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Why do students leave? Student-related factors and attrition intentions

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List of terms and abbreviations

MAP	The Mindset Theory of Action Phases
TPB	The Theory of Planned Behavior
TRA	The Theory of Reasoned Action
SR	Self-regulation
SRL	Self-regulated learning
OECD	The Organization for Economic Co-operation and Development
EU	The European Union
GPA	Grade Point Average
SEM	Structural Equation Model

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Contribution and list of papers

Efim Nemtcan is the primary author of this PhD Dissertation. In collaboration with Professor Frode Svartdal, associate professor Rannveig Grøm Sæle, and postdoctoral fellow Thor Gamst-Klaussen, Efim Nemtcan identified the research question and designed the studies presented in Papers 1 and 2. Efim Nemtcan coordinated the data collection and performed data analyses under the supervision of Thor Gamst-Klaussen. All the authors substantially contributed to the planning, drafting, revising, and approval of Papers 1 and 2. Professor Frode Svartdal identified the research question presented in Paper 3. Efim Nemtcan substantially contributed during all stages of the work, including data collection.

Paper 1. Nemtcan, E., Sæle, R. G., Gamst-Klaussen, T. & Svartdal, F. (2020). Drop-out and transfer-out intentions: The role of socio-cognitive factors. *Frontiers in Education*, 5, 273. https://www.frontiersin.org/articles/10.3389/feduc.2020.606291/full

Paper 2. Nemtcan, E., Sæle, R. G., Gamst-Klaussen, T., and Svartdal, F. (2022). Academic self-efficacy, procrastination, and attrition intentions. *Frontiers in Education* 7. https://www.frontiersin.org/articles/10.3389/feduc.2022.768959/full

Paper 3. Svartdal, F., Grøm-Sæle, R., Dahl, T. I., Nemtcan, E. & Gamst-Klaussen, T. (2021). Study habits and procrastination: The role of academic self-efficacy. *Scandinavian Journal of Educational Research*, 1–20. https://doi.org/10.1080/00313831.2021.1959393

Abstract

Established as a collection of scholars protecting their shared interests, higher education has become a driving force of economic development accountable to the government and society. However, changes in higher education have been accompanied by multiple challenges, including funding and quality assessment. This dissertation addresses one of these challenges facing academic institutions, *academic attrition*. Although much research has been conducted on the issue of why students leave education, we don't yet know enough about how students' beliefs and perceptions, study behaviors, and difficulties are related to their decisions to leave. The present dissertation aims to facilitate the current research by investigating student-related factors and mechanisms involved in academic attrition.

An important issue in research on academic attrition is the variability of the phenomenon and the difficulty in putting available research into practice. The first two papers addressed the relevance of the distinction between different types of attrition intentions and involved self-regulated learning mechanisms. In the first paper, three categories of attrition intentions were investigated: leaving permanently, changing university, and changing study field. A particular focus has been placed on time management skills, self-efficacy, and student integration in explaining students' attrition intentions. The results showed that academic self-efficacy (i.e., student-related factor) was stronger related to attrition intentions than traditionally considered aspects of students' integration. The second paper addressed a similar question. However, compared to the first paper, the focus was directed toward the role of academic procrastination in explaining attrition intentions. Results showed a significant relationship between procrastination and all three categories of students' intentions. In sum, both papers support the importance of the distinction between different categories of attrition intentions and the relevance of looking at attrition from a student perspective. Finally, in the third paper, we investigated mechanisms that may be important in explaining and reducing procrastination. The results of the study showed that academic self-efficacy was an important mediator of the study skills-procrastination relationship. Taken together, the present results might have implications for future research developing assistance programs and universities aiming to reduce academic attrition.

1 Introduction

Few problems in higher education have received as much attention as students' departure. The issue has been well-known in higher education since the establishment of the formal education system. Still, the problem has received increased attention from researchers and higher education stakeholders only in the past century due to deep and dramatic changes in the system of higher education (Aljohani, 2016).

The 20th century was characterized by a dramatic increase in higher education enrollment rates and can be pointed out as one of the most complex and extensive changes that have happened in the past century (Tight, 2019). Indeed, while in 1900 there were approximately 500 000 people enrolled in higher education worldwide, this figure increased to 100 million people by 2000 (Schofer & Meyer, 2005). This represents a change from 1% to 20% of college-age people taking higher education, and this waxing trend continues (UNESCO, 2021). The upward leap in enrollment rates has become a worldwide process. The number of countries with higher education enrollment equal to 50% has increased from 5 to 54 during the 1992 – 2012 period (Marginson, 2016). The driving force behind this process was the idea that higher education could improve economic growth and development, and ensure greater social equality or mobility (Altbach et al., 2010).

Increased enrollment was inevitably associated with various challenges, including funding. In the context of increased enrollment, it became evident that governmental or public funding would be unable to keep up with the drastically increased demand for higher education (Altbach et al., 2010; Marginson, 2016). As a result, the question of whether the resources devoted to higher education yield adequate returns and shift towards education quality assessment have become prominent in political discourse and practice (European Commission, 2019; Vossensteyn et al., 2015). Despite its questionability, students' retention or attrition was included in the consideration during quality assessments in many countries across the European Higher Education Area (Aamodt & Hovdhaugen, 2011; European Commission, 2019; Zepke & Leach, 2007). Several European countries have taken on completion and attrition rates as a premise for funding allocation. For example, the rates of (non)graduated students are directly or indirectly related to funding in the UK, Norway,

Iceland, and Estonia, while in Hungary number of enrolled students is used as a funding indicator (European Commission/Eurydice, 2011).

The initially proposed explanation argued that students' attrition is the question of student-university interaction. Although there is an extensive research base on this perspective, there remains a substantial gap in knowledge on the involved student-related and time-varying factors (Bean & Eaton, 2000; Tinto, 2017b). The overarching goal of this dissertation is to explore the student-related factors and mechanisms important for academic attrition intentions. This dissertation contains three papers aimed at achieving this goal.

Given that definitions of academic attrition can drastically vary, the present thesis begins with an overview of what is exactly meant by academic attrition. Further, we will look at why academic attrition has become so prominent in the political discourse and why educational stakeholders aim to reduce it. After that, the available research evidence is presented to pinpoint the gaps in the research literature and assert the importance of the dissertation.

1.1 What is academic attrition?

The definitions used to describe students leaving before obtaining formal degree qualifications have varied over the years: attrition, wastage, withdrawal, failure, non-completion (Haydarov et al., 2013; Urwin et al., 2010). All these definitions share one common characteristic; they bear a pejorative connotation. *Academic attrition* is commonly used to describe situations when students leave their academic institution (e.g., school, university) before they obtain a formal degree or qualification. Almost all research until the 1990s has treated students who leave education as a single population (Hoyt & Winn, 2004). However, growing evidence indicates that such an approach may be flawed.

The academic attrition variability notion can be traced back to Spady (1970) who elaborated on and distinguished two definitions of student attrition. *Definition 1* is similar to the one provided above and describes attrition as a situation when students leave a college. In contrast, *Definition 2* describes attrition as leaving a college and never receiving a degree from any college. According to Spady (1970), the main difference between the two definitions lies in that the first one is easier to operationalize methodologically and defines the problem from a broader perspective. In turn, the second definition is more difficult to measure, but it

accounts for the possibility that students can switch academic institutions. The idea was further developed by Tinto (1993), who distinguished between two categories of student departure, *institutional* and *system* attrition. The former is characterized by students still remaining in the educational system via switching or transferring to another university. In contrast, the latter involves leaving the system of higher education altogether (i.e., Definition 2; Spady, 1970). Further, Tinto (1993) notes that departure can have non-permanent nature or that some students tend to return to their studies after taking a break (i.e., *stop-out* students). A summary of the definitions is provided in Table 1.1.

Table 1

Summary of definitions commonly used in research to describe academic attrition

Construct	Definition
Attrition	Leaving an academic institution (e.g., school, university) before obtaining a formal degree or qualification.
Drop out / System departure	Leaving an education system altogether before degree completion.
Transfer out / Institutional departure	Leaving an academic institution before degree completion to study at another institution.
Stop out	Leaving an academic institution for a period of time with subsequent re-enrollment.

Note: see Herzog (2005); Hovdhaugen (2009); Hoyt and Winn (2004); Jones-White et al. (2010); Kehm et al. (2019).

The institutional-system distinction has subsequently received increased attention within the scientific field (Herzog, 2005; Hovdhaugen, 2009; Hoyt & Winn, 2004; Jones-White et al., 2010; Kehm et al., 2019). Researchers commonly agree on the importance of distinction due to variability in factors related to different types of attrition. For example, previous and current academic performance or "problems related to meeting academic standards" are reported more frequently as reasons for leaving by drop-out (i.e., system

departure) than by transfer-out (i.e., institutional departure) students (Hovdhaugen, 2009, 2011; Hovdhaugen & Aamodt, 2009; Hoyt & Winn, 2004). Indeed, transfer-out students have comparable performance with direct-entry students (Aulck & West, 2017; Quinn-Nilas et al., 2019). Also, Hovdhaugen (2009) found that age, gender, and school grades are significantly related to dropping out, but not so for transfer-out behaviors. Transfer-out was more strongly related to students' motivation, educational goals, and field of study.

In contrast, as seen in Table 1.2, the distinction between the described categories of attrition is less prominent at the level of national steering and policymaking in Europe (Thomas, 2019; Vossensteyn et al., 2015). The most common definition and the primary political focus is the *completion* or the proportion of students who have completed a study program to the number of students who started a study program. *Time-to-degree* (i.e., number of years taken to complete a study program) and *retention/drop-out* (i.e., number of students who continue on the same study program/leave the study program or higher education system) are also used but less frequently (Vossensteyn et al., 2015).

Table 2

Summary of definitions commonly used in policy to describe academic attrition

Construct	Definition
Time-to-degree	The number of years taken to complete a study program.
Dropout	The number of students who leave the study program or higher education system.
Retention	The number of students who re-enroll in subsequent years to the same study program.
Completion	The number of students who have successfully completed a study program.

Note: see Vossensteyn et al. (2015).

Further, there remains little agreement on the meaning of these terms across countries. For example, the core characteristics of drop-out students in Spain, Italy, Norway, Finland, Portugal, and the UK is that a student is not enrolled in a study program one year later or is not registered at the beginning of the following academic year. However, in the UK, the drop-out definition accounts for part-time students, and they are defined as dropouts only after two years of not being enrolled (European Commission/EACEA/Eurydice, 2014). In Belgium, students who change study programs are considered dropouts. Still, the same students are not considered dropouts if they are enrolled in another study program when they leave. In Denmark, when students transfer to another program, the relationship between two programs and the time between leaving and enrollment in a new program is considered when defining drop-out students (European Commission/EACEA/Eurydice, 2014).

In sum, the issue of students' attrition is prominent on the agenda of European policymakers. Also, the European Union has set a target that the share of residents aged 30-34 with higher education attainment should be at least 40 % by 2020 (European Commission/EACEA/Eurydice, 2014). Nevertheless, there is seemingly little agreement between European countries on who can be defined as a drop-out student. This disagreement not only complicates cross-country comparisons of different approaches aimed at reducing student attrition but also makes it necessary to conduct research on a national basis. Further, there are several differences in the operationalization of academic attrition between scientific and political perspectives (e.g., merging dropout and transfer). For example, *time-to-degree* encompasses both transfer-out and stop-out behaviors. Hence, the direct application of the available research evidence in the development of national approaches might be problematic. Also, as discussed, different factors are important in explaining drop-out and transfer-out behaviors. Thus, addressing academic attrition and not considering the variability of students' behaviors might hamper the achievement of the expected outcomes. For example, the Norwegian Quality Reform in the early 2000s had the ambition to increase rates of degree completion and reduce students' attrition. However, back then, the variability of attrition was neither addressed nor considered when planning the reform. Thus, the results were different from what was expected. The implemented changes had an effect on students' rates of switching institutions (i.e., transfer) while drop-out rates remained constant (Aamodt & Hovdhaugen, 2011; Hovdhaugen, 2011).

1.2 Why does attrition matter?

Increasingly, students' completion or attrition has become a prominent discussion point in politics and is used as an indicator of the quality of higher education in many European countries. Still, the importance of students' attrition is broader than a simple assessment of whether universities fulfill their obligations. The present section provides an overview of the evidence indicative of the consequences of academic attrition and the outcomes of (not) obtaining a higher education degree. In general, sub-optimal outcomes of academic attrition are discussed at three levels: social or governmental, institutional, and individual. However, it is worth mentioning that despite the seemingly exclusively negative consequences of attrition presented below, it might not always be the case. For example, in a recent report by Statistics Norway, Andresen and Lervåg (2022) followed a student cohort from 2012 and found that 29 – 49% of dropout students were employed by the end of next year. Still, the findings are specific to the Norwegian context, and I do not aim to generalize their implicability and importance to other countries.

1.2.1 Governmental or social perspective

As outlined, drastically increased enrollment rates indicated the unsustainability of the model when higher education institutions are financed by the government only. Thus, some countries turned to cost-sharing models meaning increased costs in the form of tuition fees for students and their families (e.g., UK, US, Belgium, Italy, Spain, and New Zeeland). Still, many members of the Organization for Economic Co-operation and Development (OECD) retained the traditional public funding systems where most of the costs are covered by the government (European Commission/Eurydice, 2011; OECD, 2021a). According to OECD (2021b,c), the average government expenditure per student in 2018 across OECD member states was $12 000 and ranged from $2 000 to over $27 000. Consequently, considering that 19 – 40% of students drop out of higher education, academic attrition represents a significant economic loss for the government and society (Vossensteyn et al., 2015).

Further, the level of education is related to increased civic engagement. Civic engagement can be generally described as individual and collective engagement in activities (e.g., voting, volunteering, activism) addressing issues of public concern. In turn, civic

engagement is commonly seen as a necessary condition for democracy, meaning that academic attrition might have broader social implications beyond the economic loss (Glaeser et al., 2007; Putnam, 1995, 2015). According to OECD's (2020) estimations, 84% of people with finished tertiary education report that they have voted, compared to 78% of those with finished secondary education. Importantly, the length of education has been found to increase the size of the relationship (Huang et al., 2009). However, it is worth mentioning that the causal relationship between educational level and civic engagement can be questioned (Egerton, 2002; Horowitz, 2015; Kam & Palmer, 2008; Persson, 2011; Putnam, 1995).

In addition, researchers commonly agree that an increase in educational attainment is associated with a decrease in overall crime rates, except white-collar and organized crime (Campaniello et al., 2016; Groot & van den Brink, 2010). For example, Groot and van den Brink (2010) indicated that higher levels of education are associated with a lower probability of committing crimes like shoplifting, vandalism or threat, and assault or injury. Although higher education was related to a higher probability of committing tax fraud (i.e., white-collar crime), the overall net savings of an increase in the average level of education by one year were estimated to amount to $669 million. A similar conclusion was reached by Dennison (2019) on the relationship between educational level and crime among a representative US sample. Importantly, the relationship remained significant even after accounting for a range of background factors (e.g., socioeconomic status, previous crime history) that are known to show robust associations with educational attainment and crime.

1.2.2 Institutional perspective

As discussed in the previous sections, students' retention or graduation is linked to university funding arrangements and quality assessment systems in a range of OECD countries (European Commission/Eurydice, 2011; Vossensteyn et al., 2015). Thus, students' attrition may directly impact the amount of state funding received by universities. Further, the increased enrollment in higher education and the funding burden related to this trend led to reevaluating how university costs are spread among individual citizens, academic institutions, and the government. The introduction of tuition fees or increasing the proportion of private funding has been introduced in several OECD countries (Altbach et al., 2010). Even though universities are mainly governmentally funded in many OECD countries, cross-country

variability is present. For example, less than 10% of university expenditures in Norway, Iceland, and Finland were covered by private sources in 2018 (OECD, 2021c). In contrast, private funding covered around 60% of institutional costs in the UK and the US. Hence, depending on the organization of higher education and the funding system, students' attrition may directly impact the economic well-being of academic institutions.

1.2.3 Individual perspective

Not least important are individual consequences of higher education (non) attainment considering students' amount of time, effort, and resources invested into higher education. First, obtaining a higher education degree is important for labor market outcomes. Based on OECD (2018) estimates, the average employment among 25 – 64 years-old citizens with higher education degrees across OECD countries in 2020 was 85% which is 10% higher than employment among citizens having upper-secondary education. Also, on average, the years that people have spent in higher education and degree attainment positively affect future earnings (Mayhew et al., 2016; OECD, 2021d). In addition, considering recent trends in the world's economy, such as globalization, digitalization, and automation, the importance of skills obtained via higher education for employment will increase (OECD, 2017). Besides field-specific or hard skills such as programming in R, higher education may facilitate the acquisition of transversal skills applicable across different life domains (e.g., critical thinking; Huber & Kuncel, 2016). One of the domains where transversal skills are commonly in demand is work, and thus, appear on the agenda of the EU (Looney & Santibañez, 2021).

Second, although tuition fees in many OECD countries are relatively low (European Commission/Eurydice, 2011; OECD, 2021a), full-time students have to cover their daily expenses while studying (e.g., rent, food). Thus, many countries (both with free and non-free education) have established different loan systems to enable students to cover these expenses and tuition fees costs (del Rey & Schiopu, 2015). However, student loan debt may have several detrimental life outcomes. According to de Gayardon et al. (2018), loan debt is related to choosing lower-paid jobs, lower rates of later homeownership, later family formation and smaller families, worse health, lower wealth, and fewer savings. Still, the evidence base is not sufficient to draw any causal conclusion due to its correlational nature.

Third, people with higher levels of education typically live longer and healthier lives (Muennig, 2008; Steingrímsdóttir et al., 2012; Zajacova & Lawrence, 2018). For example, better-educated people are less likely to smoke and have a higher probability of quitting, be obese or heavy drinkers, and tend to exercise more (Cutler & Lleras-Muney, 2010; de Walque, 2010; Devaux et al., 2011; Kuntsche et al., 2004). The influence of educational attainment on health is usually explained by cognitive and occupational/economic mechanisms (Muennig, 2008; Zajacova & Lawrence, 2018). As discussed, higher levels of education are related to better job prospects and higher income. In turn, better-paid and higher-quality jobs are related to less stress which causes negative health-related outcomes. Further, high income improves living conditions (e.g., safe neighborhood) and provides access to better health care services. In addition, education may improve cognitive ability, making engagement in healthy behaviors (e.g., physical activity) and abstaining from unhealthy ones (e.g., smoking) more likely. Importantly, it was found that dropping out of higher education does not contribute to the positive health outcomes above obtaining a high school education (Zajacova & Johnson-Lawrence, 2016).

Finally, leaving university might also affect students' mental health. However, the evidence on drop-out consequences for students' mental health is scarce. Faas et al. (2018) provided some evidence and defined mental health as a factor comprised of mastery, happiness, depression, and stress. In general, among a representative sample of US adolescents, those who left college scored significantly lower on mastery and happiness and higher on depression and stress. Also, some indirect evidence comes from the research on socioeconomic status, where education is usually considered one of the socioeconomic status indicators. In particular, low socioeconomic status was found to be related to mental disorders such as psychotic and mood disorders, obesity, and substance abuse (Kivimäki et al., 2020).

1.3 Theoretical and empirical background

Despite the fact that student attrition is not a new phenomenon, increased attention and systematic investigation have only become prominent during the second half of the 20th century (Aljohani, 2016; Yorke & Longden, 2004). The sociological research tradition has largely influenced theoretical frameworks for explaining and predicting student attrition or retention (e.g., Tinto, 1975). As it will become evident from the discussion below, the sociological perspective provides a general explanation of the academic attrition process. Although it has contributed to our understanding of students' attrition and raised the question of the university's responsibility, it lacks specificity, which precludes the development and implementation of concrete solutions. The present dissertation addresses the problem of academic attrition from the perspective of self-regulation or self-regulated learning (Inzlicht et al., 2021; Panadero, 2017). In particular, we focus on students' academic self-efficacy beliefs, study skills, and procrastination, which will be discussed in the following sections. First, I will present traditional theories or models used to explain academic attrition and persistence, e.g., the Undergraduate Dropout Process Model (Spady, 1970, 1971), the Institutional Departure Model (Tinto, 1997, 1993), and the Psychological Model of Student Retention (Bean & Eaton, 2000). Afterward, I will present the self-regulation and self-regulated learning theory and discuss its relevance for investigating students' attrition (Inzlicht et al., 2021; Panadero, 2017).

1.3.1 Academic attrition from a sociological perspective

Many researchers consider the Undergraduate Dropout Process Model by Spady (1970, 1971) as the first systematic theoretical model of students' attrition. The proposed model applies an interactionalist perspective meaning that attrition results from the interaction of an individual student with an academic environment. During this interaction, students' characteristics and attributes (e.g., interests, attitudes, skills) shaped by their family backgrounds and school experiences are exposed to influences, expectations, and demands of the university (e.g., courses, faculty members, peers). Spady (1970) assumed that the academic environment consists of academic and social systems. Students' integration into the academic system is conveyed by their level of performance (i.e., GPA) and intellectual development (e.g., critical thinking). In turn, social integration is conveyed by normative

congruence (i.e., compatibility of students' attitudes and interests with those of the academic environment) and friendship support (i.e., close relationships with peers). In turn, these factors influence academic attrition via their influence on students' satisfaction and institutional commitment.

Spady's (1970, 1971) theoretical model was subsequently extended and revised by Tinto (1975, 1993). Both models share many aspects, including student-university interaction. Still, in contrast to Spady's theoretical model, Tinto (1975) explicitly emphasized the process of interaction. In particular, it is assumed that students' background factors (e.g., previous school experiences, abilities) influence their initial goal (i.e., college graduation) and institutional (i.e., graduation from a given college) commitments. These initial commitments are subsequently modified in interaction with the university's academic and social systems leading to academic and social integration. Based on interaction with the academic environment and integration, students reevaluate their initial commitments, leading to retention or attrition. In the final revision of the theory, Tinto (1993) added connections with the external community (e.g., family, work) and intentions. Tinto argued that intentions are important for students' integration and the final decision to leave or persist. In particular, he noted that students might come to university without clear intentions of completing a degree, with intentions to transfer to another university, or intentions to increase qualifications. Further, these intentions are assumed to change as the result of interaction with an academic environment (Tinto, 1993). Importantly, this model acknowledged that different groups of attrition students (i.e., drop-out and transfer-out students) leave for different reasons, and thus, retention policies should be group-specific.

1.3.2 Academic and social integration

The main assumption of the Institutional Departure Model by Tinto (1975, 1993) is student-university interaction. This interaction is assumed to lead to either integration or misintegration into the university's social and academic systems. *Academic integration* is primarily determined by students' academic performance and level of intellectual development, while *social integration* is a function of the extent and quality of interactions with faculty and other students. According to Tinto (1975, p. 96), "given individual characteristics, prior experiences and commitments, … it is the individual's integration into

the academic and social systems of the college that most directly relates to his continuance in that college".

However, the original theory was developed for traditional residential students, i.e., students residing in on-campus housing during the academic year (Tinto, 1982). Subsequent research showed that academic and social integration are not equally important for commuter students (i.e., students who live off-campus and travel to a study place). In particular, social integration was found to be less important for commuter students' attrition (for an overview, see Davidson & Wilson, 2013). In addition, Bean and Metzner (1985) proposed a distinction between traditional and nontraditional students. The authors argued that social and academic integration should be unequally important for the attrition of nontraditional students. The assumption was subsequently validated by the findings showing that social integration was unrelated to nontraditional students' attrition, while academic integration was (Metzner & Bean, 1987). Since all Norwegian students are commuter students and many can be defined as nontraditional (e.g., older than 24 years; Hauschildt et al., 2021), the importance of academic and social integration might be questioned in the Norwegian context. According to Tinto himself (1982), classical theoretical models (e.g., Tinto, 1975) might also be less suitable for explaining transfer-out behaviors. Further, academic and social integration constructs are too broad and abstract, leading to measurement variability across studies and difficulty in making easily applicable practical conclusions (Davidson & Wilson, 2013; Tinto, 2006). For example, informal interaction with faculty was initially defined as an aspect of students' social integration (Tinto, 1975; Pascarella & Terenzini, 1980). However, it was subsequently redefined as an aspect of academic integration based on the stronger correlation with academic integration (Tinto, 1993). Moreover, some studies even found that in contrast to theoretical assumptions, social integration is negatively related to students' persistence (Pascarella et al., 1983).

1.3.3 Academic attrition from a psychological perspective

Although other disciplines have contributed to the explanation of academic attrition, the sociological perspective has dominated the research field. A psychological perspective on the issue has been undervalued. As Tinto argues: "such models (i.e., psychological) invariably see student departure as reflecting some shortcoming and/or weakness in the individual"

(Tinto, 1993, p. 85). Tinto criticized the psychological perspective for focusing on personality characteristics in explaining academic attrition. In particular, he argued that such focus is problematic from the practical perspective since universities cannot only select students who are most likely to persist. Theoretically, the psychological perspective could not explain why some personality characteristics describe differences between stayers and leavers in some situations but not in others.

This view has persisted within the research field for several decades. Still, Bean and Eaton (2000) introduced the Psychological Model of Student Retention to improve Tinto's (1975, 1993) model. Bean and Eaton (2000) argued that the Institutional Departure Model does not explain the mechanisms through which students become academically and socially integrated. The model is based on four psychological theories deemed useful for research on student attrition: attitude-behavior, coping behavior, self-efficacy, and attribution theories.

Similar to Tinto's (1975, 1993) model, student-university interaction is an important part of the attrition-retention process. The model proposed that three additional student-related factors are important in the interaction with the academic environment: self-efficacy, coping process (approach/avoidance), and attribution (locus of control). First, it is assumed that students' interaction with the academic environment leads to stress which can be ameliorated by approach or avoidance coping. Choice of *coping* strategy is crucial for subsequent integration into the academic and social spheres of the university. For example, approach behaviors or proactive coping practices used in response to a stressor (e.g., asking questions in class) should lead to successful integration. In contrast, avoidance behaviors or passive coping strategies (e.g., avoiding studying) should lead to the opposite result (Bean & Eaton, 2000). Second, *locus of control* or perceptions of causality is assumed to influence academic and social integration. In particular, *internal* locus of control (i.e., outcome is the result of one's behaviors) should promote students' integration. In contrast, *external* locus of control (i.e., outcomes are the result of external forces outside personal control) should reduce students' level of integration. Finally, high *self-efficacy* (i.e., perception of one's ability to achieve the desired outcome) is assumed to increase academic and social integration by influencing students' effort and persistence. The described factors are based on students' past experiences, but they are assumed to change due to interaction with a university and students' re-assessment. In sum, the main assumption of Bean and Eaton's (2000) model and

psychological perspective, in general, is that departure is the reflection of an individual's response to the academic environment.

1.3.4 The research gap and focus of the present dissertation

As discussed, the Institutional Departure Model by Tinto (1975, 1993) has dominated the research field on academic attrition. One of the goals for introducing the model was to raise awareness about universities' responsibility and ability to reduce academic attrition and facilitate academic success through adjustments at the institutional level. Although it is reasonable that institutional adjustments are required, the traditional models of academic attrition are not particularly clear about how they should be implemented. Tinto (2006) himself notes that universities have experienced difficulties transforming theoretical assumptions into actionable plans. In particular, this limitation of the traditional sociological explanation of academic attrition was the reason Bean and Eaton (2000) proposed their Psychological Model of Student Retention. Although I described only two traditional models of academic attrition, many of the considerations raised in the present dissertation could be applied to many other models available in the literature.

Further, besides the predominance of the sociological perspective in questions related to academic attrition, most research has been conducted in the US (Hovdhaugen & Aamodt, 2013). In turn, the research evidence on academic attrition within the Norwegian context is relatively scarce. Hence, the applicability of the theoretical assumptions to Norwegian universities may be questioned. Finally, as discussed, academic attrition is variable, and students can either drop out or transfer. The focus on the distinction between different types of attrition has been scarce in the research literature, political documents, and plans until recently. Still, the distinction may be particularly important in Norway, where transferring is integral to the higher education system's open and flexible character. Considering these limitations of the previous research, addressing students' attrition from a different perspective seems reasonable. In particular, I argue that self-regulation or self-regulated learning is a prospective alternative, the relevance of which will be discussed in the next section.

1.3.5 Self-regulation and self-regulated learning

In his most recent elaboration on academic attrition, Tinto (2017b) argues that addressing the role of students' motivation in academic attrition is a prospective approach. Although the article's aim was not to create a new explanatory model or theoretical framework, it lacks a description of mechanisms or working processes similar to the original models, which is crucial for practitioners (Bean & Eaton, 2000). In this regard, self-regulation and self-regulated learning perspective provide useful insights. Self-regulation (SR) can be defined as the dynamic and cyclical process of determining the desired end state (i.e., goal) and taking action to move toward it while monitoring progress along the way (Inzlicht et al., 2021). Self-regulated learning (SRL) is similar to SR and is used in facilitating and explaining the learning process. Although SR and SRL models differ in constructs and processes, they converge on the distinction of three phases of goal pursuit or learning: planning or forethought, monitoring or performance, and evaluation or self-reflection (for an overview, see Panadero, 2017). During the *forethought* phase, students evaluate the task at hand, set goals, and plan how to reach them. Also, during this phase, motivational beliefs (e.g., self-efficacy) energize the learning process and influence the activation of learning strategies. During the *performance* phase, students execute the task while monitoring their progress and using self-control strategies to maintain cognitive engagement and motivation. Finally, during the *self-reflection* phase, students evaluate how they did during the performance phase and whether the results of their learning or performance are in line with the goal set during the forethought phase.

The evidence shows that SRL is important for students' performance (Duckworth et al., 2019; Rischardson et al., 2012). In turn, as discussed, traditional perspectives on academic attrition argue that performance as an indicator of academic integration is crucial for students' subsequent commitment and attrition (e.g., Tinto, 1993; Bean & Eaton, 2000). Further, the results of Galla et al.'s (2019) study show that SR is important for students' timely graduation, which indirectly supports the relevance of SRL for academic integration. Also, the study by Galla and Duckworth (2015) indicates that self-control, an important SR and SRL component, is related to students' persistence. In addition, in a meta-analysis of factors related to college outcomes, academic-related skills, including time management (i.e., an aspect of SRL), were among the factors showing the strongest relationships with students' retention

(Robbins et al., 2004). Importantly, evidence on the malleability of SRL is available (e.g., Jansen et al., 2019), and some scarce evidence indicates the potential utility of SRL intervention for reducing attrition (i.e., Bail et al., 2008). For example, Bail et al. (2008) found that participating in an SRL course significantly improved students' graduation rates.

Hence, the applicability of the SR or SRL perspectives to investigating academic attrition seems plausible. The present dissertation focuses on academic skills, self-efficacy, and procrastination. Students who self-regulate their learning or apply self-regulation strategies (e.g., manage their study time) are more likely to succeed in academic tasks. Successful performance of an academic task and reflection on a study process should facilitate student beliefs in their academic abilities (i.e., self-efficacy). Students' self-efficacy beliefs or motivation, in general, is a crucial component of SRL, according to the theoretical models by Pintrich (2000) and Zimmerman (2002), which should facilitate students' self-regulation and use of self-regulation strategies during the next learning cycle. Accordingly, self-efficacy beliefs should facilitate students' use of study skills and time management as a self-regulation component (Panadero, 2017; Trentepohl et al., 2022). In contrast, low levels of self-efficacy can be assumed to lead to self-regulation failure and procrastination in particular (Sirois & Pychyl, 2013; Steel, 2007). In the following sections, I will describe the relationship between the overmentioned factors and their relevance and importance for academic attrition.

1.3.6 Academic self-efficacy

Self-efficacy can be generally defined as a person's belief in the ability to succeed in a specific situation or at a specific task (Bandura, 1977, 1997). In a nutshell, the underlying principle of self-efficacy is that individuals will have a higher level of engagement, exert a greater level of effort, and persist in activities for which they have higher levels of self-efficacy. A crucial characteristic of self-efficacy beliefs is that they are based on past experiences and, thus, can be enhanced (Bandura, 1997; Bartimote-Aufflick et al., 2016; van Dinther et al., 2011).

According to the Social Cognitive Theory, self-efficacy is formed based on mastery experience (previous experience of success), vicarious experience (observation), social persuasion, and physiological/affective states. According to Bandura (1997), mastery experience is the most influential source of self-efficacy. Changes in self-efficacy are more

likely to arise following self-observations of improved performance and experienced development of skills or abilities to meet future challenges (Bandura, 1977). The literature review conducted by van Dinther et al. (2011) supports the idea that interventions based on the Social Cognitive Theory are more effective, with mastery experiences having the greatest influence on self-efficacy beliefs. In particular, he notes that practical experience, such as performing a task while applying knowledge and skills to a demanding situation, facilitates mastery experience. Moreover, goal setting coupled with self-reflection (i.e., aspect of SR) may influence students' perception of progress, thereby contributing to a mastery experience. Also, according to Wernersbach et al. (2014), study skill interventions may be effective in improving students' self-efficacy.

Further, empirical evidence supports the importance of self-efficacy beliefs for students' academic success and attrition (Bandura, 1997; Bean & Eaton, 2000; Richardson et al., 2012; Robbins et al., 2004; Wernersbach et al., 2014). According to Robbins et al.'s (2004) meta-analysis, academic self-efficacy has the second-largest true correlation with students' retention. The opposite pattern of a relationship with students' attrition can be assumed based on the evidence showing a positive relationship with task effort and persistence (van Dinther et al., 2011; Jackson et al., 2012; Komarraju & Nadler, 2013; Puente-Diaz & Cavazos-Arroyo, 2018). In turn, students' effort is related to drop-out and transfer-out behaviors (Hovdhaugen, 2009). Also, Willcoxson's (2010) results indicate that self-efficacy beliefs are related to drop-out intentions. The findings and assumptions are in line with Bean and Eaton's (2000) academic attrition model and TPB (Ajzen, 1991, 2002), stating that self-efficacy is an important predictor of intentions in general and attrition intentions in particular.

Despite Robbins et al.'s (2004) finding that the size of the relationship is only moderate, I contend that this relationship has important theoretical and practical utility. From a practical perspective, self-efficacy is a cognitive belief that can be changed (Bandura, 1997), which is supported by evidence providing alternative approaches to self-efficacy improvement. In particular, according to Bartimote-Aufflick et al. (2016), 10 out of 17 intervention studies on teaching strategies improved students' self-efficacy. Among the most effective methods were facilitating peer collaboration, assisting students in identifying their misconceptions, including multimedia in the learning process, providing additional resources and activities for concepts that are challenging, and encouraging students to share their

personal experiences. From a theoretical perspective, little is known about the relationship between self-efficacy and different categories of students' attrition (i.e., dropout, transfer). In addition, Weisberg and Owen (2005) argue that the findings of Robbins et al. (2004) may not apply equally to commuter students. As discussed in the previous section, students in many European universities and our study sample are mostly or exceptionally commuter students. Therefore, it is important to conduct research on the importance of students' self-efficacy for a variety of attrition intentions.

As discussed, previous research on academic attrition has undervalued the importance of malleable individual factors. This dissertation addresses this research gap by also including self-efficacy as a predictor/mediator of student attrition. Although evidence of the relationship between self-efficacy and persistence is available (e.g., Robbins et al., 2004), investigating mechanisms explaining this relationship and the role of students' self-efficacy (i.e., mediator) will provide a practical understanding of the attrition problem.

1.3.7 Study skills

The second student-related factor investigated in the present dissertation, which is closely related to students' self-efficacy, is academic skills. Academic skills are a student's ability to manage time, use study strategies, and manage their resources to reach their goals and complete academic tasks (Tressel et al., 2019, p. 122). As discussed, self-efficacy is important for students' academic success (Richardson et al., 2012; Robbins et al., 2004). Still, no amount of belief in the ability to succeed will produce competent performance if skills required for successful task completion or goal achievement are lacking. Although academic skills and other study-related behaviors are not explicitly elaborated on in the attrition models (Aljohani, 2016; Yorke & Longden, 2004), it is noted that they are important for student-university interaction. For example, Spady (1970) and Tinto (1993) discuss the relevance of students' skills defined as one of the background factors determining subsequent student-university interaction and its outcomes (i.e., integration). In contrast, according to the model of nontraditional students' attrition (Bean & Metzner, 1985; Metzner & Bean, 1987), academic skills and study habits are indicators of academic integration determining students' attrition. Regardless of the role devoted to academic skills in the attrition models, the evidence consistently shows their relationship with students' performance, retention, and

attrition (Bean & Metzner, 1985; Cathey et al., 2016; Credé & Kuncel, 2008; Hattie & Donoghue, 2016; Metzner & Bean, 1987; Robbins et al., 2004). Academic skills required at the university level differ from skills at the lower levels of education. However, many newcomer students lack university-relevant academic skills or strategies and receive little assistance in acquiring these skills (Dunlosky et al., 2013).

1.3.8 The relationship between time management and self-efficacy

In Paper 1, I focused on a specific and important category of academic skills, time management skills. Academic time management can be generally defined as students' ability to purposefully and efficiently budget the use of their time to achieve an academic goal (Wolters & Brady, 2021). Compared to high school, the university provides more autonomy and responsibility since students are required to engage in more out-of-classroom learning and external support is typically limited to only specific dates for assignments and exams. In addition, students have to balance their studies with other non-university obligations and responsibilities. For example, 66% of students in Norway are employed, and 25% of all students have children (Statistics Norway, 2022a, 2022b). In this context, effective time management seems crucial for students' academic success and retention (Trentepohl et al., 2022).

From a theoretical point of view, time management is crucial for students' SRL, which is an integral part of students' success and academic experience (Foerst et al., 2017; Wolters & Brady, 2021). Although time management is not explicitly elaborated on in SRL research, it often is an assumed part of the SRL process (i.e., planning, monitoring). Pintrich and Zusho (2007) note that students' "time and effort planning or management" and its' monitoring can be seen as an expression of students' SR. According to Wolters and Brady's (2021) review, during the forethought phase, students estimate the time needed for task completion and relevant deadlines and plan their learning by setting goals within the given timeframe. During the performance phase, learners initiate their strategic plans and monitor compliance with their learning schedule. During the self-reflection phase, learners reflect on their learning by evaluating time-related experiences (e.g., planned vs. actual time investment, whether deadlines have been met) to adapt and optimize their prospective use of time management strategies. Considering the cyclical nature of SRL, poor time management might lead to low

performance and negative experiences reducing students' sense of self-efficacy, which is crucial for subsequent effort, persistence, and SRL (Bandura, 1997; Panadero, 2017). Therefore, I have measured time management as an independent variable in the relationship with attrition intentions mediated by academic self-efficacy in Paper 1 (see Figure 1).

1.3.9 Procrastination and academic attrition

As discussed, academic self-efficacy beliefs are important for students' academic persistence or attrition (Robbins et al., 2004). Still, the evidence on mechanisms explaining this relationship is lacking. One of the potential factors which may explain this relationship is academic procrastination, i.e., a voluntary delay of an intended course of action despite expecting to be worse off for doing so (Klingsieck, 2013; Steel, 2007). Procrastination is distinguished from other instances of action delay by being unnecessary or irrational, chosen despite its potentially negative consequences, and accompanied by subjective discomfort or other negative consequences (Klingsieck, 2013). Hence, delaying a report's completion in favor of another urgent task is not procrastination. Although procrastination is present across different life domains and age groups, it is especially prevalent among students. Some estimates indicate that up to 80 – 95% of students procrastinate, with 50% of students procrastinating consistently and problematically (Steel, 2007).

According to Bandura (1997), high levels of self-efficacy are associated with increased effort and persistence on the part of the student. Therefore, it is not surprising that self-efficacy and procrastination are negatively correlated (Klassen et al., 2008; van Eerde, 2003; Wu & Fan, 2017). Also, the findings are in line with the assumptions of SRL, where self-efficacy is an important component of the forethought phase (Zimmerman, 2000). In the forethought phase, students estimate whether they will be able to succeed in a learning task. High self-efficacy facilitates students' motivation to approach the task and apply learning and self-regulatory strategies during the performance phase. In contrast, procrastination is commonly defined as a self-regulatory failure resulting from underregulation (e.g., failure in setting standards, monitoring performance) or misregulation (e.g., emotional regulation strategy) of behavior (for overview see Balkis & Duru, 2016). For instance, the evidence shows a relationship between self-control (SRL component; Duckworth et al., 2019) and

procrastination, with self-control being commonly framed as an antecedent of procrastination (e.g., Zhao et al., 2021). As a self

Moreover, according to the Temporal Motivational Theory (TMT; Steel & König, 2006), self-efficacy (an indicator of the expectancy construct) plays a crucial role in explaining procrastination. People are more motivated to perform a behavior (i.e., utility) when they have confidence that they will achieve the desired reward (i.e., expectancy) or outcome (i.e., value). Increased motivation should facilitate task performance or reduce procrastination. Further, experimental evidence supports the importance of self-efficacy for procrastination, indicating that self-efficacy improvement may be effective in reducing procrastination (Visser et al., 2017). In sum, theoretical and empirical evidence support the predictive role of self-efficacy beliefs in a relationship with procrastination.

To the best of our knowledge, evidence of the relationship between procrastination and academic attrition is scarce. According to Grau and Minguillon (2013), taking a break from online studies and procrastinating upon returning increased the likelihood of dropping out. In addition, the results by Bäulke et al. (2018) indicate that procrastination mediates the relationship between motivational regulation and drop-out intentions. Finally, a qualitative study by Visser et al. (2018) revealed that students who scored high on academic procrastination also reported more often that they thought of quitting.

Hence, the relationship between procrastination and academic attrition seems plausible. Low self-efficacy may facilitate students' procrastination leading to poor academic performance, i.e., the well-established consequence of procrastination (Kim & Seo, 2015; Steel, 2007). In turn, according to Wäschle et al. (2014), this may lead to a "vicious cycle of procrastination" when students continue to procrastinate due to dissatisfaction with the achieved result (i.e., self-reflection phase of SRL) and the cyclical nature of SRL (Panadero, 2017). As discussed, students' performance is a central aspect of the sociological perspective on academic attrition (i.e., academic integration; Tinto, 1975, 1993). In sum, in the context of consistent dissatisfaction with academic achievement (i.e., academic integration), leaving education seems likely.

In addition, perceived stress, depression, and anxiety are among the commonly suggested outcomes of students' tendency to procrastinate (Kim & Seo, 2015; Klassen et al., 2008; Rozental et al., 2015; Sirois, 2016; Steel, 2007; Tice & Baumeister, 1997). Evidence suggests that stress may be one of the determinants of students' attrition/persistence intentions and actual behaviors (Andersson et al., 2009; Beccaria et al., 2016; Naylor et al., 2018; Saunders-Scott et al., 2017; Willoughby et al., 2020; You, 2018). Finally, the goal-disengagement or action crisis perspective seems relevant to academic attrition (Brandstätter & Bernecker, 2021). During action crisis, people find themselves in a dilemma between continuing to pursue a personal goal or disengaging from it, which often occurs when a person has invested a considerable amount of effort into a goal but suffers from repeated setbacks and/or the desirability/value of the goal has diminished (Brandstätter & Bernecker, 2021). These authors found that decisional conflict is characterized by doubting and being in conflict about the further goal pursuit, experiencing setbacks, implemental disorientation, rumination, disengagement impulses, and procrastination (Brandstätter et al., 2013; Brandstätter & Schüler, 2013). In turn, longitudinal study results showed that high scores on an action crisis scale were related to an increased likelihood of dropping out (Herrmann & Brandstätter, 2015.

In sum, prior research has rarely addressed the relevance of procrastination to academic attrition. Still, based on the above discussion, I contend that procrastination is a prospective factor and would expand our understanding of academic attrition process. As discussed, understanding of the practically-relevant mechanisms of academic attrition is crucial if the aim is to ameliorate the problem. Hence, the mediatory role of procrastination in the relationship between attrition intentions is investigated in Paper 2.

1.3.10 Approaches to reducing procrastination

As discussed in the previous section, academic procrastination may be one of the factors involved in students' attrition. Although procrastination can be considered a trait-like characteristic, implying relative stability across time and situations, the evidence suggests that procrastination can be ameliorated (Malouff & Schutte, 2019; Rozental et al., 2018; van Eerde & Klingsieck, 2018). For example, procrastination can be modified by interventions for individuals or by changes made at the university level (e.g., shorter deadlines; Svartdal et al.,

2020). However, research on approaches that can be integrated into the natural academic environment with little additional effort for educators is lacking. According to van Eerde and Klingsieck (2018) and Rozental et al. (2018), the most effective approach to reducing procrastination is cognitive-behavior therapy.

Still, the authors of both meta-analyses caution that interventions usually include aspects from other approaches meaning that the findings on cognitive-behavioral therapy are unclear and preliminary. Further, cluster analysis results by Rozental et al. (2015) showed that only 33% of participants reported severe consequences of procrastination potentially requiring tailored treatment interventions (e.g., cognitive-behavioral therapy). Similarly, Steel and Klingsieck (2016) suggest that such specific procrastination treatments as cognitive-behavioral therapy may not be particularly relevant for the majority of procrastinators. Furthermore, cognitive-behavioral therapy interventions are typically ad hoc and time-consuming, or they require the involvement of professionals. Therefore, the applicability of cognitive-behavioral therapy as an efficient preventive approach can be questioned. Hence, alternative approaches that could be integrated into the natural academic environment with little additional effort for educators are of particular interest.

As outlined, the higher education environment differs in many respects from the one in high school (e.g., long deadlines, a large degree of freedom, temptations, distractions). Thus, students need to acquire a range of strategies, skills, and habits to adjust and succeed at university (Credé & Kuncel, 2008; Robbins et al., 2004). In turn, academic skills and self-regulated learning strategies are related to procrastination, with a lack of skills being usually reported as a reason for delaying academic tasks (Grunschel et al., 2013; Howell & Watson, 2007; Klingsieck et al., 2013). Hence, teaching students effective study skills and strategies similar to American first-year seminars may represent a prospective solution.

Still, I argue that this approach may render ineffective and should be accompanied by measures that build students' self-efficacy. Even if students are aware of "healthy" academic skills and strategies, they may still approach academic tasks in unproductive ways (i.e., Foerst et al., 2017; Jairam, 2019). For instance, students in Foerst et al.'s (2017) study frequently reported a lack of perceived ability (i.e., self-efficacy) as one of the reasons for not using the taught effective strategies. The findings might partially explain the limited effectiveness of

first-year seminars in improving students' persistence (Permzadian & Credé, 2016). According to Wäschle et al. (2014), strengthening students' self-efficacy beliefs may reduce procrastination and break "vicious cycle of procrastination". In particular, students whose self-efficacy is high are more motivated to learn and apply effective learning strategies, and thus achieve better results. In turn, achievement fosters and raises self-efficacy, which promotex students' motivation and achievement during the next learning cycle (i.e., the virtuous cycle of self-efficacy). Indeed, evidence shows a relatively strong relationship between self-efficacy and procrastination (Klassen et al., 2008; van Eerde, 2003; Wu & Fan, 2017). Further, students' beliefs can be improved by adjusting teaching practices (i.e., Bartimote-Aufflick et al., 2016).

As discussed, Papers 1 and 2 focused primarily on students' self-regulation (i.e., time management, procrastination) and motivational factors (i.e., self-efficacy). Still, without a sufficient or appropriate repertoire of cognitive skills or strategies (e.g., generating questions before/during reading course material), it would be hard for students to regulate their learning due to insufficient strategies to choose from (Schraw et al., 2006). In Paper 3, we tested the assumption that teaching students effective study skills and strategies to reduce academic procrastination should be accompanied by measures of improving self-efficacy. Hence, the results of Paper 3, in combination with the findings of Paper 2, would suggest that it may not be enough to teach students to self-regulate (planning, monitoring) but that a more holistic approach may be required. For example, suppose a student is found to have a limited repertoire of cognitive strategies or skills. In that case, an assistance program should improve students' knowledge of cognitive strategies or skills in addition to other SRL aspects, such as self-regulation. Further, besides contributing to the research on academic attrition, the present dissertation (i.e., Paper 3) expands our knowledge of alternative approaches to reducing procrastination.

1.3.11 Behavioral intentions and academic attrition

The presented perspectives on academic attrition have two main similarities: student-university interaction and focus on students' actual behavior. Behavioral intentions have received relatively little attention in the classical theories of academic attrition. Although more recent and revised theoretical models agree on the importance of students' intentions, the

researchers do not distinguish between different types of intentions (Bean, 1982; 1983; Bean & Eaton, 2000; Tinto, 1993). Similarly, non-distinction is also prevalent in empirical studies (e.g., Cortes et al., 2014; Moneta, 2011; Williams et al., 2018). Still, the distinctions seem important based on the evidence of a close relationship between intentions and actual behavior (see the next section). In particular, different factors may facilitate or cause students' intentions to drop-out and transfer. In addition, focusing on students' intentions might provide valuable insights into the mechanisms of academic attrition (e.g., self-efficacy, procrastination).

Thus, the primary focus of the present dissertation is students' intentions: drop-out, transfer university, and transfer study field intentions. Drop-out intentions were defined as a student's conscious decision to leave higher education altogether before degree completion. In turn, transfer university and transfer study field intentions were operationalized as students' conscious decision to switch to another academic institution or study major. Although intentions are not perfect predictors of actual behaviors, as discussed below, they may still serve as good indicators based on the evidence showing a relatively strong relationship with actual attrition (Bean & Metzner, 1985; Metzner & Bean, 1987; Sandler, 2000). Although the registry data analysis is an obvious approach to determining factors important for students' attrition, it has limited utility for addressing student-related or time-varying factors important for developing assistance programs.

The assumptions and findings that attrition intentions are crucial in explaining students' subsequent behaviors are in line with the Theory of Reason Action (TRA; Fishbein & Ajzen, 1975). According to TRA, the closest antecedents of actual behaviors are intentions. Intentions are indicators of how hard people are willing to try and how much of an effort they are planning to exert to perform a specific behavior (Ajzen, 1991). Intentions, in turn, are determined by *attitudes* and *subjective norms*. If a person believes that performing a behavior will result in more positive than negative outcomes (i.e., attitude) and important others such as family or friends are believed to approve the behavior (i.e., perceived norm), the more likely the person is to form an intention and act on it (Fishbein & Ajzen, 2010). However, TRA assumes that behavior is under a person's volitional control, meaning it is less effective in explaining behaviors that were not under direct personal control. Thus, Ajzen (1991) reevaluated the theory by adding *perceived behavioral control* (PBC), which was assumed to

determine intentions and moderate their effects on behavior. PBC is personal beliefs about the ability to overcome foreseeable obstacles to achieve the desired goal. According to Ajzen (2012, 2020), PBC is conceptually similar to the concept of self-efficacy (Bandura, 1977, 1997). In sum, even if a person has favorable attitudes towards regularly going to the gym and perceives normative pressure to do so, he will hardly form an intention and behave accordingly if the job commitments are believed to be insurmountable.

1.3.12 Do we always realize our intentions?

Meta-analytic evidence supported the efficacy of the TBP model in predicting behaviors and the importance of intentions in this process (Armitage & Conner, 2001; Sheeran, 2002). For example, Sheeran's (2002) meta-analysis showed that intentions have a large effect on behavior. However, most research has been correlational, restricting conclusions about causality and practical applicability. Based on a meta-analysis of experimental evidence, Webb and Sheeran (2006) concluded that medium-to-large change in health-behavior intentions leads to a small-to-medium change in actual behavior. These findings indicate that there is a discrepancy between intentions and actual behavior (i.e., not acting on intentions). According to Fishbein and Ajzen (2010), a non-perfect intentions-behavior relationship can be explained by factors ranging from methodological problems (e.g., lack of compatibility between intention and behavior) to temporal stability of intentions. Intentions that remain relatively stable (e.g., the within-person correlation between intentions measured at two-time points) are better predictors of actual behaviors (Cooke & Sheeran, 2004; Fishbein & Ajzen, 2010). According to Cooke and Sheeran (2004), temporal stability shows the largest moderating effect on an intention-behavior relationship. Other reasons for the non-perfect relationship may include failure to get started and failure to keep goal/intention pursuit on track (Sheeran & Webb, 2016; Brandstätter & Bernecker, 2021). Also, the predictive ability of intentions might be dependent on the behavior in question (e.g., cancer screening, illicit drug use; Sheeran, 2002). In sum, forming an intention does not necessarily mean that the intention will be implemented. Still, for the purpose of this study, I chose intentions as an outcome measure since it allowed to investigate the relevance of previously described factors and mechanisms explaining their relationship with academic attrition given the time constraints of the present dissertation.

2 Aims and hypotheses

Higher education has become an integral and important part of society in the 21st century. Indeed, significantly more students are enrolling in institutions of higher education than ever before. Policymakers and academic institutions have become more interested and engaged in students' academic success and career outcomes. Although academic attrition has received attention mainly from American scholars, the issue has also attracted the attention of European researchers and policy-makers (Hovdhaugen & Aamodt, 2013). Still, many Norwegian students continue to leave their initially chosen study programs (Andresen & Lervåg, 2022). Limited progress in attrition reduction can be explained by the fact that research literature is scarce within the Norwegian context, the importance of students-related factors has been generally underestimated, and previously proposed explanations of academic attrition lack practically relevant specificity.

Although few theoretical models on academic attrition focus on student-related malleable or time-varying factors, this should not be taken to suggest that previous theories are not important or useful. Instead, it is to argue that investigating the problem from other perspectives (e.g., SR/SRL), focusing on time-varying or malleable factors (e.g., motivation), and patterns of their relationships can provide deeper and practically relevant insights into the attrition problem (e.g., Tinto, 2017a, 2017b), which is what this dissertation contributes to. As discussed, SR and SRL are malleable and can be facilitated by universities (e.g., Jansen et al., 2019). Also, the empirical evidence supports the relationship of academic self-efficacy and study skills or time management (i.e., SRL components) with academic attrition. Still, in comparison to previous research on academic attrition, the present dissertation addresses mechanisms of the relationships of the factors described in the previous section and different types of attrition intentions. In particular, both Papers 1 and 2 investigated mediation mechanisms, which, as discussed, are relevant for finding practical solutions to the attrition problem.

The present dissertation aims to answer the following questions:

1. Are student-related malleable factors grounded in SRL important in and contribute to explaining academic attrition intentions?

2. Is it important to distinguish between attrition intentions in line with empirical evidence on students' actual behavior?

Taken together, the studies presented in the dissertation aim to provide new and elaborated insights into the prospective approaches to addressing the issue of academic attrition. To achieve this aim, I have included three papers testing academic skills, self-efficacy, and procrastination relationships with attrition intentions.

The goal of Paper 1 was to investigate if students' drop-out and transfer-out intentions would show a different pattern of relationships with time management skills mediated by academic self-efficacy, academic integration, and social integration. As discussed, different factors are related to the different types of attrition behaviors, such as dropping and transferring (e.g., Hovdhaugen, 2009). However, the evidence and findings in the case of students' attrition intentions are scarce despite their common use as an approximation of students' actual attrition behaviors. Based on TPB, I assumed that a similar relationship pattern might be observed for students' intentions. As discussed, academic skills and time management are related to students' academic self-efficacy and persistence. According to the Social Cognitive Theory theory, mastery or performance experiences are the strongest determinants of students' self-efficacy beliefs (Bandura, 1997). In turn, academic skills are related to students' performance or mastery experience (Richardson et al., 2012; Robbins et al., 2004). Also, experimental evidence shows that training academic and specific skills can improve self-efficacy beliefs (Antonou et al., 2022; Brooks et al., 2021; Hildenbrand et al., 2020; Hill et al., 2020; Karnieli-Miller et al., 2018; Wernersbach et al., 2014). Further, as discussed, academic attrition has been predominantly investigated from the sociological perspective focusing on student-university interaction. In particular, students' integration into a university's academic and social systems is argued to be crucial in determining subsequent retention or attrition. Still, in the discussion of the student-university interaction, there has been less focus on students as active actors who do reflect on their interaction. Stated differently, research on academic attrition has generally undervalued the "student" factor. Hence, Paper 1 aimed to investigate the variability of academic attrition intentions (i.e., drop-out and transfer-out intentions) and compare student-related factors (i.e., academic self-efficacy) to traditionally considered academic and social integration (see Figures 1 and 2). In particular, the mediatory roles of self-efficacy, academic and social integration in the relationship between time management skills and attrition intentions have been tested.

Figure 1

Conceptual model Paper 1. T-M = Time management skills; SE = Academic self-efficacy; AI = Attrition Intentions (Drop-out, Transfer University, Transfer Study Field).

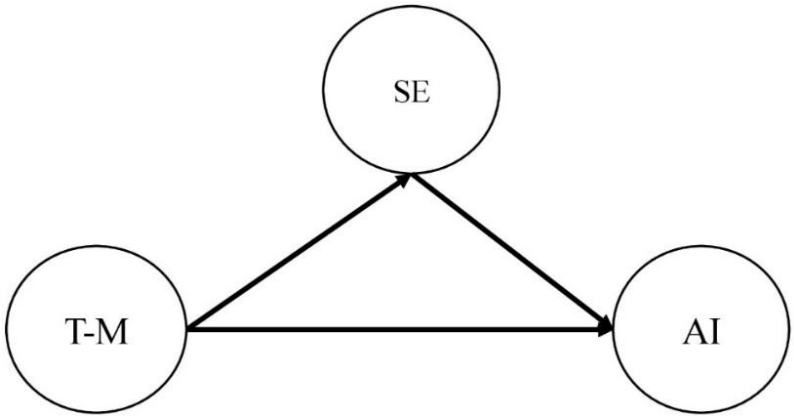
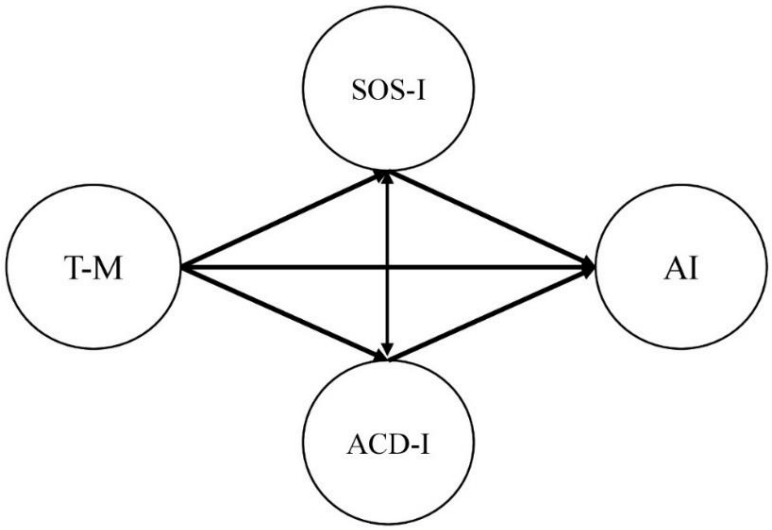


Figure 2

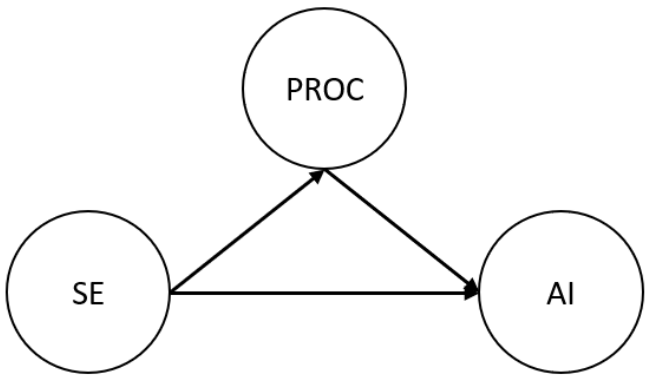
Conceptual model Paper 1. T-M = Time management skills; SOS-I = Social integration; ACD-I = Academic integration; AI = Attrition Intentions (Drop-out, Transfer University, Transfer Study Field).



The results of the Paper 1 provided support for the importance of the distinction between different types of attrition intentions and the effectiveness of self-efficacy in explaining the proposed pattern of the relationships between academic skills and attrition intentions. Thus, Paper 2 aimed to replicate the findings and investigate the notion further by focusing on mechanisms involved in the formation of attrition intentions that may assist researchers and practitioners in developing, assessing, and refining the assistance programs. Academic self-efficacy beliefs are relatively strongly related to procrastination (Klassen et al., 2008; van Eerde, 2003) which, in turn, is related to students' drop-out intentions (Bäulke et al., 2018). Low self-efficacy may incline students to delay and devote less effort to academic tasks facilitating students' attrition intentions (Hovdhaugen, 2009; Klassen et al., 2008; van Eerde, 2003; Wu & Fan, 2017). Also, in line with SRL self-efficacy beliefs are related to students use of self-regulation strategies (Pintrich, 2000; Zimmerman, 2002). Thus, it can be assumed that procrastination would mediate the relationship between self-efficacy and attrition intentions. However, although some evidence on the relationship of procrastination with attrition intentions is available (Bäulke et al., 2018), the findings may not apply to students' transfer-out intentions. For example, procrastination is detrimental to students' performance which may be less important for transfer-out decisions (Aulck & West, 2017; Hovdhaugen, 2009, 2011; Hovdhaugen & Aamodt, 2009; Quinn-Nilas et al., 2019). Thus, Paper 2 focused on the mediatory role of academic procrastination, where the evidence of its relationship with attrition intentions is scarce (see Figure 3).

Figure 3

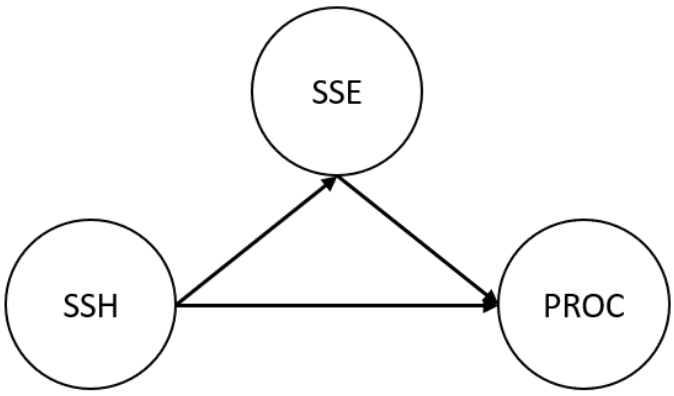
Conceptual model Paper 2. SE = Academic self-efficacy; PROC = Academic procrastination; AI = Attrition Intentions (Drop-out, Transfer University, Transfer Study Field).



The results of Paper 2 supported our assumptions about the mediatory role of procrastination and its relation to attrition intentions. Motivated by the findings, we explored mechanisms involved in procrastination that may facilitate the development of interventions aimed at reducing this detrimental tendency. As discussed, evidence on efficient approaches to assisting students in combating their tendency to procrastinate is lacking. In particular, effective approaches to reducing procrastination are limited in terms of their ease of implementation. In turn, one of the alternatives may be teaching students effective study skills and strategies based on evidence showing that it may be one of the reasons for procrastination (Grunschel et al., 2013; Howell & Watson, 2007; Klingsieck et al., 2013). However, the effectiveness of such an approach can be questioned since students may not use what they have learned (Foerst et al., 2017; Jairam, 2019). In this regard, academic self-efficacy may be an important factor that can be assumed to facilitate students' use of study skills and procrastination (Wäschle et al., 2014). Thus, Paper 3 explored the mediatory role of academic self-efficacy in the relationship between study skills and procrastination (see Figure 3). Also, as discussed, Paper 3 provided some new insights into the findings of Papers 1 and 2 (i.e., cognitive skills or strategies, self-regulation).

Figure 4

Conceptual model Paper 3. SSH = Study Skill Habits; SSE = Study Self-Efficacy; PROC = Academic procrastination.



3 Methods

3.1 Sample

In total, 756, 693, and 752 students participated in questionnaire studies presented in Papers 1, 2, and 3, respectively. The majority of participants were students from UiT the Arctic University of Norway, University of Oslo, and Norwegian University of Science and Technology. All three papers included in the present dissertation utilized the non-probability convenience sampling method. In particular, students were recruited through social media announcements (e.g., Facebook) and e-mail. In Paper 3, participants were recruited during regular lectures in addition to the overmentioned recruitment methods.

3.2 Analysis

As discussed, one of the aims of the present dissertation was to investigate mechanisms involved in academic attrition. Hence, mediation analysis was used in all three papers. Although one of the requirements for performing mediation analysis is a causal relationship between variables, the requirement was met based on previous theoretical and research evidence discussed in the previous section. Further, in the present dissertation, Zhao et al.'s (2010) approach to mediation has been used for the interpretation of observed relationships between investigated variables. In contrast to traditional Baron and Kenny's (1986) approach, Zhao et al. (2010) argue that zero-order relationships between dependent and independent variables should not necessarily be significant. Instead, the significant interaction effect (i.e., indirect effect) is the main requirement that should be met before proceeding with the mediation analysis.

Mediation analyses were performed using the structural equation model (SEM) approach. Compared to the traditional Baron and Kenny's (1986) ordinary least squares approach to mediation, recent evidence suggests the superiority of the SEM approach (e.g., Iacobucci et al., 2007; Kline, 2015). In addition, the approach allows specifying cross-equation error correlation (see Bollen, 1989), which was important for Paper 1 since academic and social integration are interrelated (Tinto, 1993). Model fit data were examined using the chi-square test ($\chi 2$), Comparative Fit Index (CFI), Tucker-Lewis Fit Index (TLI), Root Mean

Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The model fit indices have been selected based on their satisfactory performance in Hu and Bentler (1999) simulation studies: CFI, TLI values greater than .95, SRMR less than .08, and RMSEA less than .06.

3.3 Measures

3.4 Ethics

Survey data was collected with the online survey tool Qualtrics (www.qualtrics.com), which participants could access using either a mobile device or a computer. Participants were provided with shortened and full versions of informed consent (see Appendix G and H), which they signed by actively pressing the "Start survey" button. Participation was voluntary, and participants were informed that they were free to withdraw at any time without giving any reason. Also, students had the option to provide their national identification numbers in Papers 1 and 2 and were provided with a detailed consent form explaining the purposes of collecting such information. In particular, this data was collected for subsequent investigation and validation of our hypotheses in terms of students' actual behavior. This information was collected and stored separately from students' questionnaire responses in accordance with a data management plan following data protection legislation that was approved by NSD – Norwegian center for research data (reference code Papers 1 - 65124; reference code Paper 2 - 651244).

4 Summary of results

4.1 Paper 1: Drop-Out and Transfer-Out Intentions: The Role of Socio-Cognitive Factors[1]

As discussed, there has been less focus on student-related or time-varying factors and mechanisms of their relationships when explaining academic attrition among university students. Also, the explicit distinction between different types of academic attrition and attrition intention, in particular, has been less prominent in research on academic attrition. Hence, we investigated the mediatory role of academic self-efficacy (i.e., a student-related factor) in the time management skills – attrition intentions relationship. The relationships were compared with traditionally considered academic and social integration factors. Importantly, we distinguished between drop-out, transfer university, and transfer study field intentions.

The overall model fit for estimated SEM models (see Figures 1 and 2) was good, meaning that values for model fit indices were above cut-off values and that the specified models reproduced the data accurately (see Figures 1 and 2). The results revealed that students' academic self-efficacy beliefs "indirect-only" (i.e., fully mediated) time management skills – attrition intentions relationship (see Table 1). Similarly, academic and social integration "indirect-only" or fully mediated the relationship of time management skills with transfer university and transfer study field intentions (see Tables 3 and 4). In contrast, academic and social integration "complementary" or partially mediated the relationship of time management skills with drop-out intentions (see Table 2).

As expected, the size of the relationship differed for three categories of attrition intentions. Taking differences in the outcome variables (i.e., attrition intentions) into account, the relationships of time management skills mediated by academic self-efficacy were, on average, larger than those mediated by academic and social integration constructs. Furthermore, the total effect was insignificant in both models specifying transfer university

[1] Nemtcan, E., Sæle, R. G., Gamst-Klaussen, T. & Svartdal, F. (2020). Drop-out and transfer-out intentions: The role of socio-cognitive factors. *Frontiers in Education*, 5, 273. https://www.frontiersin.org/articles/10.3389/feduc.2020.606291/full

intentions as the outcome variable. Also, when considering the relationships mediated by academic and social integration, only complimentary mediation was found for drop-out intentions compared to indirect-only mediation for transfer intentions.

4.2 Paper 2: Academic Self-Efficacy, Procrastination, and Attrition Intentions[2]

In Paper 2, we aimed to replicate the observed findings on the importance of the distinction between different types of attrition intention. Further, we investigated the importance of another student-related factor, academic procrastination, which is commonly suggested to be detrimental to students' performance and well-being. In particular, it was assumed that procrastination would mediate the academic self-efficacy – attrition intentions relationship.

The overall model fit for estimated SEM models (see Figures 1 - 3 and Tables 1 – 6) was good, meaning that values for model fit indices were above cut-off values and that the specified models reproduced the data accurately. The results of Paper 1 were replicated by the findings showing stronger direct and indirect effects of academic self-efficacy on drop-out intentions. The relationship was complementary or partially mediated by procrastination for drop-out and transfer study field intentions, while indirect-only or full mediation was indicated for transfer university intention. Further, the results revealed that procrastination was significantly related to drop-out, transfer university, and transfer study field intentions. Still, procrastination showed a stronger relationship with dropout compared to transfer intentions. Academic self-efficacy and procrastination accounted for 29% of the variance in drop-out intentions compared to 5% and 11% transfer university and transfer study field intentions, respectively.

[2] Nemtcan, E., Sæle, R. G., Gamst-Klaussen, T., and Svartdal, F. (2022). Academic self-efficacy, procrastination, and attrition intentions. *Frontiers in Education* 7. https://www.frontiersin.org/articles/10.3389/feduc.2022.768959/full

4.3 Paper 3: Study Habits and Procrastination: The Role of Academic Self-Efficacy[3]

After finding evidence for the importance of procrastination for academic attrition, given attrition intentions are antecedents of actual behaviors, we explored one of the alternatives for addressing procrastination among students. In particular, in Paper 3, it was assumed that teaching study skills and strategies and assisting students in developing good study habits might mitigate academic procrastination. However, we suggested that teaching study skills alone is insufficient and that addressing students' self-efficacy beliefs is required.

The overall model fit for estimated SEM models (see Figure 1 and Tables 2, 4, 6, 7) was good, meaning that values for model fit indices were above cut-off values and that the specified models reproduced the data accurately. The results showed that academic self-efficacy mediated the study skills – procrastination relationship. In **Study 1**, the self-efficacy fully or indirect-only mediated (Zhao et al., 2010) study skills – procrastination relationship (see Table 2). In **Study 2,** the results were similar, except for partial or complimentary mediation (see Table 4). **Study 3** showed similar results for both measures of IPS and APS (see Tables 6 and 7). Study self-efficacy fully or indirect-only mediated study skills – IPS relationship, while the same effect for APS was difficult to categorize since the direct relationship was marginally significant (i.e., $p = 0.049$).

[3] Svartdal, F., Grøm-Sæle, R., Dahl, T. I., Nemtcan, E. & Gamst-Klaussen, T. (2021). Study habits and procrastination: The role of academic self-efficacy. *Scandinavian Journal of Educational Research*, 1–20. https://doi.org/10.1080/00313831.2021.1959393

5 Discussion

5.1 Student-related factors

The overall aim of the present dissertation was to explore the role of student-related factors and mechanisms involved in explaining different types of academic attrition intentions. As discussed, student-related factors have received relatively little attention in research on academic attrition. Still, focusing on such factors can expand our understanding of the attrition problem and contribute to the development of the academic attrition research field. Knowing individual factors and mechanisms explaining their relationships with academic attrition can elucidate how universities should adjust their academic environments traditionally considered by academic attrition researchers.

The present dissertation addressed the issue from the SRL perspective (Panadero, 2017; Pintrich, 2002; Zimmerman, 2002). In particular, I focused on the role of academic self-efficacy and procrastination as a mechanism explaining its relationship with attrition intentions. As discussed, task evaluation, goal setting, and planning are the core subprocesses of the forethought phase leading to task initiation and execution when supported by conductive motivational beliefs (i.e., self-efficacy). Self-regulated learners monitor their progress on a task and use self-control strategies such as time management to complete an initiated task. Lastly, in the appraisal phase, students reflect on their learning (e.g., whether the distribution of time led to satisfactory results) and what they could do the next time differently.

However, students enter university lacking self-regulation skills and strategies required to succeed at university. In the absence of assistance with the development of self-regulation skills such as time management, it is not unexpected that students may experience academic difficulties or poor performance leading to reduced self-efficacy and motivation. Also, even if students dispose of a certain repertoire of SRL strategies, it is likely that they lack conditional knowledge on why and when to use a particular strategy. In turn, misapplication of SRL strategies can be expected to result in reduced performance or achievement and reduced self-efficacy, which, as discussed, is crucial for SRL strategies application during the next learning cycle. In such a position of poor achievement and reduced self-efficacy, procrastination is

likely due to poor self-control or lack of self-regulation (Steel, 2007). Also, according to some recent elaborations on procrastination, procrastination itself can be seen as an SRL strategy. When dealing with aversive tasks, students may resort to procrastination to regulate their negative emotional state, although it is a maladaptive and ineffective strategy for long-term goal attainment (Sirois & Pychyl, 2013; Tice & Bratslavsky, 2000).

The results of Papers 1 and 2 showed a significant relationship between academic self-efficacy and three categories of attrition intentions. Also, a comparison of the proposed mediatory models in Paper 1 indicated that academic self-efficacy had generally larger effects in explaining students' attrition intentions than traditionally considered academic and social integration. Thus, our assumption that student-related factors are relevant to research on academic attrition was supported. Tinto (2017b) noted that addressing the problem from a student's perspective can shed new light on the attrition problem. In particular, it can clarify how to improve students' persistence and reduce academic attrition, a common limitation of previous research on the issue (i.e., academic and social integration; Davidson & Wilson, 2013; Tinto, 2006). Academic self-efficacy is malleable to change, and theoretical and empirical evidence is available on how to improve students' self-efficacy beliefs (Bandura, 1997; Bartimote-Aufflick et al., 2016; van Dinther et al., 2011).

Still, no amount of belief will lead to successful goal achievement if a student lacks what is required to achieve and succeed (Bandura, 1977, 1997). Who would manage to repair a car: a person who believes that he/she can do it or the one who has the required skills and believes that he can do it? Stated differently, academic skills and self-efficacy beliefs are interrelated, and both factors are necessary for competent performance and successful goal achievement. In line with the assertion, the results of Paper 1 indicate that academic self-efficacy beliefs mediated the relationship between time management skills and attrition intentions. A similar mediation mechanism was found in Paper 3 of the present dissertation, where self-efficacy beliefs mediated the relationship between study skills and procrastination. Although the study design and study sample of Paper 1 preclude making causal conclusions, it provides a potential explanation for why American first-year seminar programs show limited effectiveness in improving students' performance and persistence (Permzadian & Credé, 2016).

In particular, first year-seminars might not be particularly facilitative of students' self-efficacy which, according to SRL, is important for students' application of effective study and self-regulation strategies (Panadero, 2017). The assumption is supported by Foerst et al.'s (2017) findings that doubt about the ability to implement self-regulated learning strategies (i.e., self-efficacy) was among the second most reported reasons for not using them. Using effective study skills can improve students' performance leading to increased self-efficacy and the application of effective study skills during the next learning cycle. Still, not every achievement instance is necessarily a mastery experience, which has the strongest positive effect on self-efficacy beliefs. Easy success may lead to the formation of non-resilient self-efficacy or students who expect easy success and are easily discouraged by difficulties and failures (Bandura, 1977, 1997, 2012). To establish resilient self-efficacy, students should engage in tasks that require enough effort to be perceived as challenging but manageable.

In this regard, assisting students in improving their self-efficacy beliefs can be addressed from the SRL perspective. For example, van Dinther et al.'s (2011) literature review indicates that goal setting combined with self-reflection (i.e., SRL reflective phase) may influence students' perception of progress leading to mastery experience. Similarly, Bartimote-Aufflick et al. (2016) suggest including SRL instructions within the regular study curriculum. Also, based on the study by Trentepohl et al. (2022), it can be suggested that teaching study skills and strategies from the SRL perspective are more effective than simply informing students about effective time management strategies. The study showed that students who practiced taught time management strategies achieved better academic results at the end of the semester than students who only received a lecture on time management strategies.

In sum, as the results of Papers 1 and 2 suggest, study skills and self-efficacy are closely related and should be considered together in pursuit of improving academic success. The findings are in line with SRL and the Social Cognitive Theory. Further, as discussed, time management skills, academic self-efficacy, and procrastination are the factors related to students' SR. Hence, based on the results of Papers 1 and 2 indicating the significant relationships of the variables with attrition intentions and available research evidence, addressing students' attrition from the SRL perspective seems a prospective line for future research. In particular, it clarifies how improved persistence and reduced attrition can be achieved which, as discussed, is one of the limiations of the traditional attrition theories.

Finally, besides Papers 1 and 2 indicating that students' academic skills and self-efficacy are important for attrition intentions, Paper 3 shows that assessing students' cognitive strategies and skills might be relevant. Given that students lack knowledge of effective strategies (Dunlosky et al., 2013), SRL assistance programs that focus on student self-regulation may have limited effectiveness on attrition intentions and attrition itself. For example, a student would have difficulty adjusting the learning process if he/she chooses between two unsuitable strategies for a given academic task (e.g., mnemonic strategy for the essay-type exam). Further, the findings of Paper 3 might be of potential practical utility for universities that generally have limited capacity to address problems such as attrition and procrastination separately. For example, several studies suggest that cognitive-behavioral therapy shows the largest effect on reducing procrastination (Rozental et al., 2018; van Eerde & Klingsieck, 2018). In turn, the approach is usually difficult to implement and inevitably costly. Although developing an approach that simultaneously tackles both procrastination and attrition is unrealistic, focusing on factors that both issues have in common can be useful and, as the present dissertation suggests, might be possible. Still, as mentioned and will be discussed below, considering the limitations of the papers included in the present dissertations, the overmentioned assumptions are more than usually tentative.

Still, it is worth mentioning that multiple factors cause academic attrition, and some are not under the university's direct control (e.g., health, family reasons; Behr et al., 2021; Hovdhaugen & Aamodt, 2009). Hence, although the SRL perspective may be useful for academic attrition research, the effectiveness of the SRL in reducing attrition, in general, might be limited. Another reason for the limited potential effectiveness of the SRL approach is described below.

5.2 The distinction between types of attrition

Besides investigating the importance of student-related malleable factors, the dissertation contributes to research on academic attrition by investigating the importance of the distinction between types of students' attrition intentions. Previous studies have investigated the relationships of students' self-efficacy, study skills, and procrastination with attrition intentions and behaviors. However, researchers have rarely focused on whether these factors are equally related or predictive of different types of attrition intentions. As discussed,

intentions are approximate predictors of actual behaviors, including academic attrition (Bean & Metzner, 1985; Metzner & Bean, 1987; Sandler, 2000). In turn, the evidence shows that different factors are related to students' actual dropout and transfer (e.g., Hovdhaugen, 2009). Hence, similar variability was expected for students' intentions.

Although the evidence on the importance of the distinction between actual behaviors is available (Hovdhaugen, 2009, 2011; Hovdhaugen & Aamodt, 2009; Hoyt & Winn, 2004), to the best of our knowledge, the evidence for students' intentions is scarce. In turn, non-distinction might lead to unexpected results (e.g., Scheunemann et al., 2021). The results of Papers 1 and 2 showed that the pattern and magnitude of the relationships were dependent on the outcome variables. Specifically, in Paper 1, the relationship between time management skills and drop-out intentions was complementary or "partially" mediated by academic and social integration. In contrast, the same relationship with transfer intentions was indirect-only or fully mediated by integration factors. In addition, academic integration showed a relatively stronger relationship with drop-out than transfer-out intentions. In Paper 2, stronger direct and indirect effects of academic self-efficacy were observed for drop-out intentions. Further, procrastination showed a stronger relationship with dropout compared to transfer intentions.

As discussed, study skills, academic self-efficacy, and procrastination are the factors facilitating students' academic achievement or performance (Richardson et al., 2012; Robbins et al., 2004; Steel, 2007). Hence, the results of Papers 1 and 2 are in line with the evidence that students switching to another university may do it less due to performance-related problems (Hovdhaugen, 2009; Quinn-Nilas et al., 2019). Thus, assisting students in improving their academic performance (e.g., through the SRL approach) when they intend to change university might be a less effective or appropriate solution for these students. In this case, universities might be better of adjusting their strategy based on students' intentions and known reasons for why these intentions occur (Tinto, 1993). Further, the results of the present dissertation suggest that future research should be cautious when drawing conclusions about attrition based on non-specific measures. Similarly, the findings might be useful for researchers testing the prospective interventions to reduce university attrition rates. In particular, since intentions can be used as an indicator of intervention effectiveness, using general measures of attrition intentions may lead to less precise estimations. Also, the present findings provide an additional explanation for the previously mentioned limited effectiveness

of first-year seminar programs (Permzadian & Credé, 2016). In particular, given that the proportion of transfer-out students is larger, the actual effectiveness of first-year seminars can be different (e.g., more effective for reducing dropout). Finally, the results of Papers 1 and 2 indicate that Bean and Eaton's (2000) model has the potential for further improvement and refinement. In particular, despite the model being superior to the one proposed by Tinto (1975, 1993) in terms of practical utility, it might not be equally applicable to different categories of academic attrition.

5.3 Limitations and methodological considerations

The work presented in the dissertation clearly has limitations which will be discussed in the present section. First, the non-probability convenience sampling method was used in the papers included in the present dissertation. Although the probability sampling method would be desirable, the research presented in the present dissertation was exploratory, limited by time constraints, and restrained by the lack of easily accessible lists of students. Still, finding evidence for the proposed relationships and hypotheses even in a biased (i.e., non-probability) sample can be useful for future research testing the same or similar hypotheses more rigorously by acquiring probability-based samples. If the evidence for the proposed relationships is not found in a biased sample, it is unlikely to be present in a relatively unbiased sample.

Although convenience sampling is advantageous for collecting large amounts of data, it comes with disadvantages. For example, the representativeness of the study samples and hence, the generalizability of the findings can be questioned. Still, study samples in Papers 1 – 3 were similar in several characteristics to those found in the general population of Norwegian students. For example, in Papers 1 and 2, the proportion of participants with parents with university education was bigger than that of participants with upper-secondary and lower-secondary education. Lower-secondary education group of participants represented the smallest group (Statistics Norway, 2022c). Further, age and gender patterns in Papers 1 – 3 were similar to those that can be found in the general population (Statistics Norway, 2018).

Second, the cross-sectional nature of studies presented in Papers 1 – 3 prohibits making any causal conclusions. In Papers 1–3, one of the possible alternatives for the

relationship between academic skills or time management, self-efficacy, and procrastination with attrition intentions was investigated based on research literature. However, the relationship of academic self-efficacy with study skills (study strategies) and self-efficacy with procrastination may be bi-directional (Diseth, 2011; Phan, 2011; Wäschle et al., 2014). Hence, testing the relationships proposed in the present dissertation in a longitudinal or experimental study is required. Nevertheless, the cross-sectional studies are still since they address important questions that can be investigated further with longitudinal studies and intervention studies.

Third, the validity of the measurement scales used in the present dissertation can be questioned due to a lack of thorough validation other than face validity and some convergent evidence. For example, in Papers 1 and 2, the relationship of time management skills, self-efficacy, and procrastination with self-reported academic performance was of the size and direction consistent with meta-analytic evidence (Richardson et al., 2012). Similar results were observed for the measures of academic skills and self-efficacy used in Paper 3. In addition, in Paper 2, academic self-efficacy and procrastination were related to study strategies subscales from the Norwegian version of the ASSIST scale (Diseth, 2001). The size and direction of relationships were consistent with the research literature (Diseth, 2011; Richardson et al., 2012; Robbins et al., 2004; Sæle et al., 2017). Also, the dependent measures (i.e., drop-out and transfer intentions) in Papers 1 and 2 had a different structural pattern which raises additional questions about the measure's validity and complicates the comparison of the results. In addition, the two-factor measure of intentions used in Paper 2 factors is prone to estimation problems when the sample size is small (Kline, 2015). In sum, validation of the present dissertation’s findings in future studies using more psychometrically sound measures is required.

In addition, the self-efficacy measure used in the present study does not represent a pure measure of self-efficacy as defined by Bandura (1997), and thus, its validity can be questioned. According to Marsh et al. (2019), relatively "pure" self-efficacy measures are characterized by a clear frame-of-reference such as being confident in obtaining a top grade in a certain course. Although it was nearly impossible to achieve this standard in the context of the present dissertation (i.e., participants from different study fields), future research is advised to clarify this aspect with pure self-efficacy measures. In particular, this can be

achieved through study design adjustments, such as focusing on students having a single study major. Also, future studies may consider exchanging the self-efficacy measure with a measure of self-efficacy for self-regulation. As discussed, the factors considered in the present dissertation are related to students' SR and SRL (i.e., time management, procrastination). Hence, the relationships observed in Papers 1–3 may underestimate the actual relationships.

5.4 Future Directions

In the three papers, I have shown the importance of distinctions between different types of attrition intentions and the prospectiveness of investigating the attrition problem from other than traditional perspectives. Hence, the present dissertation has contributed to expanding our understanding of what possibilities universities have to ameliorate students' attrition. In the present section, I will discuss some prospective avenues for future research.

First, the results of the present dissertation and empirical evidence (e.g., Robbins et al., 2004) indicate that SRL factors are related to students' attrition and persistence. However, SRL is a learning *process* implying that students can experience difficulties during one or several SRL stages (i.e., forethought, performance, self-reflection; Trentepohl et al., 2022). Whether dropouts experience disproportionally more problems during one of the stages remains a question to answer by future research. Answering this question may be important for researchers and practitioners since it implies different solutions to developing assistance programs.

Second, the present dissertation considered intentions as the primary outcome. Still, other lines of research explaining and predicting behavior provide a more refined description of the process. For example, the Mindset Theory of Action Phases (MAP) by Gollwitzer (1990) distinguishes between different phases of intention formation. According to MAP, the goal pursuit process can be distinguished into four consecutive phases: predecisional, preactional, actional, and postactional. Before an action is initiated, a person deliberates on the desirability (i.e., "Do I want it?") and feasibility (i.e., "Can I achieve it?") of a certain goal (i.e., predecisional phase). The deliberation ends when a person finally decides to pursue the goal and forms a goal intention. The goal intention is similar to the concept of intention described in TPB (Ajzen, 1991). The goal intention can also be supplemented by

implementation intentions or a concrete plan on when, where, and how to realize the goal intention (Gollwitzer, 2018). Although the theory's applicability to academic attrition has not been investigated, several aspects of the theory have been tested. In particular, Bäulke et al. (2021) suggested that goal intention is preceded by four consecutive phases: non-fit perception, thoughts of quitting, deliberation, and information search. The study was cross-sectional, making it impossible to draw conclusions about the order of the phases. Still, the findings are useful since they might imply that different assistance approaches are required depending on the phase of intention formation. For example, students' non-fit perceptions may be addressed by adjusting either student-related or environmental aspects, while students who have concrete intentions may receive counseling and assistance on their prospects and available alternatives. For instance, students intending to take a break from studies (i.e., stop out) can be given information about the process of returning and receive a closer follow-up while taking a break (Grau & Minguillon, 2013).

Third, students' intentions were measured at a certain time point. Besides precluding us from securely making causal conclusions and restricting us from making data-driven suggestions about possible interventions, it was impossible to trace the development of students' intentions. As Tinto (1993) suggested, students' intentions may be important to consider both right after enrollment (i.e., lack of intention to complete a degree) and after student-university interaction. Although some students may enter university or study major intending to take only single courses, it is imaginable that some students may enter university being unsure about degree completion. Also, an important aspect of goal/intention realization is its temporal stability (Cooke & Sheeran, 2004; Fishbein & Ajzen, 2010). Finding factors that facilitate or undermine the stability of students' attrition intentions and factors that can alter intention from "unsure" to "graduate" might provide new insights into the academic attrition problem.

Fourth, the results of the present dissertation indicate that addressing student-related, time-varying, or psychological factors can shed new light on previous findings (Tinto, 2017b). In particular, some students leave due to health-related issues (e.g., Behr et al., 2021). In turn, we found that procrastination, which is related to perceived stress, depression, and anxiety (Kim & Seo, 2015; Klassen et al., 2008; Rozental et al., 2015; Sirois, 2016; Steel, 2007; Tice & Baumeister, 1997), was related to students' attrition intentions. In Norway, as well as in

other European countries, surveys of student health indicate that an increasing number of students report psychological problems (Knapstad et al., 2021). Future research might address the character of health-related issues leading to student attrition. Exploring if procrastination causes health-related psychological problems which incline students to leave might be of great utility for universities aiming to assist students in achieving success and reducing attrition.

Finally, the present dissertation addressed student-related malleable factors that are consistently shown to be related to students' performance (i.e., study skills, self-efficacy, and procrastination). Still, it is also important to consider factors related to the social aspect of the academic environment and university experience, which is the cornerstone of grand attrition theories (i.e., integration or inclusion; Tinto, 1975, 1993). Research consistently shows that students' social experience at university (e.g., interaction with peers, sense of belonging) is related to attrition and retention (Suhlmann et al., 2018; Webb & Cotton, 2018; Willcoxson, 2010). Finally, this dimension of university experience might be more important for explaining and addressing transfer. The results of Paper 1, showing a stronger relationship between social integration and transfer-out intentions than drop-out intentions, support this notion and align with Ishitani and Flood's (2018) findings. In particular, the authors found a significant relationship between social integration and students' transferring across four years that became stronger with time. In contrast, academic integration turned out to be an insignificant factor in relation to students' transfer. Also, future studies might consider addressing students' social skills and self-efficacy in line with the assumptions of the present dissertation.

6 Concluding remarks

Higher education has become an important part of modern society and young adults' integration into the workforce. Attaining a formal degree qualification does not guarantee immediate employment; still, it increases students' chances and provides competencies that are not only career-limited. Although the discussion on the importance of student-related factors presented in the dissertation may be interpreted as blaming a student, it should not. Also, in neither way does the dissertation argue that the issue should not be addressed from the university's perspective or that the importance of adjusting the university's structure and practice should be undervalued. The primary argument is that better or additional adjustments to the academic environment can be made by investigating students' perceptions of their university experience. Leaving university is not exclusively negative, as in the case of Bill Gates or Steve Jobs, and cannot be easily reduced by the university when students report family or health reasons for leaving. However, policymakers and universities can and should address attrition caused by students' academic experience. Academic study skills and self-efficacy are not entities that students are born with but are competencies and beliefs developed in their interaction with the academic environment. In turn, low focus on these aspects from the university's side, such as a curriculum lacking efficacy-building opportunities, may create an environment conducive to procrastination and academic attrition.

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Appendix A: Paper 1

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Drop-Out and Transfer-Out Intentions: The Role of Socio-Cognitive Factors

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Academic attrition is a worldwide problem representing a significant economic loss and a disadvantage for students in terms of health and career prospects. We focus on the roles of academic skills, academic self-efficacy, and students' integration in exploring their relation to attrition intentions. Based on existing research, we expected a negative relation between academic skills and attrition intentions, with academic self-efficacy and students' integration as possible mediators. Furthermore, it was expected that this relationship would be dependent on the outcome variable being measured (i.e., drop-out, transfer university, and transfer study field intentions). These hypotheses were investigated among Norwegian university students in a questionnaire study (total $N = 756$). Results supported, as predicted, the mediatory roles of academic self-efficacy and students' integration. Importantly, significant variability was indicated in comparison of the different outcome measures, with academic self-efficacy having a larger mediation effect in case of drop-out and transfer study field intentions. We conclude that academic self-efficacy is important in understanding the relationship between students' academic skills and attrition intentions. Our results provide an evidence that might facilitate development of assistance programs aiming to reduce academic attrition.

Keywords: academic attrition, attrition intentions, drop-out intentions, transfer university intentions, transfer study field intentions, integration, academic skills, academic self-efficacy

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INTRODUCTION

Obtaining a higher education qualification has become more common in the transition from school to work leading to better economic success and well-being (Dalgard et al., 2007; OECD, 2019). However, according to the estimates by the EU research team on academic attrition rates across Europe, 19 to 40% of students withdraw from higher education (Vossensteyn et al., 2015). Although significant improvements have been achieved in the Norwegian higher education during the past years, the state of affairs on academic attrition is similar to other western societies (Ministry of Education and Research, 2018). According to recent estimates, 19% of bachelor students do not complete their academic degrees (Statistics Norway, 2019a). Students leaving before graduation represent an inefficient use of government funding (Statistics Norway, 2019b), and a considerable loss for students themselves in terms of health and career prospects (Muennig, 2007; Steingrímsdóttir et al., 2012).

Why do students leave at all? Departure before degree completion (i.e., attrition) has been extensively examined from different theoretical perspectives (for an overview, see Hossler and Bontrager, 2014; Burger, 2017). Common to these perspectives is that they focus on actual behavior. Despite extensive evidence on the role of intentions in predicting behavior, few studies have focused on attrition intentions as the primary outcome of interest (Sheeran, 2002). As behavioral intentions to leave is an excellent indicator of actual attrition (e.g., Bean, 1982; Mashburn, 2000), focus on attrition intentions may add valuable insights to the attrition problem, allowing for preventive measures before actual attrition. For example, the knowledge on antecedents for attrition intentions may aid in the development and utility assessment of prospective intervention programs such as academic skills training courses and more rigorous study plans.

Further, treating students who leave their university studies as a homogenous group is common among researchers. This tendency is problematic from both theoretical and practical perspectives (Grosset, 1993; Porter, 2000; Hoyt and Winn, 2004). First, from a theoretical perspective, one potential consequence is inaccuracy in prediction and explanation of students' attrition behavior. Second, from the practical perspective, treating these students as a uniform population might lead to the opposite outcomes than those being expected. For example, while a prospective assistance program might be effective in reducing system attrition, it might have no effect on students who change their academic institution. Although intentions are approximate indicators of actual attrition behavior (Bean, 1982), differences among students' intentions have not been previously addressed. As will be discussed, students leaving university permanently and students changing their place of education might have different reasons for leaving.

In the present study, we aim to investigate and facilitate the understanding of the factors that explain attrition intentions among students. These issues will be examined from the perspective of academic skills, academic self-efficacy, and students' integration. Although these factors are related to attrition behavior, they have not been examined in relation to the different categories of attrition intentions (e.g., intentions to change academic institution, intention to leave permanently).

SOCIO-COGNITIVE FACTORS

Academic and Social Integration

Research on academic attrition has addressed the issue from a variety of perspectives, e.g., psychological, sociological, organizational, cultural, and economic. In the current section, we provide a short summary of theories attempting to explain academic attrition (for an overview, see Hossler and Bontrager, 2014; Aljohani, 2016; Burger, 2017). Two theoretical models have been particularly important in guiding thinking and research on academic attrition for the last 40 years, the Institutional Departure Model by Tinto (1975) and the Students Attrition Model by Bean (1982).

The most prominent theory, the Institutional Departure Model, assumes a crucial role of students' integration for attrition-retention behavior. Tinto (1975) theoretical model expanded the debate on the causes of academic attrition by calling attention to institutional factors that affect attrition. According to the theory, the primary determinants of academic attrition can be broken down into student-related background factors (e.g., previous academic experiences, skills, and abilities) and factors related to university experience (e.g., academic and social integration). *Academic integration* refers to students' academic performance and intellectual development, whereas *social integration* can be defined as interaction with peers and faculty, sense of belonging to peers, and extracurricular activities (Tinto, 1975). The background factors influence students' initial goals and commitments that either facilitate or hinder their integration. In turn, academic and social integration transforms students' initial goals and commitments that leads to subsequent attrition or persistence. Tinto (1975, 1993) argues that both academic and social integration are important due to their reciprocal relationship (i.e., too much integration in the social domain may lead to lower integration in the academic domain). In other words, attrition is a function of interaction (or the fit) between students and their academic environments.

The crucial role of the interaction between student-related and institutional factors in explaining attrition behavior is also highlighted by Bean (1982, 1990) in the Students Attrition Model. This model addresses the issue of academic attrition from the perspective of organizational turnover. Further, the structure and content of the models are similar (e.g., the concepts of academic and social integration, commitment) to the previously described Tinto's theory (1975; 1993). However, the models differ in several aspects. First, it is assumed that factors external to academic environment (e.g., finances, employment, family responsibilities) should be considered in explaining students' attrition. Moreover, Bean and Metzner (1985) argue that although social integration is crucial for traditional students' persistence, it might be less important in case of non-traditional students. Second, the two models differ in factors that are assumed to determine students' attrition. Tinto (1975) attributes this role to students' commitment, while Bean (1982) argues that students' intentions is the most approximate determinant of actual attrition.

A third theoretical model proposed by Cabrera et al. (1993), the Student Retention Integrated Model, integrates the aspects of the two models discussed. Similar to Bean (1982, 1990) Students Attrition Model, environmental factors are argued to have a crucial role in explaining academic attrition. However, in comparison to Institutional Departure Model, the role of environmental factors is not constrained to shaping students' commitments, but it is also assumed to influence students' social and academic experiences (i.e., integration).

In sum, the models have many similarities. First, an interaction between student and institutional factors is common. The models also agree on the significance of the match between students and an institution (i.e., academic and social integration) in explaining academic attrition. Among the differences between the models are their views on the closest antecedent of academic attrition. According to Bean (1982, 1990) and Cabrera et al. (1993), the closest antecedent is the intention to leave. In contrast, Tinto (1975, 1993) attributes this role to students' goal and

institutional commitment. Further, both Tinto (1975, 1993) and Bean (1990) admit the importance of students' skills and abilities in the process of academic attrition (i.e., background factors, academic variables), whereas Cabrera et al. (1993) do not include these factors into their integrated model.

Behavioral Intentions

Bean (1982) and Cabrera et al. (1993) argued that students' intentions are significant antecedents of actual behavior. Intentions are mental states of self-instruction to perform a behavior or to obtain a certain outcome (Webb and Sheeran, 2006). Intentions have been used to predict a wide range of behaviors, including consumer decisions, weight loss, smoking, gambling, and driver behavior. Based on a meta-analysis of meta-analyses by Sheeran (2002), intentions explain 28% of the variance (i.e., large effect size) in these behaviors. According to Bean (1982), intentions to leave university have the most substantial direct effect and explain the largest proportion of variation in actual attrition behavior. These findings are in line with different theoretical frameworks designed to explain and predict human behavior such as the Theory of Planned Behavior and the Mindset Theory of Action Phases (for an overview, see Fishbein and Ajzen, 1975; Webb and Sheeran, 2006; Gollwitzer, 2012).

Academic Skills

Even if intentions can predict students' attrition behavior, they do not contain information besides the fact that a person aims to perform a particular behavior. Identifying the factors that, in turn, determine behavioral intentions is of a great theoretical and practical value, e.g., understanding working mechanisms, assistance, and assessment. Here, academic skills provide a crucial stepping-stone to the solution. Academic skills have been consistently shown to promote students' performance, attrition intentions, and actual attrition behavior (Bean and Metzner, 1985; Rovai, 2003; Robbins et al., 2004; Credé and Kuncel, 2008; Cathey et al., 2016; Hattie and Donoghue, 2016; Bernardo et al., 2019).

Academic skills can be defined as a student's ability to manage time, use different study strategies, and manage their resources to reach their goals and complete academic tasks (Tressel et al., 2019, p.122). However, students receive little instruction on how they should acquire and properly use these skills, and such instruction is usually not included in study curricula (Dunlosky et al., 2013). In the present paper, we focus on a specific and important category of academic skills, time-management skills which many students struggle to acquire. For example, in a study by Sauvé et al. (2018), half of the participants reported problems with time management. Time-management skills can be generally defined as students' knowledge and ability to effectively manage study time to achieve an academic outcome. Also, these skills are generally assumed to predict students' learning, academic performance, and attrition (Credé and Kuncel, 2008; George et al., 2008, Goldfinch and Hughes, 2007; Kitsantas et al., 2008; Dunlosky et al., 2013; Xuereb, 2014).

Time management is a part of the broader concept of self-regulated learning (SRL), seen as an integral and inseparable part of higher education (Zimmerman, 1998, 2002; Foerst et al., 2017). SRL is defined as students' active engagement in self-generated thoughts, feelings, and actions that are oriented toward the attainment of academic goals. At the university level, external support is typically limited to only specific deadlines (e.g., dates for assignments and exams). Thus, independent regulation of one's own education is important. Self-regulated learners are usually academically successful, achieve higher grades, and procrastinate less (Zimmerman, 2002; Steel, 2007). In turn, SRL process can be divided into four interdependent phases: planning, monitoring, control, reflection (Zimmerman, 1998; Pintrich, 2000). Students' ability to manage their time is a crucial component of this process.

In sum, students' time-management skills are important for academic success and retention. Since planning academic activity is an initial step of a study process, good time-management skills are crucial for the overall study process. Even if students possess good academic skills and apply them correctly (e.g., relating ideas in preparing for essay form of an exam), they might ineffectively devote their time to different competing goals. This might lead to poor performance and negative experience reducing the sense of student's self-efficacy which is crucial for subsequent effort, persistence, and self-regulation of behavior (Bandura, 1997; Heikkilä and Lonka, 2006). Further, the relationship of time management with other important aspects of academic-related skills and competences (e.g., rehearsal, elaboration, metacognitive skills) is medium-to-large (Pintrich et al., 1993; Weinstein et al., 2016). Therefore, time-management skills were chosen as the main independent variable in the current study.

Academic Self-Efficacy

Even if students possess knowledge about "healthy" time-management skills, they may not practice them and approach academic tasks in unproductive ways. Some indirect evidence (Schunk, 1985; Pintrich and De Groot, 1990; Foerst et al., 2017) and research findings[1] show that academic skills are related to self-efficacy being a potential determinant of their implementation and practice. For example, Foerst et al. (2017) indicated that doubt about the ability to implement SRL strategies and lack of time were among the most popular self-reported reasons for not using them.

Like time-management skills, academic self-efficacy is an important part of academic attrition puzzle. The concept of self-efficacy refers to the conviction or belief that one can successfully perform a behavior required to achieve the desired outcome (Bandura, 1977). Extensive research evidence indicates a crucial role of self-efficacy in human agency including choice of behavior, effort, persistence, engagement, and emotional reactions (Bandura, 1997). Also, empirical evidence supports the importance of the construct in the domain of education and students' learning (Robbins et al., 2004).

According to the Social Cognitive Theory, self-efficacy is constructed from mastery experience (previous experience

[1]The findings of the correlational study by Svartdal et al. (2020) provide indirect support on the mediatory role of academic self-efficacy in the relation of academic skills with procrastination.

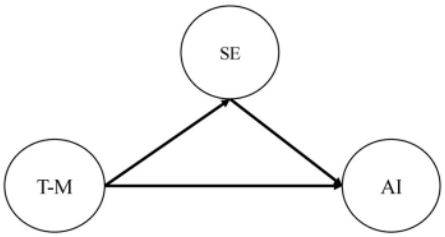

FIGURE 1 | Conceptual model. T-M, Time-management skills; SE, Academic self-efficacy; AI, Attrition Intentions (Drop-out, Transfer University, Transfer Study Field).

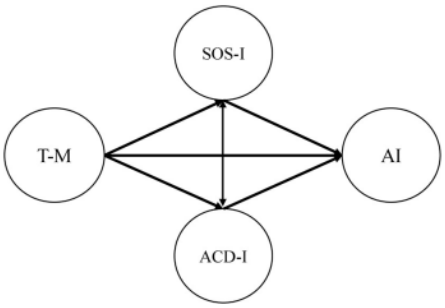

FIGURE 2 | Conceptual model. T-M, Time-management skills; SOS-I, Social integration; ACD-I, Academic integration; AI, Attrition Intentions (Drop-out, Transfer University, Transfer Study Field).

success), vicarious experience (observation), social persuasion, and physiological/affective states. According to Bandura (1997), mastery experience is the most influential source of self-efficacy. Changes in self-efficacy are more likely to arise following self-observations of improved performance and experienced development of skills or abilities to meet future challenges (Bandura, 1977). The notion is supported by the research findings indicating changes in self-efficacy as the result of skill-based interventions (e.g., Smith, 1989; Wernersbach et al., 2014).

How are self-efficacy beliefs related to students' attrition intentions? Here, the Theory of Planned Behavior (TPB) can provide a theoretical explanatory framework (Ajzen, 1991). Based on this theory, self-efficacy is a crucial dimension of behavioral control which is a central aspect in the formation of behavioral intentions and actual behavior (Ajzen, 1991, 2002). Further, according to Bean and Eaton (2001) psychological model of academic attrition, self-efficacy is an important precondition of students' intentions to persist and actual persistence. The assumption is in line with several findings indicating a negative relationship between academic self-efficacy and attrition intentions (Willcoxson, 2010; Willcoxson et al., 2011).

As discussed, academic skills and self-efficacy are important determinants of academic success and attrition intentions. However, even if students possess the skills required in post-secondary education (e.g., time management, critical thinking, selecting main ideas), they might not use them due to low self-efficacy beliefs (Schunk, 1985; Bandura, 1986, 1997; Pintrich and De Groot, 1990; Foerst et al., 2017). This relationship between academic skills and attrition intentions mediated by academic self-efficacy will be investigated in the current paper.

Variability of Attrition

According to Hoyt and Winn (2004), students not following a prescribed educational path can be differentiated into drop-outs, stop-outs, opt-outs, and transfer-outs. In the present study, we focus on the drop-out and transfer-out student categories. *Dropping out* can be defined as leaving an academic institution before degree completion, having no concrete intentions of returning to higher education. *Transferring out* is commonly referenced when an act of moving from a university (where students commenced their studies) to another higher education institution has taken place (Hovdhaugen, 2009). Students changing their initial study field could be also included in the category of transfer-outs (i.e., transfer study field).

In support, multiple researchers agree that treating non-returning students as a single cohort is inappropriate (Grosset, 1993; Porter, 2000; Hoyt and Winn, 2004; Hovdhaugen, 2011). Indeed, based on the dichotomy of system and institutional attrition, different sets of factors are found significant in explaining drop-out and transfer-out behaviors (Hovdhaugen, 2009). For example, Hovdhaugen (2009) indicated that background characteristics such as gender, age, and school grades were particularly more important in explaining students' drop-out than transfer-out behaviors. In contrast, students' motivation, educational goals, and field of the study were stronger related to a subsequent transfer to another university.

However, relatively few studies have compared the relationships between investigated variables and types of attrition intentions. Research has concentrated primarily on either intention to withdraw entirely or intention to change university (e.g., Raciti, 2012; Farr-Wharton et al., 2018). Consequently, previous findings may not be equally applicable to different categories of attrition intentions (e.g., dropping out, transferring out). For example, Willcoxson (2010) investigated factors that are related to students' intentions to persist vs. drop-out. The author excluded those students who reported an intention to change their academic institution. Hence, the results indicating the relationship between academic self-efficacy beliefs might be not applicable to those students who indicated their interion to transfer-out. Thus, we aim to address this issue through an assessment of students drop-out, transfer university, and transfer study field intentions.

THE CURRENT STUDY

In the present paper, we assess the relationship of academic skills (i.e., time-management skills) with attrition intentions, given self-efficacy, academic and social integration as possible mediating factors (see **Figures 1** and **2**). There are two possible mechanisms through which time-management skills could be

related to drop-out and transfer-out intentions. First, based on Tinto's (1975, 1993) and Bean's (1990) models, the interaction between students-related factors (e.g., academic skills) and university's environment is crucial for their subsequent attrition or retention. Second, academic self-efficacy beliefs are closely related to students' academic skills and attrition (Bandura, 1997; Robbins et al., 2004; Foerst et al., 2017). Thus, we expect that academic integration, social integration, and academic self-efficacy would mediate the relationship of time-management skills with drop-out and transfer-out intentions.

As discussed, intentions are closely related to actual behavior and evidence shows variability of factors related to drop-out and transfer-out behaviors (e.g., Hovdhaugen, 2009). Also, according to Tinto (1993) and Quinn-Nilas et al. (2019) transfer-out students might perform as good as those students who persist at university, whereas this is not the case for dropouts. Since academic skills facilitate students' performance and are related to attrition (e.g., Robbins et al., 2004; Credé and Kuncel, 2008), differences in the relationship of time-management skills with attrition intentions might be expected.

However, we did not have any specific expectations about the direction and significance of this relationship due to the limited research evidence on the issue. Based on the findings by Hovdhaugen (2009) on the role of students engagement (i.e., effort) and the role of time management in self-regulation (i.e., engagement into learning), it might be expected that students time-management skills would be negatively related to both drop-out and transfer-out behaviors (Zimmerman, 1998, 2002; Pintrich, 2004). Similar conclusion can be made about the relationship of self-efficacy beliefs which are positively related to students' effort (Bandura, 1986, 1997). Nevertheless, to the best of our knowledge, the direct relationship between academic skills and self-efficacy with different categories of attrition intention has not been investigated.

Also, the relationship of integration factors with different categories of attrition intentions is less clear. Research shows that social and academic integration can be positively related to transfer-out behaviors (Nora and Rendon, 1990; Tinto, 1993). However, according to Wood et al. (2012) the evidence is inconclusive, with several studies indicating weak or no relationship of students' integration with transfer-out behaviors. Further, these and other studies have been concerned with students transferring from 2- to 4-year institutions (i.e., vertical transfer). Nevertheless, the evidence on students' integration and transferring from 4- to 4-year institutions (i.e., horizontal transfer), which is more relevant for Norwegian education system, is lacking.

In sum, the current study will test the following assumptions. First (*Hypothesis 1*), the relationship between time-management skills and attrition intentions is mediated by their self-efficacy beliefs. Second (*Hypothesis 2*), the relation of time-management skills with attrition intentions is mediated by the level of students' integration. However, as discussed, the relationship between the variables of interest could be dependent on the measured outcome (e.g., drop-out, transfer-out intention). Hence (*Hypothesis 3*), we aim to conduct an exploratory analysis if the mediated effects of time-management skills would differ depending on the outcome measure–drop-out, transfer university, or transfer study field intentions (Tinto, 1993; Hovdhaugen, 2009).

METHODS

Sample and Setting

Participants were 756 students (72% females) in different stages of their studies at the university: first year (25%), second-year (24%), third-year (17%), fourth-year (13%), fifth-year (11%), and sixth-year or more (10%). Age ranged from 18 to 54 with a mean of 24.3 years (SD = 4.83). The relatively large proportion of females reflects the fact that the student population is female-dominated (i.e., 61%) in Norway (Statistics Norway, 2020). Also, some study programs (i.e., psychology) have even larger proportion of females (i.e., 70% and higher).

Assessment and Measures

Students participating in this study were recruited through Facebook and via e-mail sent to the active students registered at Norwegian universities. Participants from UiT The Arctic University of Norway and UiO University of Oslo were recruited via e-mail sent to active students. Data collection was done with the online survey tool Qualtrics[2], which participants could access using either a mobile device or a computer.

Ethics

Participants were presented with a consent form, informed that they were anonymous and could refrain from answering or withdraw from the study at any time. The study was approved by the Norwegian Center for Research Data (NSD) in accordance with the requirements of data protection legislation (reference code 651244). Further, the current study was preregistered on Open Science Framework (OSF)[3] where the supplementary materials and preregistration protocol could be retrieved. It is worth mentioning that *Hypothesis 3* was not explicitly specified in our initial preregistration. However, based on the previous discussion, differences might be expected. Since we did not have any specific expectations about the direction and significance of direct and indirect effects, *Hypothesis 3* is defined as exploratory (see The Current Study section).

Background Factors

Students were asked to report their age, gender, high-school GPA, university GPA, study field, university affiliation, parents' education, and if they have previously changed a study field or university. *Age* was an open-ended question and recorded as a continuous variable. *High-school and university's GPA* were categorical variables (1 = Lowest grade; 6 = Highest grade). *Study field* was an open-ended question, but subsequently re-coded into five different categories: psychology, STEM

[2]www.qualtrics.com

[3]https://osf.io/gszjq/?view_only=64754bda6648487ba4e821e4b9272a16 where readers can find preregistration protocol and additional materials: https://osf.io/gszjq/?view_only=8bf1d551536441f1a8e8478143b8932c.

field, medicine and health science, biology and fishery field, humanitarian and social field. *Parents education* was categorical and included four categories: lower-secondary education, upper-secondary education, higher education, and other. Responses of students who chose "other," were recorded as missing resulting into three main categories of parents' education. Parents education was not distinguished into mother's and father's level of education based on data-privacy considerations. *University affiliation* initially consisted of seven categories which were reduced to three because of small number of students from other Norwegian universities (recorded as "other"): University of Tromsø (UiT), University of Oslo (UiO), and other. *Number of years studied at university* was a categorical variable (1 = 1 year; 6 = 6 years or more). We also included single question about *students' initial intention* to receive an academic degree (0 = No; 1 = Yes), question about *previous history of changing study field* (0 = No; 1 = Yes), and question about *previous history of changing academic institution* (0 = No; 1 = Yes). Parents' education (with university's education as the reference group), university affiliation (with students from UiT as the reference group), and study field (with psychology as the reference group) were dummy coded for subsequent mediation analyses. The descriptive statistics can be found in the OSF depository.

Time-Management Skills

The time-management skills subscale (four items) from Approaches and Study Skills Inventory for Students (ASSIST) inventory was chosen based on its internationally validated stable factor structure and being tested with Norwegian samples (e.g., Entwistle et al., 2000; Diseth, 2001; Bonsaksen, 2018). An example item is: "I organize my study time carefully to make best use of it." Response options ranged from 1 = Totally agree to 5 = Totally disagree with lower scores interpreted as showing worse time-management skills. In the study by Diseth (2001), internal reliability of the subscale was 0.72. In the current sample Cronbach's alpha was 0.78.

Academic Self-Efficacy

The measurement index was borrowed from a Danish study by Herrmann et al. (2017). The scale is based on MSLQ (Motivated Strategies for Learning Questionnaire) by Pintrich (1991). Self-efficacy, as it is used here, refers to the students' self-appraisal of their ability to master a task and includes judgment about their ability to accomplish a task as well as their confidence in their ability to perform that task (Pintrich, 1991). Three items (1 = Totally agree; 5 = Totally disagree) were chosen based on the reported highest loadings (i.e., Herrmann et al., 2017) with lower scores interpreted as showing lower academic self-efficacy beliefs. An example item is: "I am confident that I can acquire the skills necessary to excel within my field of study." Original Cronbach's alpha (five items) was 0.83. Internal reliability for the current sample was 0.78.

Academic and Social Integration

The academic and intellectual development subscale from the Institutional Integration Scale was chosen as a measure of academic integration (Pascarella and Terenzini, 1980). Response alternatives were given on five-point Likert scale ranging from 1 = Not true of me to 5 = Totally true of me. An example item is: "I am satisfied with the extent of my intellectual development since enrolling in this university." Original Cronbach's alpha (seven items) was 0.74. Internal reliability of three items for the current sample was 0.84. Three items from the Peer-group interaction subscale were borrowed from the same measurement index (Pascarella and Terenzini, 1980). An example item is: "Since coming to this university I have developed close personal relationships with other students." Original Cronbach's alpha (seven items) was 0.84. Internal reliability of the three items was 0.84. These two subscales have been chosen based on personal communication with V. Tinto (August 16, 2019). He pointed out the significance of making distinction between academic and social integration clear for students. Hence, other dimensions of Pascarella and Terenzini (1980) academic and social integration (e.g., interaction with faculty members) were not included.

Drop-Out Intentions

Two items were taken from the study by Hardre and Reeve (2003): "I sometimes consider dropping out of university before graduation," "I intend to drop out of school before graduation." Original Cronbach's alpha (Three Items) was 0.79. Based on the Mindset Theory of Action Phases (Gollwitzer, 2012), two additional items were designed for these study, intending to measure the degree of intention's formation ("I sometimes think that other job opportunities suit me better than those I can get with my current education"; "I know what I am going to do if I withdraw from my studies"). The second item was subsequently excluded based on the low factor loading of 0.40. Cronbach's alpha was 0.67, which is lower than advised 0.70. However, internal consistency is considered sufficient given the number of items (Cortina, 1993; Streiner et al., 2015).

Transfer University Intentions

Two items were taken from the same study by Hardre and Reeve (2003) but rephrased with a focus on transfer university intentions: "I sometimes consider changing university before graduation," "I intend to change university before graduation." Similar to the drop-out intentions' measure, two items were devised based on the Mindset Theory of Action Phases (see **Supplementary Material**). Internal reliability of four items for intentions to change university (Cronbach's alpha) was 0.82.

Transfer Study Field Intentions

Two items were taken from the study by Hardre and Reeve (2003) but rephrased with a focus on transfer study field intentions: "I sometimes consider changing study field before graduation," "I intend to change study field before graduation." Similar to the previous measures of attrition intentions, two items were devised based on the Mindset Theory of Action Phases (see **Supplementary material**). Internal reliability of four items for intentions to change study field (Cronbach's alpha) of the scale was 0.82.

ANALYSIS

Model Specification and Estimation

A structural equation model (SEM) analysis was employed since it allows estimation of cross-equation error correlation (see Bollen, 1989). Allowing such correlations is important, because academic and social integration are generally assumed to be related constructs (Tinto, 1993). The models specified are similar in terms of independent (i.e., time-management skills) and dependent (i.e., drop-out, transfer-out intentions) variables. The models differ in mediators being specified. The first set of models have academic self-efficacy as the mediator, while for the second set academic and social integration variables are specified as the mediators (see **Figures 1** and **2**). It is worth mentioning that readers should not interpret our data analysis approach as an indicator of causality. As discussed, the causality in the present study is theory-driven but cannot be directly supported by the study design.

Further, the weighted least squares parameter (WLSMV) estimation was implemented, which is appropriate when manifest variables are categorical or ordinal, and the sample size is relatively large (Muthén and Muthén, 1998-2017). Bootstrapping (based on 10,000 draws), which is a preferable method for testing significance of indirect effects (MacKinnon et al., 2004), was also implemented. Model fit data were examined using the chi-square test (χ^2), Comparative Fit Index (CFI), Tucker-Lewis Fit Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). These model fit indices have been selected based on their satisfactory performance in Hu and Bentler (1999) simulation studies. For a more detailed description and discussion of the fit indices the reader is referred to Hu and Bentler (1999), Brown (2015).

Standard fit cut-off values were applied: CFI, TLI values >0.95, SRMR <0.08, and RMSEA <0.06 (Hu and Bentler, 1999). Values equal to or lesser/higher than cut-off values indicate good and close fit. Confirmatory factor analysis (CFA) was performed to assess the validity of the measurement model (i.e., time-management skills, academic self-efficacy, academic and social integration). The results of CFA indicated a good fit for time-management skills scale while academic self-efficacy, academic and social integration were *just-identified* (see OSF)[3] Hence, model-fit indices are not applicable in case of academic self-efficacy and integration constructs. Nevertheless, factor loadings were high (all above 0.60) and in expected direction. The aim of the current study was to test the described mediatory models and not to confirm factorial structure of the constructs. Thus, the results were deemed acceptable and we proceeded with the test of hypothesized mediatory models (see The Current Study section). Furthermore, the results of observed indirect effects were interpreted in concordance with Zhao et al. (2010), stating that a significant total effect is not a requirement for an indirect effect to be established. Items (i.e., questions) were used as indicators of the factors described in the method section. Analyses were performed with Mplus version 8.

TABLE 1 | Model estimates.

	Coefficient (β)	Boot *SE*	95% CI (BCB)	*p*
DROP-OUT INTENTIONS (*N* = 756)				
TIME → EFFICACY	0.458	0.041	[0.372, 0.536]	<0.001
TIME → DR	−0.074	0.055	[−0.180, 0.033]	0.177
EFFICACY → DR	−0.434	0.053	[−0.537, −0.328]	<0.001
INDIRECT EFFECTS				
TIME via EFFICACY	−0.199	0.032	[−0.265, −0.141]	<0.001
Total effect	−0.272	0.047	[−0.366, −0.179]	<0.001
TRANSFER UNIVERSITY INTENTIONS (*N* = 735)				
TIME → EFFICACY	0.451	0.044	[0.361, 0.533]	<0.001
TIME → TR_U	0.083	0.056	[−0.030, 0.190]	0.135
EFFICACY → TR_U	−0.216	0.059	[−0.335, −0.102]	<0.001
INDIRECT EFFECTS				
TIME via EFFICACY	−0.098	0.030	[−0.163, −0.045]	0.001
Total effect	−0.014	0.049	[−0.111, 0.082]	0.768
TRANSFER STUDY FIELD INTENTIONS (*N* = 754)				
TIME → EFFICACY	0.459	0.042	[0.374, 0.540]	<0.001
TIME → TR_ST	−0.022	0.052	[−0.121, 0.085]	0.674
EFFICACY → TR_ST	−0.265	0.054	[−0.371, −0.159]	<0.001
INDIRECT EFFECTS				
TIME via EFFICACY	−0.122	0.028	[−0.186, −0.072]	<0.001
Total effect	−0.144	0.046	[−0.272, −0.060]	0.002

BCB, bias-corrected bootstrap; DR, Drop-out intentions; TR_U, Transfer university Intentions; TR_ST, Transfer study field intentions; TIME, Time-management Skills; EFFICACY, Academic Self-efficacy.

Control Variables

The analyses were performed accounting for the effects of other variables that were previously found to influence students' attrition behaviors (e.g., gender, age, parents' education). Participants' age, time spent at university in years, initial goal of obtaining an academic degree, previous history of changing university or study field, parent's education, grade-average from upper-secondary school, and university affiliation were significant and were included in the final model. Only results for main effects are reported (i.e., control variables are included in the models but not presented). For detailed information on the effects of control variables see OSF.

RESULTS

Time-Management Skills and Attrition Intentions Via Academic Self-Efficacy

Drop-Out Intentions

The overall model fit for drop-out intentions was very good. The chi-square test was significant ($\chi^2 = 126.032$, $df = 50$, $p < 0.001$), CFI = 0.987; TLI=0.983; RMSEA = 0.045 (90% CI 0.035–0.055); SRMR = 0.038. As seen in **Table 1**, time-management

[3]https://osf.io/gszjq/?view_only=64754bda6648487ba4e821e4b9272a16 where readers can find preregistration protocol and additional materials. https://osf.io/gszjq/?view_only=8bf1d551536441f1a8e8478143b8932c (**Table 1**).

skills is positively related to academic self-efficacy (β = 0.458, boot $SE = 0.041$, $p < 0.001$), which in turn was negatively related to drop-out intentions (β = −0.434, boot $SE = 0.053$, $p < 0.001$). The direct effect from time-management skills to drop-out intentions was insignificant (β = −0.074, boot $SE = 0.055$, $p = 0.177$). In other words, the better time-management skills that was reported, the higher was their academic self-efficacy, which was related to lower drop-out intentions. The indirect effect of time-management skills on drop-out intentions through self-efficacy was significant (β = −0.199, boot $SE = 0.032$, $p < 0.001$), indicating that academic self-efficacy indirect-only mediated the relationship of time-management skills with drop-out intentions. This implies that academic self-efficacy "fully" mediated the relationship between time-management skills and drop-out intentions.

Transfer University Intentions

The overall model fit for transfer university intentions was good. The chi-square test was significant ($\chi^2 = 228.576$, $df = 121$, $p < 0.001$), CFI = 0.983; TLI=0.980; RMSEA = 0.035 (90% CI 0.028–0.042); SRMR = 0.080. As seen in **Table 1**, the direct effects reveals that academic self-efficacy is positively related to time-management skills (β = 0.451, boot $SE = 0.044$, $p < 0.001$), which in turn was negatively related to transfer university intensions (β = −0.216, boot $SE = 0.059$, $p < 0.001$). The direct effect from time-management skills to transfer university intentions was insignificant (β = 0.083, boot $SE = 0.056$, $p = 0.135$). That is, the better time-management skills that were reported, the higher was their academic self-efficacy, which was related to lower transfer university intentions. The indirect effect of time-management skills on transfer university intentions through self-efficacy was significant (β = −0.098, boot $SE = 0.030$, $p = 0.001$). These results indicate the indirect-only mediation of academic self-efficacy when transfer university intentions is an outcome variable. This implies that academic self-efficacy "fully" mediated the relationship between time-management skills and transfer university intentions.

Transfer Study Field Intentions

The overall model fit for transfer study field intentions was very good. The chi-square test was significant ($\chi^2 = 192.841$, $df = 91$, $p < 0.001$), CFI = 0.987; TLI=0.985; RMSEA = 0.039 (90% CI 0.031–0.046); SRMR = 0.051. As in the abovementioned result, the direct effect from time-management skills are positively related to academic self-efficacy (β = 0.459, boot $SE = 0.042$, $p < 0.001$), which in turn was negatively related to transfer study field intensions (β = −0.265, boot $SE = 0.054$, $p < 0.001$). The direct effect from time-management skills to transfer study field intentions was insignificant (β = −0.022, boot $SE = 0.052$, $p = 0.674$). That is, the better time-management skills, the higher was the academic self-efficacy, which was related to lower transfer study field intentions. The indirect effect of time-management skills on transfer study field intentions through self-efficacy was significant (β = −0.122, boot $SE = 0.028$, $p < 0.001$), which indicated that academic self-efficacy also indirect-only mediated the relationship between time-management skills and students' transfer study field intentions. In other words, academic self-efficacy "fully" mediated the relationship between time-management skills and transfer study field intentions.

Summary

Overall, these results indicate "indirect-only" mediation of time-management skills on drop-out and transfer-out intentions by academic self-efficacy. The indirect only mediation overlaps with Baron and Kenny (1986) conceptualization of full mediation effect excluding precondition of significant total and direct effects (Zhao et al., 2010; Rucker et al., 2011). We hypothesized (*Hypothesis 1*) that relation of time-management with attrition intentions would be mediated by academic self-efficacy. The hypothesis was supported despite generally small effect size of time-management skills. The indirect-only mediation was found in all three cases (see **Table 1**). Further, comparison of mediation effect sizes (completely standardized mediation effects) showed that the effect of academic self-efficacy was larger in case of drop-out (β = −0.199, $p < 0.001$) and transfer study field intentions (β = −0.122, $p < 0.001$) than transfer university intentions (β = −0.098, $p < 0.001$). Thus, *Hypothesis 3* which assumed that the mediated effects might differ depending on the category of intention (i.e., drop-out, transfer-out) was supported.

Time-Management Skills and Attrition Intentions Via Academic and Social Integration

Drop-Out Intentions

The overall model fit for drop-out intentions was very good. The chi-square test was significant ($\chi^2 = 301.647$, $df = 83$, $p < 0.001$), CFI = 0.985; TLI=0.981; RMSEA = 0.059 (90% CI 0.052–0.066); SRMR = 0.052. The direct effects reveals that academic integration and social integration are positively related to time-management skills (β = 0.321, boot $SE = 0.044$, $p < 0.001$ and β = 0.218, boot $SE = 0.045$, $p < 0.001$, respectively), which in turn was negatively related to drop-out intensions (β = −0.287, boot $SE = 0.057$, $p < 0.001$ and β = −0.244, boot $SE = 0.050$, $p < 0.001$, respectively). The direct effect from time-management skills to drop-out intentions was significant (β = −0.126, boot $SE = 0.049$, $p = 0.01$). In other words, the better time-management skills, the higher was the academic and social integration, which was related to lower drop-out intentions. The indirect effect of time-management skills on drop-out intentions through academic integration was significant (β = −0.092, boot $SE = 0.022$, $p < 0.001$). Similarly, social integration was a significant mediator (β = −0.053, boot $SE = 0.016$, $p = 0.001$). Thus, the results indicate complimentary mediation of time-management skills on drop-out intentions by academic and social integration. This implies that academic and social integration "partially" mediated the relationship between time-management skills and drop-out intentions (see **Table 2**).

Transfer University Intentions

The overall model fit for transfer university intentions was very good. The chi-square test was significant ($\chi^2 = 378.714$, $df = 175$, $p < 0.001$), CFI = 0.986; TLI=0.984; RMSEA = 0.040 (90% CI 0.034–0.045); SRMR = 0.078. The direct effects reveals that academic integration and social integration are positively

TABLE 2 | Model estimates.

	Coefficient (β)	Boot *SE*	95% CI (BCB)	*p*
DROP-OUT INTENTIONS (*N* = 756)				
TIME → ACD-I	0.321	0.044	[0.234, 0.409]	<0.001
TIME → SOS-I	0.218	0.045	[0.130, 0.306]	<0.001
TIME → DR	−0.126	0.049	[−0.224, −0.031]	0.01
ACD-I → DR	−0.287	0.057	[−0.344, −0.173]	<0.001
SOS-I → DR	−0.244	0.050	[−0.537, −0.146]	<0.001
INDIRECT EFFECTS				
TIME via ACD-I	−0.092	0.022	[−0.142, −0.054]	<0.001
TIME via SOS-I	−0.053	0.016	[−0.091, −0.027]	0.001
Total effect	−0.272	0.047	[−0.366, −0.178]	<0.001

BCB, bias-corrected bootstrap; DR, Drop-out intentions; SOS-I, Social integration; ACD-I, Academic integration; TIME, Time-management Skills.

TABLE 3 | Model estimates.

	Coefficient (β)	Boot *SE*	95% CI (BCB)	*p*
TRANSFER UNIVERSITY INTENTIONS (*N* = 735)				
TIME → ACD-I	0.332	0.045	[0.239, 0.419]	<0.001
TIME → SOS-I	0.222	0.046	[0.130, 0.307]	<0.001
TIME → TR_U	0.094	0.050	[−0.004, 0.191]	0.06
ACD-I → TR_U	−0.126	0.054	[−0.231, −0.022]	0.02
SOS-I → TR_U	−0.306	0.054	[−0.412, −0.202]	<0.001
INDIRECT EFFECTS				
TIME via ACD-I	−0.042	0.019	[−0.083, −0.008]	0.03
TIME via SOS-I	−0.068	0.019	[−0.112, −0.037]	<0.001
Total effect	−0.015	0.049	[−0.112, 0.081]	0.76

BCB, bias-corrected bootstrap; TR_U, Transfer university Intentions; SOS-I, Social integration; ACD-I, Academic integration; TIME, Time-management Skills.

related to time-management skills (β = 0.332, boot SE = 0.045, $p < 0.001$ and β = 0.222, boot SE = 0.046, $p < 0.001$, respectively), which in turn was negatively related to transfer university intensions (β = −0.126, boot SE = 0.054, p = 0.02 and β = −0.306, boot SE = 0.054, $p < 0.001$, respectively). The direct effect from time-management skills to transfer university intentions was insignificant (β = 0.094, boot SE = 0.050, p = 0.06). In other words, the better time-management skills, the higher was the academic and social integration, which was related to lower transfer university intentions. The indirect effect of time-management skills on transfer university intentions through academic integration was significant (β = −0.042, boot SE = 0.019, p = 0.03). Similarly, social integration was a significant mediator (β = −0.068, boot SE = 0.019, $p <$ 0.001). Thus, the results indicate indirect-only mediation of time-management skills on transfer university intentions by academic and social integration. This implies that academic and social integration "fully" mediated the relationship between time-management skills and transfer university intentions (see **Table 3**). In comparison to the two other models in **Tables 2**, **4**, the direct effect from time-management skills to transfer university intentions had a positive sign. In addition, only this model produced a non-significant total effect (β = −0.015, boot SE = 0.049, p = 0.768). This finding is in line with the result found when academic self-efficacy was specified as the mediator (see **Table 1**).

TABLE 4 | Model estimates.

	Coefficient (β)	Boot *SE*	95% CI (BCB)	*p*
TRANSFER STUDY FIELD INTENTIONS (*N* = 754)				
TIME → ACD-I	0.321	0.046	[0.228, 0.409]	<0.001
TIME → SOS-I	0.224	0.046	[0.132, 0.312]	<0.001
TIME → TR_ST	−0.030	0.048	[−0.121, 0.066]	0.53
ACD-I → TR_ST	−0.171	0.058	[−0.283, −0.057]	0.003
SOS-I → TR_ST	−0.262	0.054	[−0.366, −0.155]	<0.001
INDIRECT EFFECTS				
TIME via ACD-I	−0.055	0.021	[−0.101, −0.018]	0.009
TIME via SOS-I	−0.059	0.017	[−0.100, −0.030]	0.001
Total effect	−0.144	0.046	[−0.233, −0.052]	0.002

BCB, bias-corrected bootstrap; TR_ST, Transfer study field intentions; SOS-I, Social integration; ACD-I, Academic integration; TIME, Time-management Skills.

Transfer Study Field Intentions

The overall model fit for transfer study field intentions was very good. The chi-square test was significant (χ^2 = 332.436, df = 136, $p < 0.001$), CFI = 0.988; TLI=0.986; RMSEA = 0.044 (90% CI 0.038–0.050); SRMR = 0.063. The direct effects reveals that academic integration and social integration are positively related to time-management skills (β = 0.321, boot SE = 0.046, $p < 0.001$ and β = 0.224, boot SE = 0.046, $p < 0.001$, respectively), which in turn was negatively related to transfer study field intensions (β = −0.171, boot SE = 0.058, p = 0.003 and β = −0.262, boot SE = 0.054, $p < 0.001$, respectively). The direct effect from time-management skills to transfer study field intentions was insignificant (β = −0.030, boot SE = 0.048, p = 0.53). In other words, the better time-management skills, the higher was the academic and social integration, which was related to lower transfer study field intentions. The indirect effect of time-management skills on transfer study field intentions through academic integration was significant (β = −0.055, boot SE = 0.021, p = 0.01). Similarly, social integration was a significant mediator (β = −0.059, boot SE = 0.017, p = 0.001). Thus, the results indicate indirect-only mediation of time-management skills on transfer study field intentions by academic and social integration. This implies that academic and social integration "fully" mediated the relationship between time-management skills and transfer study field intentions (see **Table 4**).

Summary

In sum, it was hypothesized (*Hypothesis 2*) that effect of time management on attrition intentions would be mediated by academic and social integration. The hypothesis was supported despite generally small effect sizes of time-management skills. The indirect-only mediation was found in case of transfer intentions (see **Tables 3**, **4**). The indirect only mediation overlaps

with Baron and Kenny (1986) conceptualization of full mediation effect excluding precondition of significant total and direct effects (Zhao et al., 2010; Rucker et al., 2011). Further, the complementary mediation was found in case of drop-out intentions (see **Table 2**). Thus, academic and social integration only "partially" explained the proposed pattern of relationship. Thus, *Hypothesis 3* which assumed that the mediated effects might differ depending on the category of intention (i.e., drop-out, transfer-out) was supported. Of note, academic integration is relatively more important for drop-out intentions than social integration (as indicated by the beta coefficients), while the opposite is true for transfer intentions.

Results Summary

The results of the present study lend support to our initial hypotheses and can be summarized as follows. The relationship between time-management skills and attrition intentions was mediated by students' academic self-efficacy beliefs. Similar results were obtained when analyzing mediatory effects of academic and social integration. However, taking differences in the outcome variables (i.e., attrition intentions) into account, the effects of time-management skills mediated by academic self-efficacy were on average larger than those mediated by academic and social integration constructs. Furthermore, the total effect was insignificant in both models specifying transfer university intentions as the outcome variable. Clearly, one reason for this is the generally weaker effect between the mediators and transfer-out intentions. Also, in both the transfer university models the sign of the direct and indirect effect are of opposite directions, which leads to a reduction of the total effect. However, the primary aim of the study was to establish mediation, which is possible without a significant total effect (Zhao et al., 2010; Rucker et al., 2011; Agler and De Boeck, 2017).

DISCUSSION

Behavioral intentions are mental states that are generally assumed to capture commitment or motivation to act and readiness of a person to perform a specific behavior (Fishbein and Ajzen, 1975; Ajzen, 1991; Webb and Sheeran, 2006; Gollwitzer, 2012). However, despite the theoretical and practical utility of behavioral intentions, few studies have focused on intentions in the context of academic attrition. The objective of this paper was to investigate mechanisms that could explain different types of attrition intentions, i.e., drop-out, transfer university, and transfer study field intentions. Thus, we investigated if three potential factors would facilitate attrition intentions among Norwegian university students by mediating the effect of time-management skills. In particular, we focused on the mediatory effects of academic self-efficacy, academic integration, and social integration (Tinto, 1975, 1993; Robbins et al., 2004; Willcoxson et al., 2011).

The findings of the present study lend support to previous research (e.g., Tinto, 1975, 1993; Robbins et al., 2004; Willcoxson et al., 2011), but also contribute to research on academic attrition in the following ways. First, the findings that time-management skills and academic self-efficacy are important in explaining students' academic performance and attrition intentions are in line with previous research (Robbins et al., 2004; Willcoxson et al., 2011; Dunlosky et al., 2013). However, addressing either of them separately with an aim to reduce attrition might be tricky. For example, findings by Jairam (2019) indicate that despite being explicitly taught effective study strategies, students continued to use the ones that are commonly found to be less productive. The author concluded that traditional approaches used to reduce attrition and improve retention such as teaching students academic skills might be ill-suited practice. One of the potential reasons proposed by Wernersbach et al. (2014) might be the neglect of students' academic self-efficacy beliefs. This assumption is in line with our results showing that although time-management skills were not directly related to attrition intentions, while the indirect effect through academic self-efficacy was.

Second, we tested the mediatory role of academic and social integration in the relationship of students' time-management skills with attrition intentions. Both factors were significant in mediating the effects of time-management skills. The findings indirectly support assumptions of Tinto (1975, 1993), Bean (1982, 1990), and Cabrera et al. (1993) on the importance of academic environment in the process of academic attrition. Nevertheless, a comparison of the proposed mediatory models showed that cognitive factors (i.e., academic self-efficacy) had generally larger effects in explaining students' attrition intentions than traditionally considered social factors of the academic environment (i.e., academic and social integration). These results support Tinto (2017) recent assumptions that students' perspectives and perceptions should be also addressed when devising interventions and assistance programs.

Also, the results of the current study showed that both academic and social integration were significantly related to students' intentions to drop-out, transfer to another university, and transfer to another study field. The findings contradict Bean and Metzner's (1985) idea that social factors are less important for non-traditional students. These researchers defined non-traditional students as individuals who are either older than 24 years, do not live on campus, are part-time students, or who have all these characteristics. According to the definition, the students from the current sample can be defined as non-traditional (e.g., 35% were older than 24 years and none of the students live on campus). Hence, further investigation of social and academic integration factors in the Norwegian context adjusting the definition of non-traditional students might provide valuable insights into academic attrition. For example, culture-specific validity and reliability of the theories on academic attrition. Similar conclusions can be made based on the negative relationship between academic and social integration with transfer university intentions. These findings stand in contrast to what has been found on the issue of vertical transfer (i.e., positive relationship) among American students (Nora and Rendon, 1990; Tinto, 1993).

Finally, the results of the present study show that the pattern and magnitude of the effects were dependent on the outcome variable being measured. Specifically, academic and social integration complementary or "partially" mediated the

relationship between time-management skills and drop-out intentions. In contrast, both factors indirect-only or fully mediated the same relationship in the case of transfer intentions. Also, the effects mediated by academic self-efficacy were two times larger for drop-out intentions than transfer university intentions. These results are in line with previous findings that students transferring to other universities might be equally able as students who persist and more able than those who drop-out entirely (Tinto, 1993; Quinn-Nilas et al., 2019). Moreover, our results showed that time-management skills were positively related to students' intentions to change university. Although the relationship was insignificant, it provides an indirect support to the same notion. Further, the findings indicate the significance of distinction among students' attrition intentions which is in line with previous research on attrition behavior (Hovdhaugen, 2009). To the best of our knowledge, this is the first study addressing the same issue in terms of behavioral intentions.

These findings are important from several perspectives. First, from the theoretical perspective, students should be distinguished into more than two groups when behavioral intentions are used as a proxy of students' future behavior. The problem with dichotomization of students (i.e., returning and non-returning students) is inaccuracy in prediction and explanation of students' behavior. The same consequences could be assumed when students who leave are treated as a single population. Second, from the perspective of the government and universities, decisions based on the findings treating attrition students as a single population might potentially lead to the opposite outcomes than those being expected.

Limitation and Future Studies

One of the main limitations of the current study regards the psychometric properties of the attrition intentions scale. Four items used to measure the degree of intention's formation did not show an expected factor structure. A more precise formulation of the response items should be evaluated. Similarly, increasing the number of items measuring attrition intentions is a possible solution and should be addressed in future studies. This would require development of a specific measurement scale due to researchers' preference to use single-item measures in the field of academic attrition.

Second, the measure of academic self-efficacy that has been used in the current study measures a more general perception of students' academic-related beliefs. Thus, the observed effect sizes might be underestimated (Bandura, 1997). Future research studies might consider devising and validation of a time management specific scale to validate this assumption.

Third, academic skills is a multifaceted construct (Tressel et al., 2019). Even if time-management skills is a key process of students' self-regulation and academic success, it does not cover all aspects of academic skills and competences (Zimmerman, 2002; Credé and Kuncel, 2008). Thus, future studies should address other important aspects of the phenomenon, such as critical thinking, metacognition, depth of information processing.

Fourth, the design of the current study does not allow to make firm conclusions about causality of the observed patterns of relationships (i.e., time-management skills, self-efficacy). Based on the available evidence, the relationship may be accounted for by alternative models (MacCallum et al., 1993). For example, the relationship between self-efficacy and skills (study strategies) may be bi-directional (Phan, 2011). Thus, validation of the results by experimental or/and longitudinal studies is required. The research findings by van Dinther et al. (2011), Bartimote-Aufflick et al. (2016), and Weinstein et al. (2000) might provide some valuable insights on potential study designs.

Fifth, it is worth mentioning an exploratory aspect of the present study. Non-probability based sampling method (i.e., convenience sampling) has been used for data collection purposes. Thus, generalization of the results of the present study to the whole population of Norwegian students should be done with caution. Future studies should preferably acquire the probability based sampling methods to make more valid statistical inferences.

Finally, actual attrition behaviors (e.g., registry data, university records on students' academic status) should also be considered in future studies. As discussed, attrition intentions are closely related to students' actual behavior (Bean, 1982; Mashburn, 2000). Although behavioral intentions can be assumed to be a close approximation of future behaviors, they might not necessarily lead to the actual implementation of those intentions (Wu and Du, 2012). Further clarification of the relationship of the proposed mechanisms with actual behaviors is important and will be addressed in future studies by the current research group.

Conclusion

The findings of the current study indicate the significance of distinction among students' attrition intentions which is in line with previous research on attrition behavior (Hovdhaugen, 2009). Thus, future studies should be explicit on what is the primary outcome of their study. Further, consistent with previous research findings our results provide preliminary evidence on the mechanism being involved in the process of academic attrition. Providing students the tools (i.e., skills) required for academic success might not be enough, they should also believe that that they can succeed if implementing these tools. Although future experimental studies are required to support the indicated pattern of relationship between time-management skills and attrition intentions. These studies would provide a more solid scientific evidence for development of effective assistance programs for students (Jairam, 2019). What is clear is that "students' perceptions of their experiences add another dimension to our understanding of the complex process of persistence and completion" (Tinto, 2017, p.264).

DATA AVAILABILITY STATEMENT

The data will be made available at Open Science Framework (https://osf.io/gszjq/?view_only=64754bda6648487ba4e821e4b9272a16) at a latter point.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

EN wrote the draft and did the statistical analyses under the supervision of FS. TG-K assisted with data analyses. RS, TG-K, and FS edited the manuscript. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2020.606291/full#supplementary-material

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Appendix B: Paper 2

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Academic Self-Efficacy, Procrastination, and Attrition Intentions

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Why do students leave universities? The current study addresses the problem of academic attrition from the perspective of students' intentions. Specifically, we focus on the roles of academic self-efficacy and procrastination in exploring their relationships with attrition intentions. Based on existing research, we expected a negative relationship between academic self-efficacy and attrition intentions, with procrastination as a possible mediator. Furthermore, it was expected that this relationship would differ depending on the type of attrition (i.e., drop-out, transfer university, transfer study field). These hypotheses were investigated among Norwegian students in a questionnaire study (N = 693). Results showed that procrastination partially mediated the relationship between academic self-efficacy and three attrition intentions categories. Although procrastination was a significant mediator of self-efficacy for all types of intentions, the sizes of the direct and indirect effects were different. We conclude that academic procrastination is important in understanding the relationship between students' self-efficacy beliefs and attrition intentions.

Keywords: academic attrition, attrition intentions, drop-out, transfer-out, academic self-efficacy, procrastination, mediation

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INTRODUCTION

The rates of students' departure before degree completion (i.e., academic attrition) remain relatively high across Europe, with 24% of students leaving higher education before obtaining formal degree qualifications (OECD, 2019). Internationally, academic attrition remains on the agenda of higher education stakeholders. The increased importance of formal education, detrimental societal and personal consequences of academic attrition are among the main reasons for increased attention to the issue. For example, personal consequences might include short- and long-term economic consequences (i.e., needing to pay back study loans while earning lower wages due to the lack of formal qualifications) as well as reduced physical health and general well-being (Mayhew et al., 2016; Zajacova and Lawrence, 2018; Kirp, 2019). The leading social consequence is an inefficient use of government funding which might have more detrimental consequences in countries with state-funded higher education systems (OECD, 2021a,c). Therefore, research providing good explanations seems required to facilitate more effective solutions.

Academic attrition has usually been addressed from the perspective of students' actual behavior, despite research evidence on the role of intentions in explaining human behavior (e.g., Sheeran, 2002; Morwitz and Munz, 2020). Although some theoretical models address the role of attrition intentions (e.g., Bean, 1982; Tinto, 1993; Bean and Eaton, 2000), they do not differentiate between types of students' attrition (e.g., leaving permanently, changing university). However, evidence

shows that the predictive ability of intentions might be dependent on the behavior in question (e.g., Sheeran, 2002). Although intentions might be a good predictor of students' permanent departure from the university, the same might not be the case for changing university.

In turn, focusing on different types of students' attrition intentions might enable institutions to better address and assist students during the process of disengagement. For example, students intending to change the place of education or study field but continue their education may receive better support before (e.g., considering alternative solutions, providing information about the process) and during (e.g., grades transfer assistance) the actual transfer which might be beneficial for time spent on obtaining a degree (Li, 2010; Spencer, 2021). Students intending to leave altogether might need different types of support. Hence, counselors and university staff might adjust assistance or intervention strategies accordingly by knowing students' intentions. Interventions based on a vague definition of the target population and their intentions, on the other hand, may be limited in their effectiveness (e.g., Hovdhaugen, 2011).

The present study aims to address some of the central student-related factors and mechanisms involved in the process of attrition intentions formation. Understanding the mechanisms involved may assist researchers and practitioners in developing, assessing, and refining the assistance programs. In particular, the present study aims to assess the relationship of two psychologically grounded factors (i.e., academic self-efficacy and procrastination) with different types of attrition intentions. As will be discussed, academic self-efficacy is related to procrastination and students' attrition. However, few studies have investigated the relationship between procrastination and academic attrition. Further, these factors have not been examined accounting for different attrition intentions (e.g., leaving entirely, changing an academic institution). Hence, we first present a brief overview of academic attrition and the role of behavioral intentions. Then we proceed with an overview of the factors of interest in the present paper, self-efficacy and procrastination.

ACADEMIC ATTRITION AND ITS VARIABILITY

Researchers have used different terminology to describe that some students leave their studies before getting an official degree qualification. The operationalization of the phenomenon varied from "wastage" (e.g., Cross and Hall, 1954) to more recent "attrition." However, a common feature shared by both operationalizations is their negative connotation[1]. Although neither wastage nor attrition are appropriate to fully describe student departure, we will use the term *academic attrition*, an umbrella term for all types of academic discontinuations.

However, it is important to acknowledge that there are different forms of academic attrition. The notion that all students leaving higher education are not the same can be traced back to Tinto (1993). In his seminal work, Tinto (1993, Chapter 2) provides a synthesis of research and, importantly, distinguishes between two main categories of students' departure, *institutional* and *system* departure. The first type of departure describes a pattern of attrition when students switch academic institutions (i.e., transferring out), while the second distinguishes students who leave the wider education system altogether (i.e., dropping out). The categorization was primarily based on the registry data and pattern of students' behavior after leaving university. This distinction was seen as crucial since different factors were assumed to be involved. If an academic institution aims to handle departure, it is essential to know which type of departure a university is dealing with, institutional or system.

The institutional-system distinction is supported by research evidence indicating non-uniformity of the student population (Hoyt and Winn, 2004; Hovdhaugen, 2009; Jones-White et al., 2010; Kehm et al., 2019). For example, previous and current academic performance, or "problems related to meeting academic standards," are reported more frequently as reasons for leaving by drop-out than by transfer-out students (Hoyt and Winn, 2004; Hovdhaugen, 2009, 2011; Hovdhaugen and Aamodt, 2009). Indeed, transfer-out students have comparable performance with direct-entry students (Aulck and West, 2017; Quinn-Nilas et al., 2019). Also, Hovdhaugen (2009) found that background characteristics such as age, gender, and school grades are significantly related to dropping out, but not so for transfer-out behaviors. Transfer-out was more strongly related to students' motivation, educational goals, and field of study.

Behavioral Intentions to Leave Education

Behavioral intention is one of the most studied factors in basic and applied research on human behavior (Morwitz and Munz, 2020). Based on a meta-analysis by Sheeran (2002), intentions explain 28% of the variance in behaviors including alcohol consumption, weight loss, seatbelt use, training, smoking, and cancer screening, to name but a few. These findings align with the assumptions of the Theory of Reasoned Action (TRA)/Theory of Planned Behavior (TPB) stating that intentions are the closest antecedents of actual behaviors (Fishbein and Ajzen, 1975; Ajzen, 1991). According to TRA and TPB, intentions capture the motivational factors influencing actual behaviors. Intentions are indicators of how hard people are willing to try and how much effort they are planning to exert to perform behaviors. It is assumed that the stronger the intention to perform a behavior is, the more likely a person is to perform the behavior.

However, behavioral intentions or intentions to leave education have been rarely included in a theoretical discussion on academic attrition. This can be partially explained by the predominance of the sociological perspective on the issue (for review, see Melguizo, 2011; Aljohani, 2016; Behr et al., 2020). Nevertheless, some classical theories of academic attrition and

[1]Still, it is worth mentioning that not all types of students' departures are necessarily negative or, at least, not for everyone and not in every case (e.g., Faas et al., 2018). For example, changing university might be perceived as something positive from a student's perspective since he/she is presumably aiming for a degree qualification, only in a more suitable institution/place. Also, some students might take only specific courses to increase their qualifications while being employed. In addition, students may take a break from their studies for one or another reason and subsequently re-enroll to receive their academic degrees. Yet another group might find that higher education is not for them but may go on to something else without any negative consequences.

their reevaluations acknowledged the importance of students' intentions. For example, the ideas from TRA/TPB (i.e., intentions as antecedents of behaviors) were implemented in the student attrition models by Bean (1982) and Cabrera et al. (1993). The authors found that intentions to leave were the best predictor of students' actual attrition. Also, the importance of student's attrition intention as an antecedent of actual behavior is asserted in the models by Tinto (1993) and Bean and Eaton (2000). Although the models agree on the role of intentions, they do not address the variability of academic attrition. As discussed, different factors are related to the different types of attrition, and thus it might be the case for students' intentions. Moreover, based on the analysis of items used to measure students' intentions, the classical studies might have assessed students' persistence intentions (e.g., "Do you expect to return to this university next fall"; Bean, 1982). Still, it is evident that reasons for staying can differ from reasons for leaving.

To summarize, emerging evidence shows that transfer-out and drop-out students leave universities for different reasons. Thus, operationalizing and measuring students' departure in general terms such as wastage or attrition may lead to imprecise results and conclusions. For example, the overrepresentation of drop-out students in a study sample might lead to findings that are hardly applicable to transfer-out students, and the other way around. Further, few studies investigated differences in factors related to students' intentions. The central assumption of the majority of proposed theoretical models and frameworks is that students' attrition results from their interaction with the academic environment. Still, what is lacking in the interactionalist perspective and research on academic attrition is factors that are relevant for students and their learning. Further, relatively few studies have focused on factors that are malleable and for which evidence on possible interventions is available. In the present study, we aim to address these issues by assessing the relationship of academic self-efficacy and procrastination with students' drop-out, transfer university, and transfer study field intentions. As will be discussed, both factors may have theoretical and practical utility.

FACTORS AND MECHANISMS INVOLVED IN ACADEMIC ATTRITION

Academic Self-Efficacy

From a student's perspective, attrition can be seen as a manifestation of a flaw in motivation. According to results of multiple meta-analyses and reviews (e.g., Robbins et al., 2004; Richardson et al., 2012; Schneider and Preckel, 2017), academic self-efficacy shows the strongest relationship with both academic performance[2] and persistence. Also, indirect evidence shows that self-efficacy might be related to both dropping and transferring out behaviors. According to the Social Cognitive Theory (Bandura, 1997), individuals' confidence in their ability to perform a required course of action to solve a problem or achieve a desired goal (i.e., *self-efficacy*) is important for understanding human motivation and behavior. The basic principle behind self-efficacy is that individuals are more likely to engage, exert more effort, and persist in activities for which they have high self-efficacy. By and large, the evidence supports the theoretical predictions on the relationship of self-efficacy beliefs with the amount of effort devoted to and persistence on a certain task (Van Dinther et al., 2011; Jackson et al., 2012; Komarraju and Nadler, 2013; Puente–Diaz and Cavazos–Arroyo, 2018). In turn, students' efforts are related to both drop-out and transfer-out behaviors (Hovdhaugen, 2009).

Further, self-efficacy beliefs play a major role in Bean and Eaton's (2000) model of academic attrition. Similar to Tinto's (1975, 1993) and related theoretical models, student-university interaction is an important part of the model by Bean and Eaton (2000). Nevertheless, it adds an individual perspective or students' self-assesments of their interaction with university into the explanation of the attrition process. In particular, Bean and Eaton (2000) assumed that as the result of interaction with the university's environment, students' academic and social self-efficacy increases or decreases facilitating persistence or attrition intentions and actual behavior. Hence, the relationship between self-efficacy and students' attrition intentions can be assumed. Also, according to the Theory of Planned Behavior, self-efficacy as a dimension of behavioral control is a crucial aspect in the formation of behavioral intentions and has a direct relationship with actual behavior (Ajzen, 1991, 2002, 2020). According to TPB (Ajzen, 1991, 2002), behavior is primarily determined by attitudes toward behavior, subjective social norms or pressure from significant others, and perceived behavioral control (PBC). Individual's attitudes, subjective norms, and PBC influence behavior by facilitating intention to act. The theory assumes that behavioral intentions, which summarize the motivational forces (i.e., attitudes, subjective norms, and PBC), are the most approximate predictors of behaviors. In addition, the theory also suggests that PBC can have a direct impact on behavior.

Hence, academic self-efficacy is related to students' attrition intentions and actual attrition behaviors. Although the results of Robbins et al. (2004) meta-analysis support the importance of self-efficacy for students' retention, the size of the relationship was only moderate. Nevertheless, we argue that this relationship is crucial and has a great theoretical and practical utility. First, from a practical perspective, self-efficacy is a cognitive belief that is malleable to change (Bandura, 1997; Van Dinther et al., 2011; Bartimote-Aufflick et al., 2016). Second, from a theoretical perspective, the evidence on the relationship of self-efficacy with different categories of students' attrition (i.e., drop-out, transfer-out) is scarce. Third, according to Weissberg and Owen (2005), the findings of Robbins et al. (2004) might not be equally applicable to commuter students, which is the case for many European universities and our study sample. Thus, research on the importance of students' self-efficacy for different attrition intentions is of particular interest.

[2]Academic performance is the most stable predictor of drop behaviors (Tinto, 1975, 1993; Bean, 1982; Bean and Metzner, 1985; Bean and Eaton, 2000; Robbins et al., 2004). In addition, as discussed in the section on the variability of academic attrition, performance may be important in the distinction of drop-out and transfer-out students.

Malleability of Self-Efficacy

As noted, self-efficacy is assumed to effect engagement, effort, and persistence in tasks and behaviors (Bandura, 1997; Van Dinther et al., 2011). According to the Social Cognitive Theory (Bandura, 1997), there are four primary sources of information that influence or create self-efficacy: mastery experience (previous success experience), vicarious (observational) experience, social persuasion, and physical/affective states. The common characteristic describing these four sources of self-efficacy is that they are based on personal experience meaning that self-efficacy may be improved. Indeed, the evidence supports the theory's assertion. For example, Bartimote-Aufflick et al. (2016) reviewed 64 articles indicating 17 intervention studies investigating if certain teaching strategies or approaches can improve students' self-efficacy. Among these studies, ten interventions demonstrated improvement in participants' self-efficacy beliefs. In particular, facilitating opportunities to work with peers, helping students identify their misconceptions, including multimedia into the learning process, providing additional resources and activities for challenging concepts, and encouraging students to share their personal experiences were effective. Also, Van Dinther et al. (2011) note that interventions based on the Social Cognitive Theory are more effective with mastery experiences having the most powerful influence on self-efficacy beliefs. Here, providing practical experience such as performing a task while applying knowledge and skills in a demanding situation is argued to facilitate mastery experience. In addition, goal setting combined with self-reflection (i.e., self-regulation components) may influence students' perception of progress leading to mastery experience.

Procrastination and Academic Attrition

Procrastination has been defined as a voluntary delay of an intended course of action despite expecting to be worse off for doing so (Steel, 2007; Klingsieck, 2013). Procrastination can occur in all possible areas but is especially prevalent in the academic context (i.e., academic procrastination; Steel, 2007). Poor academic achievement, perceived stress, depression, and anxiety are among the potential outcomes of students' tendency to procrastinate (Steel, 2007; Klassen et al., 2008; Kim and Seo, 2015; Rozental et al., 2015; Sirois, 2016). To the best of our knowledge, only few studies have investigated the role of procrastination in academic attrition. For example, Grau and Minguillon (2013) demonstrated that students taking online programs who procrastinated in returning to university after taking a break from studies were more likely to leave permanently (i.e., drop out). Further, Bäulke et al. (2018) found that procrastination is related to drop-out intentions and mediated the relationship between motivational regulation and students' intentions. Also, results of a qualitative study by Visser et al. (2018) indicated that students scoring high on academic procrastination reported that they considered quitting their studies. Finally, Herrmann and Brandstätter (2015) found that an *action crisis* was predictive of disengagement from academic goals (i.e., dropout). An action crisis is a decisional conflict between continuing and disengaging from the pursuit of a personal goal. As defined by Herrmann and Brandstätter (2015), this conflict is characterized by six dimensions, including procrastination. However, to the best of our knowledge, there is no evidence on whether procrastination is related to other types of academic attrition (i.e., transfer-out intentions and behaviors).

Malleability of Procrastination

Similar to self-efficacy beliefs, research evidence shows that academic procrastination can be ameliorated (see meta-analysis by Van Eerde and Klingsieck, 2018, Malouff and Schutte, 2019). According to Van Eerde and Klingsieck (2018), cognitive-behavior therapy is the most effective approach. Still, such interventions are usually either *ad hoc*, time-consuming or require the involvement of professionals. Thus, interventions that would enable educators to support students effectively within their natural academic environment with little additional effort are of particular interest. According to Wäschle et al. (2014), one of such approaches may be strengthening students' self-efficacy beliefs. These authors argued that high self-efficacy facilitates students' achievement by increasing their motivation and application of effective learning strategies. Achievement, in turn, contributes to and raises self-efficacy which should facilitate students' motivation and achievement during the next learning cycle (i.e., virtuous cycle of self-efficacy). The results of the study supported these assumptions and indicated that self-efficacy beliefs have an important role in counteracting procrastination.

Procrastination as a Mediator

The research shows a close relationship between self-efficacy and procrastination. According to the Social Cognitive Theory (Bandura, 1997), high self-efficacy should increase students' effort and persistence devoted to a task. Hence, a negative relationship between self-efficacy and procrastination characterized by reduced effort and persistence is not unexpected (Van Eerde, 2003; Klassen et al., 2008; Wu and Fan, 2017). In addition, experimental evidence shows that altering students' negative and irrational thoughts (e.g., low self-efficacy) may be effective in reducing procrastination (Visser et al., 2017). The findings can be explained by the Temporal Motivational Theory (TMT; Steel and König, 2006). According to TMT, self-efficacy (an indicator of the expectancy construct) is crucial in explaining procrastination. In particular, motivation to perform a behavior (i.e., utility) is increased when people are confident of acquiring the desired reward (i.e., expectancy) or outcome (i.e., value). In turn, increased motivation should increase task performance or reduce task delay (i.e., procrastination).

In addition, although direct evidence on the environmentally driven nature of procrastination is scarce, different lines of research suggest that procrastination may be ingrained into the academic environment (Klingsieck, 2013; Svartdal et al., 2020). Hence, procrastination might represent an unintended environmental characteristic (i.e., academic system; Tinto, 1993) facilitating students' attrition intentions and actual attrition behaviors (Bean and Eaton, 2000). Likewise, evidence on the negative relationship of procrastination with academic performance is well-established (Steel, 2007; Kim and Seo, 2015). In turn, students' performance is a central aspect of the

student-university interaction perspective where performance is commonly defined as a mediating factor in the process of academic attrition (Aljohani, 2016). Finally, seen from a different perspective, academic attrition can be seen as a result of a goal-disengagement process (Brandstätter and Bernecker, 2021). In turn, action crisis characterized by delaying a goal pursuit (i.e., procrastination) has been commonly found to precede actual goal-disengagement (Herrmann and Brandstätter, 2015). Action crisis typically arises when individuals suffer from repeated setbacks. In the case of students, the setbacks may be determined by their self-efficacy beliefs (for review, see Honicke and Broadbent, 2016).

In sum, different lines of research suggest that having low self-efficacy beliefs may be detrimental to students' academic success and persistence. In this study, we will investigate whether this relationship can be explained (i.e., mediated) by students' tendency to procrastinate. As discussed, although the assumption is reasonable, there is no evidence on whether procrastination is related to other types of academic attrition beyond dropout (i.e., transfer-out intentions and behaviors). Hence, we aim to elucidate this aspect which may have practical utility for universities since both academic self-efficacy and procrastination are malleable to change (e.g., Van Dinther et al., 2011; Wäschle et al., 2014; Bartimote-Aufflick et al., 2016; Van Eerde and Klingsieck, 2018).

BACKGROUND FACTORS

Also, we considered several potentially relevant covariates including gender, age, high-school GPA, study field, university affiliation, years studied, parents' education, and history of changing study field or university. Previous empirical research suggests a relationship between students' background factors and actual attrition. For example, Hovdhaugen (2009) found that females, younger students, students whose parents have higher education, and students having better high-school GPAs are less likely to drop out. In contrast, transferring to another university is less likely when students are older and study natural sciences. Also, some evidence shows that females are more likely to switch majors (i.e., transfer study field) than males (Astorne-Figari and Speer, 2018; Meyer et al., 2021). Still, based on the findings of Ishitani and Flood (2018a), females may be less prone to change university (i.e., transfer university). Further, researchers note that attrition, including transferring out, varies across study fields and programs (DesJardins et al., 2003; Danaher et al., 2008; Ishitani and Flood, 2018b; Korhonen and Rautopuro, 2019). According to Wolter et al. (2014), students who have previously changed their study field or major are more likely to drop out. Similarly, changing university (i.e., history of changing university) was found to be negatively related to students' degree attainment and persistence (Ishitani, 2008; Li, 2010). Finally, Willcoxson (2010), Willcoxson et al. (2011), and Ishitani and Flood (2018b) found that different factors may drive students to drop and transfer out depending on their study year and university affiliation.

The findings that background factors (i.e., age, gender, high-school GPA) are important in the process of students attrition are in line with available theoretical models and frameworks (e.g., Tinto, 1975, 1993; Pascarella et al., 1983; Bean and Metzner, 1985). Still, the described associations are primarily found for students' actual behavior while evidence on students' intentions is scarce. Based on TPB, stating that intentions are the closest antecedents of actual behaviors, we assumed that the described factors are important for students' attrition intentions and, therefore, appropriate to control for in the analyses.

THE CURRENT STUDY

Academic attrition and persistence have been commonly viewed as the result of interaction between students and their academic environment leading to either persistence or attrition. Still, the mechanisms involved in the process of student-university interaction have rarely been addressed explicitly. In the present paper, we focus on the relationship of students' self-efficacy with different categories of attrition intentions (i.e., drop-out, transfer university, and transfer study field). As discussed, the relationship between self-efficacy beliefs and students' persistence/attrition is well-documented in the research literature (Robbins et al., 2004). Still, the evidence on the relationship of self-efficacy with other types of departure (i.e., transfer university or study field) is less clear. Also, there is little evidence on the mechanisms that explain this relationship. In the present study, we investigated if procrastination is one of such mechanisms. Self-efficacy beliefs are relatively strongly related to procrastination (Van Eerde, 2003; Klassen et al., 2008) which, in turn, is related to students' drop-out intentions (Bäulke et al., 2018). As discussed, low self-efficacy may incline students to delay and devote less effort to academic tasks facilitating students' attrition intentions (Van Eerde, 2003; Klassen et al., 2008; Hovdhaugen, 2009; Wu and Fan, 2017). In addition, seen as an environmental characteristic, procrastination may be important in the student-environment interaction process traditionally used to explain academic attrition (Tinto, 1993; Bean and Eaton, 2000; Svartdal et al., 2020). Finally, although it remains unknown whether interventions aimed at self-efficacy and procrastination substantially reduce academic attrition, the literature suggests that both factors are amenable to change. In this study, we assume that self-efficacy is negatively related to procrastination and attrition intentions (*Hypothesis 1*). Further, the relationship between self-efficacy and attrition intentions is mediated by students' procrastination tendency (*Hypothesis 2*). Finally (*Hypothesis 3*), we aim to explore if the observed relationships (i.e., direct and indirect) would differ for three types of attrition intentions (i.e., drop-out, transfer university, and transfer study field). It is expected that the observed relationships would differ for three types of intentions.

MATERIALS AND METHODS

Sample and Setting

Participants were 693 students (65% females) in different stages of their education: first-year (26%), second-year (25%), third-year (19%), fourth-year (13%), fifth-year (10%), and sixth-year or

more (7%). Age ranged from 19 to 54 with a mean of 23.9 years (*SD* = 4.79). The data was collected at the beginning of the spring semester (January- March) 2020 before the COVID restriction. The response and completion rates were satisfactory (41.2 and 88.5%, respectively).

Assessment and Measurement

Procedure and Ethics

Students were contacted via the university's e-mail and received an invitation to the study containing a brief study summary. Following the link, respondents were presented with a consent form, informed that they were anonymous and could refrain from answering or withdraw from the study at any time. Participants agreed to participate in the web-based survey by pressing a start survey button after reading information about the study. Uncompleted and suspicious responses (e.g., fast completion time) were excluded from analyses. The study was approved by the Norwegian Center for Research Data (NSD) in accordance with the requirements of data protection legislation (reference code 651244). The data for the present study is available on Open Science Framework (OSF)[3]. Participants could also participate in a random tracking of a gift card with a value of 1000 NOK. These participants provided their phone numbers which were recorded and stored separately from the rest of the data. Phone numbers were deleted when a winner had been chosen.

Covariates of Attrition Intentions

Students were asked to report their gender, age, high-school GPA, study field, university affiliation, years studied, parents' education, and history of changing study field or university (see **Supplementary Table 8** for descriptive data). *Age* was an open-ended question. *High-school GPA* was a categorical variable consisting of six categories (1 = Lowest grade; 6 = Highest grade). *Study field* was recorded into five categories: psychology; humanities and social science; science, technology, engineering and math (STEM); medicine and health science; biology and fishery. *Parents' education* included four categories: lower-secondary education, upper-secondary education, higher education, and other. Responses of students who chose "other" were recorded as missing. Parents' education was not distinguished into the mother's and father's levels of education based on data privacy considerations. *University affiliation* consisted of two categories: University of Tromsø (UiT) and Norwegian University of Science and Technology (NTNU). Only 18 participants were from other universities and, thus, were recorded as missing. *Number of years studied* at university was a six-categories variable (1 = 1 year; 6 = 6 years or more). Participants who have studied for 4 years and above were merged into one category due to the small sample size in the last two categories (i.e., 5, 6 years, and more). We also included two questions about students' *previous history of changing study fields* and *history of changing academic institutions* (0 = No; 1 = Yes). *Parents' education* (with university's education as the reference group), *university affiliation* (with students from NTNU as the reference group), *number of years studied* (with 1 year as the reference category), and *study field* (with medicine as the reference group) were dummy coded for subsequent mediation analyses. The reference category was chosen based on the easiness of interpretation (e.g., years studied). The medicine field was chosen as the reference group based on present results showing the most differences with other study fields. High-school GPA was subsequently excluded from the mediation analysis. According to the Social Cognitive Theory (Bandura, 1997), high school GPA is the antecedent of self-efficacy (i.e., previous or mastery experiences). In the study, it was related to students' academic self-efficacy beliefs (i.e., independent variable) and was insignificantly related to attrition intentions. Exclusion of high-school GPA did not lead to substantial changes in the estimated relationships.

[3]https://osf.io/k8ax4/?view_only=f8cf1a2b15ab4da7b552e4a20a79e125

Academic Self-Efficacy

The measurement index was borrowed from a Danish study by Herrmann et al. (2017). The scale is based on MSLQ (Motivated Strategies for Learning Questionnaire) by Pintrich (1991). Three items were chosen based on the reported highest factor loadings (Herrmann et al., 2017). An example item is: "I am confident that I can acquire the skills necessary to excel within my field of study" with higher scores indicating stronger self-efficacy beliefs (1 = Totally disagree; 5 = Totally agree). The items were translated to Norwegian with forward-back translation. Internal reliability (Cronbach's alpha) was 0.80. The measure was significantly related to students' self-reported academic performance (r = 0.39) and three study strategies subscales (relating ideas, r = 0.32; time-management, r = 0.38; unrelated memorizing, r = –0.39) consistent with the research literature (Robbins et al., 2004; Diseth, 2011; Richardson et al., 2012). This particular scale was chosen since the pure self-efficacy scale (i.e., task- or subject-specific) was deemed inappropriate in the context of the present study (i.e., students from different study fields). Still, it is worth mentioning that such decision could raise some questions about the construct validity (i.e., self-concept/self-efficacy distinction; Marsh et al., 2019).

Procrastination

A subset of four items from the Academic Procrastination Scale (APS; Mccloskey and Scielzo, 2015; Yockey, 2016) measured academic procrastination (e.g., "I know that I should work on a school work, but I just don't' do it"; "Cramming and last-minute studying is the best way that I study for a big test"). Based on the exploratory factor analysis performed before the main analysis, one item was excluded due to factor loading below 0.40 and low communality. The items were translated to Norwegian with forward-back translation. All items are rated on a 5-point scale with higher scores indicating more procrastination (1 = Totally disagree; 5 = Totally agree). Cronbach's alpha for 25 items was 0.94 (Mccloskey and Scielzo, 2015). The three items used in this study had Cronbach's alpha of 0.85. The measure was significantly related to students' self-reported academic performance (r = –0.20) and three study strategies subscales (relating ideas, r = –0.08; time-management, r = –0.71; unrelated

memorizing, $r = 0.23$) consistent with the research literature (Richardson et al., 2012; Saele et al., 2017).

Attrition Intentions

In the present study, we used four-item measure of students' intentions to drop out, transfer to another university, and transfer to another study field. Although the research on behavioral intentions is extensive (Sheeran, 2002), there is scarce evidence on validated and psychometrically sound measures of intentions (Fishman et al., 2020). Based on findings that intentions/thoughts of performing an action can vary in the degree of their specificity (Mashburn, 2000; Gollwitzer, 2012; Bäulke et al., 2021), we borrowed the first two items from the study by Hardre and Reeve (2003). Based on the face validity, they represented the first two (i.e., deliberation; intention or Rubicon) mindset phases of goal pursuit (Gollwitzer, 2012). The items were: "I sometimes consider dropping out of university before graduation," "I intend to drop out of school before graduation." Further, we designed two additional items for the study: "I sometimes think that other job opportunities suit me better than those I can get with my current education"; "I know what I am going to do if I withdraw from my studies." The items were intended to measure the deliberation and planning phases. Similar items were designed for transfer university intentions: "I sometimes think about how my life would be if I change my study place"; "I have a plan for when and how I will change my study place." The second pair of items measuring transfer study field intentions were the following: "I sometimes think about advantages and disadvantages of changing study field"; "I am waiting for the possibility to change my study field." Participants were also presented with a descriptive text for transfer study field intentions specifying the high-cost transfer (e.g., history → science; Meyer et al., 2021). Exploratory factor analysis was performed to test the dimensionality of the items. Based on the results, only two items for each type of intention were retained. All items are rated on a 5-point scale with higher scores indicating higher intentions. Spearman-Brown coefficient for drop-out, transfer university and transfer study field intentions were 0.73, 0.76, and 0.82 (Eisinga et al., 2013).

Analysis

Model Specification and Estimation

A structural equation model (SEM) using weighted least squares parameter (WLSMV) estimation was employed. The WLSMV estimation is appropriate when manifest variables are categorical or ordinal, and the sample size is relatively large (Muthén and Muthén, 2017). Model fit data were examined using the chi-square test ($\chi 2$), Comparative Fit Index (CFI), Tucker-Lewis Fit Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). For a more detailed description and discussion of the fit indices, the reader is referred to Hu and Bentler (1999) and Brown (2015). Standard fit cut-off values were applied: CFI, TLI > 0.95, SRMR < 0.08, and RMSEA < 0.06 (Hu and Bentler, 1999). Values equal to or lesser/higher than cut-off values indicate good or close fit. Although the traditional approach to mediation using ordinary least squares or Baron and Kenny's (1986) stepwise approach is widely used, we chose the SEM alternative. Based on the recent evaluations of the approaches to mediation analysis (e.g., Iacobucci et al., 2007; Kline, 2015), SEM seems to be superior to Baron and Kenny's (1986) regression approach. For example, SEM provides more accurate or less biased estimations due to adjustment for measurement error which is not possible with traditional mediation approaches. Confirmatory factor analysis (CFA) was performed to assess the validity of the measurement model (see **Supplementary Materials**). The results of CFA indicated an excellent fit: $\chi 2 = 94.737$, $df = 44$, $p < 0.001$; CFI = 0.993; TLI = 0.989; RMSEA = 0.041 (90% CI 0.029 – 0.052); SRMR = 0.028.

The results of observed indirect effects were interpreted in concordance with Zhao et al. (2010) approach to mediation analysis. The main characteristic and the difference of this approach from the traditionally applied Baron and Kenny's (1986) mediation analysis is the dependent-independent variables relationship. In particular, Zhao et al. (2010) argue that a zero-order relationship between dependent and independent variables should not necessarily be significant for proceeding with the mediation analysis. Under certain conditions (e.g., presence of mediator variables with opposite effects, presence of suppressing variables, temporal distance), a mediator variable may be exercising its effect even when no significant dependent-independent variables relationship is found. The main requirement for mediation is the significant interaction effect (i.e., indirect effect). Further, consistent with the proposed mediation approach, the authors provided an alternative to the «full, partial, and no mediation» categorization of mediation patterns. *Complementary mediation* is present when mediated and direct effects are significant and point in the same direction. In contrast, *competitive mediation* assumes that the same effects are present but point in the opposite direction. *Indirect-only mediation* describes a pattern when the mediated effect is significant while the direct effect is not. *Direct-only non-mediation* and *no-effect non-mediation* are patterns when either only direct effect is significant or all the relationships between variables are insignificant.

RESULTS

Academic Self-Efficacy and Drop-Out Intentions via Procrastination

The chi-square test was significant ($\chi 2 = 99.820$, $df = 44$, $p < 0.01$) for the model *without covariates*. However, the chi-square test statistics is sensitive to sample size and is usually significant in large samples (Hooper et al., 2008). Other fit indices indicated a very good model fit, CFI = 0.991; TLI = 0.986; RMSEA = 0.043 (90% CI 0.032–0.054); SRMR = 0.028. As seen in **Figure 1**, academic self-efficacy was negatively related to procrastination ($\beta = -0.265$, boot $SE = 0.047$, $p < 0.001$), which in turn was positively related to drop-out intentions ($\beta = 0.277$, boot $SE = 0.054$, $p < 0.001$). The direct effect from academic self-efficacy to drop-out intentions was significant and in expected direction ($\beta = -0.395$, boot $SE = 0.052$, $p < 0.001$). The indirect effect via procrastination was also significant and in the same direction as the direct effect ($\beta = -0.074$, boot $SE = 0.019$, $p < 0.001$), indicating *complementary mediation*

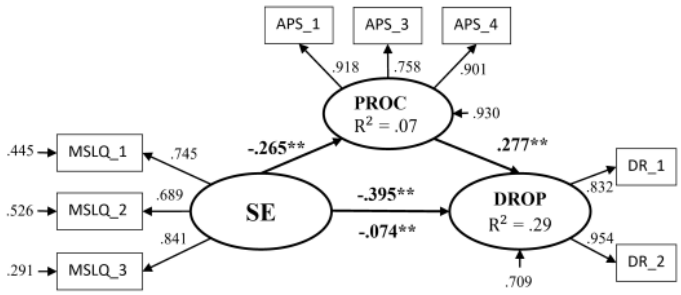

FIGURE 1 | Mediation model for drop-out intentions (n = 693). Indirect effect is provided below the path line. SE, academic self-efficacy; PROC, procrastination; DROP, drop-out intentions. **$p \leq 0.001$.

(Zhao et al., 2010). The total effect was significant (β = –0.469, boot *SE* = 0.048, $p < 0.001$). Hence, procrastination "partially" mediated the relationship between academic self-efficacy and drop-out intentions. All additional estimates are provided in the **Supplementary Table 1**. Including covariates into the model did not substantially alter either model fit or mediation model relationships (see **Supplementary Table 2**).

Academic Self-Efficacy and Transfer University Intentions via Procrastination

The overall model fit for transfer university intentions *without covariates* was very good. The chi-square test was significant ($\chi 2$ = 99.820, *df* = 44, $p < 0.01$); CFI = 0.991; TLI = 0.986; RMSEA = 0.043 (90% CI 0.032–0.054); SRMR = 0.028. As seen in **Figure 2**, academic self-efficacy was negatively related to procrastination (β = –0.265, boot *SE* = 0.047, $p < 0.001$), which in turn was positively related to transfer university intentions (β = 0.168, boot *SE* = 0.066, $p < 0.01$). The direct effect from academic self-efficacy to transfer university intentions was insignificant and in expected direction (β = –0.102, boot *SE* = 0.063, $p = 0.11$). Still, the indirect effect via procrastination was significant and in the same direction as the direct effect (β = –0.045, boot *SE* = 0.020, $p < 0.01$), indicating *indirect-only mediation*. The total effect was significant (β = –0.212, boot *SE* = 0.049, $p < 0.001$). Hence, procrastination "fully" mediated the relationship between academic self-efficacy and transfer university intentions. All additional estimates are provided in the **Supplementary Table 3**. Including covariates into the model did not substantially change the overall model fit: $\chi 2$ = 274.910, *df* = 188, $p < 0.001$; CFI = 0.982; TLI = 0.975; RMSEA = 0.029 (90% CI 0.021 – 0.036); SRMR = 0.054. However, type of mediation changed from the indirect-only to complementary (see **Supplementary Table 4**). In particular, the direct relationship between academic self-efficacy and transfer university intentions became significant (β = –0.204, boot *SE* = 0.069, $p < 0.01$).

Academic Self-Efficacy and Transfer Study Field Intentions via Procrastination

The overall model fit for transfer study field intentions *without covariates* was very good. The chi-square test was significant ($\chi 2$ = 99.820, *df* = 44, $p < 0.01$); CFI = 0.991; TLI = 0.986; RMSEA = 0.043 (90% CI 0.032–0.054); SRMR = 0.028. As seen in **Figure 3**, academic self-efficacy was negatively related to procrastination (β = –0.265, boot *SE* = 0.047, $p < 0.001$), which in turn was positively related to transfer study field intentions (β = 0.181, boot *SE* = 0.057, $p < 0.001$). The direct effect from academic self-efficacy to transfer study field intentions was significant and in expected direction (β = –0.229, boot *SE* = 0.053, $p < 0.001$). The indirect effect via procrastination was also significant and in the same direction as the direct effect (β = –0.048, boot *SE* = 0.018, $p < 0.001$), indicating *complimentary mediation*. The total effect was significant (β = –0.276, boot *SE* = 0.049, $p < 0.001$). Hence, procrastination "partially" mediated the relationship between academic self-efficacy and transfer study field intentions. All additional estimates are provided in the **Supplementary Table 5**. Including covariates into the model did not substantially alter either model fit or mediation model relationships (see **Supplementary Table 6**).

RESULTS SUMMARY

The results of the three mediatory analyses supported *Hypothesis 1* that academic self-efficacy is negatively related to procrastination and attrition intentions. Also, *Hypothesis 2* was supported by results showing that the relationship of self-efficacy with drop-out and transfer study field intentions was complementary (partially) mediated by academic procrastination. These findings may indicate that the investigated models have an omitted mediator. In turn, the relationship between self-efficacy and transfer study field intentions was complementary mediated only when covariates were included in the model. Without covariates, procrastination indirect-only or fully mediated the investigated relationship. Hence, the inclusion of covariate variables into the model was reasonable. Finally, *Hypothesis 3* was supported by results indicating stronger relationships (i.e., direct and indirect) between self-efficacy and drop-out intentions than it was the case for two types of transfer-out intentions. Also, self-efficacy and procrastination accounted for a larger amount of variance in drop-out intentions (R^2 = 29%)

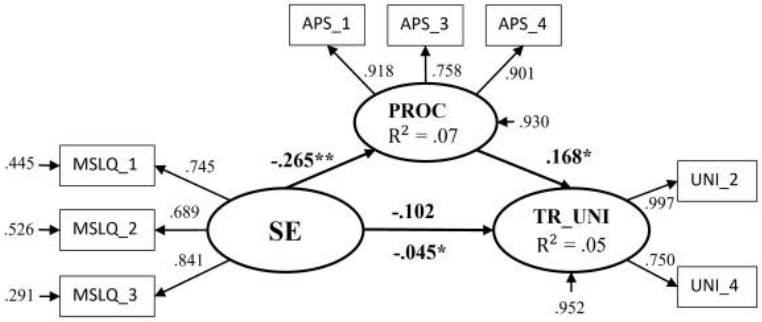

FIGURE 2 | Mediation model for transfer university intentions (n = 693). Indirect effect is provided below the path line. SE, Academic self-efficacy; PROC, procrastination; TR_UNI, transfer university intentions. *$p \leq 0.01$, **$p \leq 0.001$.

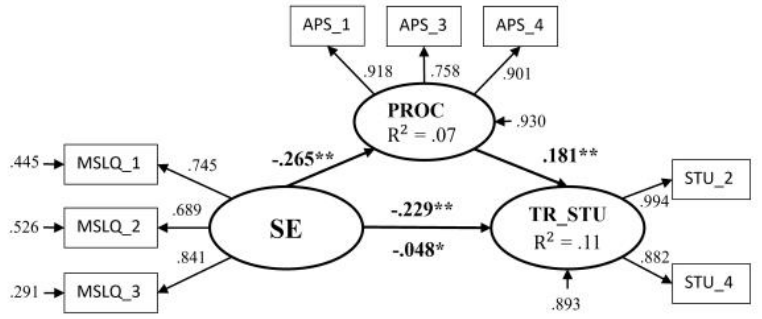

FIGURE 3 | Mediation model for transfer study field intentions (n = 693). Indirect effect is provided below the path line. SE, academic self-efficacy; PROC, procrastination; TR_STU, transfer study field intentions. *$p \leq 0.01$, **$p \leq 0.001$.

than in transfer university (R^2 = 5%) and transfer study field intentions (R^2 = 11%). The inclusion of control variables did not substantially change the observed relationships for drop-out and transfer study field intentions. In contrast, the relationship between academic self-efficacy and transfer university intentions has become complementary after the inclusion of covariates. In addition, different covariates turned out significant depending on the type of attrition intention. For instance, students' intentions to drop out and transfer study field differed between medicine and STEM fields with medicine students having fewer intentions. In contrast, no significant difference was found across the study fields for transfer university intentions (see **Supplementary Tables 2**, **4**, **6**). In sum, the results indicated the importance of the distinction between different categories of attrition intentions.

DISCUSSION

The present paper aimed to investigate the significance of the distinction between different categories of students' attrition intentions. Although students' motivation in general (Demetriou and Schmitz-Sciborski, 2011) and self-efficacy in particular (Bean and Eaton, 2000; Robbins et al., 2004; Willcoxson, 2010; Willcoxson et al., 2011; Tinto, 2017) are important for academic success and persistence, there is scarce evidence on the role of procrastination in academic attrition. In turn, understanding the involved mechanisms might assist researchers and practitioners in developing, assessing, and refining the assistance programs. Further, to the best of our knowledge, none of the previous studies investigated whether these relationships are present when accounting for the variability of academic attrition (i.e., dropping out, transferring out). The present study set out to investigate whether the relationship between academic self-efficacy and procrastination with attrition intentions would differ for drop-out and transfer-out intentions. It was also hypothesized that students' tendency to procrastinate would mediate the relationship between academic self-efficacy and attrition intentions.

The general pattern of results is in line with previous research. Academic self-efficacy was negatively related to procrastination (Van Eerde, 2003; Steel and König, 2006; Klassen et al., 2008) and attrition intentions (Robbins et al., 2004; Willcoxson, 2010; Willcoxson et al., 2011). Further, procrastination showed a positive relationship with attrition intentions, as in the study by Bäulke et al. (2018). However, our

findings supplement Bäulke et al.'s (2018) results by indicating that procrastination is also related to transfer-out intentions. Importantly, when the relationships are considered separately for each category, our findings align with prior evidence on the greater importance of academic factors for dropping out (Tinto, 1993; Hovdhaugen, 2009, 2011; Quinn-Nilas et al., 2019). This is represented by the larger amount of variance accounted for by academic self-efficacy and procrastination in drop-out intentions and larger relationships between academic self-efficacy and drop-out compared to transfer-out intentions. Hence, universities aiming to reduce academic attrition should adjust their strategies accordingly. For example, providing academic mentoring programs focusing on academic skills to reduce transfer university rates may prove less effective than expected.

In addition, our study demonstrates that students' academic self-efficacy significantly relates to attrition intentions through academic procrastination. It has been traditionally assumed that students' pre-entry characteristics or previous experiences determine the nature of student-university interaction (Aljohani, 2016). Likewise, past experiences also determine students' academic self-efficacy beliefs that have a well-established relationship with students' academic success (Robbins et al., 2004; Richardson et al., 2012). In turn, students who enter university with low self-efficacy might be at a considerable disadvantage compared to students with firm beliefs in their abilities. In particular, students with low self-efficacy tend to devote less effort, persistence to a given task, and procrastinate (Bandura, 1986, 1997; Steel, 2007). According to Wäschle et al. (2014), low self-efficacy may be involved in a vicious circle of procrastination (low self-efficacy, procrastination → poor performance → low self-efficacy → procrastination). Over time, in the face of recurrent setbacks (i.e., low performance), students may start to question the desirability and feasibility of their degree attainment goal leading to subsequent goal disengagement or attrition (Brandstätter and Bernecker, 2021). Even if students enter university with firm self-efficacy beliefs, many students lack the required competencies or abilities to succeed at university such as critical thinking or information literacy (Dunlosky et al., 2013). Lack of such skills in a students' toolbox puts them at a disadvantage causing poor achievement and, as described, might lead to procrastination and academic attrition.

Nevertheless, procrastination partially mediated the relation of academic self-efficacy with drop-out and transfer-out intentions. Obviously, other mechanisms associated with academic self-efficacy should be explored in future studies. One of the candidates for the role of a mediator is academic performance. According to the Social Cognitive Theory, self-efficacy beliefs influence which course of action a person takes, the amount of effort devoted to a task, resilience, and perseverance in the face of obstacles (Bandura, 1986, 1997). Unsurprisingly, empirical evidence shows a medium-strong relationship between self-efficacy and academic performance (e.g., Robbins et al., 2004; Richardson et al., 2012; Schneider and Preckel, 2017). However, as discussed, performance comes up to be a non-significant determinant of transferring out while it does predict drop-out behaviors. Further, according to social cognitive theory (Bandura, 1997), self-efficacy influences behavior through motivational processes. In turn, Hovdhaugen's (2009) study shows a significant relationship between students' motivation (i.e., intrinsic and extrinsic) and transferring out and a non-significant association with dropping out. Finally, self-efficacy is related to students' effort and commitment (Bandura, 1986, 1997; Weng et al., 2015). Both factors have been found important for students' drop-out and transfer-out behaviors (Tinto, 1993; Hovdhaugen, 2009). Hence, students' effort and goal commitment might be additional contributors (i.e., omitted mediators) in explaining the observed relationship of academic self-efficacy with drop-out and transfer-out intentions.

Further, in the present study, we performed the exploratory analysis with a set of covariates to investigate their relationship with attrition intentions and their influence on mediation relationships. The investigated covariates have been found important in relation to actual attrition behaviors. Still, these factors have not been addressed in the context of students' intentions. Although intentions are good approximators of actual behaviors, still, they do not account for the whole variance in actual behaviors meaning that the factors are not identical (Webb and Sheeran, 2006). Hence, it can be assumed that differences found for actual attrition behaviors (e.g., gender differences) might be absent in the case of students' intentions. The results of the present study supported this assumption. As discussed, previous findings show that female students are less prone to drop out and switch universities than males (Hovdhaugen, 2009; Ishitani and Flood, 2018a) while they are more likely to switch majors (Astorne-Figari and Speer, 2018; Meyer et al., 2021). However, we did not find any significant gender differences in drop-out, transfer university, and transfer study field intentions. Among investigated covariates, only years studied, study field, and history of changing university were significantly related to attrition intentions in the present study. In line with the findings by Willcoxson (2010), Willcoxson et al. (2011), and Ishitani and Flood (2018b), we found that students' attrition intentions differed by year of study. In particular, the longer the students studied, the fewer attrition intentions they had. Hence, assisting and paying extra attention to students during their first year at university seems crucial (Willcoxson et al., 2011). Further, it was found that students reporting that they have previously changed university had more transfer university intentions. In addition, student assistance may be less of a concern for some study fields than others. In particular, it was found that medical students have fewer drop-out and transfer-out intentions than students from other study fields (see **Supplementary Tables 2**, **4**, **6**). This might be related to higher enrollment standards and programs' structure (e.g., same students, closer follow-up of the students) than it is the case for other study majors. In sum, our findings show that although academic self-efficacy and procrastination are related to the three types of attrition intentions, adressing the attrition issue should be tailored to specific study programs and student characteristics. Also, considering students' characteristics such as year of education and previous history of changing study place might be more relevant in the case of transfer-out

students based on the results showing a change in mediated relationships after the inclusion of covariates (indirect-only → complementary mediation).

To sum up, the present study shows that academic self-efficacy and procrastination are related to students' intentions to drop out, change their field of study, and change university. Our results indicate that procrastination might be detrimental not only to traditionally investigated academic performance but also to other aspects of academic success (i.e., persistence). Hence, procrastination might have much more extensive consequences considering the negative relationship of attrition with students' future economic success and well-being (Hout, 2012; Mayhew et al., 2016). In addition, the size of the relationships, the nature of mediation, and the amount of variance accounted for were dependent on the type of intentions being considered indicating the relevance of the distinction among students' attrition intentions. Hence, future studies and interventions should be cautious when defining and drawing conclusions about academic attrition and attrition intentions.

Finally, the present study contributes to the current research by investigating the factors that are malleable and may be influenced by universities. For example, Van Dinther et al.'s (2011) literature review shows that self-efficacy interventions based on social cognitive theory are the most effective in improving self-efficacy. Some researchers (e.g., Bartimote-Aufflick et al., 2016) provide research-based best practice suggestions on how students' self-efficacy can be improved via teaching, learning support, and curriculum design. Similarly, evidence shows that procrastination can be ameliorated, with self-efficacy being one of the proposed alternatives for intervention (Wäschle et al., 2014; Van Eerde and Klingsieck, 2018). Nevertheless, counselors and university staff might need to adjust assistance or intervention strategies. As discussed, evidence and result of the present study show that students switching to another university may do it less due to performance-related problems (Hovdhaugen and Aamodt, 2009; Quinn-Nilas et al., 2019). Thus, assisting students in improving their self-efficacy beliefs when they intend to change university might be a less effective or appropriate solution for these students. In this case, universities might be better of adjusting their strategy based on students' intentions and known reasons for why these intentions occur. Still, it is worth mentioning that external factors (e.g., work, child care, illness, finances) are also responsible for students' attrition (Bean, 1985; Bean and Metzner, 1985; Leveson et al., 2013; Hovdhaugen, 2015; Behr et al., 2021). For example, Behr et al. (2021) identified a separate cluster of students who left university for personal (e.g., illness, stay abroad) or family (e.g., child care) reasons. Family or personal reasons were rarely decisive for dropping out and were reported by a small proportion of participants. Still, universities can hardly address these student difficulties directly. Hence, institutional ability to reduce student attrition may be limited indicating the need for more complex state interventions such as financial support or child-care arrangements. Finally, although improving students' self-efficacy and reducing procrastination may be a prospective approach to tackle students' attrition, its effectiveness for the students leaving primarily due to external reasons can be questioned.

Limitations and Future Research

One of the main limitations of the current study is the validity of the attrition intentions scale. The measure of students' intentions used in the present study should be cautiously evaluated since it lacks validation other than face validity. Also, factors with only two indicators are prone to estimation problems when the sample size is small (Kline, 2015). Hence, future psychometric studies developing and validating the attrition intentions scale that is applicable irrespective of statistical analysis are required. Further, although intentions represent the closest antecedent of behavior, they cannot substitute students' actual behavior (Webb and Sheeran, 2006). Thus, examination of the mechanisms found in the current study when students' actual behavior is also considered represents a prospective line for future research. In this regard, measures of intentions that depict students' firm resolution or concrete action plan can be considered for inclusion since they may be more predictive of actual behaviors (Brandstätter et al., 2015; Achtziger and Gollwitzer, 2018; Gollwitzer, 2018). However, implementation intentions (i.e., concrete if-then plans) might be problematic to measure in the context of academic attrition considering the lack of measurement scales and ethical considerations related to experimental designs. Still, future studies might test whether less concrete measures such as action planning would serve as a substitute and better predictor of students' behaviors (Hagger and Luszczynska, 2014).

Second, the causality of the proposed mediatory mechanisms should be cautiously evaluated due to the correlational study design. In the present study, the directional relationships were derived from the available research literature and theory (Bandura, 1997; Steel and König, 2006; Wu and Fan, 2017; Bäulke et al., 2018). It is reasonable to assume that self-efficacy determines students' attrition intentions and not the other way around. The results of the meta-analysis of experimental evidence indicate that changes in self-efficacy beliefs lead to changes in health-related intentions and behaviors (Sheeran et al., 2016). Nevertheless, future studies should account for alternative models (Danner et al., 2015) since the relationship between self-efficacy and procrastination may be bi-directional (Wäschle et al., 2014).

Third, the non-probability based sampling method (i.e., convenience sampling) has been used for data collection purposes due to the exploratory nature of the present study. Thus, generalization of the results to the student population should be made with caution. Future studies should preferably acquire the probability-based sampling methods to make more valid inferences about the whole population of Norwegian students.

Fourth, the self-efficacy measure used in the present study can be questioned in terms of its validity. According to Marsh et al. (2019), relatively "pure" self-efficacy measures are characterized by the future orientation and purely descriptive nature of response items and clear frame-of-reference. In particular, the present measure lacks a clear frame of reference such as being

confident in obtaining a top grade in a certain course. Although achieving such a standard in the present context (i.e., participants from different study fields) was nearly impossible, future research should clarify this aspect of the present study and if the observed relationships are better explained by a more pure self-efficacy measure. In addition, investigating the role of students' social self-efficacy may be a prospective line for future research. Based on the classical perspective on academic attrition (i.e., Tinto, 1975, 1993), Bean and Eaton's (2000) model suggests that academic and social self-efficacy are important in explaining student attrition. Still, to the best of our knowledge, we are not aware of any study which addressed the role of students' social self-efficacy in explaining different types of academic attrition.

Finally, in the present paper, we investigated the relationships between academic self-efficacy and procrastination with *high-cost* transfer study field intentions. The high-cost transfer is described by Meyer et al. (2021) as situations when students switch between broad categories of academic disciplines (e.g., history → science). In contrast, a *low-cost* transfer means situations when students switch within the same academic discipline (e.g., sociology → political science). The distinction is worth noting since Meyer et al. (2021) found that two categories might be related to different factors. In particular, high-school final grades were related to switching across disciplines (i.e., high-cost transfer), while misfit between student's occupational interests and major's content was mainly related to switching within disciplines (i.e., low-cost transfer). Thus, the results of the present study are only applicable to the high-cost transfer intentions. Future studies are encouraged to investigate the generalizability of the present findings to low-cost transfer intentions.

DATA AVAILABILITY STATEMENT

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found below: https://osf.io/k8ax4/?view_only=f8cf1a2b15ab4da7b552e4a20a79e125.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

EN wrote the draft and did the statistical analyses under the supervision of FS. TG-K assisted with data analyses. RS, TG-K, and FS edited the manuscript. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

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Appendix C: Paper 3

Svartdal, F., Grøm-Sæle, R., Dahl, T. I., Nemtcan, E. & Gamst-Klaussen, T. (2021). Study habits and procrastination: The role of academic self-efficacy. *Scandinavian Journal of Educational Research*, 1–20. https://doi.org/10.1080/00313831.2021.1959393

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Study Habits and Procrastination: The Role of Academic Self-Efficacy

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ABSTRACT

Inefficient study skills increase the probability that study work is perceived as difficult and aversive, with procrastination as a likely result. As a remedy, more effective study skills and habits may be encouraged. However, research indicates that good study skills and habits may not by themselves be sufficient to remedy problems, as this relationship may be mediated by efficacy beliefs related to academic functioning. We investigated this hypothesis across three student samples (total $N = 752$). As predicted, structural equation modeling (SEM) indicated that study self-efficacy mediated the study habits—procrastination relation. The mediation effects were medium to large. We conclude that training of, and advice on, study skills and habits should be accompanied by measures that build study self-efficacy.

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University students confront a challenging situation as they enter academic life, as adapting to a relatively unguided and complex educational environment requires skills and competencies related to study work, planning, and others. However, only a minority of students have received instruction on such skills (e.g., Dunlosky & Rawson, 2015; Dunlosky et al., 2013). Although research on effective study skills is becoming increasingly more available, universities seem to be slow in adopting them (Goffe & Kauper, 2014; Wieman & Gilbert, 2015). Moreover, academic work also benefits from skills related to planning, organization of own learning, and self-motivation, generally referred to as strategies for self-regulated learning (SRL; e.g., Pintrich & De Groot, 1990; Zimmerman, 1990). As is the case for study skills, SRL strategies are not normally part of the study curriculum, and when they are offered, it is often in one-off seminars. Still, they are important for academic success (Kreber et al., 2005). In sum, many students do not possess the sufficient levels of skills and competencies needed for efficient academic work, negatively affecting academic performance and retention (Robbins et al., 2004).

In the absence of formal training in study skills and skills related to SRL, academic staff and advisors resort to a more straightforward solution—they advise students on behaviors and habits beneficial in the study situation. Such advice is often provided at lectures and seminars, with summaries occasionally published on university websites. For example, our university has published a list of smart study habits, recommending study habits such as practicing self-test, preparing before lectures, and participating actively in seminars and discussion groups. Such advice cannot replace

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formal training, but it is an easy way of communicating insights from research, with an expectation that students following the advice presented will be better off in their academic work.

However, even when students possess knowledge of sound study habits beneficial to academic work, they may not practice them (e.g., Jairam, 2019). For example, in a study of university students in Austria, Foerst et al. (2017) found a discrepancy between students' knowledge of SRL strategies and their actual use of such strategies. Specifically, even if students demonstrated knowledge of SRL strategies, they did not necessarily put this knowledge effectively into action. Foerst et al. (2017) traced the discrepancy between knowledge and actual use of effective skills to several sources, such as lack of time and doubt about their effectiveness. Notably, one reason for this gap reported by the students was a lack of perceived ability to use such strategies. Thus, it seems that knowledge of efficient study habits is a necessary but not sufficient factor for practicing them effectively. Students' efficacy beliefs in their capabilities to carry out, organize, and perform student skills successfully (e.g., Bandura, 1997; Pajares & Valiante, 1997; Zimmerman, 1990) may be vital in translating knowledge of efficient study habits into action (Schunk, 2012).

Efficacy beliefs are positively and moderately related to academic outcomes (e.g., grades) but demonstrate considerable heterogeneity and complex relations to other relevant variables (e.g., Honicke & Broadbent, 2016, for review). This complexity is to be expected, as academic self-efficacy affects outcomes in direct as well as indirect ways. For example, self-efficacy for self-regulated learning, closely related to self-efficacy for academic achievement (Zimmerman et al., 1992) helps the student to accomplish long-term tasks through the use of self-regulation strategies such as self-monitoring, self-evaluation, goal setting, and planning (Zimmerman, 1990). An important characteristic of self-efficacy is domain-specificity (Bandura, 1997), meaning that efficacy beliefs (confidence in achieving a desired outcome) relate to a specific domain (e.g., academic efficacy beliefs) that do not easily generalize.

In the present paper, we focus on these topics from the perspective of another issue challenging the success of a student, procrastination—the habit of voluntarily putting off tasks despite expecting to be worse off (Steel, 2007). Students are especially prone to dilatory behavior (Schouwenburg, 2004; Tice & Baumeister, 1997), often delaying academic tasks unnecessarily (Pychyl et al., 2000). Procrastination is maladaptive in the long run, with negative consequences such as missing deadlines (Zarick & Stonebraker, 2009), increased stress and anxiety (Tice & Baumeister, 1997), lower academic achievement (Kim & Seo, 2015), and dropping out of studies (Grau & Minguillon, 2013). Prior research has documented a relatively strong negative relation of procrastination with self-efficacy and self-efficacy to self-regulate (Klassen et al., 2008), and lack of academic skills and self-regulated learning strategies are often listed as reasons for not starting intended tasks in time (Grunschel et al., 2013; Klingsieck et al., 2013; Van Eerde, 2003).

However, the question of how the use of study skills is affected by self-efficacy beliefs in the context of procrastination has not received much attention in the research literature. Specifically, if students do not receive formal training in study skills, they will likely perceive study tasks as difficult, with increased procrastination as a predictable outcome (Grunschel et al., 2013; Klingsieck et al., 2013; Schraw et al., 2007). When universities then offer advice on sound study habits, adopting such habits should make study work appear as easier, with reduced procrastination as a likely outcome. However, as discussed, that effect should be expected to be dependent on the self-efficacy beliefs that students hold toward their study work. Some students may follow study advice without necessarily believing that their efforts will succeed, whereas others may hold stronger study self-efficacy beliefs. It is not known whether such self-efficacy differences influence the effect of practicing recommended study habits, but we find it likely. Given the extensive literature on self-efficacy as an important factor or moderator variable in many forms of motivated behavior, including self-regulation (e.g., Bandura, 1997; Klassen et al., 2008), it may be expected that habit execution is also moderated by self-efficacy beliefs. For example, Prat-Sala and Redford (2010) demonstrated that students low in self-efficacy in academic work (reading and writing tasks) were more likely to adopt a

surface approach (less time and effort put into school-related work), whereas those high in self-efficacy adopted a deep or strategic approach to studying (more time and effort).

The Present Studies

In three studies, we assess the importance of academic study habits in procrastination, given study self-efficacy as a possible mediating factor. Because Norwegian universities do not provide formal study skills training but rather convey advice regarding recommended study habits, we approached this issue by asking students to report their use of such recommended habits in their study situation. We compiled a list of five habits often recommended by teaching staff and advisors into an index, a Study Skill Habits (SSH) scale. Examples are "I practice self-testing" and "Before every lecture, I prepare by making myself familiar with the topic." Students who endorse more of these statements should be able to manage a variety of academic challenges better than students who endorse fewer of these statements. Thus, we expected that the SSH scale should demonstrate a positive correlation with study performance (e.g., self-reported grades). Furthermore, as procrastination is more likely when facing difficult and aversive tasks, we expected—consistent with prior research (Grunschel et al., 2013; Jung, 2013; Klingsieck et al., 2013; Schraw et al., 2007)—that students scoring low on the SSH scale would also demonstrate an increased probability of academic procrastination.

However, as discussed, even if students practice relatively healthy study habits, the students' beliefs in the efficacy of executing these habits, their *study self-efficacy,* may tell a different story. Specifically, lower study self-efficacy may hamper performance, dictate lower ambitions, reduce effort and persistence (Bandura, 1997), and, in sum, represents a handicap for the student even when practicing recommended study habits. Hence, even if there is an overall negative relationship between the study habit measure and academic procrastination, that link could be affected by study self-efficacy.

These relationships were investigated across three studies with study skill habits and study self-efficacy used as predictors of procrastination. We had two expectations for the present data: First, the Study Skill Habits and Study Self-Efficacy measures should be negatively correlated with procrastination (Ferrari et al., 1992; Haycock et al., 1998; Steel, 2007; Tuckman, 1991; Wolters, 2003). Second, given the literature discussed, we expect that Study Self-Efficacy significantly mediates the effect of Study Skill Habits on procrastination. In Study 1, relatively young students from a single study discipline participated; Studies 2 and 3 included a more diverse range of students, varying in study experience (Study 2) and academic discipline (Study 3). In this way, the roles of Study Skill Habits and Study Self-Efficacy were assessed in relatively heterogeneous samples, ensuring the robustness of findings.

Method

Participants

Three samples were included in the present paper. In **Study 1**, 86 students (76.7% female) from an introductory psychology course participated. Most were first-year students invited to participate via a closed website (total number of students was approximately 140). Age ranged from 18–41 with a mean age of 21.14 years (SD = 3.45). Participants in **Study 2** were 483 students (68.7% female) in different stages of their studies at the university: first year (22.5%), second-year (23.4%), third-year (26.5%), fourth-year (13.3), fifth-year (7%) and six years or more (7.3%). Age ranged from 19–55, with most being less than 26 years old (70%), with a mean of 24.9 years (SD = 5.74). Finally, participants in **Study 3** were 183 students (67.6% female) studying medicine/odontology (65%), humanities/social sciences (17.5%) and natural sciences/other (17.5%). Age ranged from 19–57, most being less than 26 years old (90.2%),

with a mean age of 22.47 years (SD = 5.40). Participants in Studies 2 and 3 were recruited through lectures, invitations on open university websites, and social media announcements via student assistants.

Materials

Study Skill Habits (SSH)

We developed a custom scale focusing on study habits, *Study Skill Habits*, based on advice typically given at Norwegian universities. All authors discussed possible items to include and agreed on a list containing assertions addressing skills that have been demonstrated to be effective (e.g., "I test myself in the material I read") as well as study habits actively encouraged by teaching staff without specific research basis (e.g., "I am active in seminars and study groups"). Items rated on a five-point Likert scale (1–5), with higher scores indicating more usage of study recommended study habits. See Appendix for the complete list of questions.

Items in this scale address a variety of different indicators that sum up to a *formative construct* (Roberts & Thatcher, 2009). Constructs can be termed reflective or formative depending on the nature and direction of relationships between a construct and its indicators. Reflective indicators represent reflections or manifestations of a latent construct, which means that variation in the construct leads to variation in its indicators. That is, constructs are viewed as causes of reflective indicators, and indicators are interchangeable implying that removal of an indicator does not change the construct. Hence, internal consistency among indicators is expected. On the other hand, constructs can be formed or induced by their indicators. Such indicators are termed formative indicators and are viewed as causes of the constructs. Commonly, formative constructs are regarded as composites of specific component variables or dimensions. Indicators are not interchangeable, and omitting an indicator is omitting part of the construct. Therefore, correlations among indicators may not have a specific pattern that produces internal consistency.

To determine whether a construct should be regarded as reflective or formative, decision rules can be applied (Jarvis et al., 2003). Roberts and Thatcher (2009) describe these rules as (1) to assess the theoretical causal direction from the construct to indicators; (2) to examine the interchangeability of the indicators; (3) to assess if the indicators covary with one another; (4) to determine whether or not the indicators have the same antecedents and consequences. In the present context, the Study Skill Habits (SSH) measure, which encompasses a variety of different behaviors, may not be appropriately specified as reflective indicators. For example, the SSH includes different indicators referring to self-testing, working with fellow students, and preparation before lectures, making it quite evident that the construct includes indicators that are formative in nature. As formative indicators are not expected to be highly correlated (opposite of reflective indicators), Diamantopoulos and Siguaw (2006) suggest addressing the issue of a formative or reflective model by testing for multicollinearity among indicators. The variance inflation factor (VIF) statistic can help determine if the formative indicators are too highly correlated (i.e., a VIF value greater than 3.3 indicates high multicollinearity among formative indicators) and, thus, should be modeled as reflective indicators (or both). In the current three studies, the highest VIF is 2.46, and most VIF values are below 1.70. Therefore, the Study Skill Habits measure is specified as a formative construct, indicated by the causal direction going from the indicators to the construct (see Appendix, Studies 1–3).

Self-Ratings of Study Skills

Studies 1 and 2 also included a question asking respondents to evaluate the quality of their study skills: "I think that I have good study skills" rated on a scale from 1–5 (1 = "does not apply at all to me"—5 = "applies very well to me"). This item constituted an independent alternative measure of study skills. Due to few respondents at the first and last levels, levels 1–2 and 4–5 were merged,

resulting in a measure of three levels (i.e., 1 = does not apply well to me; 2 = applies sometimes; 3 = "applies very well to me"). The self-rated study skill item correlated positively with the SSH scale (Study 1, $r = .39$; Study 2, $r = .44$).

Self-Reported Grades

We also recorded self-reported grades (range 1-6, higher numbers = better grades). As expected, the SSH scale correlated positively with grades (Study1, $r = .44$; Study 2, $r = 24$, Study 3, $r = .25$), indicating support for the assumption that adherence to advice about study habits is positively associated with performance (e.g., Robbins et al., 2004).[1] Similarly, the self-rated study skill item correlated positively with grades (Study 1, $r = .35$; Study 2, $r = .30$).

Study Self-Efficacy scale (SSE)

This scale measures students' confidence in their ability to achieve desired academic outcomes. Items were adapted from the general self-efficacy scale by Schwarzer and Jerusalem (1995), rephrased to tap academic self-efficacy specifically. Items addressed confidence in the utility of study skill habits (items 1, 2, 3, i.e., "study habit self-efficacy"), general outcome expectations (items 4 and 6), as well as one persistence item (5). We avoided explicit comparisons to other students (cf. the Motivated Strategies for Learning Questionnaire, MSLQ; Pintrich & De Groot, 1990), and items were formulated to address academic tasks but still intended to remain neutral to specific study contents. In Study 1, items included were (1) "When I get a study task to work with, I have a hard time finding a solution," (2) "I have little faith in my ability to study effectively," and (3) "It is difficult for me to follow the study curriculum when something unexpected happens." Three items were added in Studies 2 and 3: (4) "I am capable of learning the course contents for this year," (5) "When I have decided to complete something important to me, I continue even if it proves more difficult than I believed," and (6) "I am sure that I will accomplish the academic goals I have set for myself." Items were rated on a five-point Likert scale (1–5), higher scores indicating higher academic self-efficacy (three first items reverse coded). Cronbach's alphas across the three studies were .63, .75, and .66, respectively. Of note, Honicke and Broadbent (2016, p. 67) pointed out that higher levels of internal reliability in self-efficacy measures are observed in content-specific scales compared to more global measures. In the present studies, item 5 demonstrated the lowest factor loadings (.33 in Study 2; .28 −.30 in Study 3).

Procrastination

All studies measured procrastination by the six non-reversed items from the Irrational Procrastination Scale (IPS, Steel, 2010) using the Norwegian version translated by Svartdal (2017). Items are rated on a five-point Likert scale, with higher scores indicating more procrastination. These items have been documented to measure procrastination similarly to the full scale (Svartdal & Steel, 2017). The IPS often is taken to measure trait procrastination, and as such, reflects a relatively stable tendency to delay unnecessarily. To be used as a dependent variable in the present context, it must be assumed that this scale reflects procrastination in the study context (i.e., measures academic procrastination) and that answers in principle can be affected by the predictor variables. As for the first requirement, studies (e.g., Steel et al., 2018) have demonstrated a high correlation between the IPS and more direct measures of academic procrastination. Also, several of the items in the IPS address delays of activities that are important to the person, which for students include academic work. Thus, examination of the individual items of the IPS reveals that most items address habitual, context-specific tendencies to put things off (e.g., item 5 "At the end of the day, I know I could

[1]Although not part of the present study, we note that the correlation between self-reported grades and procrastination (IPS) confirmed to prior research (Kim & Seo, 2015), with correlations across the three studies at $r = -.22$, $-.35$, and $-.29$. The correlations between study self-efficacy and grades were $r = .51$, .65, and .48.

have spent the time better"). Hence, for students asked to rate the items in an academic context, this scale should tap academic procrastination. This assumption was further assessed in Study 3, which included both academic procrastination and the IPS scales. The correlation between the IPS and the academic procrastination scale was $r = .85$. Second, the IPS has been used previously as an indicator of changed procrastination after interventions (e.g., Rozental et al., 2015), suggesting that this scale can reflect changes when controlling variables are changed.[2] Cronbach's alpha ranged from .90 – .94 across the three studies.

Academic Procrastination Scale

In Study 3, a subset of six items from the Academic Procrastination Scale (APS; McCloskey & Scielzo, 2015; Yockey, 2016) measured academic procrastination (e.g., "I get distracted by other, more fun, things when I am supposed to work on schoolwork"). The items were translated to Norwegian with backward translations and discussion/correction (Nordby, unpublished). All scale items are rated on a five-point Likert scale, with higher scores indicating more procrastination. Cronbach alpha was .88.

Procedure and Ethics

Respondents answered all questions in a web-based survey (www.qualtrics.com). Participation was anonymous and voluntary. All were informed that they could withdraw at any time and agreed to participate by actively pressing a start survey button after reading general information about the study. Only completed surveys were included.

The current project is part of a study on procrastination with ethical approvals from the Regional Committee for Medical and Health Research Ethics in Northern Norway (REC North 2014/2313).

Model Specification and Estimation

The conceptual model, shown in Figure 1, assumes that the influence of Study Skill Habits on academic procrastination is mediated by Study Self-Efficacy. The SSH construct is specified as a formative latent construct, whereas SSE and procrastination are specified as reflective latent constructs. In Studies 1 and 2, sensitivity analysis was employed using an alternative measure of study skills (i.e., "I think that I have good study skills") that was specified as the observed independent variable. Responses were "does not apply well to me" (1), "applies sometimes" (2), and "applies very well to me" (3). Gender (Male = 0; Female = 1) was included as a control variable in all studies, as gender differences have been observed in procrastination (e.g., Gröpel & Steel, 2008; Mandap, 2016; Steel & Ferrari, 2013; Washington, 2004), study skills (e.g., Ekuni et al., 2020; Khan & Rasheed, 2019), and self-efficacy (e.g., Huang, 2013). In Study 2, university experience (first year = 1; second year = 2; third year = 3; fourth year = 4; fifth year or more = 5) was added as a control variable. As the factors included in our model may be affected by study experience, it is of great interest to assess the relations between these variables among students with varying degrees of study experience. For example, deep and strategic approaches to learning have been shown to be affected by study experience (e.g., Brown & Murdolo, 2016; Richardson, 2010), and the effect of study self-efficacy tend to vary as a predictor of performance at early versus later study stages

[2]Scales measuring academic procrastination may include no or very few items addressing academic tasks. For example, the GPS – probably the most used scale to measure procrastination (see Svartdal & Steel, 2017) – has 20 items, and comes in two versions: One general, and a student version which includes 4 unique "academic procrastination" items. Thus, the general and student versions have 16 non-academic items in common. Similarly, an often used student procrastination scale, the Tuckman scale (35 items, often reduced to a 16-item scale based on the top loading items from the complete scale) has no items that specifically address academic procrastination (item 7 mentions studying, though: "I put the necessary time into even boring tasks, like studying"). These observations indicate that academic and general procrastination are very similar constructs, and that a valid assessment of academic procrastination is possible using a general procrastination scale focusing on implemental delay, like the IPS.

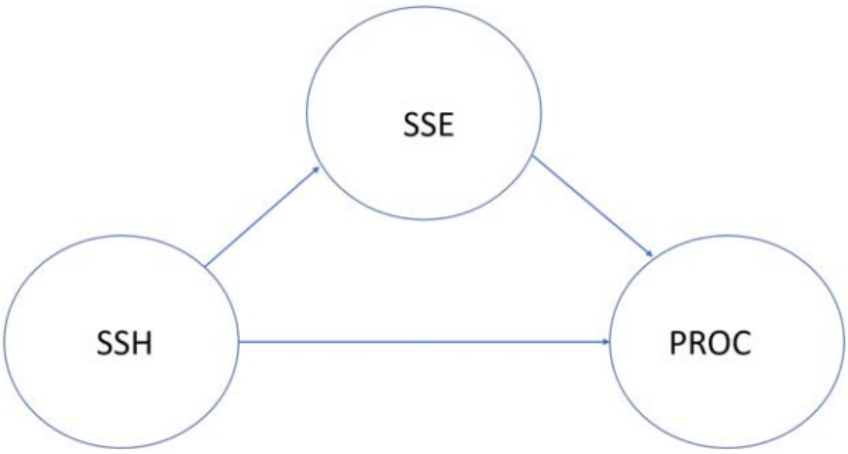

Figure 1. Conceptual model. SSH = Study Skill Habits; SSE = Study Self-Efficacy; PROC = Academic procrastination.

(e.g., Gore, 2006; Phan, 2013; Zeegers, 2004). Procrastination also differs as a function of study experience. For example, in a study by Stewart et al. (2016), procrastination levels were higher in the second year than first-year students. Finally, in Study 3, study topic (Medicine/odontology = 1; social sciences/humanities = 2; Natural sciences/other = 3) was added as a control variable. Previous research (Nordby et al., 2017) has demonstrated that students from various study disciplines (e.g., medicine, social sciences, humanities) differ in procrastination, motivating a closer assessment of the factors included in our model over different study fields. Hence, study discipline, in addition to gender, was included as control variables in Study 3.

Post-hoc power analysis (Kenny, 2017), given the sample size (Study1, $n = 85$; Study 2, $n = 483$; Study 3. $n = 183$), an alpha level of .05, and the betas in the model revealed a power level virtually at 1, except for the direct path c' that was .754 (Study 1) and .789 and .125 (Study 3).

A structural equation model using weighted least squares parameter (WLSMV) estimation was employed. The WLSMV estimation is appropriate when manifest variables are categorical or ordinal. Model fit to data was examined using standard fit indices, i.e., chi-square test, the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root-mean-square error of approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). CFI and TLI values greater than 0.95 and an SRMR less than 0.08 indicate good fit (Hu & Bentler, 1999), and RMSEA less than 0.05 indicate close fit (MacCallum et al., 1996). Standardized parameter estimates across main variables are reported with bias-corrected bootstrap confidence intervals based on 10000 bootstrap draws (MacKinnon et al., 2004). However, since the interpretation of standardized estimates of categorical variables is difficult, only the continuous outcome variable was standardized for the sensitivity analysis. For control variables, unstandardized estimates are reported. Missing values were left open, with pairwise deletion of cases. In line with Preacher and Kelley (2011), kappa-squared (k^2) values at 0.01, 0.09, and 0.25 are interpreted as small, medium, and large mediation effect sizes, respectively. All analyses were performed with Mplus version 8.1.

Results and Discussion

Study 1

Table 1 presents the means, standard deviations, and bivariate correlations between procrastination (IPS), Study Skill Habits (SSH), and Study Self-Efficacy (SSE). As expected, there was a negative correlation between the outcome variable procrastination and the predictor variables SSH ($r = -0.49$) and SSE ($r = -0.59$), and a positive correlation between SSH and SSE ($r = 0.42$).

Table 1. Descriptive statistics and correlations.

	N	Mean	SD	1	2	3	4
1. Procrastination (IPS)	83	3.09	1.00	1			
2. Study Skill Habits (SSH)	83	3.56	0.67	−0.49	1		
3. Study Self-efficacy (SSE)	83	2.94	0.76	−0.59	0.42	1	
4. Self-rated study skills	83	2.19	0.76	−0.60	0.39	0.44	1

Note: Correlations based on $N = 83$. For all correlations, $p < .01$.

Table 2. Standardized model estimates ($n = 85$).

	Coefficient (β)	Boot SE	*p*
Direct effects		*Model 1*	
SSH -> SSE	0.560	0.140	<0.001
SSH -> IPS	−0.236	0.205	0.250
SSE -> IPS	−0.603	0.158	<0.001
Indirect effects			
SSH via SSE	−0.337	0.152	0.027
Total effect	−0.573	0.205	<0.001

SSH = Study Skill Habits; SSE = Study Self-Efficacy; IPS = procrastination.

The overall model fit was very good, chi-square = 77.942, df = 72, p = 0.296, CFI = 0.996; TLI = 0.995; RMSEA = 0.031 (0.000–0.071); SRMR = 0.065. The model results are presented in Table 2. The direct effect from SSH to SSE was significant ($\beta = 0.560$, SE = 0.140, $p < .001$), indicating that self-efficacy increases as a function of study skills, whereas procrastination decreases as a function of self-efficacy ($\beta = -0.603$, SE = 0.158, $p < .001$). The direct effect from SSH to procrastination was non-significant ($\beta = -0.236$, boot SE = .205, $p = .250$), while the indirect effect of study skills on procrastination via SSE was significant ($\beta = -0.219$, 95% Bias-corrected CI [−0.662, −0.093], boot SE = 0.152, $p = .027$), indicating that SSE fully mediates the relationship between SSH and procrastination. Gender was not a significant predictor. The mediation effect was large ($k^2 = .35$).

Overall, as is seen in Table 2, these results support the conceptual model depicting that the effect of Study Skill Habits on procrastination is facilitated by Study Self-Efficacy. In effect, good Study Skill Habits by themselves are not enough to reduce academic procrastination. Study Self-Efficacy is a crucial component of how study habits impact academic procrastination.

Results from a sensitivity analysis specifying the item "I think I have good study skills" as the independent variable revealed similar results both in terms of model fit (i.e., chi-square = 66.760, df = 47, $p = .031$; CFI = 0.986; TLI = 0.981; RMSEA = 0.070 (90% CI 0.022–0.106); SRMR = 0.058) and structural relationships. Model estimates are reported in Appendix (Table 1).

Study 2

Study 1 examined a relatively small sample of young students from an introductory course in psychology. Study 2 used a larger sample with study experience ranging from short (first-year students) to long (more than five years). All variables were measured with similar scales as in Study 1, except that Study 2 added three items to the Study Self-Efficacy scale (see Methods section).

Descriptive statistics and correlations are displayed in Table 3. Compared to Study 1, mean scores were quite similar across variables, but Study Self-Efficacy was higher. This makes sense considering that the Study 1 sample comprised first-year psychology students, whereas Study 2 included students with long experience as well. Correlations were also similar to those of Study 1 in that SSH and SSE were negatively correlated with procrastination and positively correlated with each other.

The conceptual model produced a significant chi-square test (chi-square = 291.923., df = 110, $p < .001$). However, the chi-square test statistic is commonly significant in larger samples (Hooper

Table 3. Descriptive statistics and correlations.

	N	Mean	SD	1	2	3	4
1. Procrastination (IPS)	483	3.04	0.99	1.00			
2. Study Skill Habits (SSH)	483	3.30	0.64	−0.40	1.00		
3. Study Self-Efficacy (SSE)	483	3.77	0.60	−0.48	0.35	1.00	
4. Self-rated study skills	483	2.41	0.69	−0.48	0.44	0.50	1.00

Note: For all correlations, $p < .01$.

Table 4. Standardized model estimates ($N = 483$).

	Coefficient (β)	Boot SE	*p*
Direct effects			
SSH -> SSE	0.415	0.062	<0.001
SSH -> IPS	−0.220	0.058	<0.001
SSE -> IPS	−0.529	0.057	<0.001
Indirect effects			
SSH via SSE	−0.220	0.044	<0.001
Total effect	−0.439	0.045	<0.001

SSH = Study Skill Habits; SSE = Study Self-Efficacy; IPS = procrastination.

et al., 2008). Other alternative fit indices indicated that the model produces a good fit to the data, CFI = 0.989; TLI = 0.987; RMSEA = 0.043 (0.035-0.051); SRMR = 0.074. As seen in Table 4, SSH was positively associated with SSE ($\beta = 0.415$, boot SE = 0.062, $p < .001$), which, in turn, was negatively associated with procrastination ($\beta = -.529$, boot SE = 0.057, $p < .001$). The direct effect of SSH on procrastination was significant ($\beta = -0.220$, boot SE = .058, $p < .001$). The indirect effect of study skills on procrastination via SSE was significant ($p < .001$), $\beta = -0.220$, boot SE = 0.044, 95% bias-corrected CI [−0.309, −0.137]. This represents a medium effect size ($k^2 = .23$).

Overall, Study 2 repeated the findings from Study 1, further supporting the notion that study self-efficacy is an important factor that facilitates the effect of Study Skill Habits on academic procrastination. However, in the present results, the direct SSH—procrastination effect remained significant, whereas Study 1 indicated full mediation.

The results revealed that study experience had no effect on procrastination ($p > .05$), but Study Self-Efficacy generally increased with increasing study experience. This result was significant for the more experienced students (i.e., four years at university, $\beta = 0.546$, $p = .002$; five years or more at university, $\beta = 0.839$, $p < .001$), corresponding well to previous research (e.g., Gore, 2006; Phan, 2013; Zeegers, 2004). Also, gender was a significant predictor of procrastination ($\beta = 0.285$, $p = .001$) and of self-efficacy ($\beta = 0.314$, $p < .01$), indicating more procrastination and higher self-efficacy among males.

Results from sensitivity analysis specifying the item "I think I have good study skills" as the independent variable revealed similar results in terms of model fit (i.e., chi-square = 246.912, d*f* = 120. $p < .001$; CFI = 0.989; TLI = 0.986; RMSEA = 0.047 (0.038–0.055); SRMR = 0.047). Estimates among main variables were also similar to those in the main model (see Appendix, Table 2). Similar to the above results, study year was a significant predictor of SSE for the most experienced students (i.e., fourth year at university $\beta = 0.313$, $p = .051$; fifth year at university, $\beta = 0.625$, $p < .001$).

Study 3

In Studies 1 and 2, procrastination was measured by the IPS (Steel, 2010). This scale addresses habitual, context-specific tendencies to put things off. As discussed, administering this scale in an academic context should tap academic procrastination. In Study 3, we included a scale that measures academic procrastination specifically, allowing us to assess the relationship between these two procrastination measures. A high correlation between them would support the

Table 5. Descriptive statistics and correlations.

	N	Mean	SD	1	2	3	4
1. Procrastination (APS)	178	2.62	0.95	1.00			
2. Procrastination (IPS)	183	2.99	0.97	0.85	1.00		
3. Study Skill Habits (SSH)	181	3.21	0.67	−0.46	−0.37	1.00	
4. Study Self-Efficacy (SSE)	180	3.64	0.60	−0.50	−0.53	0.45	1.00

Note: Correlations are based on $N = 172$. For all correlations, $p < .01$.

Table 6. Standardized model estimates ($n = 180$).

	Coefficient (β)	Boot SE	*p*
Direct effects			
SSH -> SSE	0.462	0.088	<0.001
SSH -> APS	−0.217	0.110	0.049
SSE -> APS	−0.664	0.104	<0.001
Indirect effects			
SSH via SSE	−0.307	0.097	0.002
Total effect	−0.524	0.057	<0.001

SSH = Study Skill Habits; SSE = Study Self-Efficacy; APS = academic procrastination.

assumption made in Studies 1 and 2 that IPS is a valid measure of academic procrastination. Also, participants for this study were selected from rather diverse fields of study.

Descriptive statistics and correlations are displayed in Table 5. Of particular interest here is the high correlation between general procrastination (IPS) and academic procrastination (APS), $r = .85$, indicating that IPS is a context-specific measure reflecting academic procrastination when administered in the study context. Note that the APS scores were markedly lower compared to the IPS scores, indicating that IPS scores may be somewhat exaggerated when used as an index of academic procrastination.

The conceptual model, using APS at the dependent variable, produced good fit to the data: chi-square = 169.330 df = 136, $p = .03$, CFI = 0.970; TLI = 0.964; RMSEA = 0.037 (0.013–0.054); SRMR = 0.074. The direct, indirect, and total effects are shown in Table 6. SSE increased as a function of SSH ($\beta = 0.462$, boot SE = 0.088, $p < .001$), which was in turn is negatively related to procrastination ($\beta = -0.664$, boot SE = 0.104, $p = .001$). The direct effect of SSH to procrastination was marginally significant ($\beta = -0.217$, boot SE = .110, $p = .049$). This indirect effect of SSH on procrastination via SSE was significant ($\beta = -0.307$, 95% Bias-corrected CI [−0.484 −0.126], SE = 0.097, $p < .001$). This represents a large effect, $k^2 = .32$.

Similar results were found when IPS was applied as a measure of procrastination. Chi-square = 188.451, df = 137, $p = .002$, CFI = 0.976; TLI = 0.971; RMSEA = 0.046 (0.028–0.061); SRMR = 0.073. Estimates are reported in Appendix (Table 3). SSE increased as a function of SSH ($\beta = 0.485$, boot SE = 0.085, $p < .001$), which was in turn negatively related to procrastination ($\beta = -0.804$, SE = 0.105, $p < .001$). The direct effect from SSH to procrastination was non-significant ($\beta = -0.057$, SE = .120, $p = .633$). The indirect effect of study skills on procrastination (IPS) via SSE was significant ($\beta = -0.390$, 95% bias-corrected CI [−0.541, −0.268], boot SE = 0.108, $p < .001$), which represents a large effect, $k^2 = .40$.

As for the control variables in both models, study discipline was a significant predictor of academic procrastination when measured by APS ($\beta = 0.410$, $p = .03$), indicating more procrastination among social science students, but non-significant measured by IPS. Gender was significant in both models when predicting procrastination ($p < .001$) and Study Self-Efficacy ($p < .001$), indicating more procrastination and higher self-efficacy among males.

In summary, Study 3 repeated the results of Studies 1 and 2, indicating support for the conceptual model suggesting that study self-efficacy mediates the study skill habit – procrastination relation. In Study 3, results were similar using an academic procrastination scale (APS) and a

trait procrastination measure (IPS) as outcome variables, indicating support for the appropriateness of using IPS as a measure of academic procrastination in Studies 1 and 2. However, note the higher mean scores for the IPS scale compared to the APS. This probably reflects the fact that APS scores focus on academic tasks specifically.

General Discussion

Academic skills are important for academic performance. Unfortunately, many students do not possess the sufficient levels of academic skills and competencies needed for efficient academic work, negatively affecting their academic performance as well as the likelihood of completing their studies (Richardson et al., 2012; Robbins et al., 2004). The logical remedy for this problem would be to provide explicit training in study-related skills, but universities instead often rely on advising students on study habits believed to be of utility in the study situation. However, research (e.g., Foerst et al., 2017) has demonstrated a discrepancy between students' knowledge of SRL strategies and their actual use of such strategies: Even if students possess knowledge and skills of useful study strategies, they do not necessarily put this knowledge into action. One key factor for translating study skills into action is study self-efficacy (Klassen et al., 2008), the beliefs students have in their ability to plan and implement student activities successfully (Bandura, 1997; Pajares & Valiante, 1997; Zimmerman, 1990).

The current research explored these issues in the context of procrastination. First, we document that low study skills (in the present studies, low adherence to recommended study habits compiled in a Study Skill Habits index, SSH) were associated with increased procrastination. In three studies, we observed moderate negative correlations (−.38–−.49) between these measures. This result follows predictably from the assumption that low study skills make academic work appear difficult, boring, or even aversive. As difficult, boring, and aversive tasks are well-documented predictors of procrastination (Grunschel et al., 2013; Klingsieck et al., 2013; Schraw et al., 2007; Steel, 2007), the negative relation between the Study Skill Habits measure and procrastination is consistent with prior research.

As a remedy to this situation, study skills training, or – as in the present paper – adherence to recommended study habits, may be introduced. However, study habits are not automatically translated into good study performance, as study self-efficacy may be vital in translating knowledge of efficient study habits into action (e.g., Bandura, 1997; Pajares & Valiante, 1997; Schunk, 2012; Zimmerman, 1990). Using SEM, we tested a model proposing that study self-efficacy mediates the observed study habits – procrastination relation. The sample included in Study 1 was relatively homogeneous, whereas participants in Studies 2 and 3 varied in experience and study fields. All three studies indicated support for the model; Studies 1 and 3 indicated full mediation, whereas Study 2 indicated partial mediation. Thus, these results indicate that although Study Skill Habits index is negatively related to procrastination, one key factor in this relationship is study self-efficacy. To our knowledge, this is the first study to demonstrate that the study habits → procrastination relation is dependent on study self-efficacy beliefs.

One implication of the present results is that study skills training, as well as advice on recommended study strategies, should be accompanied by measures to increase study self-efficacy. Just sharing information on effective study habits is not enough. However, whereas academic skills are relatively easy to train, efficacy beliefs in the academic context are not easily trainable. Unfortunately, academic self-efficacy is related to preceding academic achievement (e.g., Bartimote-Aufflick et al., 2016; Diseth, 2011), making a negative academic history an effective detrimental factor for student performance. A negative academic history may reduce or even neutralize efforts to enhance study skills. Low self-efficacy also negatively affects ambition, motivation, and persistence (Bandura, 1997), putting students with low self-efficacy in an unfavorable situation compared to their student fellows. Fortunately, intervention studies indicate that educational programs may enhance self-efficacy (e.g., Van Dinther et al., 2011). These authors reviewed studies that demonstrate positive

effects of intervention efforts over different study types and domains. Interventions based on social cognitive theory demonstrated the best results, and enactive mastery experiences seemed to be important for success (Bandura, 1997). Also, combined self-efficacy sources are reported as effective in increasing student self-efficacy (Van Dinther et al., 2011, p. 105). Bartimote-Aufflick et al. (2016, p. 1930) suggest specific strategies that may enhance study self-efficacy.

Increasing the probability that students, in fact, *have* mastery experiences is important. Such self-efficacy training should also be specific and closely related to the nature of the learning tasks, how they are framed, and focus on positive habit formation and strategies for which self-efficacy beliefs are important (Bandura, 1986). Skills need to be practiced in the proper context in order to be mastered, and teaching students how to implement different study skills should therefore be an integrated part of the various subjects students learn (Purdie & Hattie, 1999). Accordingly, when educators plan to train students in study skills, such training should be closely related to specific study programs (Weinstein et al., 2000), and skills training should ensure feedback and mastery experiences, thereby building self-efficacy beliefs.

Limitations and Further Research

The relationships between study skills, study self-efficacy, and procrastination are complex, and the model tested in the present studies (see Figure 1) is one of several possible. For example, efficacy beliefs may themselves affect the use of study strategies (Diseth, 2011; Phan, 2011). Also, procrastination has been demonstrated to be negatively related to academic performance (Kim & Seo, 2015; see also Footnote 1 in the present paper), with procrastination measure, performance indicator, type of data (self-report vs. external observation), and demographic profile of the study sample as important moderator variables. The potential role of study self-efficacy was not examined in the Kim and Seo paper, but other research (e.g., Balkis, 2011) has demonstrated study self-efficacy as a moderator variable. The results of the present paper indicate that study self-efficacy should receive increased attention as a moderator or mediator variable in studies examining performance and performance-related factors in the academic context. Furthermore, our model is also a simplification, as (academic) procrastination, self-efficacy, and academic skills are complex constructs related to other factors important to student work, including value, motivation, and metacognition (e.g., Bartimote-Aufflick et al., 2016; Cerino, 2014; Steel & Klingsieck, 2016).

Some additional limitations of the present studies should be noted. First, the Study Self-Efficacy scale used included items adapted from a general self-efficacy scale, modified to specifically tap study habit self-efficacy. While the internal consistency was satisfactory in Studies 2 and 3, the low Cronbach alpha in Study 1 indicates that the results of this study should be interpreted with caution. Second, the Study Skill Habits measure used in the present studies is a simplified proxy of study skills. Although this measure correlated predictably with study performance (self-reported grades), it should not be seen as an alternative to scales addressing study skills. On the positive side, our measure is probably an ecologically valid measure of students' willingness to practice recommended study habits, which is the operational definition of "study skills" as practiced by many universities. Third, as most of the measures used in the present studies have not been assessed for measurement invariance (cf. Brown, 2015; Gregorich, 2006), results should be interpreted with some caution. In the present studies, threats to measurement invariance include study field differences and differences due to levels study experience. For example, it is possible that the understanding of items addressing study self-efficacy may depend on study experience and/or study field, so that a given item (e.g., "When I get an assignment to work with, I have a hard time finding a solution") is understood differently depending on these variables. Future research should address this issue.

The possibility that study skills training itself may increase study self-efficacy (e.g., Wernersbach et al., 2014) should also be explored. As noted, universities and high schools should train students in basic study skills, ensuring that skills training is accompanied by mastery experiences. Such training

requires repeated sessions of active student participation and feedback for success experiences that can help establish new habits as well as an understanding of when and why they are used (McCabe, 2011; Verplanken, 2006). Note that reliance on the use of advice on study habits only does not secure such a deeper understanding. Future research should explore appropriate interventions, preferably in close concert with specific study programs. In these efforts, the situational and contextual factors in academic student life should be taken into account. Universities often arrange academic environments as "procrastination friendly," especially for beginning students in open study programs (Svartdal et al., 2020). A large degree of individual freedom for the student, long deadlines, and ample opportunities to divert attention from academic tasks to more tempting alternatives easily induce procrastination, maybe especially so in students low in study skills and/or academic self-efficacy. Future studies should examine the role of such variables and the possibility of arranging academic life with less situational and contextual opportunities to procrastinate.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

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Appendix

Study Skill Habits (SSH). English/Norwegian

(1) I test myself in the material I read/Jeg tester meg selv i det stoffet jeg leser
(2) I reread material I have read before/Jeg leser om igjen ting jeg har lest før
(3) Before each lecture I prepare myself by getting acquainted with the material/Før hver forelesning forbereder jeg meg ved å gjøre med kjent med stoffet
(4) I am active in seminars and study groups/Jeg er aktiv på seminarer og forelesninger
(5) I practice understanding difficult technical terms by explaining them to myself or others/Jeg trener på å forstå vanskelige begreper ved å forklare for meg selv eller andre

Study Efficacy Scale. English/Norwegian. (= added in Studies 2 and 3)*

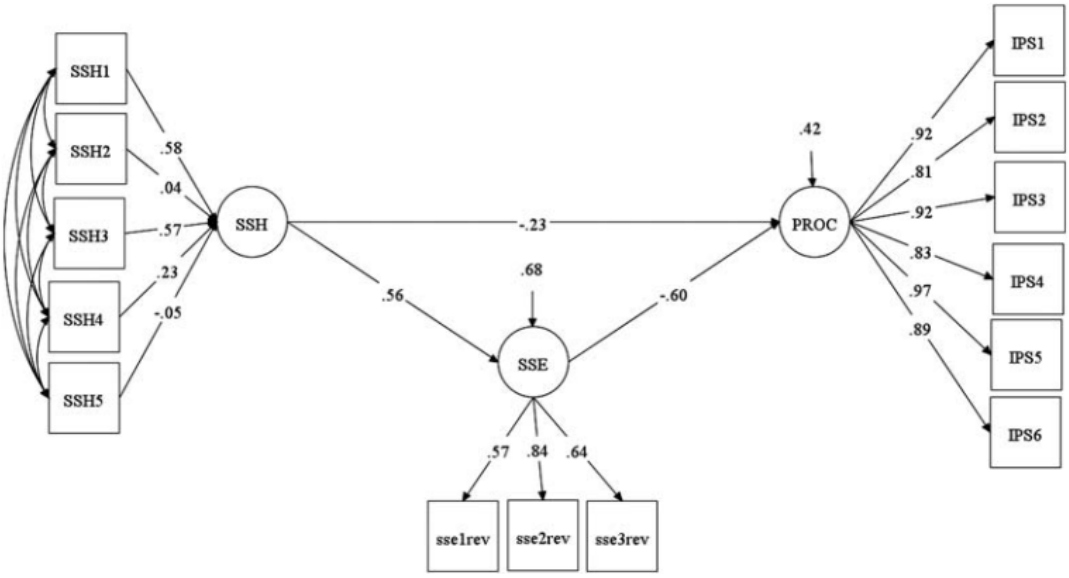
(1) When I get an assignment to work with, I have a hard time finding a solution/Når jeg får en studieoppgave å jobbe med, sliter jeg med å finne løsning
(2) I have little faith in my abilities to study effectively/Jeg har liten tiltro til mine evner til å studere effektivt
(3) It is difficult for me to follow the study curriculum when something unexpected happens/Det er vanskelig for meg å følge leseplanen når noe uventet skjer

(4) * I am capable of learning this year's course content/Jeg er i stand til å lære det som blir undervist i år
(5) * When I've decided to do something important to me, I keep working at it even when it is harder than I anticipated./Når jeg har bestemt meg for å gjennomføre noe som er viktig for meg, så fortsetter jeg å prøve, selv om det er vanskeligere enn jeg trodde
(6) * I am certain that I can achieve the academic goals I have set for myself/Jeg er sikker på at jeg klarer å oppnå de akademiske målene jeg har satt for meg selv

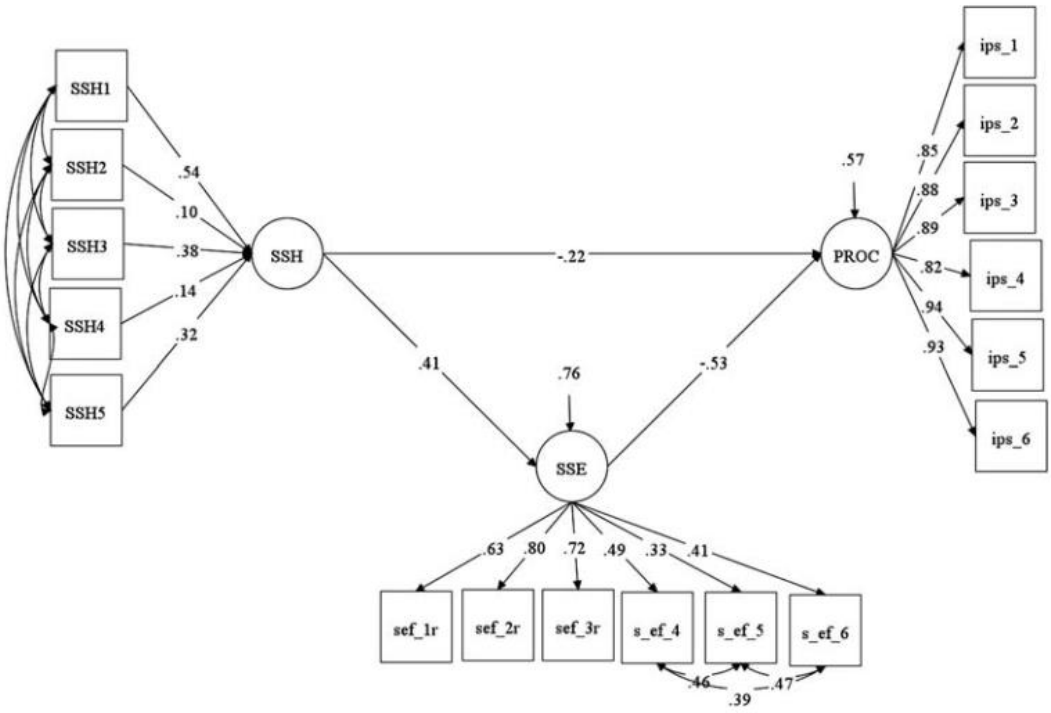
Six-item Version of Irrational Procrastination Scale. English/Norwegian

(1) I put things off so long that my well-being or efficiency unnecessarily suffers/Jeg utsetter ting så lenge at det går ut over velvære og effektivitet
(2) My life would be better if I did some activities or tasks earlier/Livet mitt ville vært bedre om jeg hadde gjort ting tidligere
(3) When I should be doing one thing, I will do another/Når jeg burde gjøre noe, gjør jeg gjerne noe annet i stedet
(4) At the end of the day, I know I could have spent the time better/Når jeg ser tilbake på dagen, vet jeg at jeg kunne utnyttet tiden bedre
(5) I delay tasks beyond what is reasonable/Jeg venter med å gjøre ting mer enn hva som er fornuftig
(6) I procrastinate/Jeg utsetter ting

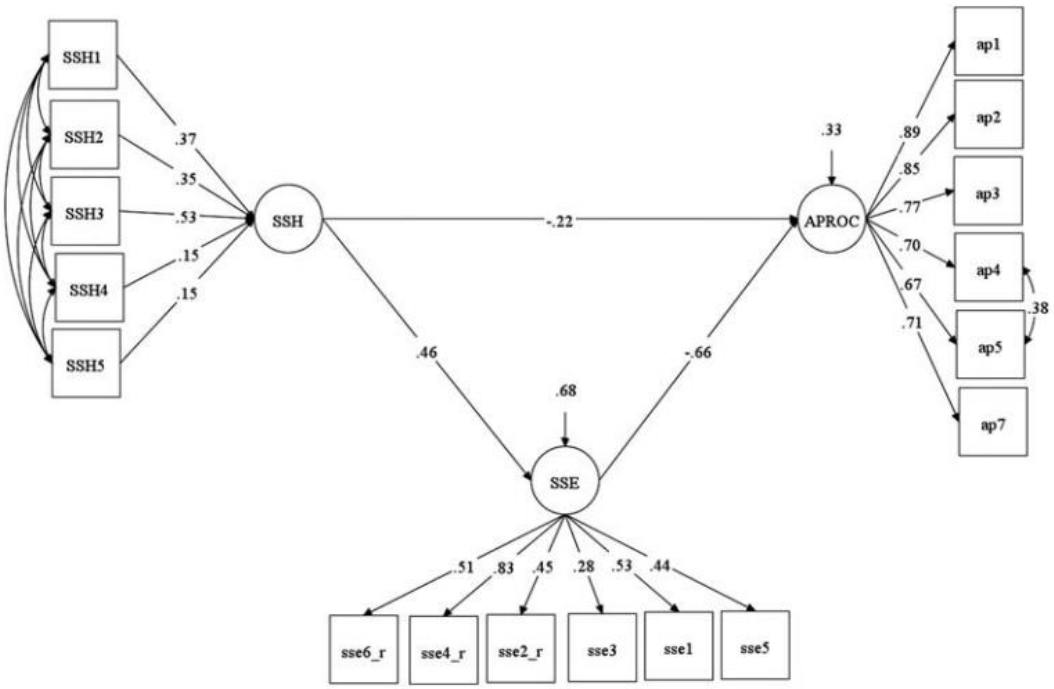
Appendix: Study 1



Appendix: Study 2



Appendix, Study 3 (APS)



Appendix, Study 3 (IPS)

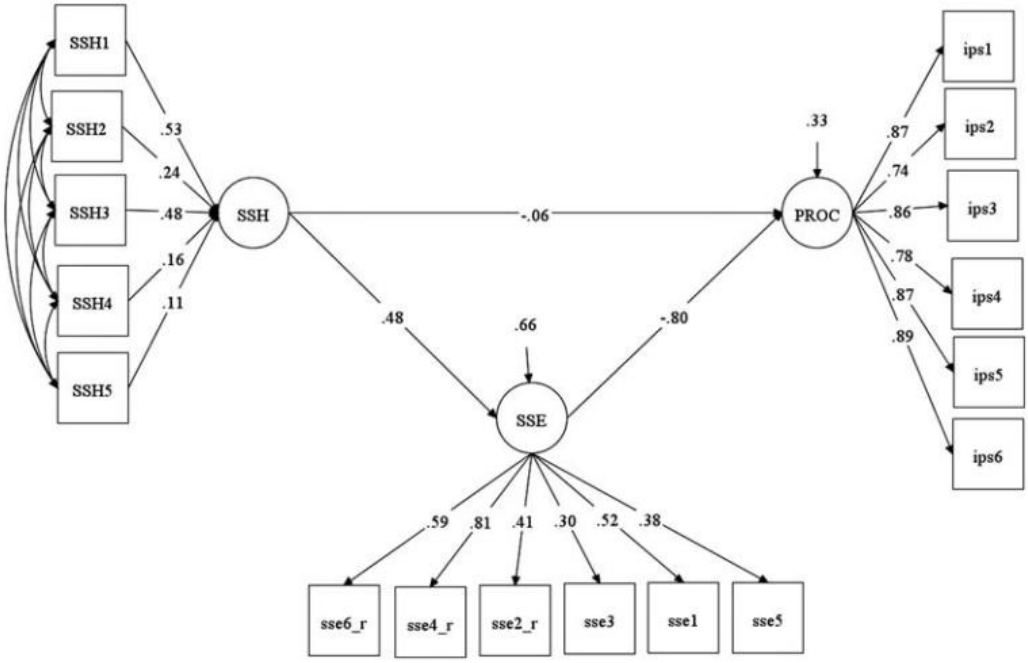


Table A1. Sensitivity analysis—model estimates ($n = 85$).

	Coefficient (β)	Boot SE	p
Direct effects		*Model 1*	
SS cat2 -> SSE	0.645	0.270	0.013
SS cat3 -> SSE	1.274	0.287	<0.001
SS cat2-> IPS	−0.499	0.242	0.039
SS cat3 -> IPS	−0.944	0.251	<0.001
SSE -> IPS	−0.538	0.110	<0.001
Indirect effects			
SS cat2 via SSE	−0.347	0.175	0.048
SS cat3 via SSE	−0.685	0.221	0.002
Total effects			
SS cat2 to IPS	−0.846	0.241	<0.001
SS cat3 to IPS	−1.629	0.175	<0.001

Note: Outcome variable standardized. SS = Study Skill Habits; SSE = Study Self-Efficacy; IPS = procrastination.

Table A2. Sensitivity analysis—model estimates ($n = 483$).

	Coefficient (β)	Boot SE	p
Direct effects		*Model 1*	
SS_cat2 -> SSE	0.530	0.156	0.001
SS_cat3 -> SSE	1.485	0.143	<0.001
SS_cat2-> IPS	−0.452	0.166	0.006
SS_cat3 -> IPS	−0.681	0.184	<0.001
SSE -> IPS	−0.500	0.065	<0.001
Indirect effects			
SS_cat2 via SSE	−0.265	0.091	0.003
SS_cat3 via SSE	−0.742	0.128	<0.001
Total effects			
SS_cat2 to IPS	−0.717	0.155	<0.001
SS_cat3 to IPS	−1.424	0.139	<0.001

Note: Outcome variable standardized.

Table A3. Standardized model estimates ($n = 180$).

	Coefficient (β)	SE	p
Direct effects			
SSH -> SSE	0. 485	0.085	<0.001
SSH -> IPS	−0.057	0.120	0.633
SSE -> IPS	−0.804	0.105	<0.001
Indirect effects			
SSH via SSE	−0.390	0.108	<0.001
Total effect	−0.447	0.063	<0.001

SSH = Study Skill Habits; SSE = Study Self-Efficacy; APS = academic procrastination.

Appendix D: Paper 1 Questionnaire

Time-management skills. English/Norwegian

- I organize my study time carefully to make the best use of it / Jeg organiserer studietiden min nøye for å utnytte den best mulig.
- I'm pretty good at getting down to work whenever I need to / Jeg er ganske flink å komme i gang med skolearbeidet når jeg trenger.
- I work steadily through the term or semester, rather than leave it all until the last minute / Jeg jobber heller jevnt gjennom hele semesteret fremfor å la alt vente til siste liten
- I generally make good use of my time during the day / Stort sett kan jeg bruke tiden godt gjennom arbeidsdagen

Academic self-efficacy. English/Norwegian

- I am confident that I can acquire the skills necessary to excel within my field of study / Jeg er trygg på at jeg kan tilegne meg ferdighetene som er nødvendige for å utmerke meg innen mitt studiefelt.
- I believe I will do well in my studies, as long as I make an effort / Jeg har tro på at jeg skal gjøre det bra i studiet, så lenge jeg gjør en innsats.
- I expect to do well in my studies / Jeg forventer at jeg skal gjøre det godt i studiet.

Academic integration. English/Norwegian

- I am satisfied with the extent of my intellectual development since enrolling in this university / Jeg er fornøyd med hvor mye jeg har utviklet meg intellektuelt siden jeg startet på universitetet.
- My academic experience has had a positive influence on my intellectual growth and interest in ideas / Mine akademiske erfaringer fra universitetet har hatt positiv innflytelse på min intellektuelle utvikling og faglige interesser.
- My interest in ideas and intellectual matters has increased since coming to this university / Min interesse for ideer og intellektuelle spørsmål har økt siden jeg begynte på universitetet

Social integration. English/Norwegian

- Since coming to this university I have developed close personal relationships with other students / Jeg har utviklet nære personlige relasjoner med andre medstudenter etter at jeg kom til dette universitetet.
- The student friendships I have developed at this university have been personally satisfying / De vennskapene jeg har utviklet med andre medstudenter på dette universitetet har vært personlig tilfredsstillende.
- It has been difficult for me to meet and make friends with other students / Det har vært vanskelig for meg å møte og bli venner med andre studenters (Reverse scored)

Drop-out intentions. English/Norwegian

- I sometimes consider dropping out of university before graduation / Av og til vurderer jeg å slutte studiene før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I intend to drop out of university before graduation / Jeg kommer til å slutte å studere før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think that other job opportunities suit me better than those I can get with my current education / Av og til tenker jeg at andre jobbmuligheter enn de studiene gir, passer bedre for meg.
- I know what I am going to do if I withdraw from my studies / Jeg vet hva blir mitt neste steg hvis jeg avbryter studiene (*excluded*).

Transfer university intentions. English/Norwegian

- I sometimes consider changing university before graduation / Av og til vurderer jeg å bytte universitet før jeg er ferdig med planlagt studieløp (eksamen, grad)
- I intend to change university before graduation / Jeg kommer til å slutte å studere før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think about how my life would be if I change my study place/ Av og til tenker jeg på hvordan livet mitt ville være hvis jeg hadde endret studiested.
- I have a plan for when and how I will change my study place / Jeg har en plan for når og hvordan jeg skal bytte studiested.

Transfer study field intentions. English/Norwegian

- I sometimes consider changing study field before graduation / Av og til vurderer jeg å endre studieretning før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I intend to change study field before graduation / Jeg kommer til å endre studieretning før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think about advantages and disadvantages of changing study field/ Av og til vurderer jeg fordeler og ulemper ved å endre studieretning.
- I am waiting for possibility to change my study field / Jeg venter på en mulighet for å endre studieretning.

Appendix E: Paper 2 Questionnaire

Academic self-efficacy. English/Norwegian

- I am confident that I can acquire the skills necessary to excel within my field of study / Jeg er trygg på at jeg kan tilegne meg ferdighetene som er nødvendige for å utmerke meg innen mitt studiefelt.
- I believe I will do well in my studies, as long as I make an effort / Jeg har tro på at jeg skal gjøre det bra i studiet, så lenge jeg gjør en innsats.
- I expect to do well in my studies / Jeg forventer at jeg skal gjøre det godt i studiet.

Academic Procrastination. English/Norwegian

- I put off projects until the last minute / Jeg utsetter prosjekter til siste minutt.
- I know I should work on school work, but I just don't do it / Jeg vet jeg burde jobbe med skolearbeid, men jeg gjør det ikke.
- "Cramming" and last minute studying is the best way that I study for a big test / «Skippertak» og jobb i siste liten er måten jeg best forbereder meg til store prøver.
- When given an assignment, I usually put it away and forget about it until it is almost due / Når jeg får utdelt en oppgave, legger jeg den vanligvis til side helt til tidsfristen nesten er gått ut.

Drop-out intentions. English/Norwegian

- I sometimes consider dropping out of university before graduation / Av og til vurderer jeg å slutte studiene før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I intend to drop out of university before graduation / Jeg kommer til å slutte å studere før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think that other job opportunities suit me better than those I can get with my current education / Av og til tenker jeg at andre jobbmuligheter enn de studiene gir passer bedre for meg (*excluded*).
- I know what I am going to do if I withdraw from my studies / Jeg vet hva blir mitt neste steg hvis jeg avbryter studiene (*excluded*).

Transfer university intentions. English/Norwegian

- I sometimes consider changing university before graduation / Av og til vurderer jeg å bytte universitet før jeg er ferdig med planlagt studieløp (eksamen, grad) (*excluded*).

- I intend to change university before graduation / Jeg kommer til å bytte universitetet før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think about how my life would be if I change my study place/ Av og til tenker jeg på hvordan livet mitt ville være hvis jeg hadde endret studiested (*excluded*).
- I have a plan for when and how I will change my study place / Jeg har en plan for når og hvordan jeg skal bytte studiested.

Transfer study field intentions. English/Norwegian

- I sometimes consider changing study field before graduation / Av og til vurderer jeg å endre studieretning før jeg er ferdig med planlagt studieløp (eksamen, grad) (*excluded*).
- I intend to change study field before graduation / Jeg kommer til å endre studieretning før jeg er ferdig med planlagt studieløp (eksamen, grad).
- I sometimes think about advantages and disadvantages of changing study field/ Av og til vurderer jeg fordeler og ulemper ved å endre studieretning (*excluded*).
- I am waiting for possibility to change my study field / Jeg venter på en mulighet for å endre studieretning.

Appendix F: Paper 3 Questionnaire

Study Skills. English / Norwegian

- I test myself in the material I read / Jeg tester meg selv i det stoffet jeg leser.
- I reread material I have read before / Jeg leser om igjen ting jeg har lest før.
- Before each lecture I prepare myself by getting acquainted with the material / Før hver forelesning forbereder jeg meg ved å gjøre med kjent med stoffet.
- I am active in seminars and study groups / Jeg er aktiv på seminarer og forelesninger.
- I practice understanding difficult technical terms by explaining them to myself or others / Jeg trener på å forstå vanskelige begreper ved å forklare for meg selv eller andre.

Study efficacy scale. English / Norwegian. (* = added in Studies 2 and 3)

- When I get an assignment to work with, I have a hard time finding a solution / Når jeg får en studieoppgave å jobbe med, sliter jeg med å finne løsning.
- I have little faith in my abilities to study effectively / Jeg har liten tiltro til mine evner til å studere effektivt.
- It is difficult for me to follow the study curriculum when something unexpected happens / Det er vanskelig for meg å følge leseplanen når noe uventet skjer.
- * I am capable of learning this year's course content / Jeg er i stand til å lære det som blir undervist i år.
- * When I've decided to do something that is important to me, I keep working at it even when it is harder than I anticipated / Når jeg har bestemt meg for å gjennomføre noe som er viktig for meg, så fortsetter jeg å prøve, selv om det er vanskeligere enn jeg trodde.
- * I am certain that I can achieve the academic goals I have set for myself / Jeg er sikker på at jeg klarer å oppnå de akademiske målene jeg har satt for meg selv.

Six-item version of Irrational Procrastination Scale. English / Norwegian

- I put things off so long that my well-being or efficiency unnecessarily suffers / Jeg utsetter ting så lenge at det går ut over velvære og effektivitet.
- My life would be better if I did some activities or tasks earlier / Livet mitt ville vært bedre om jeg hadde gjort ting tidligere.

- When I should be doing one thing, I will do another / Når jeg burde gjøre noe, gjør jeg gjerne noe annet i stedet.
- At the end of the day, I know I could have spent the time better / Når jeg ser tilbake på dagen, vet jeg at jeg kunne utnyttet tiden bedre.
- I delay tasks beyond what is reasonable / Jeg venter med å gjøre ting mer enn hva som er fornuftig.
- I procrastinate / Jeg utsetter ting.

Academic procrastination scale. English / Norwegian

- My attention span for schoolwork is very short / Mitt oppmerksomhetsspenn for skolearbeid er veldig kort.
- I know I should work on school work, but I just don't do it / Jeg vet jeg burde jobbe med skolearbeid, men jeg gjør det ikke.
- I get distracted by other, more fun, things when I am supposed to work on schoolwork / Jeg blir distrahert av andre, mer morsomme ting, når jeg skulle jobbe med skolearbeid.
- Cramming" and last minute studying is the best way that I study for a big test / «Skippertak» og jobb i siste liten er måten jeg best forbereder meg til store prøver.
- When given an assignment, I usually put it away and forget about it until it is almost due / Når jeg får utdelt en oppgave, legger jeg den vanligvis til side helt til tidsfristen nesten er gått ut.
- I don't spend much time studying school material until the end of the semester / Jeg bruker ikke mye tid på å studere pensum før slutten av semesteret.

Appendix G: Shortened Consent Form

Undersøkelse om studievaner og **beslutningstaking**

Hei og takk for at du deltar i denne undersøkelsen!

Vi ber deg her å svare på noen spørsmål knyttet til dine **studievaner og beslutningstaking**. Svar på alle spørsmålene så nøyaktig du kan. Det er ikke noen rette eller gale svar her, vi er ute etter din erfaring og dine oppfatninger.

Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Du deltar frivillig og kan når som helst avslutte undersøkelsen. Dette prosjektet utføres av forskerlinjestudent Efim Nemtcan og ledes av professor Frode Svartdal, førsteamanuensis Rannveig Grøm Sæle og postdoc Thor Gamst-Klaussen UiT.

Det tar ca. 8-10 min å svare på spørsmålene. **Når du er ferdig med svarene, du kan også være med i trekningen av 1 Elkjøp-gavekort på 1000 kr.**

Ved å klikke på "FORTSETT" under samtykker jeg til å delta i denne undersøkelsen.

Hvis du vil lese full versjon av informert samtykke kan du klikke under.

Samtykkeskjema

Appendix H: Full version of Consent Form

Vil du delta i forskningsprosjektet om beslutningstaking?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor din måtte å ta beslutninger påundersøkes. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Formålet med dette studiet er å undersøke prosessen av beslutningstaking. Dette studiet er en del av større prosjektet hvor vi er på utkikk etter årsaker til frafall i høyere utdanning. Derfor blir du spurt om å oppgi fødselsnummer for at vi kan få tilgang til data om din studentstatus (hentes fra er nasjonalt register: DBH). Denne informasjonen kun brukes til forskningsformål og skal slettes etter prosjektslutt.

Hvem er ansvarlig for forskningsprosjektet?

Dette prosjektet utføres av Ph.d. student Efim Nemtcan og ledes av professor Frode Svartdal, førsteamanuensis Rannveig Grøm-Sæle og postdoc Thor Gamst-Klaussen. UiT er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Alle studenter er velkommen til å delta i undersøkelsen.

Hva innebærer det for deg å delta?

Hvis du velger å delta i prosjektet, innebærer det at du fyller ut et spørreskjema. Det vil ta deg ca. XX minutter. Spørreskjemaet inneholder spørsmål om dine ferdigheter relaterte til beslutningstaking og framtidige intensjoner. Du blir også spurt om å oppgi ditt fødselsnummer for at vi kan få tilgang til registrerte data om din studentstatus på et senere tidspunkt.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det er bare prosjektgruppes

medlemmer (Efim Nemtcan, Frode Svartdal, Rannveig Grøm-Sæle, og Thor Gamst-Klaussen) som skal ha tilgang til dine svar. Alt data som hentes fra NSD blir kodet, så vi får ikke navn på deltakerne.

Datamaterialet samles inn via Qualtrics Survey Tool. Qualtrics følger The General Data Protection Regulation (GDPR) regler og er vurdert å være en trygg måte å samle inn data. Alle personopplysningene (fødselsnummer) vil oppbevares adskilt fra spørreskjemadata og vil bli erstattet med en kode. Deltakerne kan ikke gjenkjennes i vitenskapelige publikasjoner eller andre materialer.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Prosjektet skal etter planen avsluttes 31.12.2025. Persondata anonymiseres ved prosjektslutt slik at det blir ikke mulig å identifisere deg.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.
-

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra UiT Norges arktiske universitet har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- PhD student Efim Nemtcan at UiT The Arctic University of Norway by mail (efim.nemtcan@uit.no)
- Our Data Protection Officer: Joakim Bakkevold; tlf.: 776 46 322 / 976 915 78; mail: personvernombud@uit.no
- NSD – The Norwegian Centre for Research Data AS, by email: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.