



# Motivational mindsets, mindset churn and academic performance: The role of a goal-setting intervention and purpose in life

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## Abstract

The motivational mindset model (MMM) is a new student-centered, multidimensional perspective on motivation in higher education and aims to better explain differences in wellbeing, study success and intervention effectiveness. The four types of mindsets within the model (high-impact, low-impact, social-impact, and self-impact) have proven to differ in two important dimensions of wellbeing and predictors of study success, namely a sense of purpose in life and study engagement. The present study expands the MMM by (1) examining the relationship between the mindsets and academic performance, (2) observing the mindset churn in the first year, and (3) exploring the role of the mindsets in the effectiveness of an online, narrative goal-setting intervention. To this end, the mindset of 748 first-year university students was measured at the beginning and the end of the first academic year. Results show that the mindset churn was considerable: on average 58% of the students had changed their mindset at follow-up. Results further show that students with a low-impact mindset at follow-up were more likely to drop out of the first year compared to the other three mindsets. Finally, a group of low-impact mindset students show an increased sense of purpose after participating in the goal-setting intervention and moved to a social-impact mindset during the year. This pattern provides preliminary support that the goal-setting intervention is a purpose-fostering intervention for students entering higher education with a low-impact mindset. A potential working mechanism of the goal-setting intervention is discussed as well as implications and directions for future research.

**Keywords** Motivation · Academic achievement · Personal goals · Purpose in life · Student engagement

The first year of studying is crucial for degree completion. Students are most likely to drop out by the end of the first year of the bachelor program (Christie et al., 2004; Van Rooij et al., 2017; Willcoxson et al., 2011). In the US, for instance, 24% of first-year students drop out, while these rates have been estimated at 27% in Germany and 18% in Australia (Australian Government, 2020; Federal Ministry of Education and Research, 2020; National Center for Education Statistics, 2020). In Dutch universities, which is the focus of the current study, 26% of students drop out in the first year, of which 19% switch to another program and 7% leave higher education altogether (Inspectie van het Onderwijs [Dutch Inspectorate of Education], 2021; Van den

Broek et al., 2019). From the students who progress to the second year, most of them (90% to 95%) earn at least their bachelor's degree within five years (Van den Broek et al., 2019). For students who switch, however, data shows that their total time to graduate is much greater than expected. Moreover, an estimated 30% of these students ultimately do not even obtain a diploma (Van den Broek et al., 2019). The economic and social consequences of such academic failure are undeniable (Arce et al., 2015; Bennett, 2003).

One of the key factors for success in the first year is the motivation to study (Christie et al., 2004; Richardson et al., 2012; Robbins et al., 2004; Van den Broek et al., 2019). While research notes that students are motivated to go to university for multiple reasons simultaneously to varying degrees (Côté & Levine, 1997; Henderson-King & Smith, 2006), most studies have followed a variable-centered, unidimensional approach, largely ignoring the effect that multiple motives may have on study related behavior and outcomes. A recent line of research therefore introduced a student-centered, multidimensional perspective of student

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motivation with the aim to better understand and more fully explain differences in student behavior and performance. Hudig et al. (2020, 2021) developed and validated the *motivational mindset model* (MMM), which classifies students into types of “motivational mindset” that relate to different combinations of co-occurring motives for studying.

## Motivational mindset model

The MMM involves three distinct dimensions of study motives that were studied by Yeager et al. (2014): intrinsic self-oriented motives, intrinsic self-transcendent motives, and extrinsic self-oriented motives. Self-oriented, intrinsic study motives reflect the extent to which students find studying inherently interesting or enjoyable (Yeager et al., 2014). These motives relate to students personally, by which students go to university to gain knowledge and develop skills that make their lives more gratifying and meaningful. Self-transcendent study motives are reasons for studying with the intent to benefit society (Yeager et al., 2014). These motives are beyond-the-self oriented, in which students go to university to have a positive impact on the world. Extrinsic study motives benefit students also personally, but more so to achieve some separable outcome (e.g., earn more money or making friends) (Yeager et al., 2014). Notably, if this money would be used to make the world a better place, the student still aspires for a separable outcome and thus the motive would be extrinsic in nature (Yeager et al., 2012). Combining these three motivational dimensions yielded four meaningful patterns that were labelled as four motivational mindset profiles: high-impact mindset, low-impact mindset, social-impact mindset, and self-impact mindset (Hudig et al., 2020). Students with a high-impact mindset are confident about their reasons for studying and aim to positively affect every aspect of their lives through their study program: earning high grades, self-development, helping others, having a rich social life, and earning money. Low-impact mindset students, on the contrary, are mostly unclear about why they go to university besides having fun and making money in a good job. Social-impact mindset students go to university for self-development but have most prevalently adopted the belief that their university education enables them to improve the conditions in society. Self-impact mindset students merely go to university to improve their own personal situation and are highly career- and money-oriented (Hudig et al., 2020).

A follow-up study showed that sense of purpose and study engagement were meaningfully related to the motivational mindsets (Hudig et al., 2021). Both purpose and study engagement are central dimensions of wellbeing and important predictors of study success (Dahl et al., 2020; Martínez et al., 2019; Pizzolato et al., 2011; Widlund et al., 2018). Sense of purpose, or the extent to which students have long-term goals and a sense of direction in life (Ryff, 1989), is helpful

in managing (study) behaviors (McKnight & Kashdan, 2009), and is positively associated with resilience and perseverance (Bronk et al., 2019a; Hill et al., 2016a), positive self-image (Hill et al., 2016b), life satisfaction (Bronk et al., 2009; Bundick, 2011), and other benefits (Hill et al., 2013). Study engagement, a study-related state of mind that comprises levels of energy, dedication, and concentration while studying (Upadyaya & Salmela-Aro, 2013), has shown to predict numerous positive outcomes such as persistence in school (Ketonen et al., 2019), work and life satisfaction (Upadyaya & Salmela-Aro, 2015), more positive emotions (Ouweneel et al., 2011) and less depressive symptoms (Li & Lerner, 2011). Students with a high-impact mindset and social-impact mindset showed the same and most optimal pattern in sense of purpose and study engagement. The self-impact mindset had a weaker sense of purpose than the high-impact and social-impact mindset, while these students reported equal feelings of engagement toward their studies as the social-impact mindset students. The low-impact mindset students revealed the least optimal pattern in the two student qualities: the weakest sense of purpose and lowest level of study engagement (Hudig et al., 2021).

While these findings established meaningful mindset differences in psychological and academic wellbeing, up until now, it is unknown whether the motivational mindsets differ in academic performance. An important objective of the MMM is to better explain student differences in study success and the present study therefore examines this objective more in detail. Both universities and students might benefit if students’ motivational mindset provides indications for success in the first year. In addition, the motivational mindsets have thus far been studied solely at the critical time point of university entry. The extent to which the motivational mindsets remain stable or fluctuate over time is yet unknown. We do know that a general decline in intrinsic motivation over the course of the first year is a prevalent phenomenon (Brahm et al., 2017; Corpus et al., 2020; Trautwein & Stolz, 2015). Considering the novel student-oriented perspective of the MMM, by studying the mindset trajectories we might further understand developments of student motivation. Also gaining insight into the mindset churn during the first year could be useful since we expect that the motivational mindset is potentially related to first-year study success. We may be able to obtain knowledge about which changes are favorable and which are less favorable. Practically, students can then be guided to change to a certain mindset or prevented from changing to a certain unfavorable mindset.

## Goalsetting and the goal-setting intervention

Given the importance of first-year performance for degree completion, interventions should be delivered in this crucial time period to serve the remainder of the educational process

(Harackiewicz & Priniski, 2018; Lazowski & Hulleman, 2016; Yeager & Walton, 2011). An intervention which has shown particularly effective in this regard is the goal-setting intervention (Morisano et al., 2010; Schippers et al., 2015; for reviews see: de Jong et al., 2020; Schippers & Ziegler, 2019). In a randomized controlled trial among struggling college students, Morisano et al. (2010) showed that the experimental goal-setting group increased significantly in academic performance compared to the control group. Schippers et al. (2020) studied the effects of the intervention in a quasi-experimental design among 2928 students, showing a 22% increase in academic performance in the intervention cohorts compared to control cohorts, and remarked increases in performance for students that participated in all stages of the 3-stage goal-setting intervention, wrote more words in the exercise, and showed higher specificity of their goal-achievement plans (GAP).

The intervention has three stages of which stage 1 and stage 2 are executed online, taking up around 4-6 hours. The first stage prompts students with guided questions to reflect on their ideal life, an expressive writing exercise similar to the best-possible-future-self intervention. The theory of best possible selves (BPS) argues that we create visions of ourselves in the future and that these have a motivational power (Harrison, 2018). Oyserman et al. (2004) describe possible selves as ‘roadmaps’, and they state that possible selves can perpetuate positive affect, maintain behavioral focus, and eventually draw the self towards the goal. Writing about their BPS should be extremely helpful for first-year students as they enter a phase of transition and many will not yet have formulated their desired futures. However, only possible selves that are detailed and connected with specific behavioral strategies can sustain self-regulation over time and, therefore, be guides for academic success (Oyserman et al., 2004). Correspondingly, the second stage of the intervention entails intensive, long-term personal life goalsetting. Students write down life goals, clarify the importance of their goals, and specify plans, obstacles, and strategies to overcome these obstacles. The final stage intends to increase goal commitment. Students are requested to come up with a public, single summary goal statement based on their writings, which is put together with a photo portrait taken by a professional photographer (Schippers et al., 2020; Schippers & Ziegler, 2019).

How goalsetting positively affects performance has been discussed through examinations on the different phases of goalsetting, such as goal formulation (e.g., Vansteenkiste et al., 2004), goal pursuit (e.g., Milyavskaya & Werner, 2018), and goal achievement (e.g., Locke & Latham, 2002). However, the underlying mechanisms of this goal-setting intervention among first-year students has not yet been empirically demonstrated. Having a deeper understanding of these mechanisms might benefit

universities to further support the students who need it in their study and career success.

## Goalsetting and purpose

A fundamental positive outcome that the goal-setting intervention seems to have an impact on is students’ sense of purpose (Schippers & Ziegler, 2019). Purpose is integrally linked to goalsetting and giving one a direction from which to achieve the goals (Hill et al., 2010). One of the pioneering researchers in the field of purpose alluded to goalsetting as one of *the* intervention strategies to foster purpose (Bronk & Mangan, 2016). One of the opportunities is also to find out which students are more likely to find a sense of purpose through goal-setting activities (Bronk et al., 2019b).

As students take part in a narrative form of goal creation, they are prompted to write about the things that are most important to them. Students are not only requested to concretize their most meaningful goals, but also pushed to cultivate clear personal reasons for pursuing these objectives. Possible selves serve as roadmaps (Oyserman et al., 2004), and scholars have also regarded purpose as a roadmap (Damon, 2008). To internalize the roadmap, the goal-setting intervention connects goal planning to the goal creation process. Students immerse themselves in pathway thinking and are encouraged to write down routes they can take to achieve their goals. The function of these intervention elements is to help students discover the things that matter most to them and foster a sense of direction in life. We therefore propose that the goal-setting intervention is a purpose-fostering intervention.

## Purpose and study performance

One of the few educational studies that linked purpose directly to achievement was conducted by Pizzolato et al. (2011). Among high-school students, they found that an increased sense of purpose was associated with a greater sense of internal control over their academic achievement, which in turn was related to a higher grade point average (GPA). Furthermore, research has indicated that a sense of purpose is positively related to study engagement (Hudig et al., 2021). Students with a sense of purpose find school more meaningful (Yeager & Bundick, 2009), and seeing the value and relevance of schoolwork increases student engagement (Vansteenkiste et al., 2018). A large number of studies have shown that study engagement is related to academic performance (see also: Upadyaya & Salmela-Aro, 2013), because students who are engaged have high levels of energy and mental resilience while studying. They are dedicated towards their studies as they experience a sense of

significance and challenge. Students with high engagement also tend to get fully absorbed in their study work (Schaufeli et al., 2006).

So far, we have proposed that the goal-setting intervention impacts the purpose of students. Research suggests that an increase in sense of purpose is associated with higher study engagement and that higher engagement is related to better study performance, thus a potential mechanism of the goal-setting intervention on performance might be via both purpose and study engagement. At the same time, we know that the goal-setting intervention is not effective for everyone equally (Schippers et al., 2015). Moreover, a variable-centered approach has proven unsuccessful in showing a mechanism of this intervention. In a study by Dekker et al. (2021), self-regulated learning, resilience, grit, and engagement did not appear as mediators between the goal-setting intervention and performance. The current study therefore follows the student-oriented, multidimensional approach of the MMM to explore how the goal-setting intervention works. Specifically, we extend our proposition and propose that the goal-setting intervention works differently for students with different pre-intervention levels of purpose. These varying purpose levels can be distinguished on the basis of various combinations of motives for studying in terms of the motivational mindsets (Hudig et al., 2021). Hence, the current study examines whether the goal-setting intervention has a different effect on the purpose of the four types of motivational mindsets.

## Research questions and aims

This study is part of a larger research project regarding the goal-setting intervention and was conducted to better understand (a) differences in study success, and (b) the mechanisms of the goal-setting intervention. The data of the variables under research were already collected and we therefore employed an exploratory approach. In line with previous research on the effectiveness of the intervention, we used data from first-year university students. The first aim of the present study is to determine whether students' motivational mindset fluctuates or remains stable throughout the first year. Research suggests that students' reasons for going to university are inclined to change, especially in a transitional phase like the first year of the study (Coertjens et al., 2017; Corpus et al., 2020; Kember et al., 2008). On the other hand, studies on motivational profiles have also shown a relatively high level of stability of motivation (Gillet et al., 2017; Tuominen-Soini et al., 2011; Tuominen et al., 2020). We will therefore map out the stability and changes of the motivational mindsets and aim to categorize students into groups with a stable mindset and a changed mindset. Accordingly, **Research Question 1** is: *Do we see evidence*

*for motivational mindset churn and, if so, to what extent does this churn take place in the first academic year?*

The second aim of this study is to examine the differences in study performance between the varying types of motivational mindsets. The motivational dimensions as such have been related to study performance in earlier studies. For instance, in terms of intrinsic, interest-driven motives, research has shown consistently that intrinsic motivation is positively related to academic performance (Cerasoli et al., 2014; D'Lima et al., 2014; Kaufman et al., 2008; Richardson et al., 2012). However, the findings on extrinsic motives and performance are unequivocal, from a positive association (D'Lima et al., 2014), to no association (Richardson et al., 2012), to a negative association (Kaufman et al., 2008). For self-transcendent motives, most studies show a positive association with academic performance. For instance, a study among high-school students showed that prosocial motivation was strongest associated with self-control and academic achievement (Zhoc et al., 2019). Similarly, results by Yeager et al. (2014) indicated that having self-transcendent motives for studying promote self-regulation and performance at tedious learning tasks. Furthermore, research suggests that prosocial motivation has important effects on key cognitive processes related to creativity and, to this end, is associated with better performance in creative tasks (Forgeard & Mecklenburg, 2013; Grant & Berry, 2011). Prosocial motivation has also shown to positively impact performance in various other kinds of work-related tasks (Grant, 2007). Given the novelty of the MMM and our interest in the interplay of these three dimensions, we do not state a formal hypothesis with respect to mindset differences in study performance. One could expect though, based on characteristics of the low-impact mindset, that these students are prone to be least successful in the first year. **Research Question 2** is: *Are there differences in first-year academic performance between the four types of motivational mindsets?*

The third and final aim of this study is to explore a potential explanation for the goal-setting intervention effect on study performance. The current study has no experimental design. This means that we cannot compare an experimental group that participated in the intervention with a control group that did not participate in the intervention. This was not necessarily a dealbreaker for our study because we wanted to explore our proposition that the intervention has a different effect for the different mindset groups. As we divide the students into stable mindsets and changed mindsets, we then analyze in those groups what happens to the purpose after participation in the goal-setting intervention. Bearing in mind that purpose is positively related to study engagement, and study engagement is linked to study performance, we also analyze what happens to the study engagement of the mindsets after participation in the intervention. **Research Question**

**3 is:** *Does the goal-setting intervention impact the sense of purpose of the various mindset groups differently?*

## Method

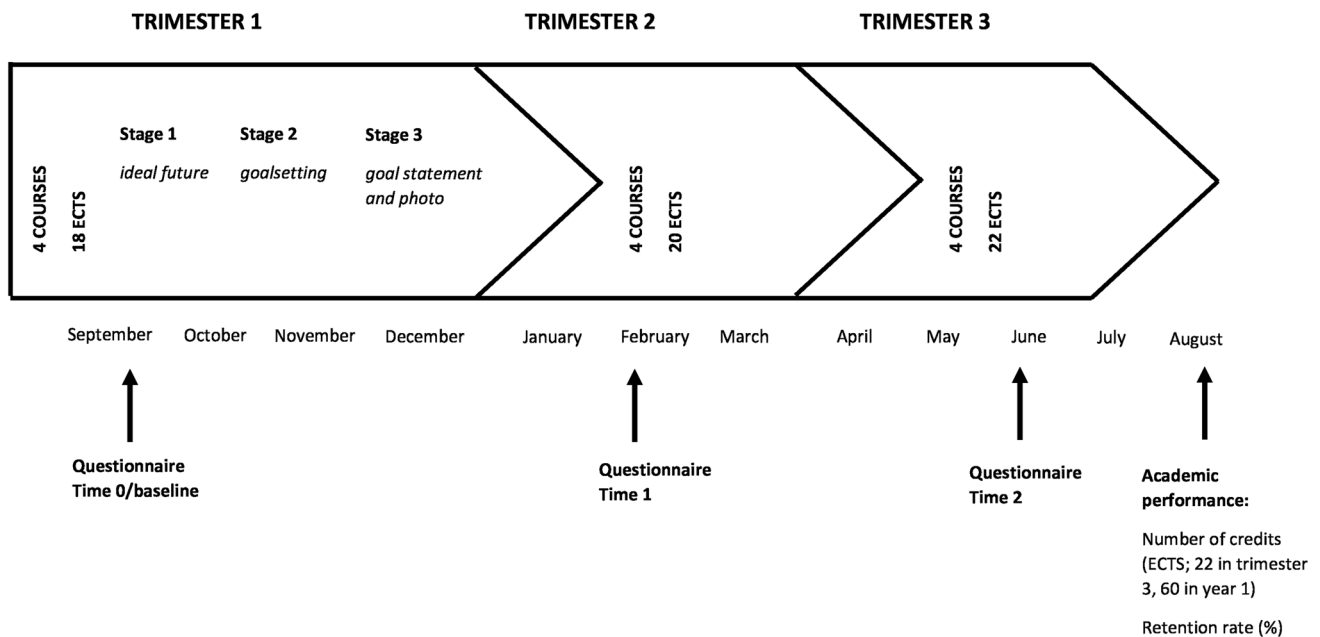
### Sample

The current study involved a large and complete cohort of first-year bachelor students ( $n = 1011$ ) enrolled in the business administration program of a Dutch university (academic year 2018-2019). The first self-report questionnaire (see the *procedure* section below) was completed by 852 students (84.3%). From these students, 104 students (12.2%) did not give consent to process their data and were therefore permanently removed from the database. As a result, the sample size with which we proceeded consisted of 748 students, which included 494 men (66%) and 254 women (34%). Their ages ranged from 17 to 30 years ( $M = 18.51$ ;  $SD = 1.15$ ) and 11.1% of the total sample were non-Western ethnic minority students.

### Procedure

Three waves of data were collected using online questionnaires which constituted items about motives for studying, purpose, and study engagement, among others. Figure 1

displays the timeline of this research project. The first wave was collected three weeks after the start of the study program (Time 0/baseline [T0]). The same questionnaire was sent out at the beginning of the second trimester (four months later; Time 1 [T1]) and again at the end of the third trimester (8 months later; Time 2 [T2]). The questionnaires were administered via Qualtrics and students were given one week to complete each questionnaire. The T0 questionnaire was completed before participation in the goal-setting intervention and the goal-setting exercises were completed before filling in the T1 questionnaire. The three-stage goal-setting intervention was part of an introductory course on Managerial Skills that runs through the entire first year. Tutors informed students about the purpose of the intervention and the additional research during the regular group meetings. Completion of stage 1 and stage 2 was mandatory to earn course credits. Participation in the research was however voluntary and not participating had no consequence for their grades or credits. Tutors notified students that they could withdraw their data from the research at any time and that their data would be treated confidentially. Students provided explicit informed consent to participate in the research prior to filling out the first online questionnaire. Stages 1 and 2 of the intervention were designed and distributed via Qualtrics software. Students were instructed to find a suitable location and work uninterrupted for at least two hours per stage. Stage 1 had to be finished three weeks into the course; stage 2 two weeks later; and stage 3 was executed after completing



**Fig. 1** Study timeline goal-setting intervention (adapted from Schippers et al., 2020)

stages 1 and 2 before the end of the first trimester. Data on gender, ethnicity, and age were collected using university transcripts after the first year had finished. Similarly, data on students' first-year academic performance were gathered in this manner. All methods were carried out in approval of the research school's Internal Review Board and the research was compliant with the General Data Protection Regulation (GDPR).

## Measures

*Motives for studying* were measured by the Study Motives Scale (SMC; Hudig et al., 2020). Participants rated nine reasons for going to university along three dimensions – self-transcendent (“I want to learn things that will help me make a positive impact on the world”); self-oriented (“I want to learn more about my interests”); and extrinsic (“I want to earn more money”) on a Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). Separate mean scores were calculated for each dimension of study motives. The *motivational mindsets* were subsequently established at T0 and T2 using the mindset classification tool (MCT). This tool was developed to classify students into the motivational mindsets according to their pattern of scores on the SMC (for more details on the MCT, see Hudig et al., 2020, 2021).

*Sense of purpose* was measured with a Dutch version of the Purpose in Life subscale from the Scales of Psychological Wellbeing (PIL; Hudig et al., 2021; Ryff, 1989). Seven items (e.g., I enjoy making plans for the future and working to make them a reality) were rated on a Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*).

*Study engagement* was measured with the Utrecht Work Engagement Scale for students (UWES-S; Hudig et al., 2021; Schaufeli et al., 2002; Schaufeli & Bakker, 2003). Participants rated nine items along three dimensions – energy (“When studying I feel strong and vigorous”); dedication (“I am proud of my studies”); and absorption (“Time flies when I’m studying”) on a Likert scale ranging from 1 (*totally disagree*) to 5 (*totally agree*). The nine items were combined to compute a mean score of overall study engagement.

*Academic performance* was operationalized as two dependent variables: (1) number of EC/study credits earned<sup>1</sup>

and (2) retention rates.<sup>2</sup> Students receive a *Binding Study Advice* (BSA) by the end of the first year (Arnold, 2015; de Koning et al., 2014). The current BSA of the business school implies the difficult performance goal that students need to obtain all their first-year courses (i.e., 60 EC) in their first year of enrolment to advance to the second year of the program (Schmidt et al., 2021).<sup>3</sup> In terms of retention rates, students were categorized into two groups (1 = *successful* and 0 = *unsuccessful*) based on their final BSA. The unsuccessful students comprised students who dropped out early and students with a Negative Binding Study Advice.<sup>4</sup> Students with a Positive Binding Study Advice comprised the successful students. Some students received postponed advice due to personal circumstances that affected their study performance. These students were excluded the academic performance variables (see also the inclusion/exclusion criteria in the next section).

## Data processing and analyses

We first examined the data for missing values, normality, and outliers (Hair et al., 2013). Subsequently, descriptive statistics were computed and the reliability of the measurement instruments was assessed in the current sample. In terms of measurement quality, internal consistency reliability was estimated by Cronbach's alpha ( $\alpha$ ). Additionally, the stability of participants' responses over time (i.e., the test-retest reliability) was assessed by Pearson's correlation between timepoints of the same measure. Prior to every analysis, we considered and tested the relevant assumptions (Field, 2013).

To explore the churn and stability of the motivational mindsets (**RQ1**), the MCT was employed identically (with the same score levels) at T0 and T2 resulting in two categorical variables: T0 mindsets and T2 mindsets. We first

<sup>2</sup> In the current context, we considered grade-point average (GPA) as an inappropriate indicator of academic performance for first-year students in the Netherlands (see also Schippers et al., 2015; Schippers et al., 2020). Students who dropout early have finished only a couple of courses but still might have a reasonable GPA. In addition, students were allowed to re-sit course exams multiple times and only the (highest) passing grade was reflected in their GPA. Given these circumstances, GPA in our sample of freshman does not adequately differentiate between study success levels of students and could be a biased marker of performance.

<sup>3</sup> Students can retake each course exam once at the end of the year and they can compensate for one insufficient course grade under the following conditions: the grade is between 4.5 and 5.4, they passed all other first-year courses, and they have at least one rounded 7 on their first-year grade list.

<sup>4</sup> If students deregister within 5 months of the start of the program, they may enroll in the program again the next academic year. If students receive a final Negative Binding Study Advice, they are not allowed to enroll in the program for a period of three academic years.

<sup>1</sup> The European Credit Transfer and Accumulation System (ECTS) is a standardized grading scale and a measure of academic performance across the EU (European Commission, 2015). Each course consists of a number of EC, where one credit equals 28 hours of study. Credits are awarded when a pass grade (minimum 5.5) is obtained for a course. A full year of a university program entails 60 EC.

calculated the overall frequencies and percentages of change and stability in the sample. Then, each specific membership development in mindset from baseline to follow-up was counted and computed as a proportion of the baseline mindset group size. In this way, we would observe the extent to which students' mindset was stable and discern where the largest mindset changes occurred. Afterwards we did not further explore all mindset fluctuations, but rather focus on the mindset change that was *most prominent for each of the four mindsets*.

In order to investigate the motivational mindset differences in academic performance (**RQ2**), we conducted two separate mindset comparisons. First, we compared the academic performance of the *stable* mindset groups. And second, we compared the academic performance of the motivational mindset groups at *Time 2*. These mindset groups at follow-up encompassed both the stable and the changed mindset students. Study performance was first assessed in terms of study credits. As the year 1 credits variable was not normally distributed, a non-parametric test was run (Kruskal-Miller, 2014). The Kruskal-Wallis  $H$  test was conducted with the stable motivational mindsets (IV) and year 1 credits (DV). Next, given that the measurement of mindset at T2 was in trimester 3, an analysis of variance (ANOVA) was performed between the T2 motivational mindsets (IV) and trimester 3 credits (DV). The second assessment of study performance was executed in terms of retention. First, a chi-square test was conducted with the stable motivational mindsets (IV) and first-year retention rates (DV). The expected frequencies were smaller than 5 for more than 20% of the cells and thus Fisher's exact test was performed (Field, 2013; Kim, 2017). Then, a chi-square test was conducted with the T2 motivational mindsets (IV) and first-year retention rates (DV). Significant results between motivational mindsets were further examined through  $2 \times 2$  contingency tables.

To explore whether the goal-setting intervention impacts students' sense of purpose (**RQ3**), the over-time developments in purpose across the motivational mindsets were examined. Specifically, we focused on students in the four stable motivational mindset groups and students in the four prominent changed mindset groups. In addition to developments in purpose, we tested and compared developments in study engagement across these student groups. First, paired  $t$ -tests were conducted within each stable mindset group both for purpose and study engagement to check for differences between timepoints (T0-T1 and T1-T2). Second, paired  $t$ -tests were conducted within each prominent changed mindset group to analyze developments in purpose and study engagement between timepoints (T0-T1 and T1-T2). As the goal-setting intervention was implemented closely after T0, significant differences between T0 and T1 were of particular interest.

Several criteria were set up concerning the inclusion/exclusion of participants. Students were required to have completed at least the questionnaires at baseline and T2 to be included for the main analyses. In addition, students with a postponed BSA ( $n = 50$ ) were excluded from the analyses on first-year academic performance in the second research question. Furthermore, certain students had not completed either stage 1 or stage 2 of the goal-setting intervention. Relevant cases with such missing intervention data ( $n = 6$ ) were excluded from the analyses regarding RQ3. Similarly, relevant cases with missing data on T1 ( $n = 14$ ) were removed from this analysis as we aimed to examine the developments along the three timepoints. Importantly, Hudig et al. (2020) identified four patterns of study motives that did not fit well with one of the four motivational mindsets. These patterns revealed no meaningful combination of study motives and therefore comprised the *residual group*. When we specifically tested and compared the four motivational mindsets, we excluded this group of students from the analyses.

Considering the preliminary and exploratory nature of this research, we adopted an  $\alpha < .05$  and cautiously interpreted marginally significant findings with  $\alpha < .10$  when groups were relatively small. Cramer's  $V$  was included as measures of effect size in the chi-square analyses (.10/.30/.50 = small/medium/large effect size; Kim, 2017). Effect sizes in the ANOVA and paired samples  $t$ -tests were measured as Cohen's  $d$  (.20/.50/.80 = small/medium/large effect size; Cohen, 1992). All analyses were executed using SPSS version 25.

## Results

### Missing data

The present longitudinal study included two types of missing data: within-wave item nonresponse and across-wave attrition. With respect to item nonresponse, a very small number of missing values was observed in the study variables (<1%). We checked each specific item nonresponse and no patterns or problematic cases were detected. The missingness was regarded as ignorable and mean variable scores were calculated without the missing item values (Tabachnick & Fidell, 2012). With respect to the across-wave attrition, completion rates were 72% at T1 (546/748 students) and 43.9% at T2 (328/748 students). We examined whether the data were missing completely at random (MCAR) with two variables (purpose and study engagement) over three time points (T0-T1-T2) and three variables (self-transcendent motives, self-oriented motives, extrinsic motives) over two time points (T0-T2). Little's test (Nicholson et al., 2017) revealed a significant violation of MCAR,  $\chi^2(22) = 58.99, p < .001$ . We therefore inspected

the extent to which the missingness was related to baseline levels of the outcome variables. Such systematic attrition is a concern as it causes potential biases in the results and threatens generalizability (Asendorpf et al., 2014). We created a dummy variable with two groups: research dropouts and research respondents. Research dropouts were students who did not respond to the questionnaire at T1 or T2 ( $n=420$ ). Respondents were students who completed all three questionnaires or completed the questionnaire at T0 and T2 ( $n=328$ ). The systematic attrition analysis involved a series of independent samples  $t$ -tests which revealed that students with lower levels of purpose ( $d=0.26$ ) and study engagement ( $d=0.29$ ) at baseline were more likely to drop out of the research at later time points. Despite these small effect sizes, patterns indicated that the data was not missing at random. Imputation methods have been suggested to handle systematic attrition (Asendorpf et al., 2014). However, these procedures should generally be avoided with such specific patterns and large proportions of missing data (Bingham et al., 1998). Given this recommendation and in the light of the current exploratory study, we decided to not correct for the systematic attrition and, where necessary, take it into consideration when interpreting the results. An additional analysis across baseline motivational mindsets revealed the following attrition rates: 60.6% (low-impact mindset), 58.7% (self-impact mindset), 58.5% (high-impact mindset), 55.8% (residual group), and 48.9% (social-impact mindset). The chi-square test between baseline mindsets was non-significant, indicating that students with a particular motivational mindset at baseline were not more or less likely to drop out later in the research,  $\chi^2(4) = 5.68$ ,  $p = .224$ , Cramer's  $V = 0.09$ .

### Preliminary analysis

Table 1 displays the means, standard deviations, intercorrelations, and Cronbach's alpha coefficients for the study variables. The self-transcendent motives, self-oriented motives, and extrinsic motives subscales reported internal consistency coefficients ranging from  $\alpha = .62$  to  $\alpha = .74$ . Test-retest reliability coefficients were  $r = .49$ ,  $r = .43$  and  $r = .51$  for the three study motives subscales respectively. The purpose in life scale had internal consistency coefficients ranging from  $\alpha = .71$  to  $\alpha = .77$  and test-retest coefficients ranging from  $r = .56$  to  $r = .66$ . The overall study engagement scale reported internal consistencies ranging from  $\alpha = .80$  to  $\alpha = .87$ . Test-retest coefficients of this scale ranged from  $r = .60$  to  $r = .76$ . All scales had internal consistency coefficients higher than .60 which is acceptable (Hair et al., 2013; Taber, 2018). No true standards exist for establishing the minimum acceptable value for a test-retest reliability estimate (Crocker & Algina, 2006). Given the relatively long time between measurement points (4 to 5 months), the

attrition within the sample, and the developmental nature of first-year university students, we deemed the test-retest reliability coefficients as adequate.

## Main Analysis

### Mindset churn and stability (RQ1)

The first research question examined the mindset churn and stability from Time 0 to Time 2. The result of the mindset classification at baseline entailed the following motivational mindset distribution: 193 high-impact mindset students (25.8%), 94 low-impact mindset students (12.6%), 186 social-impact students (24.9%), 189 self-impact mindset students (25.3%), and 86 residual group students (11.5%). The classification at follow-up resulted in the following mindset distribution: 70 high-impact mindset students (21.4%), 60 low-impact mindset students (18.3%), 93 social-impact mindset students (28.3%), 67 self-impact mindset students (20.4%), and 38 residual group students (11.6%). Of the total sample at T2 ( $n=328$ ), 137 students (41.8%) comprised students with a stable motivational mindset and 191 students (58.2%) demonstrated a change in motivational mindset from the beginning to the end of the academic year. Thus, results show that there was considerable mindset churn: on average 58% of students changed mindset. These changes in mindset were quite similar across mindsets (*low-impact mindset*: 51.4% changed, *social-impact mindset*: 54.7% changed, *high-impact mindset*: 58.7% changed, *self-impact mindset*: 61.5% changed). Most students changed to the social-impact mindset while the self-impact mindset appeared to be the least stable. Table 2 illustrates the specific membership developments. The four types of mindsets had the following transition that were most prominent: high-impact and low-impact mindset students switched mostly to a social-impact mindset (high-to-social: 23.8%; low-to-social: 24.3%). Social-impact mindset students switched mostly to a high-impact mindset (social-to-high: 21.1%), and finally, self-impact mindset students mostly endorsed a low-impact mindset (self-to-low: 21.8%).

### Motivational mindset and academic performance (RQ2)

The second research question investigated whether the motivational mindsets differ in academic performance. To this end, two performance indicators were used: 1) the number of study credits/EC earned, and 2) retention rates. The stable motivational mindset groups were compared in year 1 credits and retention. The mindset groups at Time 2 (combining the stable and changed mindset students) were tested in trimester 3 credits and retention.



**Table 1** Descriptive statistics, Cronbach's alpha coefficients, and intercorrelations

	M	SD	$\alpha$	r	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1. T0 ST motives	3.95	0.61	.66	-																
2. T2 ST motives	3.92	0.67	.69	.49**	-															
3. T0 SO motives	4.19	0.59	.69	.41**	.28**	-														
4. T2 SO motives	4.11	0.68	.74	.19**	.49**	.43**	-													
5. T0 EX motives	4.27	0.61	.62	.16**	-.07	.28**	.07	-												
6. T2 EX motives	4.14	0.68	.64	-.08	.07	.30**	.30**	.51**	-											
7. T0 Sense of purpose	3.88	0.51	.71	.23**	.19**	.19**	.14*	-.01	.04	-										
8. T1 Sense of purpose	3.73	0.58	.75	.19**	.26**	.16**	.18*	.03	.05	.57**	-									
9. T2 Sense of purpose	3.72	0.62	.77	.17*	.24**	.21**	.24**	.01	.02	.56**	.66**	-								
10. T0 Study engagement	3.49	0.50	.80	.39**	.24**	.36**	.31**	.01	.00	.44**	.35**	.35**	-							
11. T1 Study engagement	3.35	0.56	.84	.24**	.27**	.23**	.36**	-.03	-.01	.29**	.35**	.30**	.63**	-						
12. T2 Study engagement	3.38	0.62	.87	.22**	.34**	.23**	.43**	-.01	.05	.23**	.34**	.36**	.60**	.76**	-					
13. EC year 1	47.07	19.62		-.01	.09	.02	.03	.03	.00	.00	.12*	.20**	.11*	.16**	.09	-				
14. EC trimester 3	14.55	7.99		-.04	.08	-.01	-.01	-.01	-.05	.00	.12*	.20**	.18*	.15*	.07	.88**	-			
15. Retention				.01	.11*	.03	.07	.07	.01	.01	.12*	.19**	.11	.06	.15*	.08	.92**	.82**	-	

T0-T1-T2 = Time-points 0, 1, 2; ST = self-transcendent, SO = self-oriented, EX = extrinsic; EC = credits; retention: 1 = successful, 0 = unsuccessful; n = 748 at T0, n = 546 at T1, n = 328 at T2, n = 698 for study performance variables; \*\* $p < .001$ , \* $p < .05$

**Table 2** Time 0 to Time 2 mindset developments

Motivational mindset		n	%
Time 0/Time 2			
high-impact	high-impact	33	41.3
	low-impact	5	6.3
	social-impact	19	23.8
	self-impact	15	18.8
	residual group	8	10.0
total		80	100
low-impact	high-impact	1	2.7
	low-impact	18	48.6
	social-impact	9	24.3
	self-impact	6	16.2
	residual group	3	8.1
total		37	100
social-impact	high-impact	20	21.1
	low-impact	12	12.6
	social-impact	43	45.3
	self-impact	13	13.7
	residual group	7	7.4
total		95	100
self-impact	high-impact	12	15.4
	low-impact	17	21.8
	social-impact	12	15.4
	self-impact	30	38.5
	residual group	7	9.0
total		78	100
residual group	high-impact	4	10.5
	low-impact	8	21.1
	social-impact	10	26.3
	self-impact	3	7.9
	residual group	13	34.2
total		38	100

T0 sample follows T2 sample,  $n = 328$ ;  
 Proportions based on the T0 mindset distribution

**Study credits**

A Kruskal-Wallis  $H$  test among the stable motivational mindsets ( $n = 117$ ) indicated no significant differences in first-year credits obtained,  $\chi^2(3) = 5.11, p = .164$ . The mean rank scores for the high-impact mindset, low-impact mindset, social-impact mindset, and self-impact mindset were 64.05, 48.00, 57.59, and 62.20, respectively. The ANOVA between the T2 motivational mindsets ( $n = 278$ ) also indicated no significant differences in trimester 3 credits,  $F(3, 274) = 0.99, p = .397$ . Based on these results, we may conclude that students' motivational mindset is not related to their earned study credits in the first year. The mean study credits per motivational mindset group are displayed in Table 3. Notably, all year 1 credit averages trend toward the BSA performance goal of 60 credits.

**Retention**

Fisher's exact test among the stable motivational mindsets was non-significant ( $p = .067$ , Cramer's  $V = 0.22$ ), indicating that these mindset groups were not different in retention rates [Retention<sub>high-impact</sub> = 100%, Retention<sub>self-impact</sub> = 100%, Retention<sub>social-impact</sub> = 92.3%, Retention<sub>low-impact</sub> = 88.9%]. Between T2 motivational mindsets, the  $\chi^2$  analysis indicated significant differences in retention rates,  $\chi^2(3) = 9.05, p = .026$ , Cramer's  $V = .18$ . Follow-up  $\chi^2$  analyses showed that the high-impact mindset students were significantly more successful than the low-impact mindset students (Retention<sub>high-impact</sub> = 97.1%, Retention<sub>low-impact</sub> = 82.8%,  $\chi^2(1) = 7.43, p = .006$ , Cramer's  $V = .24$ ). And the differences in retention rate between the social-impact mindset and low-impact mindset (Retention<sub>social-impact</sub> = 92.8%,  $\chi^2(1) = 2.39, p = .087$ , Cramer's  $V = .14$ ), and the self-impact mindset and low-impact mindset (Retention<sub>self-impact</sub> = 93.8%,  $\chi^2(1) = 3.62, p = .057$ , Cramer's  $V = .17$ ) were marginally

**Table 3** Number of credits and retention rate by motivational mindset group (stable and Time 2)

	motivational mindset								
	high-impact		low-impact		social-impact		self-impact		
	stable	T2	stable	T2	stable	T2	stable	T2	
$n$	33	68	18	58	39	88	27	64	
EC (mean and SD)	year 1	59.21 (1.71)	x	55.39 (9.31)	x	56.97 (7.41)	x	58.74 (2.90)	x
	trimester 3	x	18.51 (4.56)	x	17.53 (5.79)	x	17.89 (5.07)	x	18.97 (5.24)
Retention (%)		100	97.1a	88.9	82.8b	92.3	92.8a	100	93.8a

The N varies because the residual group and students with personal circumstances were excluded (Time 2  $n = 278$ , stable mindsets  $n = 117$ ); letters denote  $\chi^2$  tests - different letters indicate significant differences

significant. The other mindset comparisons in retention rates did not significantly differ from each other. According to these results, we may conclude that students' end-of-the-year motivational mindset is related to first-year retention. Specifically, low-impact mindset students at follow-up were more likely to drop out of the first year than the other three motivational mindsets.

### Mindset developments in sense of purpose (RQ3)

The third research question aimed to explore whether the goal-setting intervention has a different effect on the sense of purpose of the various mindset groups. To this end, developments in purpose across the four stable mindsets and four most prominent changed mindsets were inspected at Time 1 and Time 2 after participation in the program. In addition, we also examined developments in study engagement across these groups to explore whether the engagement towards studying was impacted differently after participation in the goal-setting program.

### Sense of purpose

Paired samples *t*-tests were conducted to check for purpose differences within the four stable mindset groups ( $n = 113$ ) across the three timepoints. For the stable motivational mindsets, only the social-impact mindset had a lower sense of purpose at T1 compared to T0 ( $M = 0.25$ ,  $CI [0.10, 0.40]$ ,  $t(38) = 3.36$ ,  $p = .002$ ,  $d = 0.52$ ). The other differences between timepoints were non-significantly different. Figure 2 displays the development in sense of purpose by stable

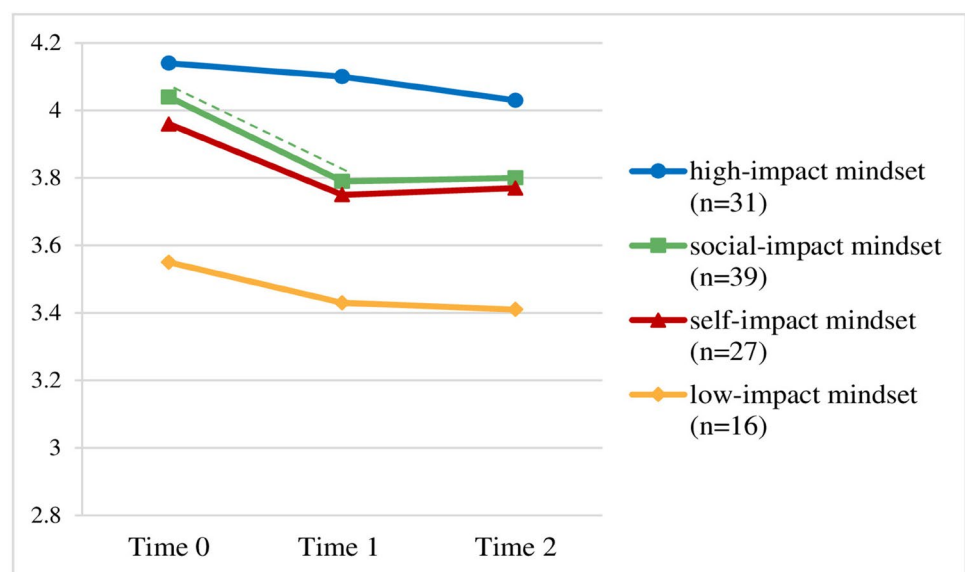
motivational mindset. Overall, the plot shows a decreasing trend in sense of purpose during the first academic year.

Paired samples *t*-tests were also conducted to check for purpose differences within the four prominent changed mindsets ( $n = 58$ ) across timepoints. The low-to-social-impact mindset demonstrated an *increase* in sense of purpose at T1 compared to T0 ( $M = 0.29$ ,  $CI [0.04, 0.53]$ ,  $t(8) = 2.68$ ,  $p = .028$ ,  $d = 0.57$ ). Furthermore, the self-to-low-impact mindset reported a *decrease* in sense of purpose from T1 to T2 ( $M = 0.26$ ,  $CI [0.06, 0.45]$ ,  $t(14) = 2.84$ ,  $p = .013$ ,  $d = 0.54$ ). The other difference tests between timepoints were non-significant. Figure 3 displays the development in sense of purpose by prominent changed mindset group and Table 4 presents the mean sense of purpose scores by motivational mindset group and by timepoint.

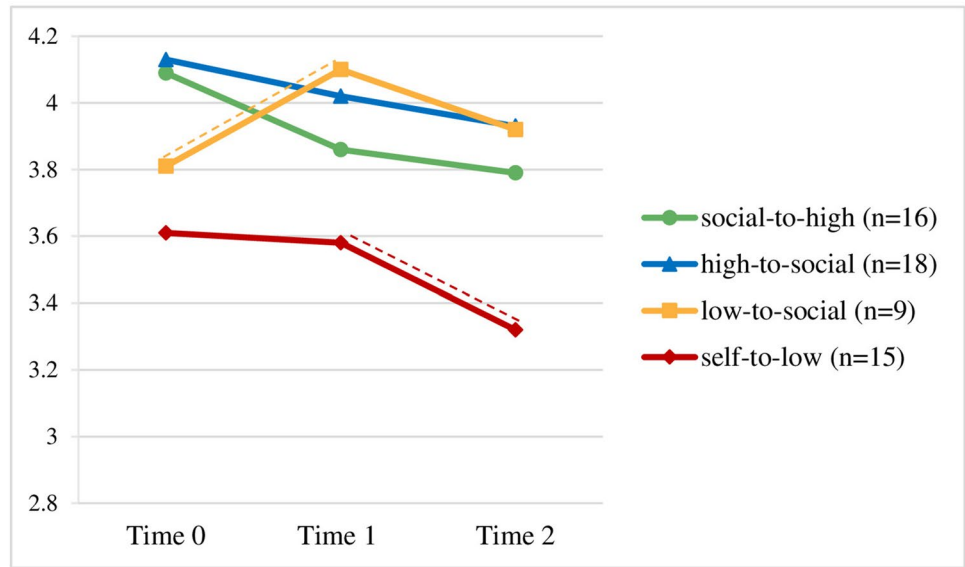
### Study engagement

Paired samples *t*-tests were again conducted to check for study engagement differences across timepoints within each stable motivational mindset. The high-impact mindset ( $M = 0.20$ ,  $CI [0.05, 0.34]$ ,  $t(30) = 2.81$ ,  $p = .009$ ,  $d = 0.41$ ), social-impact mindset ( $M = 0.11$ ,  $CI [0.01, 0.22]$ ,  $t(38) = 2.20$ ,  $p = .034$ ,  $d = 0.24$ ), and self-impact mindset ( $M = 0.20$ ,  $CI [0.05, 0.35]$ ,  $t(26) = 2.79$ ,  $p = .010$ ,  $d = 0.47$ ) all had lower levels of study engagement at T1 compared to T0. The other timepoint difference tests were non-significantly different. Figure 4 displays the development in study engagement by stable motivational mindset. In the same way as purpose, the plot shows an overall decreasing trend in study engagement during the first academic year.

**Fig. 2** Purpose development within stable mindsets. (A dashed line indicates significant difference.)



**Fig. 3** Purpose development within prominent changed mindsets. (A dashed line indicates significant difference.)

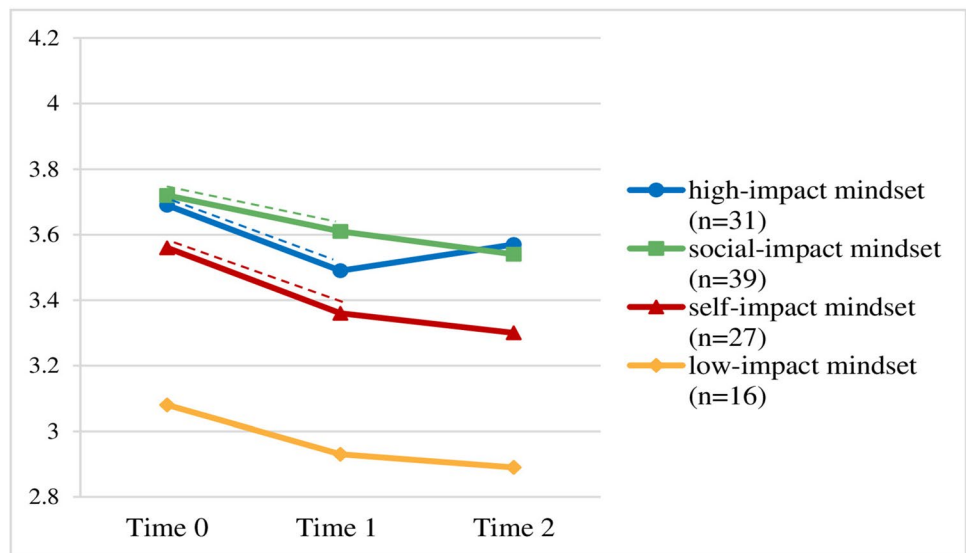


**Table 4** Mean purpose and study engagement scores by stable mindset and prominent changed mindset

	motivational mindset							
	stable mindset				prominent changed mindset			
	high-impact	low-impact	social-impact	self-impact	social-to-high	high-to-social	low-to-social	self-to-low
T0 sense of purpose								
n	31	16	39	27	16	18	9	15
M	4.14	3.55	4.04	3.96	4.09	4.13	3.81	3.61
SD	0.59	0.65	0.45	0.58	0.27	0.67	0.47	0.57
T1 sense of purpose								
n	31	16	39	27	16	18	9	15
M	4.1	3.43	3.79	3.75	3.86	4.02	4.10	3.58
SD	0.44	0.64	0.51	0.74	0.66	0.76	0.53	0.46
T2 sense of purpose								
n	31	16	39	27	16	18	9	15
M	4.03	3.41	3.8	3.77	3.79	3.93	3.92	3.32
SD	0.71	0.62	0.60	0.73	0.53	0.83	0.57	0.50
T0 study engagement								
n	31	16	39	27	16	18	9	15
M	3.69	3.08	3.72	3.56	3.77	3.75	3.35	3.39
SD	0.49	0.74	0.46	0.45	0.30	0.56	0.49	0.55
T1 study engagement								
n	31	16	39	27	16	18	9	15
M	3.49	2.93	3.61	3.36	3.76	3.71	3.41	3.16
SD	0.48	0.62	0.47	0.4	0.40	0.59	0.43	0.54
T2 study engagement								
n	31	16	39	27	16	18	9	15
M	3.57	2.89	3.54	3.3	3.74	3.61	3.47	3.02
SD	0.71	0.69	0.51	0.58	0.30	0.68	0.40	0.46

The N varies from previous analyses due to missing intervention and T1 data

**Fig. 4** Study engagement development within stable mindsets. (A dashed line indicates significant difference.)



Finally, paired samples *t*-tests were conducted to check for study engagement differences between timepoints within the four prominent changed mindset groups. Each *t*-test demonstrated a *p* value larger than .05 and thus study engagement levels were non-significantly different from T0 to T1 and from T1 to T2. Figure 5 displays the development in study engagement by changed mindset pattern. Notably, the self-to-low group demonstrates a strong decline in engagement over the course of the academic year. Considering the other three prominent change patterns, only the low-to-social pattern expresses an upward trend while all three seem to gravitate towards the same level of engagement. Table 4 also presents the mean study engagement scores by motivational mindset group and by timepoint.

## Discussion

This study aimed to investigate motivational mindset developments, the relationship between the motivational mindset and academic performance, and a potential working mechanism of the goal-setting intervention. Results indicated a plasticity of the motivational mindset as more than half of students endorsed a different combination of study motives by the end of the first academic year. Results also suggest that students with a low-impact mindset at follow-up were more likely to drop out of the study program compared to the other three types of motivational mindsets. Finally, according to patterns in the results, a group of low-impact mindset students were the only students who increased in their sense of purpose, right after participating in the goal-setting intervention. While most

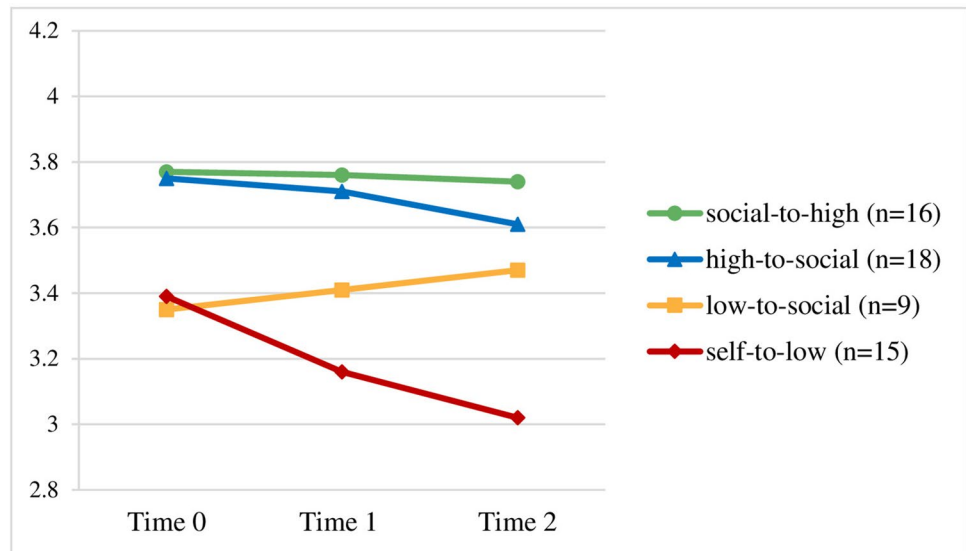
students experienced a decrease in study engagement, the engagement levels of these low-impact mindset students remained steady and even trended upward. Moreover, by the end of the first year, they had endorsed a social-impact mindset.

## Mindset churn and stability

In terms of mindset churn/stability (RQ1), 42% of the students had a similar motivational mindset over the course of the first year, with mindset profile memberships subject to change for many students (58%), which is quite a large percentage. Previous longitudinal research on motivational profiles with frameworks from self-determination theory and achievement goal theory also demonstrated fluctuations (Gillet et al., 2017; Tuominen-Soini et al., 2011; Tuominen et al., 2020). The proportion of change in the current study was a bit higher though. This could be due to the relatively long time between measurement points (i.e., 8 months), but we suspect that this could also be due to the goal-setting intervention and students developing a more realistic picture of themselves and the study program (see the next sections for more elaboration).

Most students switched to the social-impact mindset, although these students might have been more motivated to complete the questionnaire at the end of the year. Given the like-minded characteristics in terms of self-transcendent and self-oriented (intrinsic) study motives, it is not surprising that social-impact mindset students changed mostly to the high-impact mindset and vice versa. These students fluctuated primarily in their extrinsic motives for studying. Students with a low-impact mindset switched

**Fig. 5** Study engagement development within prominent changed mindsets



most prominently to the social-impact mindset. Thus, students who enter university with a shallow perspective of their future were inclined to develop a prosocial and interest-driven academic motivation during the first year. Overall, the self-impact mindset students included the largest proportion of change, while they changed predominantly towards the low-impact mindset. Students who enter university with a strong money- and career-focused orientation regarding their studies could therefore be most prone to experience a decline in intrinsic motives. This mindset churn aligns with previous research noting that being motivated by external rewards such as financial success can over time undermine the inherent interest-driven motivation (Vansteenkiste et al., 2006).

### Mindset differences in study performance

To assess whether students' motivational mindset matters for study performance (RQ2), we identified the most meaningful results in terms of retention. Low-impact mindset students at follow-up were less likely to advance to the second year of the study program compared to the other three motivational mindsets. This finding builds on the characteristics of the motivational mindset model in which the low-impact mindset has shown the least optimal pattern for academic functioning (Hudig et al., 2021). As the BSA norm was operative in the first year (i.e., a lower and upper limit of 60 study credits), performance differences between the low-impact mindset and the other mindsets might be more pervasive in the rest of the study program. Future research could proceed this investigation. Notably, given that we do not know the exact turning point of the mindset churn, the data here was not suitable to test the direct impact of the motivational mindset on retention. We nevertheless suppose that

students obtained the largest part of their study results with the mindset measured at follow-up. Future research could test the mindset-performance relationship in a student sample without the goal-setting intervention and measure the study motives more frequently during the academic year.

Students with a stable low-impact mindset were equally retained in the first year as the other three stable mindsets. Thus, even students who have no real intrinsic motives for studying and merely go to university to make friends or earn more money managed to be successful in the first year, provided that their study motives were stable. Future research can investigate how this stable mindset performs in the long run of the study and work career. Overall, the high-, social-, and self-impact mindset showed similar patterns in study performance. Despite varying degrees of student characteristics (Hudig et al., 2020, 2021), these mindsets all contain qualities that support first-year study success. One has to view this finding also in the context of the BSA where the norm was 60 study credits and deviations were generally not allowed. Future studies can inquire whether the three types of mindsets would be equally successful over the course of the study and work career. These findings also pertain to business university students and first-year success levels could be different across the motivational mindsets in other study programs. Having a self-impact mindset, for instance, might fit less well in a more socially oriented study program.

### Mindset developments in purpose and study engagement

The final part of this study explored the proposition that the goal-setting intervention impacts the sense of purpose of the various mindset groups differently (RQ3). To this end, developments of purpose were observed among the stable mindset

groups and most prominent changed mindset groups. As purpose has been linked to engagement and engagement is a strong promoter of academic performance, developments of study engagement were also observed within these groups.

For the stable mindset groups, no increases over time were observed neither in purpose nor in study engagement. In fact, the overall trend was that students decreased in feelings of purpose and engagement. This finding is in line with previous studies showing that students generally experience declining levels of purpose and engagement in the first academic year (Bowman, 2010; Salmela-Aro et al., 2021). One could explain this pattern in that students might have been overoptimistic at the beginning of their studies and then became more realistic due to the challenges that the first year of study includes (Nadelson et al., 2013). Given the non-experimental design of this study, we cannot determine what the role of the intervention has been in these developments. Goalsetting might, for instance, prevented even stronger declines in purpose and engagement.

For the four prominent changed mindsets, we again noticed declining purpose trends in three of the four change patterns. However, in students who shifted from a low-impact to a social-impact mindset, we observed a medium-sized within-group effect on sense of purpose. A quarter of low-impact mindset students demonstrated a significant increase in their levels of purpose between baseline and T1, precisely after participating in the goal-setting intervention. Their level of study engagement also indicated an increasing trend over time, although these measurements varied non-significantly. In contrast, one fifth of students who started their studies with a self-impact mindset switched to the low-impact mindset and reported a strong decrease in their sense of purpose, specifically between T1 and T2. Their reported study engagement also dropped quite drastically over the course of the first year. The high-to-social and social-to-high change patterns did not reveal significant developments in purpose and study engagement. Hudig et al. (2021) showed that the high-impact mindset and social-impact mindset had similar levels of purpose and study engagement. The finding here suggests that a switch between these mindsets does not seem to impact the two dimensions of student wellbeing over longer periods of time.

### Potential mechanism of the goal-setting intervention

Here we attempt to illuminate how the goal-setting intervention positively impacts the purpose of the low-impact mindset students who switched to a social-impact mindset. These low-impact mindset students, presumably, had not explicitly considered their reasons for studying before going to university. During the goal-setting intervention they reflect on their ideal future and they formulate life goals. As a result,

they might discover the direction they want to go in life and the reflection exercises enhance their sense of purpose. Still this sense of purpose needs to connect to the study program to influence performance. This link could take place because students are also encouraged to reflect on why their life goals are important to them. To this end, unstable low-impact mindset students can develop self-transcendent and/or self-oriented, intrinsic motives for studying through the intervention. These students gain a clearer perspective on why they go to university and clarifying these reasons for their life goals creates an important focus on the study program. Goalsetting could to that extent be designated as a kind of *mindsetting*. In contrast with their peers, these low-impact mindset students demonstrated a study engagement that remained stable and even slightly increased. One could argue that the goal-setting intervention, through a stronger sense of purpose and expanded motivational mindset, buffered against a decreasing spiral of engagement that most students tend to experience as the academic year progresses. Preventing negative spirals of engagement stemming from low engagement at the start of the program is crucial for students to succeed in the first year of the studies (Masten et al., 2005).

Importantly, a group of students with a self-impact mindset at the beginning of their studies changed to a low-impact mindset, while they reported strong declines in purpose and engagement over the course of the academic year. One could imagine that the goal-setting intervention may also have a “negative” influence on the motivational mindset of students. Students could realize that the study program does not fit with their life goals, or perhaps their study motives appear to be different than previously considered. Future research is warranted to investigate whether these mindset developments indeed occur as a result of goalsetting.

### Implications and future research

The results of this study expand the literature on the effects of motivational mindsets and personal goalsetting in several keyways. More than half of students changed their motivational mindset by the end of the first year. We can conclude that the meanings that students ascribe to university fluctuate and this implies a plasticity of motivational mindset. The extent of mindset churn corresponds with the high instability of first year at university and the dynamic nature of this phase of life. As the sample participated in the goal-setting intervention at the beginning of the academic year, we cannot state conclusions about the general stability and changeability of the mindsets. Future research should investigate the trajectories of students’ motivational mindset in a context without an intervention program.

Furthermore, students with a low-impact mindset at follow-up were less likely to progress to the second year

compared to the other three mindsets. This may imply that a shift to a low-impact mindset could be predictive of first-year dropout, as students with a stable low-impact mindsets were equally successful as the other three stable mindset groups. A common assumption is that if students are not intrinsically motivated, they perform less well than intrinsically motivated students (Corpus et al., 2020). The findings here imply that when students' motives for studying are stable, even without intrinsic motives in a low-impact mindset, their study success can be similar. In addition, while extrinsic motives have shown to increase the likelihood of dropout (Tinto, 2012), self-impact mindset students demonstrated that having strong extrinsic motives does not necessarily diminish performance as long as they are combined with an intrinsic drive for personal development. These findings underscore the value of the student-centered approach for better understanding performance differences among students. Practically, teachers and study advisors can take the motivational mindsets and their developments into consideration for measuring wellbeing and potential study success. They could educate students about their mindset profile and instruct students about possible favorable and unfavorable mindset changes.

The findings in this paper suggest that the goal-setting intervention fosters a sense of purpose in low-impact mindsets students. Stable low-impact mindset students, however, did not experience an increase in sense of purpose after participation in the intervention. These students seem to be aware of their reasons for studying, despite having low intrinsic motives. To boost academic performance in the first year at least, the goal-setting intervention might be less effective for specific study programs such as medicine and physiotherapy in which students enroll who have often explicated their reasons for studying before entering. A quarter of low-impact mindset students did show an increased sense of purpose after participating in the expressive writing exercises of the goal-setting intervention. This finding contributes to the purpose literature where it is important to uncover which pathways help students to find a sense of purpose and direction (Hill & Burrow, 2021). As low-impact mindset students seem to have a higher risk of dropping out, this finding substantiates research noting that the goal-setting intervention is particularly effective for potential struggling students (Morisano et al., 2010; Schippers et al., 2015). The specific group of low-impact mindset students experienced benefits from the goal-setting intervention not only in terms of purpose, but arguably also in terms of stable engagement levels and a favorable mindset churn. Future research can investigate why particularly these students were positively influenced in terms of purpose, engagement, and the motivation to study.

Ultimately, more attention should already be given in secondary education to developing a personal future and

a sense of purpose. High-school students need to consider their deeper reasons or why for going to university, and not just because it is an obvious next step (Antikainen et al., 1995). Gaining personal reflection skills and participating in purpose-fostering exercises at high school could help students find direction in higher education as well as in the rest of life.

## Strengths and limitations

This exploratory study has several limitations that need to be addressed. The current research potentially suffers from common method bias as self-report measures were used to assess the study motives, purpose, and study engagement. Measurement bias could also be an issue as the measurement invariance of the instruments was not tested. Future research could confirm measurement invariance across the measured time periods (see also: Coertjens et al., 2012). As is common in longitudinal research, the study suffered from relatively high attrition rates. This may have biased the results particularly in terms of performance, as most low-performing students already dropped out from the research at follow-up. Also, due to the 60 credits norm of the BSA, the credits indicator captured performance differences insufficiently. Future research could include procedures to retain students in the research (e.g., via compensation), but also conduct more advanced analyses such as growth curve modelling to handle large amounts of missing data. Given the non-experimental design of this study and despite the difficulty of conducting experiments in the academic setting, the proposed mechanism of the goal-setting intervention can only be confirmed in a randomized trial with an active control group. In addition, one should consider that the group sizes of the prominent changed mindset students were relatively small and that the study involved a homogeneous sample of first-year business university students. Future research could test whether the results are generalizable to other study programs, populations, and ages. Finally, we did not include demographic variables such as gender and ethnicity in our analyses. Future studies can control for the influence of these background characteristics on the results.

Despite the limitations, we still can address and highlight the strengths of the present study. We conducted a longitudinal study over the full course of the first academic year at university. Given the importance of this period for young adults, it is imperative to gain insight into the developments of students' psychology during this phase of their lives. Moreover, with a large entering cohort of first-year students, we identified a promising pattern that indicates a plausible mechanism of the goal-setting intervention which has proven to be effective for study and career success. This paper therefore builds on previous findings and provides valuable indications for further research.



We substantiated the value of a multidimensional student perspective to understand differences between students in higher education. We gained new and nuanced insight into developments of motivation, the connection between motivation and first-year study success, and the working mechanism of the goal-setting intervention following a unique student-oriented approach.

## Conclusions

This study demonstrated important nuances in differences between the academically less-motivated students. Firstly, students who enter higher education with a stable low-impact mindset can be just as successful in the first academic year as the other three motivational mindsets. However, students who have an unstable mindset and endorse a low-impact mindset during the study program have a higher risk of dropping out. Secondly, in line with research noting that the goal-setting intervention is particularly effective among struggling students, this paper provides indications that low-impact mindset students benefit mostly from the intervention. Specifically for unstable low-impact mindset students does the intensive reflection exercises positively change their mindset, foster purpose, and protect the level of study engagement. This is particularly relevant for broad study programs and in secondary education – where unstable mindset students are prevalent and where students often have not yet considered their life aspirations and lack a sense of direction in life.

**Author's contributions** JH conceived and designed the study, performed the statistical analysis, and has written the draft of the manuscript; AS assisted in performing the statistical analysis; AS, MS and GS contributed to the conception and design of the study; All authors contributed to revise, read and approve the submitted version of the manuscript.

## Declarations

**Ethics approval** This study was carried out in accordance with the recommendations of the Internal Review Board of the Erasmus Research Institute of Management, Erasmus University Rotterdam and the protocol was approved by the Internal Review Board.

**Consent to participate** Informed consent was obtained from all individual participants included in the study.

The raw, pseudo-anonymized data supporting the conclusions of this manuscript will be made available by the authors to qualified researchers.

**Conflict of interest** The authors declare that there is no conflict of interest.

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## References

- Antikainen, A., Houtsonen, J., Huotelin, H., & Kauppila, J. (1995). In search of the meaning of education: The case of Finland. *Scandinavian Journal of Educational Research*, 39(4), 295–309. <https://doi.org/10.1080/0031383950390402>
- Arce, M. E., Crespo, B., & Míguez-Álvarez, C. (2015). Higher education drop-out in Spain-particular case of universities in Galicia. *International Education Studies*, 8(5). <https://doi.org/10.5539/ies.v8n5p247>
- Arnold, I. J. M. (2015). The effectiveness of academic dismissal policies in Dutch university education: An empirical investigation. *Studies in Higher Education*, 40(6), 1068–1084. <https://doi.org/10.1080/03075079.2013.858684>
- Asendorpf, J. B., Van De Schoot, R., Denissen, J. J. A., & Hutteman, R. (2014). Reducing bias due to systematic attrition in longitudinal studies: The benefits of multiple imputation. *International Journal of Behavioral Development*, 38(5), 453–460. <https://doi.org/10.1177/0165025414542713>
- Australian Government (2020). 2019 Section 15 - Attrition, Success and Retention. Available at: <https://www.dese.gov.au/higher-education-statistics/resources/2019-section-15-attrition-success-and-retention>. Accessed 20 August 2021.
- Bennett, R. (2003). Determinants of undergraduate student drop out rates in a university business studies department. *Journal of Further and Higher Education*, 27(2), 123–141. <https://doi.org/10.1080/030987703200065154>
- Bingham, C., Stemmler, M., Petersen, A., & Graber, J. (1998). Imputing missing data values in repeated measurement within-subjects designs. *Methods of Psychological Research*, 3(2), 131–155.
- Bowman, N. A. (2010). The development of psychological well-being among first-year college students. *Journal of College Student Development*, 51(2), 180–200. <https://doi.org/10.1353/csd.0.0118>
- Brahm, T., Jenert, T., & Wagner, D. (2017). The crucial first year: A longitudinal study of students' motivational development at a Swiss business school. *Higher Education*, 73(3), 459–478. <https://doi.org/10.1007/s10734-016-0095-8>
- Bronk, K. C., Baumsteiger, R., Mangan, S., Riches, B., Dubon, V., Benavides, C., & Bono, G. (2019a). Fostering purpose among young adults: Effective online interventions. *Journal of Character Education*, 15(2), 21–38.
- Bronk, K. C., Hill, P. L., Lapsley, D. K., Talib, T. L., & Finch, H. (2009). Purpose, hope, and life satisfaction in three age groups. *Journal of Positive Psychology*, 4(6), 500–510. <https://doi.org/10.1080/17439760903271439>
- Bronk, K. C., Leontopoulou, S., & McConchie, J. (2019b). Youth purpose during the great recession: A mixed-methods study. *Journal of Positive Psychology*, 14(4), 405–416. <https://doi.org/10.1080/17439760.2018.1484942>

- Bronk, K. C., & Mangan, S. (2016). Strategies for cultivating purpose among adolescents in clinical settings. In P. Russo-Netzer, S. E. Schulenberg, & A. Batthyany (Eds.), *Clinical perspectives on meaning: Positive and existential psychotherapy* (pp. 407–421). Springer International Publishing AG. [https://doi.org/10.1007/978-3-319-41397-6\\_20](https://doi.org/10.1007/978-3-319-41397-6_20)
- Bundick, M. (2011). The benefits of reflecting on and discussing purpose in life in emerging adulthood. In *new directions for youth development* (issue 132, pp. 89–103). 10.1002/yd.
- Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year Meta-analysis. *Psychological Bulletin*. <https://doi.org/10.1037/a0035661>
- Christie, H., Munro, M., & Fisher, T. (2004). Leaving university early: Exploring the differences between continuing and non-continuing students. *Studies in Higher Education*. <https://doi.org/10.1080/0307507042000261580>
- Coertjens, L., Brahm, T., Trautwein, C., & Lindblom-Ylänne, S. (2017). Students' transition into higher education from an international perspective. *Higher Education*, 73(3), 357–369. <https://doi.org/10.1007/s10734-016-0092-y>
- Coertjens, L., Donche, V., de Maeyer, S., Vanthournout, G., & van Petegem, P. (2012). Longitudinal measurement invariance of Likert-type learning strategy scales: Are we using the same ruler at each wave? *Journal of Psychoeducational Assessment*, 30(6), 577–587. <https://doi.org/10.1177/0734282912438844>
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037//0033-2909.112.1.155>
- Corpus, J. H., Robinson, K. A., & Wormington, S. V. (2020). Trajectories of motivation and their academic correlates over the first year of college. *Contemporary Educational Psychology*, 63(August), 101907. <https://doi.org/10.1016/j.cedpsych.2020.101907>
- Côté, J. E., & Levine, C. (1997). Student motivations, learning environments, and human capital acquisition: Toward an integrated paradigm of student development. *Journal of College Student Development*, 38(3), 229–243.
- Crocker, L., & Algina, J. (2006). Introduction to classical and modern test theory (1st ed.). Cengage Learning.
- D'Lima, G. M., Winsler, A., & Kitsantas, A. (2014). Ethnic and gender differences in first-year college students' goal orientation, self-efficacy, and extrinsic and intrinsic motivation. *Journal of Educational Research*, 107(5), 341–356. <https://doi.org/10.1080/00220671.2013.823366>
- Dahl, C. J., Christine, D. W. M., & Davidson, R. J. (2020). The plasticity of well-being: A training-based framework for the cultivation of human flourishing. *Proceedings of the National Academy of Sciences of the United States of America*, 117(51), 32197–32206. <https://doi.org/10.1073/pnas.2014859117>
- Damon, W. (2008). *The path to purpose: Helping our children find their calling in life*. Free Press.
- de Jong, E. M., Ziegler, N., & Schippers, M. C. (2020). From shattered goals to meaning in life: Life crafting in times of the COVID-19 pandemic. *Frontiers in Psychology*, 11, 577708. <https://doi.org/10.3389/fpsyg.2020.577708>
- de Koning, B. B., Loyens, S. M. M., Rikers, R. M. J. P., Smeets, G., & van der Molen, H. T. (2014). Impact of binding study advice on study behavior and pre-university education qualification factors in a problem-based psychology bachelor program. *Studies in Higher Education*, 39(5), 835–847. <https://doi.org/10.1080/03075079.2012.754857>
- Dekker, I., Schippers, M. C. & Van Schooten, E. (2021). Reflective goal-setting improves academic performance in teacher and business education: A large-scale field experiment. *SSRN* [Preprint]. <https://doi.org/10.2139/ssrn.3778544>.
- European Commission (2015). ECTS User's Guide. Luxembourg: Publications Office of the European Union. <https://doi.org/10.2766/87192>.
- Federal Ministry of Education and Research. (2020). Education and Research in Figures 2020. Available at: <https://www.datenportal.bmbf.de/portal/en/B25.html>. Accessed 20 Aug 2021
- Forgeard, M. J. C., & Mecklenburg, A. C. (2013). The two dimensions of motivation and a reciprocal model of the creative process. *Review of General Psychology*, 17(3), 255–266. <https://doi.org/10.1037/a0032104>
- Gillet, N., Morin, A. J. S., & Reeve, J. (2017). Stability, change, and implications of students' motivation profiles: A latent transition analysis. *Contemporary Educational Psychology*, 51, 222–239. <https://doi.org/10.1016/j.cedpsych.2017.08.006>
- Grant, A. M. (2007). Relational job design and the motivation to make a prosocial difference. *Academy of Management Review*, 32(2), 393–417.
- Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, 54(1), 73–96. <https://doi.org/10.5465/AMJ.2011.59215085>
- Hair, J. F. J., Black, W. C., Barry, J. B., & Anderson, R. E. (2013). Multivariate data analysis: Pearson new international edition. Upper Saddle River: Pearson.
- Harackiewicz, J. M., & Priniski, S. J. (2018). Improving student outcomes in higher education: The science of targeted intervention. *Annual Review of Psychology*, 69, 409–435. <https://doi.org/10.1146/annurev-psych-122216-011725>
- Harrison, N. (2018). Using the Lens of 'possible selves' to explore access to higher education: A new conceptual model for practice, policy, and research. *Social Sciences*, 7(10), 209. <https://doi.org/10.3390/socsci7100209>
- Henderson-King, D., & Smith, M. N. (2006). Meanings of education for university students: Academic motivation and personal values as predictors. *Social Psychology of Education*, 9(2), 195–221. <https://doi.org/10.1007/s11218-006-0006-4>
- Hill, P. L., & Burrow, A. L. (2021). Why youth are more purposeful than we think. *Child Development Perspectives*. <https://doi.org/10.1111/CDEP.12432>
- Hill, P. L., Burrow, A. L., Brandenberger, J. W., Lapsley, D. K., & Collado Quaranto, J. (2010). Collegiate purpose orientations and well-being in early and middle adulthood. *Journal of Applied Developmental Psychology*, 31, 173–179. <https://doi.org/10.1016/j.appdev.2009.12.001>
- Hill, P. L., Burrow, A. L., & Bronk, K. C. (2016a). Persevering with positivity and purpose: An examination of purpose commitment and positive affect as predictors of grit. *Journal of Happiness Studies*, 17(1), 257–269. <https://doi.org/10.1007/s10902-014-9593-5>
- Hill, P. L., Burrow, A. L., & Sumner, R. (2013). Addressing important questions in the field of adolescent purpose. *Child Development Perspectives*, 7(4), 232–236. <https://doi.org/10.1111/cdep.12048>
- Hill, P. L., Edmonds, G. W., Peterson, M., Luyckx, K., & Andrews, J. A. (2016b). Purpose in life in emerging adulthood: Development and validation of a new brief measure. *Journal of Positive Psychology*, 11(3), 237–245. <https://doi.org/10.1080/17439760.2015.1048817>
- Hudig, J., Scheepers, A. W. A., Schippers, M., & Smeets, G. (2020). Motivational mindsets and reasons for studying: Development and validation of a classification tool. *Frontiers in Psychology*, 11, 535801. <https://doi.org/10.3389/fpsyg.2020.535801>
- Hudig, J., Scheepers, A. W. A., Schippers, M. C., & Smeets, G. (2021). Motives for studying and student wellbeing: Validation of the motivational mindset model. *Frontiers in Psychology*, 11, 753987. <https://doi.org/10.3389/fpsyg.2021.753987>
- Inspectie van het Onderwijs [Inspection of Education]. (2021). De staat van het onderwijs. Onderwijsverslag 2020/2021 [the current state of education. Educational report 2020/2021]. Utrecht, The Netherlands. Available at: <https://www.onderwijsinspectie.nl/>

- binaries/onderwijsinspectie/documenten/rapporten/2021/04/14/de-staat-van-het-onderwijs-2021/Staat-van-het-Onderwijs-2021.pdf. Accessed 2 July 2021
- Kaufman, J. C., Agars, M. D., & Lopez-Wagner, M. C. (2008). The role of personality and motivation in predicting early college academic success in non-traditional students at a Hispanic-serving institution. *Learning and Individual Differences, 18*, 492–496. <https://doi.org/10.1016/j.lindif.2007.11.004>
- Kember, D., Hong, C., & Ho, A. (2008). Characterizing the motivational orientation of students in higher education: A naturalistic study in three Hong Kong universities. *British Journal of Educational Psychology, 78*(2), 313–329. <https://doi.org/10.1348/00070907X220581>
- Ketonen, E. E., Malmberg, L.-E., Salmela-Aro, K., Muukkonen, H., Tuominen, H., & Lonka, K. (2019). The role of study engagement in university students' daily experiences: A multilevel test of moderation. *Learning and Individual Differences, 69*, 196–205. <https://doi.org/10.1016/j.lindif.2018.11.001>
- Kim, H.-Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. *Restorative Dentistry & Endodontics, 42*(2), 152. <https://doi.org/10.5395/rde.2017.42.2.152>
- Kraska-Miller, M. (2014). *Nonparametric statistics for behavioral and social sciences*. CRC Press.
- Lazowski, R. A., & Hulleman, C. S. (2016). Motivation interventions in education: A Meta-analytic review. *Review of Educational Research, 86*(2), 602–640. <https://doi.org/10.3102/0034654315617832>
- Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology, 47*(1), 233–247. <https://doi.org/10.1037/a0021307>
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist, 57*(9), 705–717. <https://doi.org/10.1037/0003-066X.57.9.705>
- Martínez, I. M., Youssef-Morgan, C. M., Chambel, M. J., & Marques-Pinto, A. (2019). Antecedents of academic performance of university students: Academic engagement and psychological capital resources. *Educational Psychology, 39*(8), 1047–1067. <https://doi.org/10.1080/01443410.2019.1623382>
- Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., Boelcke-Stennes, K., & Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology, 41*(5), 733–746. <https://doi.org/10.1037/0012-1649.41.5.733>
- McKnight, P. E., & Kashdan, T. B. (2009). Purpose in life as a system that creates and sustains health and well-being: An integrative, Testable Theory. *Review of General Psychology, 13*(3), 242–251. <https://doi.org/10.1037/a0017152>
- Milyavskaya, M., & Werner, K. M. (2018). Goal pursuit: Current state of affairs and directions for future research. *Canadian Psychology, 59*(2), 163–175. <https://doi.org/10.1037/cap0000147>
- Morisano, D., Hirsh, J. B., Peterson, J. B., Pihl, R. O., & Shore, B. M. (2010). Setting, elaborating, and reflecting on personal goals improves academic performance. *Journal of Applied Psychology, 95*(2), 255–264. <https://doi.org/10.1037/a0018478>
- Nadelson, L. S., Semmelroth, C., Martinez, G., Featherstone, M., Fuhrman, C. A., Sell, A., & Fuhrman, C. A. (2013). Why did they come Here?-the influences and expectations of first-year students' college experience. *Higher Education Studies, 3*(1). <https://doi.org/10.5539/hes.v3n1p50>
- National Center for Education Statistics. (2020). Table 326.30: Retention of First-Time Degree Seeking Undergraduates at Degree-Granting Postsecondary Institutions, by Attendance Status, Level and Control of Institution, and Percentage of Applications Accepted: Selected Years, 2006 to 2019. Available at: [https://nces.ed.gov/programs/digest/d20/tables/dt20\\_326.30.asp](https://nces.ed.gov/programs/digest/d20/tables/dt20_326.30.asp). Accessed 20 Aug 2021
- Nicholson, J. S., Deboeck, P. R., & Howard, W. (2017). Attrition in developmental psychology. *International Journal of Behavioral Development, 41*(1), 143–153. <https://doi.org/10.1177/0165025415618275>
- Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2011). Flourishing students: A longitudinal study on positive emotions, personal resources, and study engagement. *Journal of Positive Psychology, 6*(2), 142–153. <https://doi.org/10.1080/17439760.2011.558847>
- Oyserman, D., Bybee, D., Terry, K., & Hart-Johnson, T. (2004). Possible selves as roadmaps. *Journal of Research in Personality, 38*(2), 130–149. [https://doi.org/10.1016/S0092-6566\(03\)00057-6](https://doi.org/10.1016/S0092-6566(03)00057-6)
- Pizzolato, J. E., Brown, E. L., & Kanny, M. A. (2011). Purpose plus: Supporting youth purpose, control, and academic achievement. *New Directions for Youth Development, 32*, 75–84. <https://doi.org/10.1002/yd.429>
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin, 138*(2), 353–387. <https://doi.org/10.1037/a0026838>
- Robbins, S. B., Le, H., Davis, D., Lauver, K., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes?. A Meta-Analysis. *Psychological Bulletin, 130*(2), 261–288. <https://doi.org/10.1037/0033-2909.130.2.261>
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081.
- Salmela-Aro, K., Tang, X., Symonds, J., & Upadyaya, K. (2021). Student engagement in adolescence: A scoping review of longitudinal studies 2010–2020. *Journal of Research on Adolescence, 31*(2), 256–272. <https://doi.org/10.1111/jora.12619>
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. <https://doi.org/10.1177/0013164405282471>
- Schaufeli, W., & Bakker, A. (2003). UWES Utrecht work engagement scale preliminary manual. Occupational Health Psychology Unit, Utrecht University.
- Schaufeli, W., Martínez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students a cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464–481. <https://doi.org/10.1177/0022022102033005003>
- Schippers, M. C., Morisano, D., Locke, E. A., Scheepers, A. W. A., Latham, G. P., & de Jong, E. M. (2020). Writing about personal goals and plans regardless of goal type boosts academic performance. *Contemporary Educational Psychology, 60*, 101823. <https://doi.org/10.1016/J.CEDPSYCH.2019.101823>
- Schippers, M. C., Scheepers, A. W. A., & Peterson, J. B. (2015). A scalable goal-setting intervention closes both the gender and ethnic minority achievement gap. *Palgrave Communications, 1*(1), 15014. <https://doi.org/10.1057/palcomms.2015.14>
- Schippers, M. C., & Ziegler, N. (2019). Life crafting as a way to find purpose and meaning in life. *Frontiers in Psychology, 10*. <https://doi.org/10.3389/fpsyg.2019.02778>
- Schmidt, H. G., Baars, G. J. A., Hermus, P., van der Molen, H. T., Arnold, I. J. M., & Smeets, G. (2021). Changes in examination practices reduce procrastination in university students. *European Journal of Higher Education, 2021*. <https://doi.org/10.1080/21568235.2021.1875857>
- Tabachnick, B. G., & Fidell, L. S. (2012). *Using multivariate statistics* (6th ed.). Harper and Row.
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in*

- Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tinto, V. (2012). *Completing college: Rethinking institutional action*. University of Chicago Press.
- Trautwein, C., & Stolz, K. (2015). “Press on regardless!” – The role of volitional control in the first year of higher education. *Zeitschrift Für Hochschulentwicklung*, 10(4), 123–143.
- Tuominen-Soini, H., Salmela-Aro, K., & Niemivirta, M. (2011). Stability and change in achievement goal orientations: A person-centered approach. *Contemporary Educational Psychology*, 36(2), 82–100. <https://doi.org/10.1016/j.cedpsych.2010.08.002>
- Tuominen, H., Niemivirta, M., Lonka, K., & Salmela-Aro, K. (2020). Motivation across a transition: Changes in achievement goal orientations and academic well-being from elementary to secondary school. *Learning and Individual Differences*, 79, 101854. <https://doi.org/10.1016/j.lindif.2020.101854>
- Upadaya, K., & Salmela-Aro, K. (2013). Development of school engagement in association with academic success and well-being in varying social contexts: A review of empirical research. *European Psychologist*, 18(2), 136–147. <https://doi.org/10.1027/1016-9040/a000143>
- Upadaya, K., & Salmela-Aro, K. (2015). Cross-lagged associations between study and work engagement dimensions during young adulthood. *Journal of Positive Psychology*, 10(4), 346–358. <https://doi.org/10.1080/17439760.2014.983958>
- Van den Broek, A., Warps, J., de Korte, K., Cuppen, J., Termorshuizen, T., & Lodewick, J. (2019). *Monitor Beleidsmaatregelen 2019-2020: Studiekeuze, studiegedrag & leengedrag in relatie tot beleidsmaatregelen in het hoger onderwijs*. ResearchNed.
- Van Rooij, E., Brouwer, J., Fokkens-Bruinsma, M., Jansen, E., Donche, V., & Noyens, D. (2017). A systematic review of factors related to first-year students’ success in Dutch and Flemish higher education. *Pedagogische Studien*, 94(5), 360–405.
- Vansteenkiste, M., Aelterman, N., De Mynck, G. J., Haerens, L., Patall, E., & Reeve, J. (2018). Fostering personal meaning and self-relevance: A self-determination theory perspective on internalization. *Journal of Experimental Education*, 86(1), 30–49. <https://doi.org/10.1080/00220973.2017.1381067>
- Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist*, 41(1), 19–31. [https://doi.org/10.1207/s15326985sep4101\\_4](https://doi.org/10.1207/s15326985sep4101_4)
- Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., Matos, L., & Lacante, M. (2004). Less is sometimes more: Goal content matters. *Journal of Educational Psychology*, 96(4), 755–764. <https://doi.org/10.1037/0022-0663.96.4.755>
- Widlund, A., Tuominen, H., & Korhonen, J. (2018). Academic well-being, mathematics performance, and educational aspirations in lower secondary education: Changes within a school year. *Frontiers in Psychology*, 9, 1–20. <https://doi.org/10.3389/fpsyg.2018.00297>
- Willcoxson, L., Cotter, J., & Joy, S. (2011). Beyond the first-year experience: The impact on attrition of student experiences throughout undergraduate degree studies in six diverse universities. *Studies in Higher Education*, 36(3), 331–352. <https://doi.org/10.1080/03075070903581533>
- Yeager, D. S., & Bundick, M. (2009). The role of purposeful work goals in promoting meaning in life and in schoolwork during adolescence. *Journal of Adolescent Research*, 24, 423–452. <https://doi.org/10.1177/0743558409336749>
- Yeager, D. S., Bundick, M. J., & Johnson, R. (2012). The role of future work goal motives in adolescent identity development: A longitudinal mixed-methods investigation. *Contemporary Educational Psychology*, 37, 206–217. <https://doi.org/10.1016/j.cedpsych.2012.01.004>
- Yeager, D. S., Henderson, M. D., Mello, S. D., Paunesku, D., Walton, G. M., Spitzer, B. J., & Duckworth, A. L. (2014). Boring but important: A self-transcendent purpose for learning fosters academic self-regulation. *Journal of Personality and Social Psychology*, 107(4), 559–580. <https://doi.org/10.1037/a0037637>
- Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education. *Review of Educational Research*, 81(2), 267–301. <https://doi.org/10.3102/0034654311405999>
- Zhoc, K. C. H., King, R. B., Law, W., & McInerney, D. M. (2019). Intrinsic and extrinsic future goals: Their differential effects on students’ self-control and distal learning outcomes. *Psychology in the Schools*, 56(10), 1596–1613. <https://doi.org/10.1002/PITS.22287>

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