presumed phases, we conducted latent path analyses using structural equation modelling (SEM). We modelled the relationships between adjoining phases as well as between next adjoining phases (lag-1 paths, as we assume that phases build on one another) separately for

Table 2 Descriptive statistics and internal consistencies of intentions to quit studies completely and intentions to change a major as well as of potential correlates associated with student dropout

		M	SD	α	Range
Intentions to quit studies completely	Non-fit perception	1.87	0.97	.85	1.00–6.00
	Thoughts of quitting	1.87	1.05	.80	1.00–6.00
	Deliberation	1.79	1.21	.94	1.00–6.00
	Information search	1.58	0.96	.92	1.00–6.00
	Final decision	1.21	0.63	.95	1.00–6.00
Intentions to change a major	Non-fit perception	2.24	1.13	.86	1.00–6.00
	Thoughts of changing	2.12	1.22	.88	1.00–6.00
	Deliberation	1.85	1.23	.94	1.00–6.00
	Information search	1.67	1.18	.95	1.00–6.00
	Final decision	1.35	0.88	.93	1.00–6.00
Correlates associated with student dropout	Subjective well-being	7.99	1.90		1.00–11.00
	Anxiety	2.34	0.99	.85	1.00–5.00
	Academic self-concept	3.64	0.69	.82	1.00–5.00
	Subjective task value	4.61	1.31	.88	1.00–6.00
	Academic procrastination	2.77	1.03	.94	1.00–5.00
	Learned helplessness	2.21	0.98	.94	1.00–6.00

Note. N = 1005

quitting studies and changing majors, with additionally specifying the indirect effect from *non-fit perceptions* to the *final decision*. Our third hypothesis concerning correlations with variables associated with student dropout was tested with latent correlations of our assumed phases with subjective well-being, anxiety, academic self-concept, subjective task value, academic procrastination, and learned helplessness.

Confirmatory factor analyses and latent models were executed using Mplus 7 by Muthén and Muthén (1998–2012), considering chi-square (χ^2), root-mean-square error of approximation (RMSEA ≤ .06), comparative fit index (CFI ≥ .95), tucker lewis index (TLI ≥ .95), and standardized-root-mean-square-residual (SRMR ≤ .08) according to the criteria of Hu and Bentler (1999). The correlates associated with student dropout (anxiety, academic self-concept, subjective task value, academic procrastination, and learned helplessness) were latent variables. These variables were parceled according to the item-to-construct balance approach (Little et al., 2002).

Results

At first, we took a look on the descriptive statistics of the scores reflecting the postulated phases of intentions to quit studies completely and intentions to change a major (Table 2). Descriptively, the means of intentions to quit studies completely as well as of intentions to change a major were rather lower in advanced phases. These descriptive statistics provide first indications that students seem to differ between different phases. Hence, it seems fruitful to examine the different dropout processes more in detail. Descriptive statistics for potential correlates of student dropout revealed, on average, moderate to positive expressions.

Separability of the postulated phases in the process of student dropout

To test the separability of our postulated phases (Hypothesis 1), we considered model fit indices of various reasonable models. The hypothesized ten-factor model (Fig. 2), which combines the five phases of intentions to quit studies completely and intentions to change a major with admitted correlations of corresponding phases, showed a rather acceptable fit (χ^2 = 2304.5; df = 380; p < .001; RMSEA = .07; CFI = .94; TLI = .93; SRMR = .17). This confirms our hypothesis as it emphasizes the separability of the phases. Moreover, small to moderate correlations between these corresponding phases (.08 < r < .28) support the idea that these processes require separate consideration. This indicates that phases of intentions to quit studies completely and intentions to change a major are separate aspects and therefore distinguishable. As a consequence, we conducted separate analyses for intentions to quit studies completely and intentions to change a major to further consider the differentiation between these constructs. That is, we estimated two separate five-factor models, one each for intentions to quit studies completely and intentions to change a major. Both models for intentions to quit studies completely (χ^2 = 422.7; df = 80; p < .001; RMSEA = .07; CFI = .98; TLI = .97; SRMR = .05) and intentions to change a major (χ^2 = 390.7; df = 80; p < .001; RMSEA = .06; CFI = .98; TLI = .97; SRMR = .03) showed good data fit.

In a next step, we wanted to examine if our assumed phases can be robustly differentiated, and, in that sense, if a separation between them is necessary. Therefore, we compared the five-factor models (in separate analyses for intentions to quit studies completely and intentions to change a major) with four-factor models, resulting in all possible combinations of phases. For
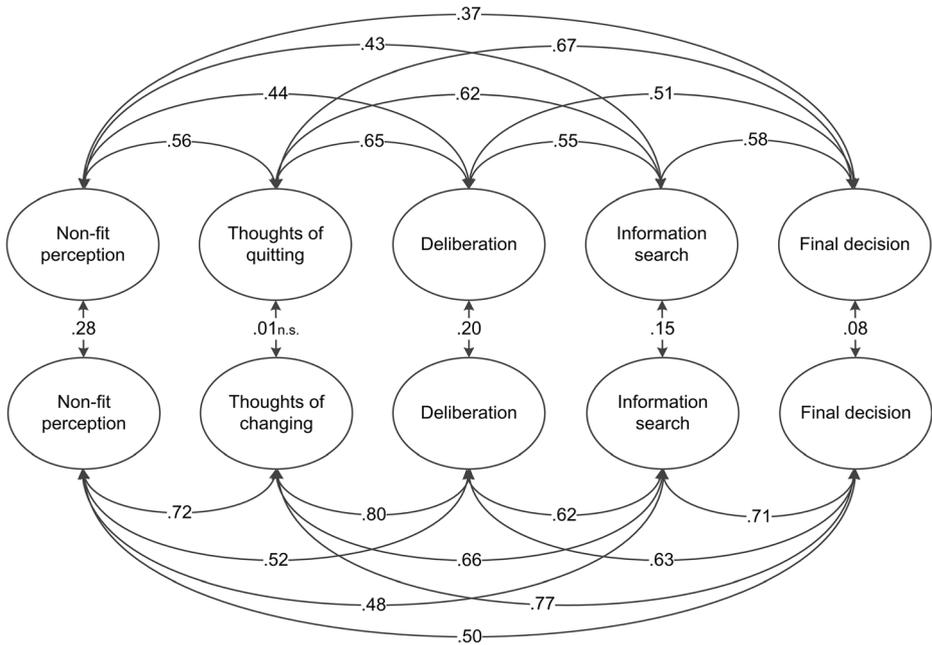
Fig. 2 Results of confirmatory factor analyses of the intercorrelations of the process of intentions to quit studies completely and intentions to change a major (all latent correlations were significant at $p < .001$). The upper row refers to the process of quitting studies completely, and the bottom row refers to the process of changing a major

instance, we compared the five factor model (consisting of one factor each for [1] *non-fit perceptions*, [2] *thoughts of quitting*, [3] *information search*, [4] *deliberation*, [5] *final decision*) with models with two merged phases (consisting of one factor each for [1] *non-fit perceptions*, [2] *thoughts of quitting*, and *information search* were merged, [3] *deliberation* and [4] *final decision*). The fit of these four-factor models was not as good (RMSEA > .15; CFI < .92; TLI < .90; SRMR > .07) and significantly worse than five-factor models (all $p < .001$). In addition, a two-factor model without differentiating between phases did not fit the data in an acceptable way as well ($\chi^2 = 13,512.0$; $df = 404$; $p < .001$; RMSEA = .18; CFI = .58; TLI = .55; SRMR = .11) and was significantly worse than the hypothesized ten-factor model ($p < .001$).

In conclusion, our first hypothesis can be supported as model fit indices indicate that the five postulated phases are factorial separable for both intentions to quit studies completely and for intentions to change a major. Based on the results of the confirmatory factor analyses, we constituted two versions with five subscales each with good internal consistencies (see Table 2).

Order of the postulated phases

Testing our second hypothesis regarding whether the assumed phases follow the presumed order, we used structural equation modelling, and again conducted one model each for intentions to quit studies completely and intentions to change a major, only including direct paths between adjoining phases as well as lag-1 paths to next adjoining phases (see Fig. 3). These models indicated good data fit, both for intentions to quit studies completely ($\chi^2 = 602.4$; $df = 83$; $p < .001$; RMSEA = .08; CFI = .96; TLI = .95; SRMR = .07) and intentions to
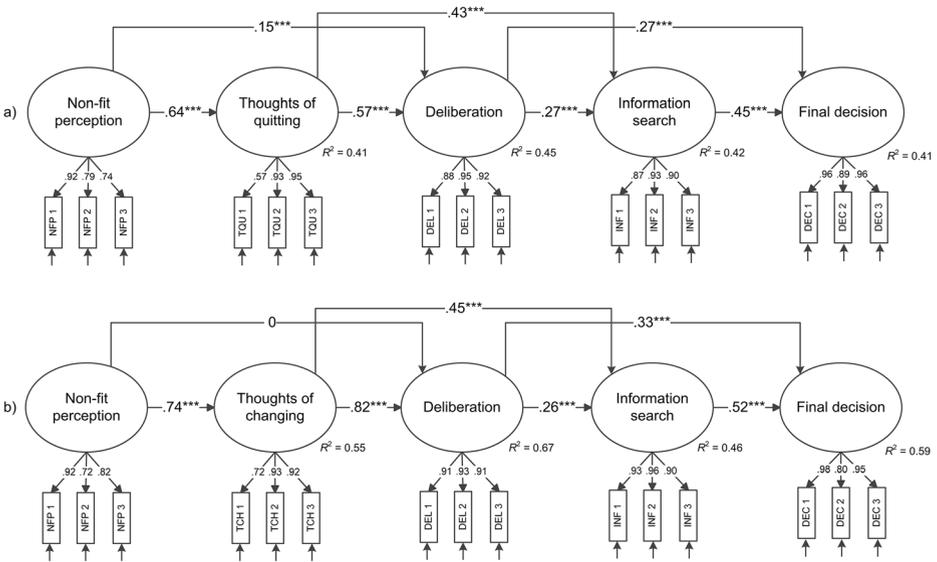
Fig. 3 Structural equation modelling on the postulated processes of quitting studies completely (**a**) and changing a major (**b**)

change a major[1] ($\chi^2 = 575.2$; $df = 84$; $p < .001$; RMSEA = .08; CFI = .97; TLI = .96; SRMR = .05). As expected, all adjoining phases were positively linked, which supports the assumption of the postulated order of the phases. Furthermore, direct paths indicated a stronger relation than lag-1 paths, except for the relations between *thoughts of quitting/changing* and *information search*[2]. There was a significant indirect effect of *non-fit perceptions* on the *final decision* through *thoughts of quitting/changing*, *deliberation*, and *information search*, both for intentions to quit studies completely ($\beta = .19$; $p < .001$) and for intentions to change a major ($\beta = .32$; $p < .001$). Concluding, Hypothesis 2 was supported as all adjoining are positively related, which emphasizes the presumed order of the postulated phases.

Associations of postulated phases in the process of student dropout with emotional, motivational, behavioral, and cognitive/affective determinants

Testing our third hypothesis concerning interrelations of intentions to quit studies completely and intentions to change a major with variables that are potentially associated with student dropout (Hypothesis 3), single latent bivariate correlations were estimated (Table 3). We found significant positive correlations of our assumed phases

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[1] Due to the unexpected direction of the lag-1 path from *non-fit perceptions* to *deliberation* for intentions to change a major ($\beta = -.12$), this path was manually set to 0.

Without modelling lag-1 paths, both models for intentions to quit studies completely ($\chi^2 = 819.1$; $df = 86$; $p < .001$; RMSEA = .09; CFI = .96; TLI = .94; SRMR = .13) and intentions to change a major ($\chi^2 = 776.8$; $df = 86$; $p < .001$; RMSEA = .09; CFI = .96; TLI = .95; SRMR = .10) showed an acceptable data fit according to Hu and Bentler (1999).

[2] Testing models with an alternative order of the phases (*non-fit perception*, *thoughts of quitting/changing*, *information search*, *deliberation*, *final decision*) revealed clearly larger lag-1 paths than direct paths on *deliberation* and *final decision* for both, quitting studies completely and changing majors. This was not the case for the postulated model—which indicates that the postulated model is a better representation of the empirical data than the alternative models.

Table 3 Latent bivariate correlations of the assumed phases of intentions to quit studies completely or intentions to change a major and variables associated with student dropout

	Emotional		Motivational		Behavioral	Cognitive/ affective
	Subjective well-being	Anxiety	Academic self-concept	Subjective task value	Academic procrastination	Learned helplessness
Intentions to quit studies completely						
Non-fit perception	−.34	.42	−.49	−.55	.34	.37
Thoughts of quitting	−.32	.29	−.25	−.43	.29	.23
Deliberation	−.27	.30	−.23	−.34	.21	.27
Information search	−.22	.19	−.19	−.35	.22	.15
Final decision	−.16	.17	−.14	−.33	.17	.13
Intentions to change a major						
Non-fit perception	−.39	.46	−.47	−.75	.29	.43
Thoughts of changing	−.28	.32	−.24	−.48	.23	.27
Deliberation	−.22	.29	−.20	−.31	.13	.28
Information search	−.17	.11	−.07[n.s.]	−.32	.07	.08
Final decision	−.14	.16	−.09	−.34	.14	.13

Note. All $|r|$: $p < .05$ except *n.s.* = non-significant

(both for intentions to quit studies completely and for intentions to change a major) with anxiety, academic procrastination, and learned helplessness as well as significant negative correlations with subjective well-being, academic self-concept, and subjective task value. A decreasing correlation strength with progressing phases could be noticed on a descriptive level. This decreasing descriptive strength of the correlations with progressing phases was noticeable at all emotional, motivational, behavioral, and cognitive/affective variables. This was especially evident for intentions to quit studies completely, whereas for intentions to change a major, the correlation strength increased slightly again—on a descriptive level—when the decision was made.

In conclusion, our third hypothesis is supported, as the phases of quitting studies completely and changing a major correlated significantly and to a substantial amount with the selected variables associated with student dropout, supporting our assumptions on the postulated model.

Discussion

Student dropout is a phenomenon that is of increasing importance in higher education research and can cause serious consequences. There are several indications in the previous literature that student dropout can be conceptualized as an ongoing process (e.g., Mashburn, 2000; Morrow & Ackermann, 2012; Rivière, 1999; Robbins et al., 2004; Tinto, 1975). Therefore, we assumed that research should focus on examining this process more closely in order gain a better understanding so appropriate interventions can be provided. Hence, we postulated that dropout intentions—as they can be seen as a precursor of actual student dropout (see Mashburn, 2000)—are the result of a long-term process. Based on the decision-making model by Betsch (2005) and the Rubicon model of action phases (Achtziger & Gollwitzer, 2010), we assumed that this process starts with a *non-fit perception* between student and institution (Tinto, 1975), followed by *thoughts of quitting/changing* (e.g., thoughts of quitting; Mashburn, 2000), *deliberation* and *information search* (e.g., search intentions; Mashburn, 2000), and eventually leading to a *final dropout decision*. The aim of the present study was to examine

whether developing dropout intentions can be considered as an ongoing process, while differentiating between intentions to quit studies completely and intentions to change a major.

On the descriptive level, the means of intentions to quit studies completely and intentions to change a major indicated a decrease over the several phases—what can be taken as a first indication that students differentiate the postulated phases. Furthermore, the means of changing a major were on a descriptive level predominantly higher than the means of quitting studies completely. This might indicate that students are more likely to consider changing their major than actually quitting their studies completely (see also Diem, 2016; Kehm et al., 2019). Additionally, the newly constructed scales to assess quitting studies and changing majors capture the constructs in a reliable and valid way: They indicated good internal consistencies, fit indices supported the internal structure of the postulated process, and the scales correlated with a selection of emotional, motivational, behavioral, and cognitive/affective variables in the expected direction.

Results concerning Hypothesis 1 (addressing the separability of the assumed phases and distinctions between quitting studies completely and changing majors in the process of student dropout) showed that our theoretically assumed phases are separate and that quitting studies and changing majors should be considered separately, as our estimated ten-factor model showed acceptable data fit. Moreover, correlations between the corresponding phases of intentions to quit studies completely and intentions to change a major were rather small. In line with Cope and Hannah (1975), Kehm et al. (2019), and Stratton et al. (2005), these findings emphasize the importance of considering quitting studies completely and changing a major as two different phenomena not only theoretically but also empirically. Additionally, the comparison of fit-indices between the five-factor models and the four-factor models especially elucidates the robustness of the five-factor models and this finding thereby emphasizes the separation of the assumed phases. Taken together, the development of intentions towards student dropout can be separated into five phases and it should be differentiated between intentions to quit studies completely and intentions to change a major.

As a second result, structural equation modelling revealed positive relations between adjoining phases of the process, emphasizing the postulated order of the phases for both, quitting studies and changing majors. Furthermore, there was an indirect effect of *non-fit perceptions* on the *final decision*. This supports the assumption that the phases built on each other as the effect of a *non-fit perception* on the *final decision* can be explained by *thoughts of quitting/changing*, *deliberation*, and *information search*. Hence, this first phase of *non-fit perceptions* can already start the process of developing a *final decision* to quit studies completely or to change one's major, respectively. The relatively strong relations between *thoughts of quitting/changing* and *information search* (and relatively week relations between *deliberation* and *information search*) might indicate a partial simultaneity of these phases that future research should examine more profoundly with longitudinal data. Nevertheless, testing an alternative order of the phases revealed a better data representation for the postulated order—indicating that the postulated order might still apply even if the phases have partial simultaneity.

In line with our third hypothesis, we found significant correlations of the different phases with emotional, motivational, behavioral, and cognitive/affective variables associated with student dropout. The direction of the correlations is consistent with previous findings (e.g., Bäulke et al., 2018; Heublein et al., 2017; Krejtz & Nezlek, 2016; Ruthig et al., 2007), since subjective well-being, academic self-concept, and subjective task value correlated negatively with the phases of intentions to quit studies completely and intentions to change a major,

whereas there were positive correlations of the assumed phases with anxiety, academic procrastination, and learned helplessness. This finding is in line with the assumed process model. Furthermore, it implies that intentions to quit studies completely and intentions to change a major can be associated with negative emotional, motivational, behavioral, and cognitive/affective aspects and thus interventions should be derived in order to support the student in the decision-making process. Additionally, descending descriptive correlations in progressing phases could be detected. The decreasing correlational strength is consistent with previous literature as it can be explained by a narrowed information search of an individual in an ongoing decision-making process (see Gollwitzer, 2012). This indicates that these correlates of student dropout play an important role especially in the early stages of intentions to quit studies completely and intentions to change a major.

Taken together, a process-oriented approach on dropout intentions has not been studied in detail yet but has several advantages. First, dropout intentions can be considered in a differentiated way. Thus, individual phases are recognizable until the actual dropout decision, which enables us to understand the decision-making process of student dropout. This leads to a second advantage of the present study, as this makes it possible to identify students in their dropout process and diagnose them individually, so an individual consultation is possible. This seems to be especially important in early phases, particularly for students who leave university despite solid academic performance (Lehmann, 2007), as the first phase of forming a dropout intention can start the whole process until the actual dropout decision. However, potential reciprocal effects might complicate profound diagnoses. This presents a potential difficulty that future research has yet to resolve. In previous research, intentions to quit studies completely and intentions to change a major were confused. So overall, a third strength of this study is the differentiation between intentions to quit studies completely and intentions to change a major, thereby avoiding a bias of the effects while examining student dropout (e.g., Berger & Lyon, 2005; Cope & Hannah, 1975; Stratton et al., 2005). Fourth, on this basis, suitable interventions depending on the phase of the dropout process can be conceived in order to prevent student dropout in early phases or help students in later phases to find a suitable alternative. Therefore, the content of interventions could and should be adapted to a specific dropout phase. Possible content includes supportive measures concerning student-system integration for reducing a *non-fit perception* (e.g., mentoring), counselling services for students with *thoughts of quitting/changing* and students who are already *deliberating* a dropout, information centers for students who search for targeted *information*, and finally a contact point for getting help concerning new alternatives in order to reduce subjective discomfort and anxiety after the *final decision* to quit studies completely or to change a major (e.g., Christenson & Thurlow, 2004; Ecker-Lyster & Niileksela, 2016). In contrast to Tinto's student integration model (1975) that is criticized for being too broad in its treatment (e.g., Metz, 2004; Tierney, 1992), this model can thus help us to provide nuanced interventions. However, further studies should, based on the postulated model, examine under which conditions quitting studies completely or changing one's major is functional or dysfunctional and thereby establish profound interventions. An aspect that we did not account for is the support of university instructors that can also be essential for successful integration (Bensimon, 2007). Therefore, a next and interesting step would be to determine how instructors and student counsellors can intervene and provide help in different phases of the dropout process.

The study has some limitations that should be taken into account when interpreting our results. First, we examined students regardless of disciplines and semester. It would be interesting for future research to test our assumed model especially with first semester students as they have to manage the transition from school to university and dropout rates are particularly high at the end of the first semester (e.g., Heublein & Wolter, 2011). However, the current approach allowed us to examine a large student sample and results that are generalizable over subjects or semesters. On the other hand, a second limitation restricts the generalizability of the findings: The sample was recruited from a single German university—although this university is a typical public mid-size university with a typical range of majors and, thus, can be seen as representative for many universities in the German context. Additionally, from a theoretical point of view, the structure of the process of developing dropout intentions can be seen as relatively independent of specific institutional characteristics (although they might impact the pace with which the different phases are passed through) and as compatible to a wide range of reasons behind quitting studies completely or changing a major that might be more or less pronounced in different institutions (such as low performance, lack of study motivation, problems of financing studies; see Heublein, 2014). Nevertheless, future research should take multiple institutions from different countries into account in order to empirically test the generalizability of the proposed model. Here, it would be also desirable to have longitudinal approaches in the next step. In this way, it could be examined if students go through the different phases over the course of time for confirming the presumed order of the phases and determining how long each phase lasts (in different institutions). For instance, determining cross-level interactions could provide valuable insights in the process of student dropout by describing directional influences between the phases. A further limitation is that the study was based on self-reported data and not on objective data. It would be especially interesting to confirm our postulated model further by recording actual dropout or actual changes in major and integrate it into our assumed model after the phase of the *final decision*. This would consolidate the findings of Mashburn (2000) that dropout intentions predict actual student dropout. Additionally desirable would be the inclusion of further behavioral indicators for the involved self-regulatory processes. Finally, further phases after the actual dropout could be examined (for instance a post-dropout phase, see Rivière, 1999; a postselectional phase, see Betsch, 2005; an actional as well as postactional phase, see Achtziger & Gollwitzer, 2010).

Despite these limitations, the present study contributes to a better understanding of the process of developing dropout intentions and distinguishes between intentions to quit studies completely and intentions to change a major. It is therefore a further step towards understanding the complexity of the individual student dropout process.

Conclusion

Overall, the results are in line with the assumptions of the proposed process model of developing intentions to quit studies completely and intentions to change a major. With the present findings, the conception of different phases of developing intentions to quit studies completely or intentions to change a major can theoretically be used to better understand, for example, involved regulatory processes. Practically, the developed instrument allows insights into specific phases of the dropout process—it can also be seen as a foundation for developing a diagnostic instrument for the early detection of student dropout in order to provide specific counselling and thereby enhance study success.

Appendix

Appendix Scales to assess student dropout intentions (original German items in brackets)

Scale	Item
Intentions to quit studies completely	(3 items per phase, 15 items altogether)
	At the moment… [Aktuell…]
1. Non-fit perception	(1.1)… it occurs to me that studying does not suit me well.
	[... kommt mir oft in den Sinn, dass ein Studium nicht gut für mich passt.]
	(1.2) … I don't feel suitable for studying.
	[... fühle ich mich für ein Studium nicht geeignet.]
	(1.3)… I realize that I don´t like studying.
	[... merke ich, dass mir ein Studium nicht gefällt.]
2. Thoughts of quitting studies completely	(2.1) …different thoughts go through my head, about what I could do instead of studying.
	[... gehen mir verschiedene Gedanken durch den Kopf, was ich anstelle eines Studiums machen könnte.]
	(2.2) … I'm considering quitting my studies.
	[... überlege ich, mein Studium ganz abzubrechen.]
	(2.3) …I can't get rid of the feeling that I should quit my studies.
	[...werde ich das Gefühl nicht los, dass ich ein Studium ganz aufgeben sollte.]
3. Deliberation	(3.1)… I'm deliberating exactly what quitting my studies would mean for me.
	[... wäge ich genau ab, was ein Studienabbruch für mich bedeuten würde.]
	(3.2) … I collect and evaluate advantages and disadvantages of quitting my studies.
	[... sammle und bewerte ich die Vor- und Nachteile eines Abbruchs des Studiums.]
	(3.3) … I systematically consider what quitting my studies would mean for me compared to continuing studying.
	[... überlege ich systematisch, was es für mich hieße, das Studium aufzugeben im Vergleich dazu es fortzuführen.]
4. Information search	(4.1)… I inform myself precisely about alternatives to studying at a university.
	[... informiere ich mich gezielt über Alternativen zum Studium.]
	(4.2)… I am specifically looking for information about alternatives to studying (e.g., education counsellor, employment agency, internet, acquaintances)
	[... suche ich mir gezielt Informationen über Alternativen zu einem Studium (z.B. Ausbildungsratgeber, Agentur für Arbeit, Internet, Bekannte).]
	(4.3) …I thoroughly research what the requirements are for alternatives to studying (e.g., professional training).
	[... recherchiere ich gründlich, welche Anforderungen in verschiedenen Alternativen zum Studium (z.B. Berufsausbildung) gestellt werden.]
5. Final decision	(5.1)… I've decided to quit my studies completely.
	[... bin ich entschieden, das Studium ganz abzubrechen.]
	(5.2) … I'm sure that I will not continue studying.
	[... bin ich mir sicher, dass ich mein Studium nicht weiter fortführe.]
	(5.3) … I'm certain that I will quit my studies.
	[... steht es für mich fest, dass ich mein Studium abbrechen werde.]
Intentions to change a major	(3 items per phase, 15 items altogether)
1. Non-fit perception	At the moment… [Aktuell…]
	(1.1) … it occurs to me that my major does not suit me well.
	[... kommt mir oft in den Sinn, dass mein Studiengang nicht gut für mich passt.]
	(1.2) … I don't feel suitable for my major.
	[... fühle ich mich für meinen Studiengang nicht geeignet.]
	(1.3)… I realize that I don´t like my major.
	[... merke ich, dass mir mein Studiengang nicht gefällt.]
2. Thoughts of changing a major	(2.1) …different thoughts go through my head, about what I could study instead of my major.
	[... gehen mir verschiedene Gedanken durch den Kopf, was ich anstelle meines Studiengangs studieren könnte.]

Scale	Item
	(2.2) … I'm considering changing my major.
	[... überlege ich, meinen Studiengang zu wechseln.]
	(2.3)…I can't get rid of the feeling that I should change my major.
	[...werde ich das Gefühl nicht los, dass ich meinen Studiengang wechseln sollte.]
3. Deliberation	(3.1)… I'm deliberating exactly what changing my major would mean for me.
	[...wäge ich genau ab, was ein Studiengangwechsel für mich bedeuten würde.]
	(3.2)… I collect and evaluate advantages and disadvantages of changing my major.
	[... sammle und bewerte ich die Vor- und Nachteile eines Studiengangwechsels.]
	(3.3)… I systematically consider what changing my major would mean for me compared to staying in my current major.
	[... überlege ich systematisch, was es für mich hieße, in einen anderen Studiengang zu wechseln im Vergleich dazu, meinen aktuellen Studiengang weiter zu studieren.]
4. Information search	(4.1)… I inform myself precisely about alternative majors.
	[... informiere ich mich gezielt über andere Studiengänge.]
	(4.2) … I am specifically looking for information about other majors (e.g., student guidance, internet, acquaintances).
	[... suche ich mir gezielt Informationen über andere Studiengänge (z.B. Studienratgeber, Studienberatung, Internet, Bekannte).]
	(4.3)…I thoroughly research what the requirements are for other majors. [... recherchiere ich gründlich, welche Anforderungen in anderen Studiengängen gestellt werden.]
5. Final decision	(5.1)… I've decided to change my major.
	[... bin ich entschieden, den Studiengang zu wechseln.]
	(5.2)… I'm sure that I will not continue my major.
	[... bin ich mir sicher, dass ich meinen Studiengang nicht weiter fortführe.]
	(5.3)… I'm certain that I will change my major.
	[... steht es für mich fest, dass ich meinen Studiengang wechseln werde.]

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Current themes of research:

Self-regulated learning in higher education with focus on procrastination. Motivation and motivational regulation in educational settings. Study success and study dropout.

Most relevant publications in the field of Psychology of Education:

Bäulke, L., Daumiller, M., & Dresel, M. (2021). The role of state and trait motivational regulation for procrastinatory behavior in academic contexts: Insights from two diary studies. *Contemporary Educational Psychology, 65*, 101951. 10.1016/j.cedpsych.2021.101951

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Current themes of research:

Learning success and study dropout. Self-regulated learning. Motivation and motivational regulation. Procrastination

Most relevant publications in the field of Psychology of Education:

Schnettler, T., Bobe, J., Scheunemann, A., Fries, S. & Grunschel, C. (2020). Is it still worth it? Applying expectancy-value theory to investigate the intraindividual motivational process of forming intentions to drop out from university. *Motivation and Emotion. Advance online publication.* 10.1007/s11031-020-09822-w

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Self-regulated learning. Motivation and motivational regulation. Achievement goal orientations. Student dropout

Most relevant publications in the field of Psychology of Education:

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