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Academic procrastination, study satisfaction, and dropout intentions: a longitudinal study of inter- and intra-individual reciprocal relations

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Abstract
Student dropout involves an intra-psychic process that is multi-causal. Important predictors of student dropout, specifically academic procrastination, study satisfaction, and dropout intentions, are assumed to be reciprocally related. Understanding which predictors of student dropout precede others, or are involved in vicious cycles, would help identify early intervention opportunities. Furthermore, this approach gives insights into the role of dropout intentions from the onset of the dropout process, rather than only as a last step before actual student dropout. However, results at the inter-individual level are limited, and those at the intra-individual level are missing. In the present study, we applied latent cross-lagged panel modeling and multiple-indicator random-intercept cross-lagged panel modeling to investigate the reciprocal relations between academic procrastination, study satisfaction, and dropout intentions at both the inter-individual and the intra-individual level. For both models, we analyzed data from $N = 1{,}409$ ($n = 837$ women) undergraduate students enrolled in different majors from a longitudinal study with three measurement points across one semester. At the inter-individual level, we found that having lower study satisfaction compared to other students was related to subsequently increased dropout intentions. At the intra-individual level, a lower than usual study satisfaction was related to subsequently increased dropout intentions and academic procrastination. In sum, study satisfaction seems to protect against increases in dropout intentions and academic procrastination, whereas academic procrastination and dropout intentions did not precede each other nor study satisfaction. Therefore, interventions targeting study satisfaction may help mitigate academic procrastination and dropout intentions over the long term.

Keywords Academic procrastination · Study satisfaction · Dropout intentions · Latent cross-lagged panel model · Multiple-indicator random-intercept cross-lagged panel model

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Student dropout is a prevalent phenomenon in higher education. Within the standard three-year period for a bachelor's program, 23% of students leave tertiary education without obtaining a degree (OECD, 2022). In Germany, the dropout rate at universities is even higher (32%; Heublein et al., 2020). This is concerning as dropping out can result in costs for individuals, institutions, and society (Faas et al., 2018; OECD, 2022). Accordingly, student dropout is attracting considerable interest in higher education policy and research (Berger et al., 2012; Blüthmann et al., 2008; Neugebauer et al., 2019).

Based on theoretical frameworks and empirical findings, student dropout is understood as the result of a multi-factorial deliberation and decision-making process (e.g., Bäulke et al., 2022; Bean & Metzner, 1985; Heublein, 2014; Tinto, 1975). Students' dropout intention is a key component of this process, mediating between important predictors of dropout and actual student dropout (e.g., Bean & Metzner, 1985; Dewberry & Jackson, 2018). Specifically, dysfunctional learning behaviour (e.g., procrastination of study-related tasks) and negative study experiences (e.g., low study satisfaction) are thought to foster the development of dropout intentions, which in turn increases the likelihood of actual dropout (Bäulke et al., 2018; Fleischer et al., 2019; Mashburn, 2000). In addition, academic procrastination and study satisfaction are related, with findings indicating that academic procrastination can precede study satisfaction (Gadosey et al., 2022) and vice versa (Grunschel et al., 2013a; Patrzek et al., 2012).

However, dropout intentions that evolve over time may play a more dynamic role in the dropout process, potentially acting as an amplifier for other risk factors associated with dropout: Increasing dropout intentions reflect an action-crisis, where students are in a conflict between goal-completion (i.e., gaining a degree and working on study tasks) and goal-disengagement (i.e., not doing the tasks; Ghassemi et al., 2017). These dropout intentions could increase disengaging learning behaviour in the form of academic procrastination. Moreover, such an action-crisis can lead to a mindset-shift amplifying negative aspects of the original goal (Brandstätter et al., 2013), possibly decreasing study satisfaction.

Two empirical studies have addressed the role of dropout intentions within these vicious cycles on an inter-individual level (Lindner et al., 2023; Scheunemann et al., 2022). Whereas Scheunemann et al. (2022) found that students with higher dropout intentions reported subsequently more academic procrastination and less study satisfaction than students with lower dropout intentions, Lindner et al. (2023) found dropout intentions only preceding study satisfaction in their less constrained model. Methodological differences (e.g., differing time frames) and limitations (e.g., the mixed assessment of dropout intentions and intentions to change majors) in these two studies necessitate further research. Moreover, both studies did not address how procrastination, study satisfaction, and dropout intentions relate at the intra-individual level, though student dropout is theoretically assumed to result from intra-psychic processes (e.g., Students with a lower study satisfaction than usual experience a subsequent increase in dropout intentions; Mashburn, 2000).

In the present study, we first aim to investigate the reciprocal relations between academic procrastination, study satisfaction, and dropout intentions over one semester on the *inter-individual level* to overcome limitations of previous research (e.g., different majors, differentiated operationalization of dropout intentions). Second, we add insights on the reciprocal relations at the *intra-individual level* (e.g., students who experience a lower study satisfaction than usual), which better fits theoretical assumptions on the dropout process (Mashburn, 2000). By combining the inter-individual and intra-individual perspective, we can help to identify students at risk of dropping out (e.g., students with lower study satisfaction compared to others) and may extend our understanding of the longitudinal within-person processes that play important roles in student dropout.

Dropout intentions within the student dropout process

In line with Heublein, (2014), we define student dropout as leaving higher education without obtaining any degree. This focus excludes changes of major, in which students leave their current program but continue their studies in a different degree program (Bäulkeet al., 2022). Theoretical models describe student dropout as an intra-individual process that unfolds within students over time and is multi-causal (e.g., Bean & Metzner, 1985; Heublein, 2014; Mashburn, 2000). Key predictors of student dropout encompass external factors (e.g., financial situation, study conditions; Bean & Metzner, 1985; Heublein, 2014) and individual factors. Key individual predictors of dropout intentions can be stable characteristics that differ between students (e.g., gender, high school grade point average (GPA); Bean & Metzner, 1985; Heublein, 2014) and characteristics that can not only vary between students but also within an individual over time (e.g., procrastination, study satisfaction, dropout intentions; Bean & Metzner, 1985; Schnettler et al., 2020).

Dropout intentions play a key role in the student dropout process (Bäulke et al., 2022; Bean, 1982; Fleischer et al., 2019) and are stressed as the most significant predictor of actual student dropout (Bean, 1982; Dewberry & Jackson, 2018). In the dropout model proposed by Bäulke et al. (2022), dropout intentions follow directly from the perception of a misfit with one's studies, thereby shaping the dropout process from its inception. Similarly, Ghassemi et al., (2017) describe dropout intentions as a continuous component of the dropout process. They conceptualize the overall process as one of goal disengagement, in which dropout intentions represent the doubts regarding the goal of obtaining a degree. This close link between dropout intentions and actual student dropout is further associated with other predictors of dropout in theoretical models (e.g., Bean & Metzner, 1985; Heublein, 2014; Mashburn, 2000). Specifically, these models posit that dropout intentions mediate the relations between important predictors of student dropout and actual attrition.

Academic procrastination and study satisfaction as predictors of dropout intentions

Students' learning behaviour and study satisfaction are important individual predictors for dropout intentions and student dropout (e.g., Bean & Metzner, 1985; Fleischer et al., 2019; Mashburn, 2000). In higher education, academic procrastination is a prevalent dysfunctional learning behaviour. It is defined as the voluntary delay of an intended study-related task, despite anticipating potential negative consequences resulting from the delay (Steel & Klingsieck, 2016). Academic procrastination is associated with stress (e.g., Sirois & Kitner, 2015), the accumulation of study tasks, a lengthened study course (Grunschel et al., 2013a), and lower academic performance (e.g., Kim & Seo, 2015; Kooren et al., 2024). Moreover, in a qualitative study, student counsellors mentioned academic procrastination as a reason for student dropout (Patrzek et al., 2012). Quantitative studies found that academic procrastination is negatively correlated with dropout intentions (Kegel et al., 2025; Scheunemann et al., 2022) and significantly predicts dropout intentions in studies with cross-sectional designs (Bäulke et al., 2018; Nemtcan et al., 2022) and longitudinal designs (Bäulke et al., 2022).

In addition to such risk factors, study satisfaction is generally understood as a protective factor against student dropout (Bernardo et al., 2025; Fleischer et al., 2019). Study satisfaction is a cognitive component of subjective well-being (Diener et al., 2018) and represents the extent to which students evaluate their studies as positive or negative (Westermann &

Heise, 2018). In Mashburn's dropout model (2000), study satisfaction is the central predictor of student dropout: Dropout cognitions, which contain dropout intentions, mediate the relationship between study satisfaction and student dropout. Although he found empirical evidence for this assumption, study satisfaction and dropout intentions were measured at the same time point. Longitudinally, Fleischer et al. (2019) identified study satisfaction (i.e., satisfaction with study content) as a significant predictor of dropout intentions and student dropout among first-year STEM (science, technology, engineering, and mathematics) students.

Academic procrastination and study satisfaction are mutually related in many empirical studies (Balkis & Duru, 2016; Grunschel et al., 2016; Kegel et al., 2025; Liborius et al., 2019). A typical assumption for the direction of effects between academic procrastination and study satisfaction is that academic procrastination hinders goal achievement (Wäschle et al., 2014), which reduces study satisfaction (e.g., Lent & Brown, 2008). In addition, university students indicate low study satisfaction to be a reason for their academic procrastination (Grunschel et al., 2013b; Patrzek et al., 2015). Both perspectives align with the short-term mood-repair theory (Sirois & Pychyl, 2013). It proposes that students procrastinate on tasks linked to diminished well-being (e.g., bad mood). Yet, because procrastination fails as a mood-regulation strategy, well-being declines in the long-term. Whereas these assumptions are empirically supported for affective well-being (e.g., Gadosey et al., 2022; Pollack & Herres, 2020), research regarding cognitive well-being is lacking. A better understanding of the direction of this association in the context of student dropout would clarify the relevance of academic procrastination and study satisfaction for the design of interventions targeting dropout.

Dropout intentions as a predictor of academic procrastination and study satisfaction

In theoretical models (Bean & Metzner, 1985; Heublein, 2014; Tinto, 1975), dropout intentions have been reduced to being a last step before the actual dropout. However, dropout intentions are part of the dropout process from the beginning and evolve throughout (Bäulke et al., 2022). Ghassemi et al. (2017) describe student dropout as a gradual process of goal detachment, in which dropout intentions express an action-crisis (Brandstätter et al., 2013). The individual experiences an intra-psychic conflict between maintaining the original goal and detaching from it (Brandstätter et al., 2013). In other words, the student is still aiming to achieve a degree in higher education but experiences increasing goal-related doubts. At the behavioural level, this may manifest as a conflict between planning academic tasks and disengaging in learning behaviour, such as procrastinating academic tasks. In sum, "studies strengthen the view that disengagement is shaped by reciprocal processes between the experience of action crisis and changes in goal appraisal" (Ghassemi et al., 2017; p. 1). Furthermore, dropout intentions experienced during the action crisis can trigger a *mindset shift* (Brandstätter et al., 2013; Ghassemi et al., 2017), which subsequently impacts study satisfaction. Students become more attentive to the negative aspects of their studies, thereby decreasing study satisfaction. This is supported by Navarro et al. (2014), who identified a reciprocal relationship between satisfaction with an engineering degree and the intention to persist in the program.

Some researchers have found evidence for reverse or reciprocal relations of dropout intentions with academic procrastination and study satisfaction on the inter-individual level. In a three-wave longitudinal study over one semester with $N = 326$ undergraduate

students of mathematics and law, Scheunemann et al. (2022) explored these reciprocal relations with a latent cross-lagged panel model (CLPM). In concordance with the assumption of dropout intentions affecting the dropout process, they found that students with higher dropout intentions reported subsequently more academic procrastination and subsequently less study satisfaction than students with lower dropout intentions. Surprisingly, students with higher study satisfaction reported subsequently higher dropout intentions and less academic procrastination than student with lower study satisfaction. They suggested that students with higher study satisfaction in the beginning of a semester may subsequently experience more disappointment when expectations are not met and underestimate the number of academic tasks waiting for them during the semester. Scheunemann et al. (2022) recommended that to gain more insight into the dynamics of predictors of student dropout, future studies should include a larger sample, different majors, an operationalization that separates dropout intentions from intentions to change majors, and control variables. Stable individual characteristics are especially suitable to consider as control variables, as they cannot reciprocally relate with the main variables but can explain differences between students. Inter-individual differences in academic procrastination, study satisfaction, and dropout intention are known to depend on gender, high-school GPA, and the semester of studies (e.g., Lindner et al., 2023; Schnettler et al., 2020).

Lindner et al. (2023) investigated these reciprocal assumptions with a different study design regarding larger time intervals, each of one academic year; different conceptualization of the three constructs (i.e., dropout from a specific degree program, general procrastination, satisfaction with study content); and a sample of teacher education students. Consistent with Scheunemann et al. (2022), they found in their latent CLPM that higher dropout intentions were related to subsequently decreased satisfaction with study content and that higher satisfaction with study content was related to subsequently increased procrastination. Additionally, procrastination was related to decreased satisfaction with study content. However, they focused on the results of their Full-Forward CLPM (FF-CLPM), because according to Lindner et al. (2023) it provided a better understanding of causal relationships than their latent CLPM and it is especially useful for longer time intervals such as one-year lags (Hübner et al., 2023). The FF-CLPM indicated that over three years, procrastination negatively predicted satisfaction with study content, which in turn negatively predicted dropout intentions. The divergent findings of the two studies may be attributed to their differing methodologies. Therefore, further research is required to test the theoretical assumptions of reciprocal relations, which should also incorporate within-person analyses as an important extension.

An intra-individual perspective on dropout intentions, academic procrastination, and study satisfaction

Focusing on the inter-individual level is important for identifying students at risk for high dropout intentions, yet this approach neglects one important factor: The student dropout process is an intra-individual process (Heublein, 2014; Mashburn, 2000). For this reason, investigating the association of academic procrastination, study satisfaction, and dropout intentions at the intra-individual level is more suitable for testing the theoretical assumptions on reciprocal relations of predictors in the intra-individual dropout process. The observed intra-individual variability in academic procrastination (Bäulke et al., 2021), study satisfaction (Scheunemann et al., 2022), and dropout intentions (Ghassemi et al., 2017; Schnettler et al., 2020) reflects the changeability of the constructs and justify the adoption of an additional intra-individual perspective in empirical studies. Over one

semester, previous studies found an increase in academic procrastination (e.g., Scheunemann et al., 2022), a decrease in study satisfaction (e.g., Gadosey et al., 2022), and an increase in dropout intentions (e.g., Schnettler et al., 2020). Moreover, dropout intentions have already been investigated on an intra-individual level in association with other study-relevant variables, such as motivation and affective states (Ghassemi et al., 2017; Kelava et al., 2022). For instance, Schnettler et al. (2020) found that the intra-individual increase of intrinsic value related to the intra-individual decrease in dropout intentions. The modelling possibilities at the intra-individual level allow for a precise analysis of such reciprocal associations (random-intercept cross-lagged panel models; Hamaker et al., 2015; Orth et al., 2021). An investigation of the intra-individual relations between academic procrastination, study satisfaction, and dropout intentions seems worthwhile to refine theoretical models (e.g., Mashburn, 2000) and to find starting points for interventions for students at risk (Usami et al., 2019).

The present study

The first aim of the present study was to extend previous findings (Lindner et al., 2023; Scheunemann et al., 2022) on the reciprocal associations between academic procrastination, study satisfaction, and dropout intentions at the inter-individual level. We analysed a larger sample with students of various majors, included control variables (gender, high school GPA, number of semesters studied in the current major), and measured dropout intentions without major change intentions. Our second aim was to provide new insights into these reciprocal associations by examining them, for the first time, at the intra-individual level. For both, the inter- and the intra-individual level, time intervals of some weeks or months are suitable (Orth et al., 2021). To compare our results with the findings of Scheunemann et al. (2022), we also used a suitable one-semester time frame for our models. This time frame does not allow for the investigation of processes between semesters. But focusing on associations within a single semester offers the advantage of incorporating the various phases of the term (e.g., exam preparation) and providing a more granular view of the dropout process.

Studies at the inter-individual level have shown that students who report high levels of academic procrastination subsequently experience lower study satisfaction (e.g., Grunschel et al., 2016; Lindner et al., 2023) and students who experience low study satisfaction subsequently report more academic procrastination (Grunschel et al., 2013b; Patrzek et al., 2015). On this basis, we assume that academic procrastination is negatively associated with subsequent study satisfaction (H1a) and vice versa (H1b) at the inter-individual level. Furthermore, both academic procrastination and study satisfaction are understood as important predictors of student dropout intentions (e.g., Bäulke et al., 2018; Bean & Metzner, 1985; Fleischer et al., 2019). Empirical findings support that students with high academic procrastination and low study satisfaction are more at risk to have high dropout intentions (Fleischer et al., 2019; Liborius et al., 2019; Lindner et al., 2023). Therefore, we assume that academic procrastination (H2a) is positively and study satisfaction (H3a) is negatively associated with subsequent dropout intentions at the inter-individual level. Based on the understanding of student dropout as a goal disengagement process (Ghassemi et al., 2017) with dropout intentions being a part of this process from its inception (Bäulke et al., 2022), we aim to better understand the role of dropout intentions as a predictor for academic procrastination and study satisfaction. These reverse relationships are also possible, as indicated by results at the inter-individual level (Lindner et al., 2023; Scheunemann

et al., 2022). We assume that dropout intentions are positively associated with subsequent academic procrastination (H2b) and negatively associated with subsequent study satisfaction (H3b).

For the intra-individual level, empirical findings regarding reciprocal relations between dropout intentions, academic procrastination, and study satisfaction are scarce. However, the conceptualization of student dropout as an intra-psychic process (Heublein, 2014; Mashburn, 2000) combined with findings on the intra-individual variability of all three constructs (Bäulke et al., 2022; Ghassemi et al., 2017; Scheunemann et al., 2022) advocate to extend the investigation of reciprocal relations toward the intra-individual level. We exploratively investigate whether the assumptions for the inter-individual level regarding reciprocal relations between dropout intentions, academic procrastination, and study satisfaction (H1a-H3b) can be supported on the intra-individual level (RQ1a-RQ3b). This combined perspective helps to broaden our understanding of the dynamic relations in the dropout process.

Method

Procedure and participants

The longitudinal study took place at three German universities within the project "Procrastination as Risk Factor for Student Dropout". The project aimed to examine risk factors of academic success from a motivation-action-regulation perspective and included 13 online measurement points spread over six semesters from 2018/2019 fall semester to 2021 summer semester. For the present research, we used data from the first three measurement points that took place at the beginning, middle, and end of the 2018/2019 fall semester (T1: end of October to end of November 2018; T2: December 2018; T3: February 2019). We focused on these measurement points because we were interested in the reciprocal relations during one semester and wanted to use the largest possible sample size of the study. Prior to data collection, the ethics committee of the Department of Psychology at the University of Bielefeld approved the study. We recruited undergraduate students of different majors with moderate dropout rates (law, economics, and humanities, 21%) and high dropout rates (STEM disciplines, 43%, Heublein et al., 2020) in Germany. We provided information about the study, and interested students filled out a contact form. Shortly afterwards, we invited interested students to an introductory session, where students obtained detailed information about the study, received a small gift worth €5, and gave informed consent for voluntary participation. Then, students were invited via e-mail to the online surveys.

As in previous studies that used the same dataset while focusing on other variables (e.g., Turhan et al., 2023), students were excluded from the analyses who did not participate at T1 ($n = 42$) or who reported a major that was not the focus of the study ($n = 6$). For the current analyses, we additionally excluded students who declared they had changed major ($n = 10$) or quit studies completely ($n = 8$) during T1 to T3 and who reported no high school GPA ($n = 8$), because high school GPA is a control variable for which missing values could not be estimated. After this exclusion, $N = 1{,}409$ ($n = 837$ women, $n = 572$ men, $n = 0$ diverse) undergraduate students enrolled in STEM disciplines ($n = 410$), law ($n = 308$), economics ($n = 509$), and humanities ($n = 182$), participated at T1. On average, they were 20.79 ($SD = 2.69$) years old, had a high school GPA of 2.32 ($SD = 0.56$), and were in semester 2.62 ($SD = 2.03$) of their current major. At T2, $n = 1{,}150$, and at T3, $n = 1{,}077$ students

participated. Overall, $n = 1{,}045$ students participated at all three measurement points. The attrition rate between T1 and T3 was 23.56%. Participants received up to €121 for all 13 measurement points of the longitudinal study, depending on their participation rate.

Measures

The project covered many variables. We describe the variables relevant to our research questions in this contribution.

Students' background characteristics

We included the following demographic variables as control variables at every measurement point in our analyses: students' gender (1 = *woman*, 2 = *man*), high school GPA (interval-scaled; in Germany, a smaller GPA reflects better performance), and number of semesters studied in their current major (interval-scaled).

Academic procrastination

We used the 16-item German version of the Tuckman Procrastination Scale (TPS-d; Stöber & Joormann, 2001; Tuckman, 1991), adapted for the academic context (Grunschel et al., 2013b) to measure academic procrastination (e.g., "I get stuck in neutral even though I know how important it is to get started with my study-related tasks"). Participants responded on a 5-point Likert scale (1 = *is not true at all* to 5 = *is perfectly true*). The reliability was good ($\omega_{T1} = .93$, $\omega_{T2} = .94$, $\omega_{T3} = .94$).

Study satisfaction

Participants answered 10 items on a 6-point Likert scale (1 = *is not true at all* to 6 = *is absolutely right*) about their satisfaction with study content (e.g., "I am satisfied with my subject to the extent that I would choose it again"), satisfaction with the study conditions (e.g., "At my university, there is not sufficient attention paid to students' concerns"), and satisfaction with coping with study-related stress (e.g., "I often feel tired and exhausted due to my studies"; Schiefele & Jacob-Ebbinghaus, 2006). As in previous studies (Grunschel et al., 2016), we used the total score of study satisfaction. The reliability was good ($\omega_{T1} = .86$, $\omega_{T2} = .87$, $\omega_{T3} = .85$).

Dropout intentions

We measured students' dropout intentions with three items (e.g., "I'm considering quitting my studies") on a 6-point Likert scale (1 = *strongly disagree* to 6 = *strongly agree*; Bäulke et al., 2022). The reliability was good ($\omega_{T1} = .82$, $\omega_{T2} = .83$, $\omega_{T3} = .89$).

Data analysis

We used IBM SPSS Statistics (Version 27; IBM Corporation, 2020) for preliminary analyses. First, we checked with three one-way ANOVAs for systematic differences in academic procrastination, study satisfaction, and dropout intentions at T1 between participants who

partook at different numbers of measurement points. Second, we conducted descriptive and correlational analyses. Third, we checked for measurement invariance, which is an important prerequisite for longitudinal analyses (Geiser, 2013) with Mplus (Version 8.6; Muthén & Muthén, 1998–2017).

To analyse the reciprocal relations, we used structural equation modelling with Mplus (Version 8.6; Muthén & Muthén, 1998–2017). For the latent factors in both models, we used parcels and single items as indicators. For academic procrastination and study satisfaction, we created parcels to reduce the number of parameters in our models and improve the sample-size-to-parameters ratio (Kline, 2016; Little et al., 2002). For academic procrastination, we built four balanced parcels with the item-to-construct method (Little et al., 2002) to distribute the items systematically, rather than randomly, across the different parcels based on their loadings on the latent factor. To take the multi-dimensionality of study satisfaction into account, we built three parcels with the domain-representative approach (Little et al., 2002). This approach offers greater stability and a better fit for the model compared to the internal-consistency approach, which risks the parcels to represent separate dimensions of a construct (Little et al., 2002). Based on Kline's (2016) recommendation to use at least three indicators for a latent factor, we used the three single items as indicators for dropout intentions.

First, we analysed the reciprocal relations at the *inter-individual level* with a latent cross-lagged panel model (CLPM; Geiser, 2013). The CLPM focuses on associations of change in individual differences (Hamaker et al., 2015) and is suitable for investigating risk and resilience factors (e.g., Do students with a lower study satisfaction relative to others have a higher risk of subsequently increased dropout intentions compared to highly satisfied students? Orth et al., 2021). The autoregressive effects in a CLPM inform about the construct's temporal stability. The cross-lagged effects inform about how variable *X* relates to variable *Y* under control of the previous value of *Y*, and vice versa (Orth et al., 2021).

Second, we analysed the reciprocal relations at the *intra-individual level* with a multiple-indicator random-intercept cross-lagged panel model (RI-CLPM; Mulder & Hamaker, 2021). As in the latent CLPM, the multiple indicators in the RI-CLPM form a latent factor for each construct at each measurement point. Unlike in the CLPM, these common factors are then decomposed into a time-invariant part (i.e., random intercepts) and a time-varying part (i.e., intra-individual relations). The random intercepts capture the stable between-person variance for each variable (Hamaker et al., 2015). They are correlated and provide information about the cross-sectional relations at the between-person level (Orth et al., 2021). The remaining time-varying part tests for prospective effects at the pure within-person level (i.e., change in the within-person deviation from the trait level). The autoregressive effects reveal carryover effects, as they inform about the extent to which the temporary deviations from a student's trait level in variable *X* can predict subsequent temporary deviations from the student's trait level in the same variable *X* at a later time point (Kryshko et al., 2023). The cross-lagged effects are the prospective effects of temporary deviation from the trait level in variable *X* on change in the temporary deviation from the trait level in variable *Y*, and vice versa (Orth et al., 2021). The RI-CLPM answers a different research question than the CLPM: Do students with a lower study satisfaction than they usually experience have a subsequent increase in dropout intentions?

In both models, we modelled within-time correlations between our three constructs at T1 and their residuals at T2 and T3. They control for situation-specific effects (Geiser, 2013). We included students' gender, high school GPA, and number of semesters studied in their current major as potential confounding variables in both models. They represent manifest variables. We handled missing data with the full information maximum likelihood

approach (Enders, 2010). Model fit was evaluated with the following criteria from Hu and Bentler (1999): CFI ≥ .95; RMSEA ≤ .06; SRMR ≤ .08. Alpha level was set at .05 in all analyses.

Results

Preliminary analyses

Panel attrition

We checked for systematic differences between students who participated only at T1 ($n = 227$), students who participated at two measurement points ($n = 137$), and students who participated at all three measurement points ($n = 1{,}045$) with one-way ANOVAs for academic procrastination, study satisfaction, and dropout intentions at T1. Study satisfaction did not differ significantly between the three groups ($F(2, 1406) = 0.214$, $p = .808$). However, academic procrastination ($F(2, 1406) = 11.188$, $p < .001$, $\eta^2 = .016$) and dropout intentions (Welch's $F(2, 276.135) = 3.082$, $p = .047$, $\eta^2 = .005$) differed significantly between the groups. This indicates that a selection effect is present in the data. Tukey post hoc analysis revealed that students who participated at all measurement points reported significantly lower academic procrastination than students who participated only at T1 (−0.22, 95% CI[−0.35, −0.09]) and students who participated at two measurement points (−0.21, 95% CI[−0.37, −0.05]). On a descriptive level, but not statistically significant, students who participated at all measurement points reported lower dropout intentions ($M = 1.64$, $SD = 0.89$) than students who participated only at T1 ($M = 1.80$, $SD = 1.04$) or students who participated at two measurement points ($M = 1.78$, $SD = 1.01$).

Descriptive statistics and bivariate correlations

Table 1 displays the descriptive results and bivariate correlations between students' background characteristics, academic procrastination, study satisfaction, and dropout intentions. Descriptively, students reported an increase in academic procrastination and dropout intentions and a decrease in study satisfaction, with a main change between the start and the middle of the semester. Academic procrastination and study satisfaction correlated negatively on a small to moderate level (Cohen, 1988). Students' dropout intentions correlated positively with academic procrastination on a small to moderate level and negatively with study satisfaction on a moderate to high level (Cohen, 1988). Gender did not correlate significantly with any main construct. High school GPA correlated positively with academic procrastination and dropout intentions. Semester of current major correlated positively with academic procrastination and dropout intentions at the semester start only and negatively with study satisfaction at all measurement points.

Measurement invariance

Measurement invariance over time is an important prerequisite to ensure that the latent variables represent the same construct at each measurement point (Geiser, 2013). Based on the cutoffs proposed by Chen (2007) to identify possible non-invariance (ΔCFI ≥ −.010,

Table 1 Descriptives and bivariate correlations between students' background characteristics, academic procrastination, study satisfaction, and dropout intentions

Variable	*M*	*SD*	AP1	AP2	AP3	StS1	StS2	StS3	DI1	DI2	DI3	Gender[a]	GPA[b]
Academic Procrastination (AP)													
T1	2.69	0.76	-										
T2	2.84	0.78	.785***	-									
T3	2.87	0.78	.718***	.815***	-								
Study Satisfaction (StS)													
T1	4.17	0.81	-.354***	-.292***	-.236***	-							
T2	3.98	0.83	-.307***	-.329***	-.296***	.748***	-						
T3	3.95	0.84	-.282***	-.299***	-.338***	.716***	.820***	-					
Dropout Intentions (DI)													
T1	1.68	0.93	.300***	.258***	.239***	-.464***	-.389***	-.377***	-				
T2	1.71	0.93	.268***	.297***	.279***	-.423***	-.471***	-.423***	.597***	-			
T3	1.82	1.09	.225***	.256***	.314***	-.344***	-.427***	-.480***	.535***	.658***	-		
Background Characteristics													
Gender[a]	-	-	.017	.020	-.002	.023	.023	.057	.005	-.002	-.021	-	
High school GPA (GPA)[b]	2.32	0.56	.190***	.237***	.204***	-.042	-.043	-.040	.083**	.085**	.139***	.052	-
Semester of major	2.62	2.03	.110***	.055	.013	-.239***	-.197***	-.210***	.052*	.049	-.037	-.012	.011

Note. T1/T2/T3 = first, second, third measurement point; $N_{T1} = 1{,}409$, $N_{T2} = 1{,}150$, $N_{T3} = 1{,}077$. The scale of academic procrastination ranges from 1 to 5, study satisfaction and dropout intentions from 1 to 6

[a] 1 = woman, 2 = man, 3 = diverse ($n = 0$). [b] Lower values indicate a better achievement

$^{*}p \leq .05$, $^{**}p \leq .01$, $^{***}p < .001$

supplemented by ΔRMSEA ≥ .015 or ΔSRMR ≥ .030 for weak invariance, and ΔCFI ≥ −.010, supplemented by ΔRMSEA ≥ .015 or ΔSRMR ≥ .010 for strong invariance), we found strong measurement invariance over time for all three constructs (Table 2).

Research aim 1: inter-individual reciprocal relations

Figure 1 displays the standardized autoregressive and cross-lagged effects of the latent CLPM. We included students' gender, high school GPA, and semester in current major as control variables. The latent CLPM showed good model fit: $\chi^2(439) = 1152.20$ ($p < .001$), CFI = .98, RMSEA [90% CI] = .03 [.03, .04], SRMR = .04.

The significant within-time correlations showed that variables that are not part of our model influence our constructs. All within-time correlations between academic procrastination and dropout intentions were positive ($r_{T1} = .291$, $p < .001$; $r_{T2} = .176$, $p < .001$; $r_{T3} = .197$, $p < .001$). All correlations of study satisfaction with dropout intentions ($r_{T1} = -.483$, $p < .001$; $r_{T2} = -.287$, $p < .001$; $r_{T3} = -.290$, $p < .001$) and with academic procrastination ($r_{T1} = -.370$, $p < .001$; $r_{T2} = -.248$, $p < .001$; $r_{T3} = -.254$, $p < .001$) were negative. All autoregressive effects were significantly positive. Overall, this indicates a moderate to high stability of academic procrastination, study satisfaction, and dropout intentions during one semester.

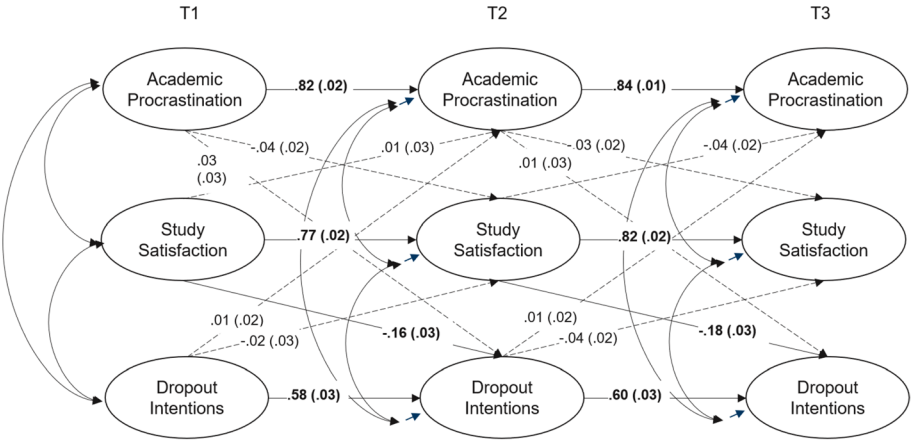
We found that students with lower study satisfaction relative to other students at T_n experienced significantly higher dropout intentions at T_{n+1} (H3a). These effects can be interpreted as large cross-lagged effects (Orth et al., 2022). However, dropout intentions did not relate to a subsequent change in study satisfaction (H3b). We neither found reciprocal relations between academic procrastination and study satisfaction (H1a, H1b) nor between academic procrastination and dropout intentions (H2a, H2b).

Table 2 Measurement invariance of academic procrastination, study satisfaction, and dropout intentions

Variable	Fit indices				Model comparison		
	X^2(df)	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Academic Procrastination							
Configural	126.35 (39)	.994	.040	.021			
Weak	174.97 (45)	.991	.045	.038	−.003[a]	.005[a]	.017[a]
Strong	201.99 (51)	.990	.046	.039	−.001[b]	.001[b]	.001[b]
Study satisfaction							
Configural	29.58 (15)	.999	.026	.014			
Weak	34.22 (19)	.999	.024	.020	.000[a]	−.002[a]	.006[a]
Strong	47.59 (23)	.998	.028	.020	−.001[b]	.004[b]	.000[b]
Dropout intentions							
Configural	48.93 (15)	.996	.040	.028			
Weak	62.33 (19)	.995	.040	.030	−.001[a]	.000[a]	.002[a]
Strong	102.19 (23)	.990	.049	.034	−.005[b]	.009[b]	.004[b]

Note. CFI comparative fit index; *RMSEA* root mean squared error of approximation; *SRMR* standardized root mean square residual

[a] Comparison of configural invariance model with weak invariance model. [b] Comparison of weak invariance model with strong invariance model



T1 = semester start, T2 = mid-semester, T3 = end of semester. Standard errors are presented in parentheses; analysis was controlled for gender (1 = woman, 2 = man), high school GPA, and semester in current major; statistically significant effects at $p \leq .05$ have solid lines and are in bold; dotted lines were part of the model but not significant at $p \leq .05$

Fig. 1 Standardized autoregressive and cross-lagged effects of the latent cross-lagged panel model between academic procrastination, study satisfaction, and dropout intentions

Research aim 2: intra-individual reciprocal relations

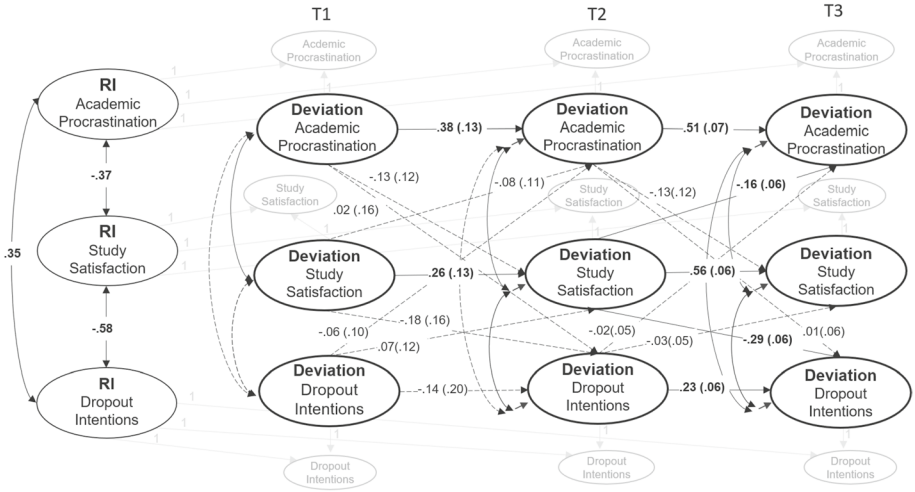
Figure 2 displays the correlations of random intercepts as well as the standardized autoregressive and cross-lagged effects of the multiple-indicator RI-CLPM. We included students' gender, high school GPA, and semester in current major as control variables. The multiple-indicator RI-CLPM showed good model fit: χ^2 (433) = 1054.18 ($p < .001$); CFI = .98, RMSEA [90% CI] = .03 [.03, .03], SRMR = .04.

Inter-individual level: correlations of the random intercepts

The correlations of the random intercepts in the RI-CLPM represent time-invariant relations that are comparable to cross-sectional correlations but are based on information of all three measurement points (Orth et al., 2021). All correlations were significant on a moderate to high level (Cohen, 1988). Academic procrastination and dropout intentions correlated positively. Study satisfaction correlated negatively with dropout intentions and academic procrastination.

Intra-individual level: autoregressive and cross-lagged effects

All within-time correlations between academic procrastination and dropout intentions were positive, but only significant at T3 ($r_{T1} = .149$, $p = .359$; $r_{T2} = .153$, $p = .137$; $r_{T3} = .198$, $p < .001$). All within-time correlations between study satisfaction and dropout intentions were negative, but only significant at T2 and T3 ($r_{T1} = -.235$, $p = .127$; $r_{T2} = -.296$, $p = .003$; $r_{T3} = -.357$, $p < .001$). All within-time correlations between academic procrastination and study satisfaction were significantly negative ($r_{T1} = -.377$,



T1 = semester start, T2 = mid-semester, T3 = end of semester. Standard errors are presented in parentheses; analysis was controlled for gender (1 = woman, 2 = man), high school GPA, and semester in current major; statistically significant effects at $p \leq .05$ have solid lines and are in bold; dotted lines were part of the model but not significant at $p \leq .05$

Fig. 2 Correlations of random intercepts and standardized autoregressive and cross-lagged effects of the multiple-indicator random-intercept cross-lagged panel model, between academic procrastination, study satisfaction, and dropout intentions

$p = .004$; $r_{T2} = -.272$, $p < .001$; $r_{T3} = -.305$, $p < .001$). In the RI-CLPM, the autoregressive effects represent the amount of within-person carryover effect (Hamaker et al., 2015). A positive autoregressive effect implies that a deviation above the personal mean at one time point is likely to be followed by a deviation above the personal mean at the next time point. All autoregressive effects for academic procrastination and study satisfaction were significantly positive. For dropout intentions, only the autoregressive effect between T2 and T3 was significantly positive. This indicates that students with higher dropout intentions than usual at the semester start did not likely experience higher dropout intentions than usual in the middle of the semester.

On this intra-individual level, students with lower study satisfaction than usual (i.e., than their person mean) at T2 experienced a subsequent increase in academic procrastination (RQ1b) and dropout intentions at T3 (RQ3a). The significant cross-lagged effects can be interpreted as large effects (Orth et al., 2022). However, academic procrastination did not relate to subsequent study satisfaction (RQ1a) nor dropout intentions (RQ2a) and dropout intentions did not relate to subsequent academic procrastination (RQ2b) nor study satisfaction (RQ3b).

Discussion

To gain a deeper understanding of the longitudinal and dynamic relations between central predictors of student dropout (e.g., Bean & Metzner, 1985; Ghassemi et al., 2017; Mashburn, 2000), the present study investigated the reciprocal relations between academic

procrastination as a study behaviour, study satisfaction as a study experience, and dropout intentions as an aspect of study decision at both the inter-individual and the intra-individual level over one semester. Study satisfaction turned out to be a critical variable within the framework of the study. Low study satisfaction was related to more academic procrastination at the intra-individual level (RQ1b) and to higher dropout intentions at both the inter- and intra-individual level (H3a; RQ3a). The other investigated relations were not significant. We discuss these results in more detail in the following.

Study satisfaction as a critical variable for academic procrastination

On the intra-individual level, students with lower study satisfaction than usual in the middle of the semester reported more academic procrastination in the examination phase. This result is line with past research on reasons for academic procrastination (Grunschel et al., 2013a; Patrzek et al., 2012). Based on reports by students and student counsellors, the procrastinator type *discontent with studies* represents students who procrastinate due to their dissatisfaction with their studies (Grunschel et al., 2013b) and could be the reason behind our finding.

According to the short-term mood-repair theory (Sirois & Pychyl, 2013), individuals procrastinate to avoid aversive tasks that trigger negative feelings. So far, the mood-repair theory and related studies have referred to affective well-being (e.g., Gadosey et al., 2024; Pollack & Herres, 2020; Sirois & Pychyl, 2013). Our finding suggests that this theory can be transferred to components of cognitive well-being on the intra-individual level, such as study satisfaction (Diener et al., 2018): A lower than usual level of study satisfaction could be related to one's reluctance to perform study-related tasks, which the student then postpones against their better knowledge. Future studies could investigate in more detail the relationship between study satisfaction, task aversiveness, and academic procrastination on the intra-individual level.

On the inter-individual level, we found no positive relation between study satisfaction and subsequent academic procrastination. Accordingly, the significantly positive result reported by Scheunemann et al. (2022) was not confirmed in an additional sample. Due to our larger sample and the inclusion of control variables, the results of the present study appear to be more generalizable. In addition, they align with findings of the FF-CLPM by Lindner et al. (2023).

Integrating our inter- and intra-individual findings, it appears that the tendency toward academic procrastination is not determined by a specific threshold value of study satisfaction, but rather by the subjective perception of change in the student's study experience. Consequently, interventions aimed at increasing study satisfaction may yield positive effects on learning behaviour for students regardless of whether their satisfaction levels at the start of the semester are high or low. This effect would have remained unnoticed without investigating the intra-individual level.

Study satisfaction as a critical variable for dropout intentions

In line with theory (e.g., Mashburn, 2000) and longitudinal studies at the inter-individual level (Fleischer et al., 2019; Lindner et al., 2023), having lower study satisfaction compared to other students (inter-individual level) and lower study satisfaction than usual (intra-individual level) were related to subsequently increased dropout intentions. To our knowledge, the present study is the first to demonstrate this association at the intra-individual level.

Consequently, study satisfaction serves a dual purpose. It can be used to identify students at greater risk of student dropout, and it offers a point of intervention to reduce dropout intentions by increasing levels of satisfaction for all students. Overall, a high level of study satisfaction appears to be a protective factor against the formation of dropout intentions (Bernardo et al., 2025; Fleischer et al., 2019; Mashburn, 2000). These results align with the notion that perceived misfit—the perceived lack of fit between the student and their program—serves as the starting point of student dropout (Bäulke et al., 2022). Low study satisfaction can be seen as an expression of a perceived lack of fit between the student and their studies (e.g., Bohndick et al., 2018; Etzel & Nagy, 2016; Schmitt et al., 2008), whether this concerns a mismatch between demands and skills or between personal interests and the degree program. Before this misfit is consciously differentiated, it may first appear as a general decrease in subjective study satisfaction, acting as an early warning indicator. Consequently, future research should examine how the specificity of the perceived misfit influences the link between study satisfaction and dropout intentions.

Academic procrastination and dropout intentions did not reciprocally relate nor predict study satisfaction

Our findings indicate that from the start to the middle to the end of one semester, the dropout process is driven by study satisfaction rather than by academic procrastination or dropout intentions. No reciprocal relationship was found between academic procrastination and dropout intentions, nor did either variable was associated with subsequent study satisfaction. For procrastination, previous longitudinal research has yielded inconsistent results (e.g., Lindner et al., 2023; Scheunemann et al., 2022), suggesting that the mechanisms underlying (academic) procrastination and its impact on dropout intentions are more complex. It is likely that differences in personal resources (e.g., motivational regulation strategy knowledge; Bäulke et al., 2026) or supportive contexts (e.g., group work settings; Koppenborg & Klingsieck, 2022) moderate the potentially detrimental effects of academic procrastination on student's study experience and critical academic decision-making.

For dropout intentions, our findings align with its role in theoretical models as the mediator between predictors of student dropout and actual student dropout (Bean & Metzner, 1985; Dewberry & Jackson, 2018) and findings by Lindner et al. (2023), but are in contrast to findings of Scheunemann et al. (2022). Beyond the inclusion of control variables, the diversity of degree programs, and a larger sample, this discrepancy to the findings of Scheunemann et al. (2022) may be attributed to the more nuanced operationalization of dropout intentions in the present study. The present study exclusively assessed dropout intentions (Bäulke et al., 2022), whereas Scheunemann et al. (2022) confounded dropout intentions with the intention to change majors in their measurement instrument. This represents a fundamental conceptual distinction, as processes to drop out and to change a major are driven by different underlying reasons and tend to differ in their relationship with academic procrastination and subjective well-being (Bäulke et al., 2022). Future research should separately measure dropout intentions and intentions to change majors within the same sample and examine their reciprocal relationships. This would help to determine whether dropout intentions serve solely as the final stage in the process leading to student dropout.

Regarding both academic procrastination and dropout intentions, further consideration should be given to the temporal resolution necessary to effectively examine cross-lagged effects. The period of one semester was possibly too short to uncover reciprocal

associations of academic procrastination, study satisfaction, and dropout intentions. Students who procrastinate more than other students might not achieve their goals (Wäschle et al., 2014), which may be reflected in subsequently lower study satisfaction (Lent & Brown, 2008) and dropout intentions *in the long-term* (Lindner et al., 2023). Study designs spanning one semester cannot capture a critical period of goal achievement: Receiving grades. In Germany, grades are typically disseminated to students several weeks after the examination period in the end of the semester. Consequently, extending the current study's design to include a fourth measurement point following the examination period, would consider how students perceive their goal attainment.

Limitations and future research

Although the present study sheds new light on associations between academic procrastination, study satisfaction, and dropout intentions, we need to discuss some limitations. First, the generalizability of our findings is limited. We observed selection effects, as students with higher procrastination and dropout intentions tended to participate in fewer measurement points. Consequently, we cannot dismiss that this restriction in variance has influenced the observed effects. Additionally, our sample was recruited at three German universities. Since universities of applied science in Germany (Heublein et al., 2020) and other European countries (OECD, 2022) have different dropout rates, replicating the study in different higher education contexts would be valuable. Furthermore, we investigated a single semester, which can differ from other semesters due to contextual influences (e.g., Goppert & Pfost, 2021), and does not include potential recovery effects between consecutive semesters (e.g., Young et al., 2018). Future studies should extend the time frame to include at least two semesters.

Second, although we controlled for previous values of our constructs via the autoregressive design (e.g., Orth et al., 2021), we considered important control variables (e.g., high school GPA), and the RI-CLPM controls for time-invariant variables (Usami et al., 2019), we cannot rule out alternative explanations as in an experimental design. This includes the consideration of additional control variables, such as migration background and field of study (e.g., Lindner et al., 2023). Consequently, these cross-lagged effects are not causal. Furthermore, the self-report measures we used seem valid for students' subjectively experienced study satisfaction and dropout intentions, but for academic procrastination it may have been more useful to measure actual procrastination behaviour. This could be explored in future experience-sampling studies, including the e-MAPs (Wieland et al., 2018) for assessing self-reported episodes of academic procrastination.

Third, aside from academic procrastination and study satisfaction, other important time-varying individual factors of student dropout have already shown reciprocal relations with dropout intentions (e.g., study motivation; Ghassemi et al., 2017) or might show mutual relations (e.g., academic achievement; Respondek et al., 2017). Future studies could consider these individual factors when investigating reciprocal relations with dropout intentions.

Practical implications

Based on our results, increasing study satisfaction especially in the middle of the semester seems to be a good starting point for interventions both against the development of dropout intentions and academic procrastination. To enhance study satisfaction, a wide range of comprehensive

measures involving students, teaching staff, and administrators are being discussed (Bernardo et al., 2025). For targeted support, it therefore appears crucial to identify the specific reasons for students' dissatisfaction based on the three sub-facets of study satisfaction (Kryshko et al., 2022; Schiefele & Jacob-Ebbinghaus, 2006). Satisfaction with the study content could be addressed by incorporating utility-value interventions into lectures, in which students from higher semesters demonstrate the utility of the course content (e.g., Harackiewicz et al., 2016; Rosenzweig et al., 2020). Furthermore, students may need support in coping with their study-related demands, such as by strengthening their self-regulation skills (e.g., Bernacki et al., 2021; Kryshko et al., 2023; van Rooij et al., 2018). In addition, Bernardo et al. (2025) highlighted that prevention measures can be implemented prior to the start of studies through appropriate academic guidance, focusing on high interest-major fit (Messerer et al., 2025) or informed study choice to enable students to form realistic expectations (van Rooij et al., 2018). Finally, it is important to note that the best decision for an individual might indeed be to change their major or to drop out (Faas et al., 2018), which should be supported by suitable student services.

Conclusion

The present study examined reciprocal associations between academic procrastination, study satisfaction, and dropout intentions over the course of one semester. We addressed limitations identified in two previous studies (Lindner et al., 2023; Scheunemann et al., 2022) by analyzing a larger sample with students of various majors, including control variables, measuring dropout intentions without major change intentions, and considering both the inter- and intra-individual level. On the inter-individual level, only higher study satisfaction preceded student's lower dropout intentions. On the intra-individual level, being more satisfied than usual was associated with subsequently less academic procrastination and lower dropout intentions than usual. In sum, these unidirectional findings highlight that enhancing study satisfaction relative to both peers and the individual's own average is a key target for interventions in higher education.

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Data Availability The data on which our analyses are based can be provided on request.

Declarations

Competing interests The authors declare no competing interest.

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The authors' current themes of research and relevant publications in the field of Psychology of Education Anne Scheunemann. Institute of Educational Research Ruhr-University Bochum, Universitätsstraße 150, 44801 Bochum, Germany. E-mail: Anne.Scheunemann@ruhr-uni-bochum.de

Current themes of research:

Student dropout
Study Satisfaction
Academic Procrastination

Most relevant publications in the field of Psychology of Education

Bäulke, L., Daumiller, M., Wenker, T. Scheunemann, A., Grunschel, C., Wirth, J., Fries, S., Leutner, D., & Dresel, M. (2026). On the development of motivational regulation strategy knowledge and its longitudinal relationship with academic procrastination over the course of study. Journal of Educational Psychology, 118(2), 139-152. https://doi.org/10.1037/edu0000984

Gadosey, C. K., Schnettler, T., Scheunemann, A., Bäulke, L., Thies, D. O., Dresel, M., Fries, S., Leutner, D., Wirth, J., & Grunschel, C. (2023). Vicious and virtuous relationships between procrastination and emotions: an investigation of the reciprocal relationship between academic procrastination and learning-related anxiety and hope. *European Journal of Psychology of Education*, *39*, 1-27. https://doi.org/10.1007/s10212-023-00756-8

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Current themes of research:

Academic achievement, study satisfaction, student dropout
Academic self-concept
Teacher enthusiasm

Most relevant publications in the field of Psychology of Education

Kegel, L. S., Schnettler, T., Scheunemann, A., Bäulke, L., Thies, D. O., Dresel, M., Fries, S., Leutner, D., Wirth, J., & Grunschel, C. (2021). Unterschiedlich motiviert für das Studium: Motivationale Profile von Studierenden und ihre Zusammenhänge mit demografischen Merkmalen, Lernverhalten und Befinden [Differently motivated to study: Motivational profiles of students and their correlations with demographic characteristics, learning behaviour and well-being]. Zeitschrift für Empirische Hochschulforschung (ZeHf), 4(1), 81–105. https://doi.org/10.3224/zehf.v4i1.06

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Current themes of research:

Academic success and student dropout intention
Student's academic motivation (situated expectancy-value theory)
Academic procrastination

Most relevant publications in the field of Psychology of Education

Scheunemann, A., Schnettler, T., Bobe, J., Fries, S., & Grunschel, C. (2022). A longitudinal analysis of the reciprocal relationship between academic procrastination, study satisfaction, and dropout intentions in higher education. European Journal of Psychology of Education, 37(4), 1141–1164. https://doi.org/10.1007/s10212-021-00571-z

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, 44*, 491–507. https://doi.org/10.1007/s11031-020-09822-w

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Current themes of research:

Self-regulated learning in higher education with focus on procrastination and motivational regulation in educational settings
Study success and student dropout
Educational effectiveness

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, Article 101951. https://doi.org/10.1016/j.cedpsych.2021.101951

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Current themes of research:

Academic procrastination
Motivation
Academic emotions

Most relevant publications in the field of Psychology of Education

Bobe, J., Schnettler, T., Scheunemann, A., Fries, S., Bäulke, L., Thies, D. O., Dresel, M., Leutner, D., Wirth, J., Klingsieck, K. B., & Grunschel, C. (2022). Delaying academic tasks and feeling bad about it: Development and validation of a six-item scale measuring academic procrastination. European Journal of Psychological Assessment, 40(1), 59–72. https://doi.org/10.1027/1015-5759/a000728

Scheunemann, A., Schnettler, T., Bobe, J., Fries, S., & Grunschel, C. (2022). A longitudinal analysis of the reciprocal relationship between academic procrastination, study satisfaction, and dropout intentions in higher education. *European Journal of Psychology of Education, 37*(4), 1141–1164. https://doi.org/10.1007/s10212-021-00571-z

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Current themes of research:

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

Most relevant publications in the field of Psychology of Education

Daumiller, M., Dickhäuser, O., & Dresel, M. (2019). University instructors' achievement goals for teaching. Journal of Educational Psychology, 111, 131–148. https://doi.org/10.1037/edu0000271

Dresel, M., Schmitz, B., Schober, B., Spiel, S., Ziegler, A., Engelschalk, T., Jöstl, G., Klug, J. Roth, A., Wimmer, B., & Steuer, G. (2015). Competencies for successful self-regulated learning in higher education: Structural model and indications drawn from expert interviews. *Studies in Higher Education, 40*, 454–470. https://doi.org/10.1080/03075079.2015.1004236

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Current themes of research:

Motivation to learn
Motivational conflicts
Academic procrastination
Self-regulation in everyday life
Ambulatory assessment

Most relevant publications in the field of Psychology of Education

Capelle, J. D., Grunschel, C., Bachmann, O., Knappe, M., & Fries, S. (2022). Multiple action options in the context of time: When exams approach, students study more and experience fewer motivational conflicts. Motivation and Emotion, 46(1), 16–37. https://doi.org/10.1007/s11031-021-09912-3

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Current themes of research:

Self-regulated learning
Learning with multimedia
Cognitive load
Study success in higher education

Most relevant publications in the field of Psychology of Education

Brünken, R., Plass, J. L., & Leutner, D. (2003). Direct measurement of cognitive load in multimedia learning. Educational Psychologist, 38, 53–61. https://doi.org/10.1207/S15326985EP3801_7
Höffler, T.N., & Leutner, D. (2007). Instructional animations versus static pictures: a meta-analysis. *Learning and Instruction, 17*, 722–238. https://doi.org/10.1016/j.learninstruc.2007.09.013
Kryshko, O., Fleischer, J., Grunschel, C., & Leutner, D. (2023). University students' self-efficacy for motivational regulation, use of motivational regulation strategies, and satisfaction with academic studies: Exploring between-person and within-person associations. *Journal of Educational Psychology, 115*(4), 571. https://doi.org/10.1037/edu0000785
Wirth, J., Stebner, F., Trypke, M., Schuster, C., & Leutner, D. (2020). An interactive layers model of self-regulated learning and cognitive load. *Educational Psychology Review, 32*, 1127–1149. https://doi.org/10.1007/s10648-020-09568-4

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Current themes of research:

Self-regulation in learning and problem solving
Training and intervention research
Authenticity in the communication of scientific work
Citizen science and science communication

Most relevant publications in the field of Psychology of Education:

Kryshko, O., Fleischer, J., Waldeyer, J., Wirth, J., & Leutner, D. (2020). Do motivational regulation strategies contribute to university students' academic success? Learning and Individual Differences, 82, Article 101912. https://doi.org/10.1016/j.lindif.2020.101912
Schuster, C., Stebner, F., Leutner, D., & Wirth, J. (2020). Transfer of metacognitive skills in self-regulated learning: An experimental training study. *Metacognition and Learning, 15*, 455–477. https://doi.org/10.1007/s11409-020-09237-5
Waldeyer, J., Fleischer, J., Wirth, J., & Leutner, D. (2019). Validating the resource-management inventory (ReMI): Testing measurement invariance and predicting academic achievement in a sample of first-year university students. *European Journal of Psychological Assessment, 36*, 777–786. https://doi.org/10.1027/1015-5759/a000557
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Current themes of research:

Academic Procrastination
Motivation and motivational regulation
Learning success and study dropout

Most relevant publications in the field of Psychology of Education

Bäulke, L., Grunschel, C. & Dresel, M. (2021). Student dropout at university: A phase-orientated view on quitting studies and changing majors. European Journal of Psychology of Education, 37(3), 853-876. https://doi.org/10.1007/s10212021-00557-x
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Scheunemann, A., Schnettler, T., Bobe, J., Fries, S., & Grunschel, C. (2021). A longitudinal analysis of the reciprocal relationship between academic procrastination, study satisfaction, and dropout intentions in higher education. *European Journal of Psychology of Education, 37*(4), 1141–1164. https://doi.org/10.1007/s10212-021-00571-z

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, 44*, 491–507. https://doi.org/10.1007/s11031-020-09822-w

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