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What predicts student decision to leave? A new perspective on academic attrition

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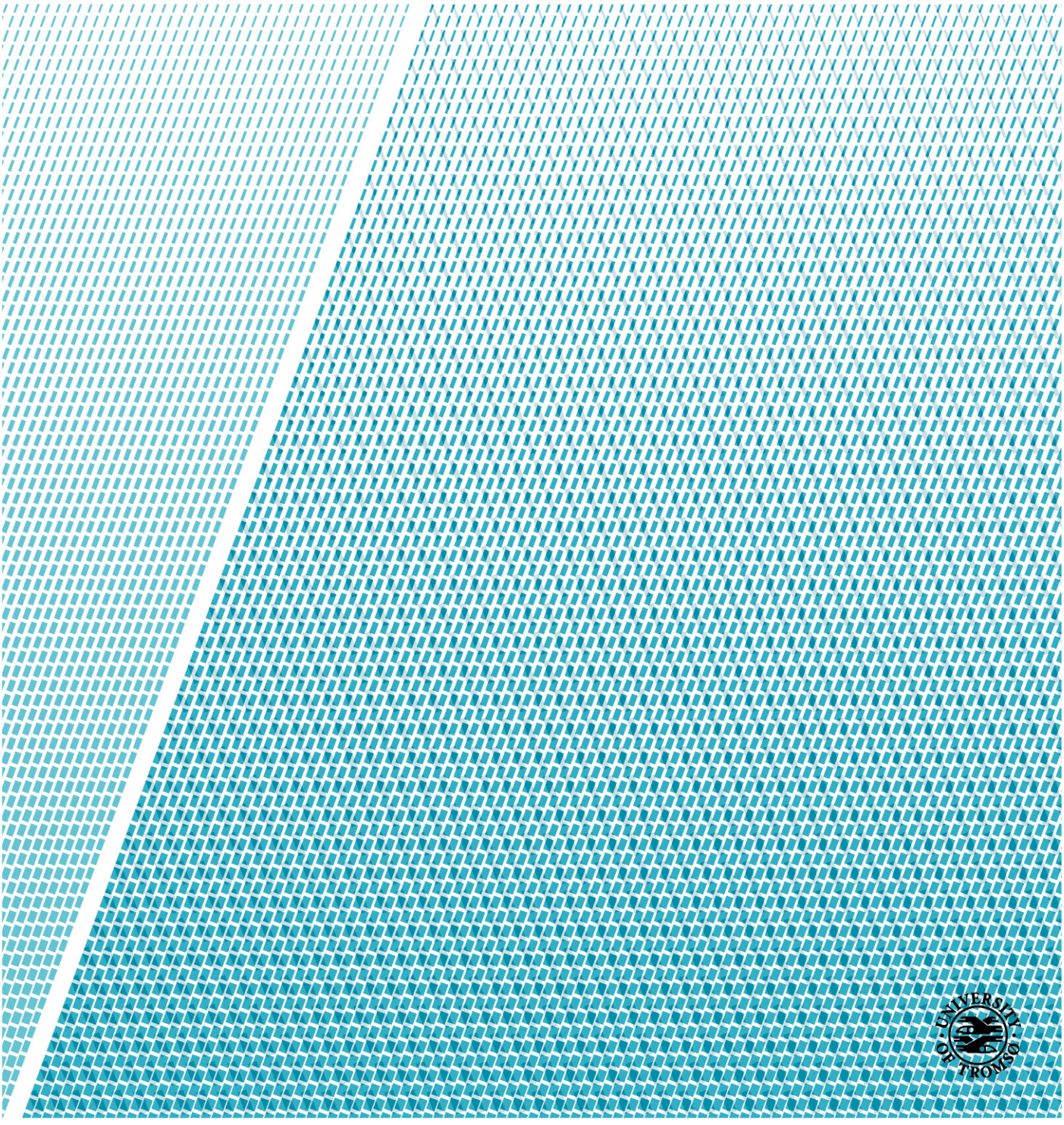

Foreword

To my supervisor, Prof. Frode Svartdal. Frode was the first person who introduced me to the field of psychology. His enthusiasm and passion for psychology went along with me on the long bachelor and subsequent master's path. I have always been amazed by his incredible mind, finding research possibilities where I would not even try to search for and endless industriousness. Your optimism, approval, and dedication always gave me that motivation that everyone so desperately searches for. I would like to thank you for invaluable guidance to create a project that was both important and achievable, reading and correcting all my drafts that were possibly not the best ones you have ever read. You have been a fantastic help in everything from planning to overseeing my master thesis from the early start, and I could never have done it without your help.

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It is always sad to acknowledge that something comes to an end. Nevertheless, I am grateful for the possibility to be a master student and to this priceless experience I have got from this program.

Efim Nemtcan

Frode Svartdal

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Sammedrag

Frafall fra høyere utdanning er av stor betydelig for mange europeiske land og spesielt for Norge, med frafallsprosent på 20-25%. I denne studien undersøkes dette problemet ut fra et perspektiv som fokuserer på intensjoner om å slutte, et mål som er nært relatert til faktisk frafall. Spesielt forsøkte vi å skille mellom forskjellige former for frafall: å slutte permanent, å skifte lærested, og å ta en pause. Vi antok at det finnes forskjeller i mekanismer bak disse intensjonene. I denne sammenhengen fokuserte vi på tidligere undersøkte variabler (motivasjon, prestasjon, og akademisk mestringstro) og på nye (mangel på energi, akademisk studiekompetanse, akademisk innsats, og prokrastinering) som prediktorer for studenters intensjoner om å falle fra.

Et spørreskjema ble distribuert blant studenter ved UiT Norges arktiske universitet (n = 491). Resultater av hierarkiske multiple-regresjonsanalyser indikerte at studiemotivasjon var en sterkere predikator av studenters intensjoner om å slutte enn akademisk mestringstro. I en utvidet modell var også variablene mangel på energi til å starte akademisk oppgave og dets interaksjon med prokrastinering statistisk signifikante. I motsetning, vi fant ingen sammenheng mellom undersøkte modelene og intensjoner om å bytte studiested.

Nøkkelord: frafall, prestasjon, akademiske studieferdigheter, akademisk mestringstro, studiemotivasjon, akademisk innsats, mangel på energi, prokrastinering.

Abstract

The issue of attrition from higher education is a significant problem across Europe and especially Norway, where dropout rates are as high as 20-25%. In the current study, we address the issue from the perspective of attrition intentions that have been found closely associated with actual attrition behavior. In particular, we attempted to differentiate between types of students' attrition intentions: dropping-out, transferring-out, and stopping-out. We assumed that mechanisms causing these intentions are not the same. Consequently, we investigated a relative significance of previously researched predictors (motivation, performance, and academic self-efficacy) and ones proposed in the current study (lack of energy, academic study skills, academic effort, and procrastination).

A questionnaire was distributed among students of UiT The Arctic University of Norway (N = 491). Results indicated that study motivation was a more significant predictor of drop-out intentions than academic self-efficacy. In the enhanced model, lack of energy to initiate academic behavior and its interaction with procrastination were statistically significant. In contrast, none of the models were significant for the explanation of students' transfer-out intentions.

Keywords: attrition, drop-out, transfer-out, stop-out, performance, academic study skills, academic self-efficacy, study motivation, academic effort, lack of energy, procrastination.

Do we know why students leave education?

According to statistics, 34% of Norwegian university students do not complete their initial study program within eight years ("Gjennomføring ved universiteter og høgskoler", 2018). Similar estimates are provided in a report by the EU research team on drop-out and completion rates across Europe (Vossensteyn et al., 2015). The state of affairs is comparable across investigated countries (Denmark, Netherlands, France and The United Kingdom, among the others) where non-completion rates range from 19 to 40% in 2011. Further, Aamodt and Hovdhaugen (2011) who compared three students cohorts indicate that drop-out rates among Norwegian bachelor students are relatively stable and vary around 20-25%. The situation is discouraging given the amount of national wealth (5% of gross domestic product) spent on education (OECD, 2018).

Considering the significant consequences of students' attrition relevant both to institutions and the Norwegian welfare state, the issue of decreasing students' attrition rates from higher education is of great importance. Indeed, it has been indicated that on average, 81% of 25- to 34-year-old adults who have at least upper secondary education are employed, compared to 60% of adults who did not finish their upper secondary school (OECD, 2018). In addition, adults with higher education report having better health and well-being (De Ridder et al., 2012). According to Muennig (2007), the effects of education on health could be potentially explained by two mechanisms: better health awareness and knowledge that leads to more health-promoting behaviors or better socioeconomic status leading to better health insurance and lower level of stress.

What are the reasons and why some students leave their academic institutions? Research demonstrates that one of the strongest predictors of actual attrition is attrition intentions as well as academic performance (Bean, 1982; Bowers, 2010; Steel & Ovalle, 1984; Van Breukelen, Van der Vlist, & Steensma, 2004). Further, behavioral theories (e.g., Ajzen's Theory of Planned Behavior) support the significance of intentions in understanding the underlying causes of behavior (Ajzen &

Madden, 1986). In sum, attrition intentions is seemingly a prospective variable in terms of practical utility such as increasing validity and reliability of attrition estimations (Bean, 1982).

Due to the fact that attrition intentions per se do not explain why students consider leaving as an alternative, investigation of potential mechanisms involved in intention formation is required. However, research on this issue is scarce and different factors are advocated in terms of their predictive ability. For example, according to Alivernini and Lucidi (2011), students' motivation is the strongest predictor of attrition intentions, while Litalien and Guay (2015), and Willcoxson (2010) ascribe this role to academic self-efficacy. In the current master thesis, we aim to clarify the relative significance of these factors.

Based on analysis of the research literature devoted to the issue of actual attrition, we expect that academic study skills, academic self-efficacy, academic effort, procrastination (irrational postponement of intended course of action), and lack of energy would facilitate our understanding of the phenomenon (Credé & Kuncel, 2008; Foerst, Klug, Jöstl, Spiel, & Schober, 2017; Robbins et al., 2004; Steel, 2007). These factors have been found either directly or indirectly related to students' actual attrition behavior. Since some overlap between predictors of students' intentions and subsequent behavior can be found, we assume that examination of the overmentioned factors is a reasonable premise.

Before we proceed to the theoretical background underlying the current investigation, it is necessary to have a clear understanding of what would be referred to as students' retention and attrition. According to Grau-Valldosera and Minguillón (2014), it is important to establish a clear phenomenological base of attrition/retention, since ambiguity impedes the accuracy of results and conclusions, biases theoretical models, complicates subsequent interpretation and implementation of findings. According to Hoyt and Winn (2004), students' attrition behavior is a multidimensional phenomenon and differentiation between subgroups of attrition is required. Further, based on theories of intention-behavior relationship, the predictive ability of intentions is highly dependent

on the behavior being investigated (Ajzen & Madden, 1986). Consequently, in the current master thesis, we apply the differentiation of attrition behavior to attrition intentions that will be described in the next section, and investigate the importance of overmentioned predictors, accounting for types of attrition intentions.

What are attrition and retention?

Defining attrition

Even though academic attrition has been of interest to researchers since the 20th century, no single and universally accepted definition exists within the literature. *Attrition, dropout, wastage, and withdrawal* are the most commonly used terms (Haydarov, Moxley, & Anderson, 2013; Urwin et al., 2010). One of the reasons for such inconsistent terminology seems to be an overgeneralization of attrition-retention dichotomy (Grau-Valldosera & Minguillón, 2014; Hoyt & Winn, 2004). For example, students who were not active at university where they commenced for one year, because they moved to another academic institution, could be classified as drop-outs from an institutional perspective. However, from a personal perspective, it is likely that students would not consider themselves as drop-outs.

Based on the current state of education, multiple researchers agree that treating non-returning students as a single cohort is inappropriate (Grosset, 1993; Hoyt & Winn, 2004; Porter, 2000; Woosley, Slabaugh, Sadler, & Mason, 2005). Indeed, based on the dichotomy of permanent and temporary attrition (dropping-out and stopping-out), students show significant differences in educational and institutional commitment as well as academic intentions and goals (Woosley et al., 2005). In addition, the study by Hoyt and Winn (2004) shows that drop-out, stop-out and transfer-out students are likely to report different reasons for their decisions to leave (economical, family, or low GPA) and could be differentiated on some demographic variables such as age, gender, and family status.

As illustrated in Table 1, based on the patterns of students' behavior, academic attrition can

be differentiated into the following subgroups: dropping-out, stopping-out, opting-out, and transferring-out. According to Grau-Valldosera and Minguillón (2014), and Hoyt and Winn (2004), treating students as a homogenous group has significant detrimental consequences for the statistical validity of obtained results and intervention strategies acquired by academic institutions to prevent attrition. For example, interventions implemented by universities to decrease high transfer-out rates (increasing university's reputation) would be different from those implemented to change undesirable drop-out trends (improving lecture and examination form of particular course).

Table 1

Types of academic attrition

Construct	Definition
Drop-out	A student leaving an academic institution without completing a degree and having no concrete intentions of returning to higher education (Bonham & Luckie, 1993; Hoyt & Winn, 2004; Spady, 1970; Strom & Boster, 2007; Tinto, 1975).
Stop-out	A student leaving an academic institution without completing a degree and stating that he/she has intentions to return (Ahson, Gentemann, & Phelps, 1998; Hoyt & Winn, 2004; Woosley et al., 2005).
Opt-out	A student leaving an academic institution without completing a degree. These students come for avocational purposes and predominantly do not intend to complete any degree (Bonham & Luckie, 1993; Hoyt & Winn, 2004).
Transfer-out	A student moving from a university where he/she commenced his/her studies to another institution of higher education (Hoyt & Winn, 2004; Tinto, 1975).

Defining retention

A similar situation is observed in the case of students' *retention* with various studies citing *retention rate*, *persistence rate,* and *graduation rate* while describing different phenomena (Haydarov et al., 2013). The definition also varies depending on the study's design and pattern of students enrolment being considered: successful completion of a single (several courses), status of student's registration the following term or being an active student until graduation (De Paepe, Zhu, & DePryck, 2018; Haydarov et al., 2013; Manyanga, Sithole, & Hanson, 2017). Further, it is important to differentiate between retention and persistence. While both concepts are similar in most respects concerning whether a student stays and continues his education, retention is most widely referred as an institutional measure of students' achievement (success). In contrast, persistence is more student-focused measure of how an academic goal is achieved (Hagedorn, 2006; Haydarov et al., 2013).

As discussed, the dichotomous classification of students into those who continue their studies and those who leave is prone to overgeneralization and imprecision. According to Hagedorn (2006), the academic path of a student is not always straightforward and retention-attrition taxonomy is not entirely suitable for its depiction. Consequently, a more nuanced classification structure is required (see Table 2).

The issue of students' retention and time-to-degree has been of the primary interest for Norwegian government and higher education institutions until recently. Only after the introduction of a comprehensive reform of higher education in Norway, the Quality Reform, the attrition problem appeared on the agenda (Hovdhaugen, 2009). As a result, to our knowledge, relatively few research studies are available on attrition among Norwegian students compared to other European countries and the United States.

According to Tinto (2006): "Leaving is not the mirror image of staying. Knowing why students leave does not tell us, at least not directly, why students persist" (p. 6). In the current

master thesis, we focus on the issue of student's attrition (attrition intentions in particular). Based on the previous discussion, the overmentioned differentiation of academic attrition will be applied in the context of students' intentions, because of its significance for subsequent research and development of possible implementation strategies. Drop-out, transfer-out, and stop-out subgroups of attrition are of the primary interest.

Further, attrition will be subsequently referred to as a generalized term comprised of drop-out, stop-out, opt-out and transfer-out types of withdrawal. In the following section, an overview of the most influential models of students' attrition is presented. The description is intended to provide additional evidence for the importance to distinguish between different types of attrition.

Table 2

Classification of retention by Hagedorn (2006)

Construct	Definition
Institutional retention	The most basic and straightforward differentiation of students which covers scenarios when a student persists from one semester to another at the same academic institution.
System retention	A more general category according to which students who continue their higher education despite re-enrolment (stop-outs) or transferring to another institution (transfer-outs) are classified as persisters.
Retention within a major/discipline	Categorization of students which involves those who persist in the same major area, discipline or department. It is assumed that students do not change their major from, for example, engineering to medicine.
Retention within a course	The smallest unit of classification which presupposes that students persist in a given course until completion.

Models of student attrition

Tinto's model of attrition

One of the most influential models of students' attrition was proposed by Tinto (1975). In this model, the author emphasizes the central role of integration in explaining students' attrition-retention behavior. Tinto theorized that integration is a function of whether students perceive being a part of an academic and social environment. The differentiation between these systems is crucial since academic and social "malintegration" lead to different types of withdrawal such as voluntary and forced attrition (Tinto, 1975). For example, a student can voluntary drop-out due to insufficient integration into the social life of college (lack of friends) or excluded because of poor performance (poor integration into the academic sphere).

Based on the model, factors that are not under the direct control of an institution such as family background, personal characteristics, previous educational experience, and goal commitment are of importance in determining students' persistence. *Family background* involves parental education, economic status, attitudes towards education and their expectations for their children's academic path which influence students' withdrawal decision. According to Tinto (1975), students having better backgrounds (e.g., social status attributes) are more prone to drop-out voluntary than their counterparts. *Personal characteristics* are defined as students' gender, race, ethnicity, and intellectual ability. *Previous educational experience* includes past performance as well as other school experiences influencing student's aspirations, and expectations concerning higher education (Tinto, 1975). *Goal commitment* is student's dedication to his academic goal (e.g., successful degree completion).

Further, this model assumes that both individual (family background, individual characteristics, previous educational experience, and goal commitment) and institutional factors (academic and social integration) contribute to students' drop-out decision (Tinto, 1975). The analysis of their interaction shows that different subgroups of dropout student could be identified:

voluntary withdrawal, academic dismissal, permanent and transfer dropouts. For example, an individual who has high goal commitment (to receive master-degree in engineering) but fails to integrate into the university's academic sphere may transfer to an institution with lower requirements. A similar model can also be applied in a situation when due to low goal commitment students decide to withdraw from an academic environment permanently.

Bean and Metzner's model of attrition

Another influential model was proposed by Bean and Metzner (1985). These authors promote the idea that Tinto's model with an excessive focus on integration and especially social integration is not suitable to explain attrition of emerging group of non-traditional students. *Non-traditional students* are defined as students who differ from their traditional counterparts in the following aspects: either study part-time, or commuter (do not live in the in an institution residence), or older than traditional students (approximately 24 years old), or combination of some of these factors. Previously mentioned opt-outs and distance students could be assigned to this group. Due to characteristics of non-traditional students (study part-time and commuter) they are not much influenced by the social aspect of an institution, while the opposite tendency is observed in case of academic dimension (Bean & Metzner, 1985).

Consequently, the social aspect of Tinto's model is an unsound explanation of non-traditional students' attrition, although the authors agree that it perfectly suits the purpose in case of traditional students. Further, Bean and Metzner's model pays much closer attention to environmental factors. They argue that lack of finances, work schedule conflicts, and family responsibilities are perhaps crucial factors to distinguish non-traditional students who might leave.

Based on the analysis of available research literature Bean and Metzner (1985) propose a different model that in comparison to the model by Tinto (1975) is more suitable in case of non-traditional students' attrition. Defining and background variables (age, goals, ethnicity, high-school GPA), academic and environmental variables (study habits, finances, employment, family),

academic and psychological outcomes as well as intentions to leave are identified as crucial predictors of attrition (Appendix B).

Rovai's model of attrition

The model by Rovai (2003) combines the two previous models in an attempt to explain attrition of distance students (online programs attrition). These students are assumed to have different educational needs than traditional and non-traditional counterparts. In this composite persistence model (Appendix C) the authors differentiate between two types of factors: students' characteristics and skills *prior to admissio*n and factors *after admission* such as external and internal factors (Rovai, 2003). According to the model, student success and retention at an academic institution is determined by a degree to which both prior and after admission factors represent strengths in a given academic context. For example, students who have a high level of prior performance (GPA), superior time-management skills, socially integrated and few other responsibilities (family, work) are less likely to drop-out (Xuereb, 2014). Further, Rovai (2003) underlines five special needs of distance learning students that should be met to increase their retention: consistency and clarity of programs and procedures, self-esteem, identification with a given university, social integration (interpersonal relationships) and availability of support services.

Summary

From this discussion, attrition is a multidimensional construct that could be explained by integration issues (Tinto, 1975), background variables such as GPA, age, gender, or internal and external variables (Bean & Metzner, 1985), comparability of students' characteristics prior and after admission (Rovai, 2003). Also, it is evident that interplay of the factors (these are summarized in Appendix A-C) can lead to different consequences in the form of changing university or permanent withdrawal. Therefore, the differentiation between subgroups of attrition seems reasonable (Grau & Minguillón, 2013; Grau-Valldosera & Minguillón, 2014). Second, based on the model by Bean and

Metzner (1985), intention to leave is an essential factor in predicting subsequent attrition behavior. The role of attrition intentions in determining the likelihood of actual attrition is addressed in the next section.

Importance of students' intentions

Intentions have been used to predict a wide range of behaviors from physical activity and weight loss to academic activities and achievement (Sheeran, 2002). According to Bean (1982), intentions to leave (drop-out) university have the most substantial direct effect and explain the largest proportion of variation (R^2 = .42 - .50) in actual drop-out behavior. In addition, Alfred (1973) reports that 65% of the students who had intentions to leave dropped-out afterward, but 69% of the students who intended to continue, in fact persisted. Further, in a longitudinal study of high school students, Davis, Ajzen, Saunders, Williams, and Pressley (2002) found that retention intentions significantly predicted students' graduation three years later. Similar conclusions are made in the context of employee turnover, where intentions are consistently indicated to be more predictive of actual attrition than organizational commitment or job satisfaction (Steel & Ovalle, 1984; Van Breukelen et al., 2004).

Consequently, attrition intentions is seemingly a valid indicator of students' subsequent behavior and represent a substantial practical utility such as increasing and improving the reliability of intervention strategies or early detection of students at risk of attrition. From a more theoretical perspective, investigation of whether subgroups of students intending to drop-out, transfer-out or stop-out would potentially improve existent and facilitate future theoretical models.

Why students consider leaving as an alternative? According to Bean (1982), attrition intentions is an "empty variable" and does not explain why people decide to drop-out (p. 296). Investigation of potential predictors is required since it might promote understanding of the processes that are involved and lead to behavioral attrition.

In the current study, we approach the problem of attrition from a more practical perspective

and are primarily interested in those factors that can be more readily influenced by an academic institution (Peguero & Shaffer, 2015; Polansky, Horan, & Hanish, 1993; Rubin & Cohen, 1974). An analysis of the literature indicates that several variables are generally attributed as determinants of actual attrition: *academic study skills*, *academic self-efficacy*, *motivation*, *effort,* and *performance* (Credé & Kuncel, 2008; Foerst, Klug, Jöstl, Spiel, & Schober, 2017; Robbins et al., 2004; Steel, 2007). Also, studies that explicitly investigated students' attrition intentions show the significant role of *academic self-efficacy*, *performance*, *engagement*, and *motivation* (Alivernini & Lucidi, 2011; Baier, Markman, & Pernice-Duca, 2016; Leveson, McNeil, & Joiner, 2013; Willcoxson, 2010). It seems, therefore, that there is some overlap between mechanisms that explain both actual attrition and attrition intentions (Bean, 1982). In the current master thesis, we aim to investigate further if factors suggested as significant in predicting attrition behavior would also explain student's intentions to leave.

What determines intentions?

According to Alivernini and Lucidi (2011), Duque (2013), Suhlmann, Sassenberg, Nagengast, and Trautwein (2018) and Willcoxson (2010), the quality of academic experience, sense of belonging to academic institution, satisfaction with a study program and background variables such as socioeconomic status are all significant determinants of the withdrawal decisions. Some authors acquire an environmental perspective and attribute attrition intentions to commuting (distance to university), employment status and caring for others (Leveson et al., 2013).

Despite the theoretical significance and practical utility of these findings, development and implementation of strategies aimed to change the structure of study programs requires more comprehensive and time-consuming solutions. Further, such factors as financial concerns and family obligations cannot be adequately addressed by governmentally sponsored academic institutions.

Analysis of the research literature indicated several factors that can be potentially more

readily manipulated by universities: students' motivation and self-efficacy. However, the pattern of their relationships with intentions is not straightforward as it could be expected since different studies report a divergent explanatory ability of these factors.

According to Alivernini and Lucidi (2011), self-determined *motivation* accounts for significant variance in drop-out intentions after controlling for the effects of socioeconomic status and performance. Motivation was found to be a more significant predictor of intentions than self-efficacy and performance. Contrary to these findings is the research by Litalien and Guay (2015), which shows that the strongest predictor of drop-out intentions was *self-efficacy*, while motivation plays a mediatory role between academical support and intentions. A longitudinal study by Willcoxson (2010) reached the same conclusion about self-efficacy being the strongest predictor of attrition intentions. However, Cortes, Mostert, and Els (2014) failed to support the predictive ability of academic self-efficacy. The third factor that is attributed to predict departure intentions is students' engagement (the umbrella term which also includes academic effort). According to Leveson et al. (2013), «the odds of students leaving their study are lower if their level of student engagement is high» (p. 940). The findings are in line with the Theory of Student Involvement (Astin, 1999).

To sum up, academic self-efficacy, engagement, and motivation are important predictors of attrition intentions (Alivernini & Lucidi, 2011; Cortes et al., 2014; Litalien & Guay, 2015; Willcoxson, 2010). However, these studies have one common shortcoming, namely none of them accounted for types of intentions being investigated. In the following sections, an overview of potential factors leading to attrition intentions is provided.

Potential factors and mechanisms involved in attrition intentions

Academic study skills and self-efficacy attrition

Academic study skills is one of the variables that is consistently attributed to predict students' performance and success within an academic environment (Bean & Metzner, 1985; Credé

& Kuncel, 2008; Robbins et al., 2004; Rovai, 2003; Tinto, 1975). Study skills are defined as students' knowledge of appropriate cognitive or behavioral strategies and ability to apply them in order to solve academic tasks (Credé & Kuncel, 2008). According to the results of meta-analysis by Robbins et al. (2004), the relationship between study skills (time-management skills, problem-solving and coping strategies) and students' retention is highly positive.

However, as Foerst, Klug, Jöstl, Spiel, and Schober (2017) argue, knowing about possible learning strategies and implementing them do not appear automatically. These authors investigated discrepancies between students' knowledge about self-regulated learning strategies (academic skills related to planning, motivation and organization of learning) and their actual behavior. The results showed that despite students' advanced knowledge about the effectiveness and utility of various learning strategies, there was a significant discrepancy between their knowledge and action. S*elf-efficacy* or individuals' judgement of their capability to execute certain course of action necessary to achieve desired result (highest school grade) is seemingly required (Bandura, 1993; Klassen, Krawchuk, & Rajani, 2008; Rosário, Núñez, Valle, González-Pienda, & Lourenço, 2013; Svartdal, Sæle, Dahl, Nemtcan, & Gamst-Klaussen, 2019; Zimmerman, Bandura, & Martinez-Pons, 1992). Further, several research studies indicate the relationship between student's self-efficacy beliefs and the likelihood of subsequent attrition or retention behavior (Aryee, 2017; Devonport & Lane, 2006; Multon, Brown, Lent, & Multon, 1991).

To sum up, an association between academic study skills and self-efficacy with student's performance and attrition from an academic environment is indicated. However, whether the factors are significant predictors of students' attrition intentions was investigated only in the case of academic self-efficacy (Litalien & Guay, 2015; Willcoxson, 2010). Further, the predictive ability of factors was not previously investigated across overmentioned subgroups of attrition intentions (dropping-out, transferring-out or taking a break from studies). As discussed, academic study skills and self-efficacy seem to be closely related. Also, some evidence is present indicating the

association of academic self-efficacy with attrition intentions. Consequently, investigation of the relationship between academic study skills with drop-out, stop-out and transfer-out intentions accounting for academic self-efficacy seems reasonable.

Academic effort and attrition

Does effort matter in the context of academic attrition? As discussed, students' involvement and engagement are important factors in explaining students' attrition and attrition intentions. *Academic effort* is a narrower term and can be defined as time and energy invested into a study activity (Butler, 2007; Eccles & Wigfield, 2002; Heyder & Kessels, 2017; Meeuwisse, Born, & Severiens, 2011; Trautwein, Lüdtke, Roberts, Schnyder, & Niggli, 2009). Multiple studies consistently indicate the strong relationship between study effort and performance (Butler, 2007; Diseth, Pallesen, Brunborg, & Larsen, 2010; Meeuwisse et al., 2011; Trautwein et al., 2009). Performance (grade point average or total credits earned per term) as well as previous academic success are generally quoted to be the strongest predictors of actual attrition (Battin-Pearson et al., 2000; Bowers, 2010; Casillas et al., 2012; Daugherty & Lane, 1999; Sæle et al., 2016). This is in accordance with Finn's theory of high school attrition, which emphasizes the detrimental role of academic failure in explaining academic attrition (Dupéré et al., 2015).

Established models of academic learning and achievement support the conclusions of academic effort being a positive predictor of students' success: the harder students work, the better their results (Eccles & Wigfield, 2002; Heyder & Kessels, 2017). Indeed, it was demonstrated that the effort invested into study behavior (for example, attending lectures) explains the difference in students' performance from two study tracks as well as between genders (Carbonaro, 2005; Downey & Vogt Yuan, 2005). In addition, in the comprehensive meta-analysis by Richardson, Abraham, and Bond (2012) it was found that academic effort was similarly and, in some instances, stronger correlated with students' performance than other well-validated constructs such as consciousness and intelligence.

Finally, according to Hovdhaugen (2009) and Yang, Baldwin, and Snelson (2017), academic effort is one of the main determinants of actual drop-out and transfer-out behavior among students. These findings are in accordance with the theory of student involvement by Astin (1999). Based on the theory, an amount of time that student devotes to education facilitates involvement, similar to the process described by Tinto (1975). Involvement, in turn, decreases the likelihood of students' attrition. However, the only study that investigated the role of effort (measured as engagement) in the context of attrition intentions was conducted by Leveson, McNeil, and Joiner (2013).

To sum up, academic effort seems to predict actual attrition behavior directly and indirectly through its influence on academic performance (Butler, 2007; Cortes et al., 2014; Meeuwisse et al., 2011; Trautwein et al., 2009). Further, academic effort could potentially decrease the probability of attrition through its effect on academic involvement.

Procrastination and academic attrition

Based on available research literature, it can be concluded that a vast majority of the studies focused on the positive predictors of students' attrition. Nevertheless, investigation of the predictive ability of variables located on the opposite spectrum is comparably crucial. Students' tendency to *procrastinate* on the academic tasks is one of the prospective constructs in this respect (for review see Steel, 2007). Despite significant research base on the issue of attrition, we have found only one study to investigate the role of procrastination in students' withdrawal (Grau & Minguillón, 2013). These authors report that stop-out students who procrastinate on returning to university are more likely to drop-out permanently.

Further, procrastination is often associated with poor academic performance, study skills and self-efficacy (Klingsieck, Grund, Schmid, & Fries, 2013; Steel, 2007; Tice & Baumeister, 1997). The notion is in line with findings showing that procrastinators devote lesser amount of effort to their studies and Temporal Motivational Theory which argues that procrastinators tend to invest most of their efforts right before the task's deadline (Steel, 2007, 2012; Steel & Konig, 2006;

Steel, Svartdal, Thundiyil, & Brothen, 2018). Also, indirect evidence shows that procrastination is related to unsatisfactory study progress or delay of degree completion (Muszynski & Akamatsu, 1991; Wadkins, 1999). According to Bair and Haworth (2005), the longer the time students spend studying before graduation, the higher the chance that students will withdraw.

Consequently, the assumption that procrastination can facilitate understanding of students' attrition intentions seems reasonable (Grau & Minguillón, 2013; Ferrari, Johnson, & McCown, 1995; Kong, 2011; Steel, 2007). Further, relatively few studies investigated the relationships between procrastination and attrition, and none were found to address the association with attrition intentions.

Lack of energy as a potential predictor of attrition intentions

A considerable proportion of human behavior is a subject to rational decision making (Baumeister et al., 1998). Choosing between porridge or cookies for breakfast, deciding on going out with the best friends or preparing for an upcoming final exam are examples of such behaviors. A similar mechanism is involved in many other acts of volition, thought suppression, impulse restraining or delaying acts (Steel et al., 2018). Although most of the time people can exert willpower and restrain from impulsive actions successfully, self-regulation resources are assumed to be exhaustible (for review, see Baumeister & Vohs, 2016). Research consistently indicates that an act of volition leads to the reduction of internal resource(s) required for successful completion of a second task (Baumeister et al., 1998; Johns, Inzlicht & Schmader, 2008; Kuhl, 2000; Schmeichel, 2007).

The phenomenon is generally known as "ego depletion" and implies that an act of volition depletes limited self-control resources and leads to decreased performance on the following task which requires the same resources (Baumeister et al., 1998). As it was indicated by Baumeister et al. (1998), participants who were required to restrain from eating chocolates (and choose radishes instead) or suppress emotional reaction while watching a film, subsequently quit faster on

unsolvable/solvable anagram tasks. Indeed, subsequent studies validated the original notion of ego depletion and its negative relationship with performance (for review, see Hagger, Wood, Stiff, & Chatzisarantis, 2010).

According to the results obtained by Strongman and Burt (2000), tiredness was one of the top three reasons for procrastination. In addition, a strong correlation between energy level and procrastination (r = .60) was indicated (Gröpel & Steel, 2008, Svartdal, Steel, Jakobsen, & Tharaldsteen Halvorsen, 2019). According to the theory of student involvement by Astin (1999), it could be concluded that the energy level is also related to the effort that student invests into education.

Based on the previous discussion, it is evident that ego depletion (or lack of energy) and procrastination are strongly related as well as the negative relationship of both factors with academic performance is observed (Gröpel & Steel, 2008; Hagger et al., 2010). Further, one can conclude from research that self-regulation skills (the dimension of self-regulation) explain a large and significant proportion of variation in drop-out behavior (Kaplan, 2008; Lee, Choi, & Kim, 2013). Consequently, the assumption that lack of energy (lack of self-regulatory resource) would be negatively related and predict students' attrition intentions seems reasonable. However, the notion was not previously examined in the context of either actual attrition or attrition intentions. In the current paper, we aim to investigate whether lack of energy is a significant determinant and would explain students' attrition intentions.

Summary

To sum up, attrition intentions are indicated to be closely related (r = .42 - .50) to subsequent attrition behavior (Alfred, 1973; Bean, 1982). The findings are in accordance with results on the issue of non-academic intention-behavior relationship, r = .55 (for review see Sheeran, 2002). Consequently, understanding of why students consider leaving as an alternative is crucial. Despite some evidence that external factors such as family and satisfaction with a program

are associated with attrition intentions, in practice, they require more sophisticated intervention approaches (Alivernini & Lucidi, 2011; Duque, 2013, Suhlmann, Sassenberg, Nagengast, & Trautwein, 2018; Willcoxson, 2010). From a more student-centered and applied perspective, academic effort, academic study skills, academic self-efficacy, procrastination, and lack of energy represent potential utility in explaining attrition intentions. Previous research shows that academic self-efficacy, engagement, and motivation are related to student's intentions to leave (Alivernini & Lucidi, 2011; Leveson et al., 2013; Litalien and Guay, 2015; Willcoxson, 2010). Further, these variables are also significant predictors of actual attrition behavior (Hardre & Reeve, 2003; Lovelace, Reschly, & Appleton, 2017; Peguero & Shaffer, 2015). However, none of the studies accounted for the types of attrition in predicting students' intention and relatively few studies did this in case of attrition behavior (Hoyt & Winn, 2004). Additionally, there is scare evidence if procrastination and lack of energy are related to students' attrition behavior and attrition intentions.

The current study

A considerable amount of research is accumulated on the issue of academic attrition. However, the question of students' intentions to leave university is seemingly underinvestigated despite the empirical evidence of its significant predictive ability and relationship with actual attrition behavior (Bean, 1982, Steel & Ovalle, 1984; Van Breukelen et al., 2004).

Further, the attrition phenomenon has been rarely investigated within the Norwegian context, where researchers and institutions of higher education have been more preoccupied with completion and time-to-degree issues (Hovdhaugen, 2019). According to Hovdhaugen and Stensaker (2018), and Thomas and Hovdhaugen (2014), significant differences could be indicated between countries' educational systems (e.g., student fees, a structure of higher education). Consequently, comparison of attrition rates and mechanisms that explain such tendencies is complicated. This facilitates the importance of cross-cultural research on the factors that have a causal impact on students' attrition (Thomas & Hovdhaugen, 2014).

First, our *primary aim* is to investigate differences in mechanisms that may explain students' attrition intentions (drop-out, transfer-out, and stop-out). If different patterns of relationship are found, it will support the assumption that differentiation between types of attrition intentions is an important aspect to consider. We aim to examine which of the previously investigated factors are the most significant determinants of drop-out, stop-out, and transfer-out intentions: academic self-efficacy, motivation or performance (Alivernini & Lucidi, 2011; Astin, 1999; Cortes et al., 2014; Leveson et al. 2013; Litalien & Guay, 2015; Willcoxson, 2010).

Based on the previous discussion and seemingly present overlap between factors predicting actual attrition and attrition intentions, we expect that academic study skills, academic effort, lack of energy and procrastination would significantly predict attrition intentions. To the extent of our knowledge, the current study is the first to investigate these factors in the context of attrition intentions.

Second, to support our assumption concerning the overlap between factors predicting attrition behavior and intentions, we also aim to test if the relationship between study skills and attrition intentions would be mediated/moderated by academic self-efficacy. As discussed, the notion that academic self-efficacy is a crucial factor in the relationship between study skills and retention seems reasonable (Bandura, 1993; Klassen, Krawchuk, & Rajani, 2008; Rosário, Núñez, Valle, González-Pienda, & Lourenço, 2013; Zimmerman et al., 1992). However, the validity of the assumption has not been previously investigated in the context of attrition intentions. If a similar relationship is indicated with attrition intentions as a dependent variable, it would support our hypothesis that inclusion of study skills, academic effort, lack of energy and procrastination was a reasonable assumption. Also, it would provide theoretically valuable knowledge on the importance of academic self-efficacy in explaining the relationship between academic study skills and students' attrition intentions.

Method

Participants

A total of 491 students participated in the study, 69% of female (n = 337) and 31% of male (n = 154). 23% (n = 112) were first-year students, 23% (n = 115) were second-year students, 27% (n = 131) were on their third year of education, 13% (n = 64) were on their 4th year, 7% (n = 34) were 5th year students and 7% (n = 35) reported to study 6 or more years. They ranged in age from 19 to 55 years (M = 25, SD = 5.74). Participants that had more than 10% of missing values were excluded resulting into the final sample of 490 students, 69% of female (n = 337) and 31% of male (n = 153). Students participating in this study were recruited through Facebook and via e-mail sent to all active students registered at UiT The Arctic University of Norway. Data collection was done with the online survey tool Qualtrics (www.qualtrics.com), which participants could access using either mobile device or computer. Participants were presented with a consent form, informed that they were anonymous and could refrain from answering or withdraw from the study at any point.

Measures

Study skills. The custom index measuring study skills was based on an analysis of research on effective study skills (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). Participants were asked to rate statements on a Likert type scale ranging from 1 = “Disagree” to 5 = “Agree”. The scale includes eight items measuring both skills that have been shown generally more effective (self-explanation and practice testing) and those that have been indicated less efficient such as rereading (Appendix D). In the current sample, internal consistency was found to be within an acceptable range (Cronbach’s alpha was .73.)

Academic effort. This was measured by asking the students the total amount of time they usually spend on studies. The measure is similar to the one used by Diseth et al. (2010). The students were asked to reply to the items of type: “How many hours do you spend on subjects per week (excluding lectures/seminars)?”. Response options were provided on the five-point Likert

scale ranged from “Up to 10 hours” to “More than 40” with 10 points difference between choice options (Appendix D). Two questions were added that asked students about the amount of time they devote to study at university: “How many hours of lectures do you have per week?” and “How much time do you usually spend at university?”. One question was added to tap the amount of energy students invest into studies: “How much energy do you invest into your studies (on average)?”. Response options ranged from 1 = “Not at all” to 5 = “Allot”. Due to low correlations with other items, we excluded the question “How many hours of lectures do you have per week?” from the index measure. Cronbach’s alpha was .63.

Study self-efficacy. The scale measures students’ beliefs that they can study effectively. The measurement index was borrowed from the study by Svartdal, Sæle, Dahl, Nemtcan, and Gamst-Klaussen (2019). Three items were adapted from the general self-efficacy scale which is an established measure of the construct (Schwarzer & Jerusalem, 1995). These items were rephrased to tap the academic context more specifically as advised by the author (Schwarzer, Bäßler, Kwiatek, Schröder, & Zhang, 1997). The items were “When I get a study task to work with, I have a hard time finding a solution,” “I have little faith in my ability to study effectively,” and “It is difficult for me to follow the study curriculum when something unexpected happens”. Also, three positively formulated items were added: “I am able to learn what is being taught this year”, “When I have decided to do something important to me, I continue to try, even though it is more difficult than I thought” and “I am sure that I can achieve the academic goals I have set for myself”. Participants rated statements on a Likert scale (1 = “Disagree”, 5 = “Totally agree”). Exploratory factor analysis (EFA) with maximum likelihood rotation was used to uncover the scale's underlying structure (for details see Appendix E). The results showed a two-dimensional structure (positive and negative self-efficacy beliefs). The Cronbach’s alphas were .73 and .67 respectively.

Procrastination. We used the Norwegian version of the Irrational Procrastination Scale (IPS, Svartdal, 2017) consisting of 6 non-reversed items. It was validated that the short version (reversed

items excluded) of IPS has the same (or even better) psychometric properties in comparison with the full measuring scale (Svartdal & Steel, 2017). Participants rated statements on a five-point Likert scale (1 = “Never”, 5 = “Most of the time/always”), where high scores reflect higher levels of procrastination. The scale was validated to reflect a single latent construct (Svartdal & Steel, 2017). The Cronbach’s alpha was .94.

Performance. Respondents achievement was measured by self-reported grade that they usually receive: “What is your typical grade?”. Response options ranged from A to E/D which is a standardized grading system applied across Norwegian universities.

Lack of energy. Lack of energy scale was borrowed from the study by Svartdal, Steel, Jakobsen, & Tharaldsteen Halvorsen (2019). Two items were from the Volitional Components Inventory (VCI) by Kuhl and Fuhrmann (1998): “When I take on work reluctantly, I feel too defeated to get started right away” and “I feel too listless to even get started on tasks I find disagreeable” (Appendix F). Participants rated statements on a five-point Likert scale (1 = “Disagree”, 5 = “Totally agree”). An exploratory factor analysis (maximum likelihood method) indicated a two-dimensional construct. The first factor represented lack of self-regulation to initiate task execution (subsequently referred as self-regulation to initiate), while the second factor represented lack of self-regulation to maintain task execution (subsequently referred as self-regulation to maintain). Cronbach’s alphas were .81 and .85 for the first and second factors respectively (for details see Appendix F).

Motivation. Students motivation was measured by three items designed for the current study: “How motivated were you when you started your education?”; “How motivated are you to study today?”; “How motivated are you to graduate in time?”. Response options ranged from 1 = “Not at all” to 5 = “Very motivated”. A measure of internal consistency indicated a low, but acceptable results for the three items scale (Cronbach’s alpha was .55). Deletion of the item "How motivated was you when you started your education?” led to significant change of Cronbach’s alpha of .68.

Consequently, the item was excluded from subsequent analyses.

Attrition intentions. The scale measuring attrition was based on the study by Hardre, Reeve, and Harris (2003). First three items ask about students' intention to drop-out from school ("I sometimes consider dropping out of school", "I intend to drop out of school", "I feel unsure about continuing my studies"). We also added an item asking about students' intention to continue their education until graduation (reverse scored) as well as two items concerning intentions to take a break from university (stop-out) and intentions to change university (transfer-out). An exploratory factor analysis (maximum likelihood method) indicated a two-dimensional structure. The acquired scale did not differentiate between stop-out and drop-out intention types. Consequently, only original items by Hardre et al. (2003) measuring drop-out intentions and two items measuring transfer-out intentions were retained (for details see Appendix G). The Cronbach's alphas were .80 and .89 respectively.

Statistical procedures

First, data were screened for missing values and outliers. Only one participant was excluded from data-analyses due to more than 70% of unanswered questions. EFA was used to determine the factorial structure of academic self-efficacy, lack of energy and attrition intentions scales (see Appendix E-G).

Second, we accounted for gender differences since it was found that predictors of intended and actual attrition can vary among men and women (Flores, 2002; Freeney & O'Connell, 2012; Vera, Polanin, Polanin, & Carr, 2018). Given a non-normal distribution of the data (see Table 3), a non-parametric test, the Mann-Whitney U, was used to investigate gender differences. One-way ANOVA was not used since there is no agreement in the literature on its robustness to violations of normality (Andrew, 2012). The results indicated that scores on study skills ($U = 21044$, $z = -2.984$, $p < .01$), lack of energy to continue working on a task ($U = 34275$, $z = 6.339$, $p < .001$) and procrastination ($U = 28725$, $z = 2.390$, $p < .05$) were statistically different between men and women.

Women were found to report having better study skills, having lesser problems with lack of energy to maintain task execution and procrastinating less often. The primary aim of the study was to investigate the predictive ability of previously investigated variables and the contribution of overmentioned factors. Consequently, gender influence was controlled in hierarchical regression analyses.

Second, all the assumptions of multiple linear regression analysis other than homoscedasticity were met. The macro written in SPSS syntax by Ahmad Daryanto as well as visual inspection of residuals were used to test the assumption. The macro acquires the Breusch-Pagan and Koenker test for assessment of heteroscedasticity (Breusch & Pagan, 1979; Koenker, 1981; Lyon & Tsai, 1996). To obtain the best achievable model and avoid too liberal or conservative significance tests, the decision to use heteroskedasticity-consistent standard error estimators (HC3 method) was made (Hayes & Cai, 2007). All procedures were performed with the macro (RLM) written in SPSS syntax by Andrew F. Hayes.

SPSS version 25 was used for conducting EFA and regression analyses. Analyses of mediation and moderation were done with PROCESS macro for SPSS v3.3 by Andrew F. Hayes.

Results and discussion

Summary statistics

Table 3 shows the summary statistics for all acquired measures. Responses on motivation, drop-out and transfer-out scales were indicated to be non-normally distributed. Respondents tended to report being highly motivated to study and having few intentions to withdraw. Consequently, a non-parametric measure of correlation was used to examine the bivariate relationships between the variables of interest (see Table 4). Further, the obtained correlations support the proposed association of academic study skills, lack of energy, effort, and procrastination with attrition intention. Also, some differences are present concerning drop-out and transfer-out intention. For example, lack of energy and effort were insignificantly correlated with transfer-out intentions.

Table 3

Summary statistic, including skewness, kurtosis and Cronbach's alpha

	N	*M (SD)*	*Skew (SE)*	*Kurtosis (SE)*	Items	α
Self-efficacy (P)	490	4.12 (0.66)	-0.58 (0.11)	0.06 (0.22)	3	0.67
Self-efficacy (N)	490	2.57 (0.77)	0.13 (0.11)	-0.14 (0.22)	3	0.73
Study skills	490	3.43 (0.62)	-0.28 (0.11)	0.02 (0.22)	8	0.73
Lack of Energy (I)	490	3.22 (0.82)	0.16 (0.11)	-0.26 (0.22)	4	0.81
Lack of Energy (M)	490	1.96 (0.90)	0.99 (0.11)	0.62 (0.22)	3	0.85
Effort	490	2.94 (0.76)	0.16 (0.11)	-0.08 (0.22)	3	0.63
Motivation	490	4.34 (0.73)	-1.56 (0.11)	2.69 (0.22)	2	0.68
Drop-out	490	1.59 (0.77)	1.68 (0.11)	3.25 (0.22)	3	0.80
Transfer-out	490	1.44 (0.87)	2.39 (0.11)	5.56 (0.22)	2	0.89
Procrastination	490	3.03 (0.99)	0.18 (0.11)	-0.65 (0.22)	6	0.94
Performance	485	2.75 (0.76)	-0.09 (0.11)	-0.43 (0.22)	1	-

Note. Performance was measured with a single item.

Table 4

Spearman's correlations between all measurements (N = 485)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Gender	1											
2. Self-efficacy (P)	-.03	1										
3. Self-efficacy (N)	-.06	-.43**	1									
4. Study skills	-.14**	.38**	-.27**	1								
5. Lack of Energy (I)	-.06	-.23**	.43**	-.23**	1							
6. Lack of Energy (M)	.29**	-.36**	.23**	-.46**	.20**	1						
7. Effort	-.07	.30**	-.22**	.44**	-.29**	-.58**	1					
8. Motivation	-.06	.48**	-.34**	.38**	-.21**	-.38**	.37**	1				
9. Drop-out	-.01	-.38**	.33**	-.16**	.27**	.15**	-.16**	-.45**	1			
10. Transfer-out	-.03	-.19**	.14**	-.13**	.08	.06	-.07	-.19*	.27**	1		
11. Procrastination	.11*	-.32**	.49**	-.42**	.51**	.52**	-.47**	-.37**	.28**	.13**	1	
12. Performance	-.07	.28**	-.32**	.21**	-.12**	-.28**	.24**	.25**	-.18**	-.06	-.28**	1

Note. Self-efficacy (P): positive beliefs about own abilities; Self-efficacy (N): negative beliefs about own abilities; Lack of Energy (I): lack of energy to initiate behavior; Lack of Energy (M): lack of energy to maintain behavior.
* $p < .05$, ** $p < .01$, two-tailed

Self-efficacy and attrition intentions

To test possible moderation/mediation of the relationship between academic study skills and attrition intentions by academic self-efficacy, sets of linear regression analyses were performed. As discussed, heteroskedasticity-consistent standard error estimators (HC3 method) were acquired due to violation of the homoscedasticity assumption. The results indicated that there were no significant moderation effects of either positive or negative self-efficacy on the relationship between academic study skills and both types of attrition intentions (for details see Appendix H). What was found is that the relationship between academic skills and drop-out intentions was mediated by positive and negative self-efficacy (see Figure 1).

In order to test the assumption of mediatory role of academic self-efficacy in the relationship between study skills and attrition intentions (transfer-out or drop-out), several linear regression analyses with gender as a covariate variable were performed (for detail see Appendix I). All investigated variables were indicated to be related (see Table 4). First, study skills were indicated to significantly predict drop-out intentions (ignoring positive and negative self-efficacy as mediators), $b = -.21$, $t(488) = -2.82$, $p < .01$. Second, the regression of study skills on the mediators (positive and negative self-efficacy) was also significant, $b = .39$, $t(488) = 8.06$, $p < .001$ (positive self-efficacy) and $b = -.30$, $t(488) = -4.89$, $p < .001$ (negative self-efficacy). Third, the mediators, controlling for study skills, had a significant effects on drop-out intentions, $b = -.32$, $t(486) = -4.42$, $p < .001$ (positive self-efficacy) and $b = .19$, $t(486) = 2.91$, $p < .05$ (negative self-efficacy). However, when controlling for the mediators, the effect of study skills on drop-out intentions was not significant anymore, $b = -.03$, $t(486) = -0.34$, $p = .73$ (see Figure 1).

To sum up, the mediation effects of academic self-efficacy in the relationship between academic study skills and drop-out intentions were indicated. As discussed, academic study skills and academic self-efficacy seems to be closely related (Bandura, 1993; Klassen et al., 2008; Rosário et al., 2013; Zimmerman et al., 1992). The results show that self-efficacy is also an

important factor to consider in the relationship between study skills and attrition intentions. The observed mediation effects indirectly support previously discussed overlap between predictors of actual attrition and attrition intentions (Litalien & Guay, 2015; Willcoxson, 2010). Also, the mediation effects were statistically insignificant in the relationship between academic study skills and transfer-out intentions. The lack of mediation facilitates the proposed significance of accounting for the type of attrition intention being under investigation.

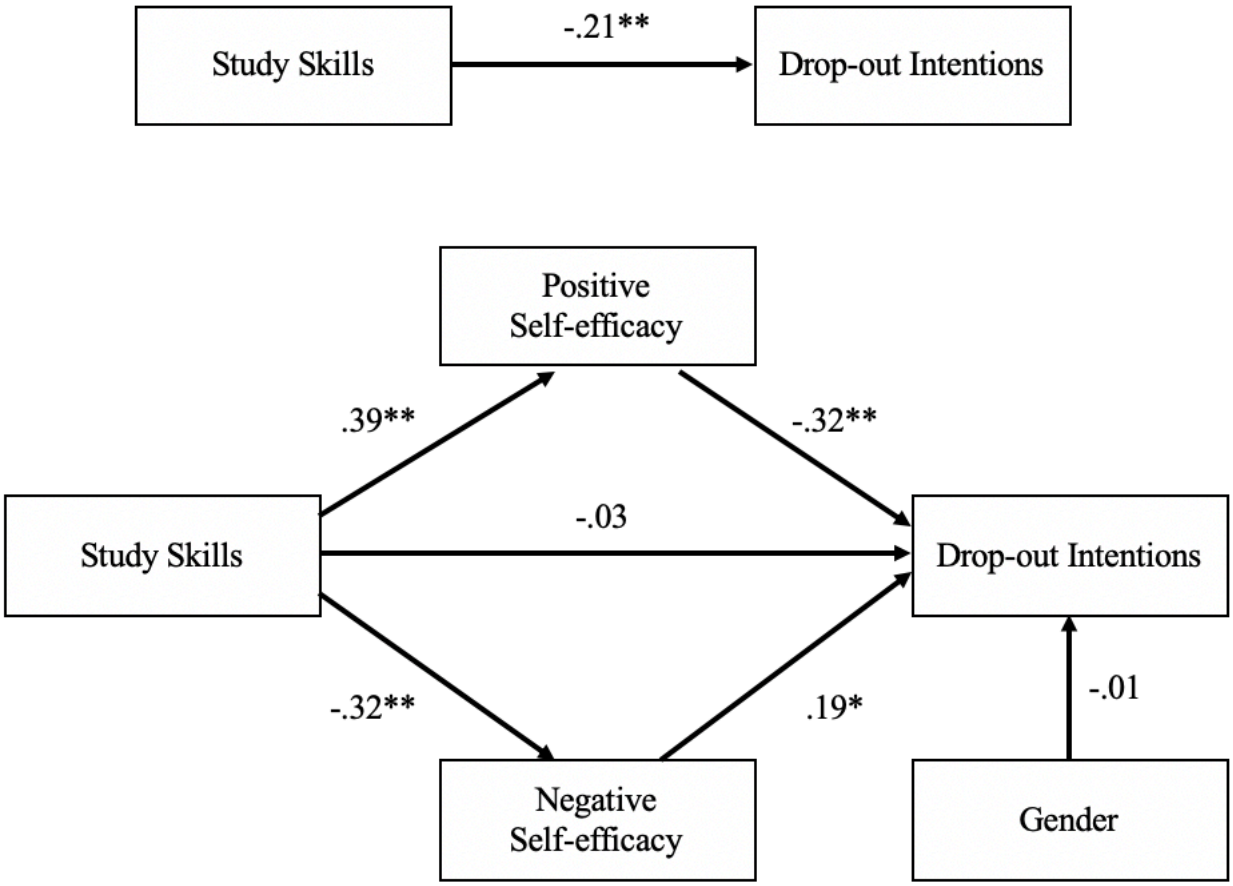

Figure 1. Regression model of drop-out intentions on academic study skills with two mediators (positive and negative self-efficacy) and one covariate (gender)

*$p < .05$, **$p < .01$, two-tailed.

Predictors of drop-out and transfer-out intentions

Previously investigated predictors. To test the role of the previously investigated factors such as academic self-efficacy, motivation, and performance in predicting attrition intentions and hypothesized predictors, a hierarchical multiple linear regression analysis was performed (using heteroskedasticity-consistent standard error estimators). Effects of gender were controlled for through inclusion of the variable into the first block of hierarchical regression.

The results indicated that the strongest predictor of drop-out intentions among previously investigated variables was study motivation (b = -.47) followed by negative self-efficacy (b = .13), $F(5, 479) = 27.449$, $p < .001$, $R^2 = .31$ (see Table 5). The results are in accordance with findings by Alivernini and Lucidi (2011) which show that motivation is a stronger predictor of drop-out intentions than academic self-efficacy.

Proposed predictors of attrition intentions. Second, we expected that academic study skills, academic effort, lack of energy and procrastination would also be significant predictors of drop-out and transfer-out intentions. The variables were included in the second block of hierarchical regression controlling for the effect of gender (see Table 6). Procrastination (b = .15) and lack of energy to initiate academic task (b = .16) were found to be statistically significant predictors of drop-out intentions, $F(6, 483) = 8.371$, $p < .001$; adjusted $R^2 = .11$.

All the variables (analyzed together) were insignificant in predicting students' transfer-out intentions (see Table 5 and Table 6). The only significant predictor of transfer-out intentions among previously investigated variables was study motivation, b = -.14, $F(1, 488) = 4.448$, $p = .04$. Procrastination was the only significant predictor among hypothesized predictors of attrition intentions, b = .09, $F(1, 488) = 5.109$, $p = .02$.

Finally, we investigated if the inclusion of academic study skills, academic effort, lack of energy and procrastination would increase the predictive ability of the previously investigated variables. Results showed a small but statistically significant increase of 3% in the variance

Table 5

Hierarchical multiple regression analysis of indicated predictors (Model 1) and assumed predictors (Model 2) (n = 485)

	Drop-out Intentions						Transfer-out Intentions					
	Model 1			Model 2			Model 1			Model 2		
	b	SE_{HC3}	β	*b*	SE_{HC3}	β	*b*	SE_{HC3}	β	*b*	SE_{HC3}	β
Intercept	3.76	.50		3.10	.59		1.92	.54		2.05	.68	
Gender	-.04	.07	-.03	-.01	.07	-.01	.02	.08	.01	.04	.09	.02
Self-efficacy (P)	-.13	.07	-.11	-.17	.07	-.14*	-.07	.07	-.05	-.08	.07	-.06
Self-efficacy (N)	.13	.07	.13*	.05	.07	.05	.07	.07	.06	.04	.08	.03
Motivation	-.47	.07	-.45**	-.49	.07	-.47**	-.08	.08	-.07	-.09	.09	-.07
Performance	.05	.05	. 05	.04	.05	.03	-. 02	.06	-.02	-.03	.06	-.02
Lack of energy (I)				.10	.04	.11*				.03	.06	.02
Lack of energy (M)				-.05	.05	-.06				-.08	.07	-.08
Effort				.07	.06	.07				-.01	.07	-.01
Study skills				.11	.07	.09				-.01	.09	-.01
Procrastination				.10	.05	.12				.05	.07	.05
$R^2(\Delta R^2)$	.31 (.31**)			.34 (.03*)			.02(.02*)			.03 (.01)		

Note. *b* = unstandardized regression coefficient; SE_{HC3} = heteroskedasticity-consistent standard error; β = standardized coefficient; $\Delta R^2 = R^2$ change.

*$p < .05$, **$p < .01$, two-tailed.

Table 6

Hierarchical multiple regression analysis of proposed predictors of attrition intentions (n = 485)

	Drop-out Intentions						Transfer-out Intentions					
	Model 1			Model 2			Model 1			Model 2		
	b	SE_{HC3}	β	*b*	SE_{HC3}	β	*b*	SE_{HC3}	β	*b*	SE_{HC3}	β
Intercept	1.62	.11		0.72	.40		1.43	.12		1.36	.45	
Gender	-.02	.08	-.01	-.06	.07	-.04	.01	.08	-.01	.02	.09	.01
Lack of energy (I)				.16	.05	.17**				.05	.06	.05
Lack of energy (M)				.04	.06	.05				-.06	.07	-.07
Effort				.01	.06	.01				-.02	.06	-.02
Study skills				-.04	.08	-.03				-.05	.09	-.03
Procrastination				.15	.05	.19*				.08	.07	.09
$R^2(\Delta R^2)$	.0002			.12 (.12**)			0			.02(.02)		

Note. *b* = unstandardized regression coefficient; SE_{HC3} = heteroskedasticity-consistent standard error; β = standardized coefficient; $\Delta R^2 = R^2$ change.

*$p < .05$, **$p < .01$, two-tailed.

explained by the model including all factors, $R^2 = .34$, $F(5, 474) = 4.165$, $p = .001$. A more detailed description is presented in Table 5.

To sum up, our data support the results of the study by Alivernini and Lucidi (2011), indicating that students' motivation to study is the best predictor of drop-out intentions. The results showed that motivation was a stronger predictor than academic self-efficacy.

Further, the hypothesis that study skills, procrastination, lack of energy and academic effort would be significant predictors of attrition intentions was partly supported. Lack of energy to initiate academic-related behavior and procrastination were found to be statistically significant predictors of drop-out intentions and explained 12% of the variance. However, none of the variables were significant in predicting transfer-out intentions. Study motivation and procrastination were the only significant predictors (simple linear regression model). The results follow our hypothesis that the distinction between types of attrition intentions is an issue deserving future investigation.

Is procrastination important? The results of hierarchical multiple regression indicated that procrastination became an insignificant predictor of drop-out intentions after inclusion in the extended model (see Table 5). However, lack of energy was still significant in predicting students' drop-out intentions. Based on the findings that both factors are closely related, the possibility of mediation/moderation effects was investigated (Grau & Minguillón, 2013; Gröpel & Steel, 2008; Strongman & Burt, 2000).

To test possible moderation/mediation of the relationship between lack of energy and drop-out intentions by procrastination, sets of linear regression analyses were performed (see Appendix H and Appendix I). As discussed, heteroskedasticity-consistent standard error estimators (HC3 method) were acquired due to violation of the homoscedasticity assumption. We failed to indicate significant mediation effects of procrastination on either drop-out or transfer-out intentions. However, the relationship between lack of energy to initiate academic behavior with drop-out intentions was found to be significantly moderated by procrastination, $b = .10$, $t(486) = 2.09$, $p <$

.05. The variables were centered to avoid potentially problematic high multicollinearity with the interaction term. The conditional effect was significant under average and high levels of procrastination (see Figure 2). This means that being typical and ingrained procrastinator enhances the positive effect of lack of energy to initiate a study behavior on drop-out intentions.

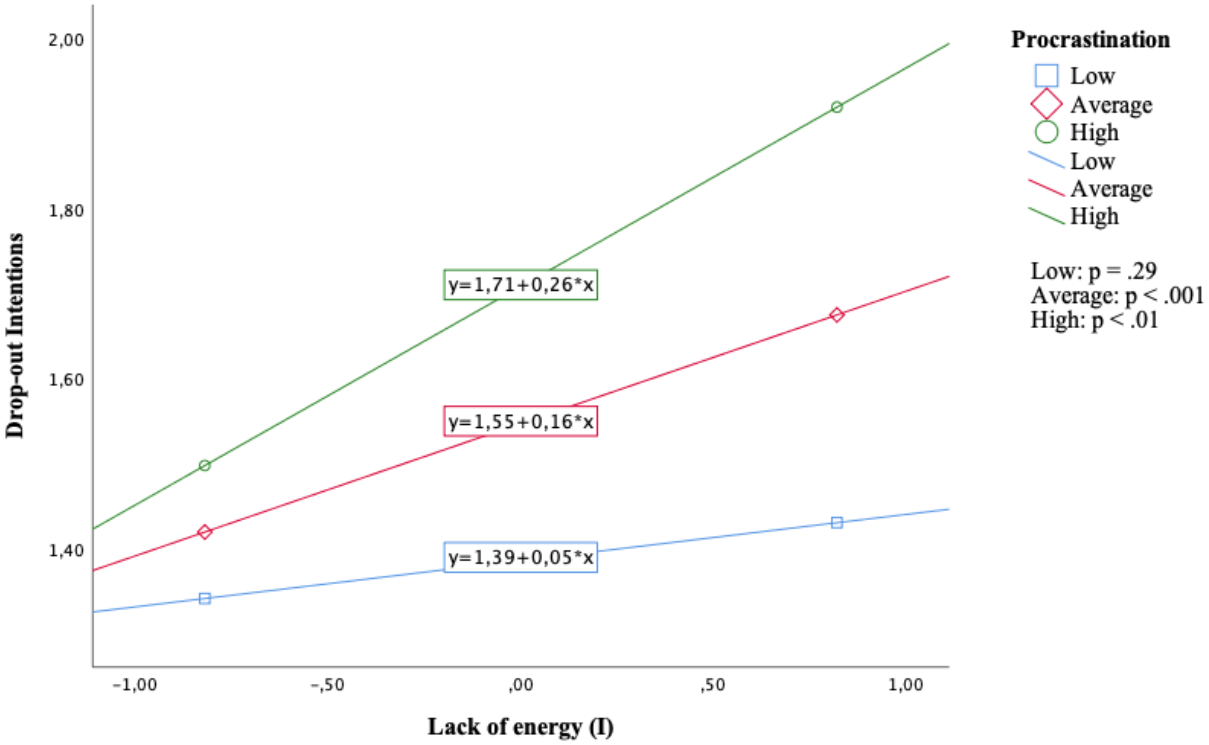

Figure 2. Moderation effects of procrastination on the relationship between lack of energy to initiate task execution and drop-out intentions (n = 490).

Further, to investigate the significance of indicated effect we included the interaction term in the extended model. The model was significant, $F(11, 473) = 15.089$, $p < .001$. Interaction term (moderation effect) was also found statistically significant, $b = .10$, $t(473) = 1.98$, $p < .05$.

To sum up, despite the insignificance of procrastination in the extended model (see Table 5), it had the statistically significant moderation effect in the relationship between lack of energy to initiate study behavior and drop-out intentions. Further, the interaction term was found to be a statistically significant predictor in the extended model. Consequently, our assumption concerning

the importance of procrastination in explaining drop-out intentions was supported.

General discussion

The primary aim of the study was to investigate the predictive ability of previously investigated variables (motivation, academic self-efficacy, and performance) and contribution of academic study skills, procrastination, effort and lack of energy to the prediction of different types of attrition intentions. We assumed that differences in predictors of attrition intentions would be indicated. Indeed, this study finds support for the significance of motivation, self-efficacy, lack of energy and procrastination in explaining students' drop-out intentions, even though some limitations are warranted. On the contrary, transfer-out intentions were predicted only by two separate predictors: study motivation and procrastination.

As discussed, the self-reported measure of attrition intention did not show expected psychometric properties necessary to differentiate three types of attrition intentions: dropping-out, transferring-out, and stopping-out (Appendix G). Consequently, only two types of student's intentions were approached, namely dropping-out and transferring-out.

First, to support our assumption concerning the overlap between factors predicting attrition behavior and attrition intentions, we performed a set of linear regression analyses to test if the relationship between study skills and attrition intentions would be mediated/moderated by academic self-efficacy (Bandura, 1993; Klassen, Krawchuk, & Rajani, 2008; Rosário, Núñez, Valle, González-Pienda, & Lourenço, 2013; Zimmerman et al., 1992). The results indicated that academic self-efficacy was a statistically significant mediator in the relationship between academic study skills and drop-out intentions. However, mediation effects were insignificant in the context of transfer-out intentions. The findings provide some indirect evidence of the overlap between predictors of actual attrition and attrition intentions. Further, it supports our hypotheses of the importance to differentiate and control for the type of attrition intention or attrition behavior being investigated (Hoyt & Winn, 2004).

Second, we addressed the relative importance of factors previously found being associated with students drop-out intentions (Table 5). The results showed that the strongest predictor of drop-out intentions was self-reported study motivation followed by academic self-efficacy, which support findings by Alivernini and Lucidi (2011. Lack of energy to initiate academic-related behavior (preparade for exams) and procrastination were statistically significant predictors of drop-out intentions (Table 6). However, none of the investigated factors were significant in predicting transfer-out intentions. A simple linear regression models with only study motivation or procrastination as an independent variable were significant in predicting transfer-out intentions.

In the next step, we tested if proposed predictors would significantly improve the initial model. However, only study motivation, self-efficacy and lack of energy were significant predictors of drop-out intentions in the extended model. Procrastination had an insignificant direct influence on students' drop-out intentions but was found to have moderation effects on the relationships between lack of energy and drop-out intentions. These findings are of significance since they provide some preliminary evidence on the mechanisms that are involved in the formation of students' drop-out intentions. Also, the results facilitate the general agreement on the detrimental influence of procrastination and ego depletion on academic-related outcomes (Schmeichel, 2007; Steel, 2007).

To sum up, the results support our hypothesis that differentiation between types of attrition intentions is a crucial aspect to consider, which is supported by considerable differences in predictors of drop-out and transfer-out intentions. These findings could potentially explain the contradictory results of the study by Cortes et al. (2014). The authors failed to support previously indicated relationship between academic self-efficacy and drop-out intentions. However, Cortes et al. (2014) did not account for the types of attrition intentions. It seems feasible that it could influence on the predictive ability of academic self-efficacy.

Procrastination and lack of energy to initiate academic-related behaviors were significant in

the prediction of students' drop-out intentions as it was assumed. Further, these variables were significant as independent predictors and when included in the extended model. The findings provide evidence that both factors should be considered in future research and accounted for in the implementation of intervention strategies.

Further discussion is subdivided into several topics. First, we discuss the potential theoretical and practical implications of the current findings. Second, we address the issue of future research prospectives and limitations of the current study.

Implications

Based on the obtained empirical findings and examination of the presented research literature, several main implications were found to be of significance. The main discussion is devoted to how our finding can contribute higher education and what these findings mean for the body of research on students' attrition.

Practical implications. First, a broad range of factors is indicated to influence students' attrition such as integration within an academic environment, academic goals, motivation and performance among the others (Bean & Metzner, 1985; Hoyt & Winn, 2004; Rovai, 2003; Tinto, 1975; Xuereb, 2014). However, based on relatively high attrition and non-completion (30-40%), it is evident that the issue requires further investigation.

According to Alfred (1976) and Bean (1982), intentions to leave university is a significant determinant of subsequent drop-out behavior (R^2 = .42 - .50). Consequently, students' attrition intention can be reasonably assumed to be an indicator of subsequent attrition behavior, which might potentially increase the validity of attrition estimations. However, research on mechanisms that would explain and predict such intentions is scarce. Examination of the issue is of a high priority if an academic institution aims to develop a valid and reliable assessment measure of attrition.

The obtained results support our assumption that differences between the factors or reasons

for drop-out and transfer-out intentions are not the same. Consequently, if an academic institution seeks to predict whether a given student is likely to leave, the distinction between types of intentions is required. In addition, the issue seems to be also relevant in terms of decision-making concerning the choice of intervention approach or assisting students. For example, an intervention strategy aimed to reduce transferring-out can involve increasing the overall reputation of an institution, while providing extra financial support might potentially reduce drop-out behavior (Hoyt & Winn, 2004).

An investigation of attrition behavior was not the primary aim of the current study, and it is not possible to make definite conclusions about how to reduce attrition behavior. Nevertheless, based on the previous discussion, it seems reasonable that manipulation with student's intentions might lead to changes in their behavior (Alfred, 1976; Bean, 1982; Davis et al., 2002).

Also, it is impossible to make certain conclusions about the change of intentions because of the correlational study design. However, it is likely that the facilitation of students' academic self-efficacy (favorable perception of their capabilities), motivation to study, improving student's self-regulatory capabilities and reducing procrastination would lead to change in drop-out intentions. In sum, universities are advised to address the issue of lack of energy in conjunction with procrastination. Based on the results of moderation analyses it is possible that even if ego depletion effects would be reduced, procrastination might still amplify this effect and negate implemented intervention.

Finally, the current study provides evidence on the factors that are relevant to the attrition of Norwegian students. As discussed, indication and validation of culture-specific aspects of attrition is of significance to policymakers and practitioners as they endeavor to improve the outcomes of higher education (Thomas & Hovdhaugen, 2014). However, to make more robust conclusions about the applicability of the current findings on the country's basis, cross-validation with samples from other universities is required.

Theoretical implications. As discussed, the majority of research studies on the issue of attrition behavior used to neglect the disaggregation of non-returning students into distinctive subpopulations (Hoyt & Winn, 2004). Also, it is apparent from the available research that students abandoning their education, changing university or merely taking a break might do it due to different reasons (Bean & Metzner, 1985; Hoyt & Winn, 2004; Rovai, 2003; Tinto, 1975; Xuereb, 2014). According to Hoyt and Winn (2004), the most frequently reported reason by students belonging to either drop-out, stop-out or transfer-out group was financial difficulties. However, significant differences were observed in the ranking of other reasons: the second most important reason for drop-outs was family responsibilities, while the job-study conflict was more significant for stop-out and transfer-out students.

In the current study, we indicated that differentiation of student intentions into drop-out and transfer-out subgroups could be an issue. Future studies are advised to account for and explicitly define subgroups of intentions being under examination. As a result, more valid and reliable findings are expected to be achieved.

Second, validation of the current research's findings within other academic contexts might indicate a need to reevaluate previously obtained results within the field of academic attrition (Alivernini & Lucidi, 2011; Litalien & Guay, 2015). For instance, study motivation, academic self-efficacy, lack of energy and procrastination might be of greater importance for students drop-out intentions and subsequent attrition. On the contrary, external factors such as travel time and social support might be significant in predicting transfer-out intentions and corresponding behavior (Cortes et al., 2014; Leveson et al., 2013; Willcoxson, 2010). Based on the findings by Cortes et al. (2014) who failed to support the significance of social support in predicting drop-out intentions the assumption of previous findings' reassessment seems reasonable. In the following section, possible future research directions are discussed.

Future research

The primary aim of the current study was to investigate if the distinction among subgroups of attrition applies to students' attrition intentions as well as to investigate potential mechanisms leading to such intentions. The relationship between students' intentions and subsequent behavior (dropping-out, transferring-out or stopping-out) was not addressed in the current study. As discussed, a significant association was found between attrition intentions and actual behavior (Alfred, 1976; Bean, 1982). Consequently, future research studies might investigate if the subgroups of actual behavior are related and predicted by corresponding students' intentions. Investigation of the overmentioned relationship would most likely require the implementation of longitudinal study design. In particular, data on participants' drop-out and transfer-out intentions might be collected during a period of one or several years, which will be later analyzed and compared with actual attrition behavior. However, such type of study will require the involvement of many academic institutions and development of assessment strategy that can indicate transfer-out students. Notwithstanding, a longitudinal survey study design might potentially provide new insight into the reasons of students' attrition which cannot be achieved through commonly used register data analyses (Aamodt & Hovdhaugen, 2011). Described potential project is of a grand theoretical significance and is seemingly more feasible in the Norwegian context, where the number of higher academic institutions is comparably small (Skauge. 2018).

Based on findings concerning drop-out intentions as well as available statistics, a significant proportion of students tend to drop-out during the first semesters of their education (Grau-Valldosera & Minguillón, 2014; OECD, 2018; Willcoxson, 2010). As a result, the assessment of the relationship between subgroups of attrition intentions and actual behavior among first-year students is a perspective line to pursue. However, reasons for attrition and intentions to leave can vary among student cohorts being under investigation. Indeed, Willcoxson (2010) indicated that none of the investigated mechanisms such as self-efficacy and engagement were significant among third-

year students, while the opposite during first. Consequently, future research studies should account for the variability of attrition intentions' mechanisms depending on the year of study progression.

The assumption of the relationship between intentions and subsequent behavior is in line with the theory of planned behavior (Ajzen & Madden, 1986). According to the theory, time difference between the formation of intention and actual behavior is a crucial factor in predicting the relationship. Future research studies are advised to account for the possibility that the relationships between attrition intentions and actual behavior is dependent on the passage of time.

Further, the mechanisms underlying students' drop-out, transfer-out or stop-out behavior can vary (Bean & Metzner, 1985; Rovai, 2003; Tinto, 1975; Xuereb, 2014). As discussed, the year of progression also contributes to such variability. For instance, Grau and Minguillon (2013), and Grau-Valldosera and Minguillón (2014) report that chance of dropping-out are higher during the first study semesters, while stopping-out behavior tends to increase during the same measurement period. However, we are not aware of the studies that addressed the relationship of transferring-out behavior and study progression. Also, investigation of change in drop-out, transfer-out and stop-out intentions and their interaction with actual behavior might be addressed in the future studies. Clarification of the interaction between students' intentions and observed behavior might potentially contribute to the development of more effective intervention practices.

In addition, since the aim of the current study was to investigate the predictive ability of the models, accounting for types of attrition intentions, gender differences were not explicitly addressed. According to Flores (2002), Freeney and O'Connell (2012), and Vera et al. (2018), mechanisms explaining actual attrition and attrition intention can vary across genders. For instance, Vera et al. (2018) examined a model where academic self-efficacy and motivation mediated relations between family, peer, and school support, school belonging, and home-school dissonance to the outcome of academic intentions. The relationship between friend support and motivation to achieve was positive for boys but not for girls. Consequently, investigation of mechanisms involved

in students' attrition intentions across genders might be a perspective line to pursue by the future studies.

As discussed, the investigated models were not significant in predicting students transfer-out intentions. According to Aamodt and Hovdhaugen (2011) and Hovdhaugen (2019), the majority of students registered as drop-out change the place of their education. Consequently, clarification of the reasons for students' intentions to transfer-out is essential and requires further investigation. In the study by Hovdhaugen and Aamodt (2009), the authors indicate that university-related dissatisfaction (e.g., learning environment, absence of desired study programs) was one of the main reasons for transferring-out. In contrast, the inability to fulfill the requirements of an academic institution (e.g., having a satisfactory study progress) was among the reasons for dropping-out. This is in accordance with findings of the current study. Future studies are advised to consider structure-related issues as possible predictors of students' transfer-out intentions.

Strengths and limitations

One of the main limitations of the current thesis regards the psychometric properties of the attrition intentions scale. Five items used for statistical analyses were an adequate measure differentiating between drop-out and transfer-out intentions. However, the questions aimed to separate those students who intend to take a break from university loaded on the factor measuring drop-out intentions. A more precise formulation of the response items should be evaluated. Similarly, increasing the number of items measuring transfer-out and stop-out intentions is a possible solution and should be addressed in future studies.

Notwithstanding, in the current study we addressed the issue of students' transfer-out intentions from the more general system's perspective. Namely, if students intend or consider changing university. However, transferring-out can also be an issue at the level of university when students change the initial study program or field of study. Future research is recommended to consider more nuanced differentiation.

Further, the heteroscedasticity was an issue in the current sample of data. Heteroscedasticity-consistent standard error estimators (HC3 method) were acquired that were indicated to provide reliable estimations (Hayes & Cai, 2007). It is expected that violation of homoscedasticity assumption (opposite of heteroskedasticity) was due to the skewness of several variables: motivation, drop-out intentions and transfer-out intentions (see Table 3). Future studies should address the issue and possibly reevaluate or change motivation measurement scale, and attrition intention scale.

Second, self-reported grades were acquired as a measure of students' performance, which could be biased due to social desirability effects. According to Cassady (2001), the correlation between self-reported grades and actual records is highly positive (r = .97). However, the accuracy of self-reported grades was indicated to be dependent on students' quartile with inflation of grades being more prominent among low achievers (Kuncel, Credé, & Thomas, 2005). Consequently, it is not clear if the measure of students' performance collected in the current study is an accurate assessment of participants actual performance and assessment of actual records is seemingly required. Since the average reported grades were above the average (close to B), we expect that our measurement of students' performance is accurate.

Conclusion

In sum, we found support for the findings by Alivernini and Lucidi (2011) that student's motivation is the strongest predictor of attrition intentions. Also, the significance of previously uninvestigated factors such as lack of energy to initiate academic behavior (or running out of self-regulatory resources) and procrastination in predicting drop-out intentions was indicated. Further, some preliminary evidence on the pattern of relationship between lack of energy and drop-out intentions was found. This contributes towards the literature on the students' attrition and attrition intentions in particular by providing additional information on the predictors of such intentions. However, the most significant finding of the current thesis is that the reasons or mechanisms that

lead to drop-out and transfer-out intentions are not the same and vary considerably. This is in line with previous findings on the issue of actual attrition behavior (Hoyt & Winn, 2004). Consequently, it is of great importance for future research to be cautious about what they are predicting to avoid misspecifications and biased conclusions. Also, implementation of intervention strategies and assessment of expected attrition rates should be more nuanced and precise, if the desired high estimations' accuracy and interventions' efficiency is to be achieved.

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Appendix A

Tinto's model of academic attrition

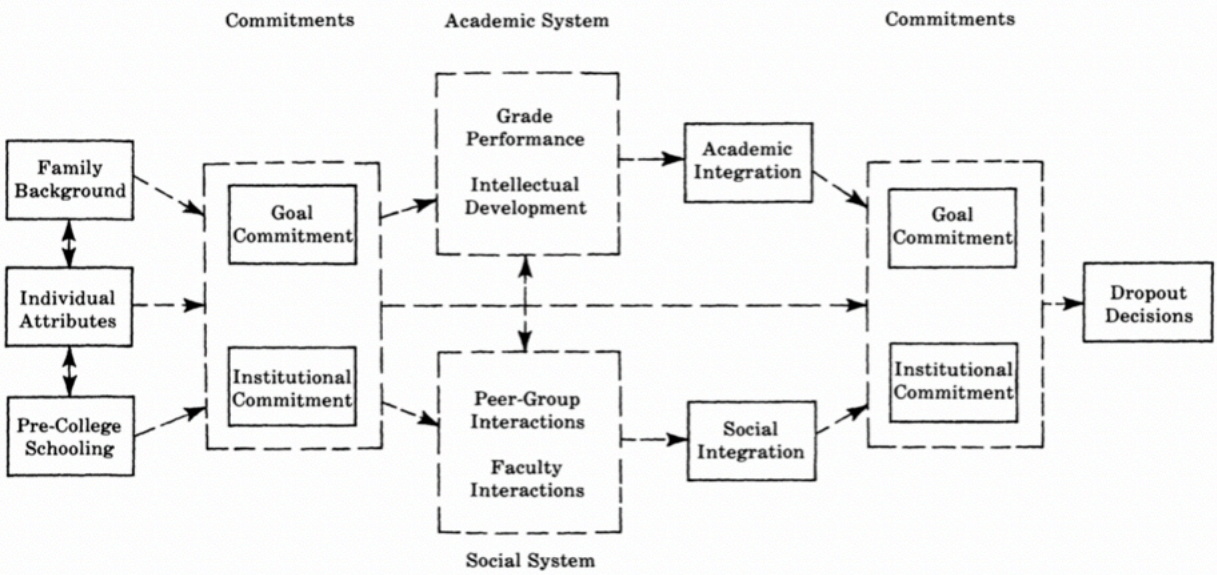

Figure 1. A conceptualization of Tinto's (1975) model of academic attrition. Adapted from Tinto, V. (1975). Dropout from Higher Education: A Theoretical Synthesis of Recent Research. *Review of Educational Research, 45*(1), p. 95.

Appendix B

Bean and Metzner's model of academic attrition

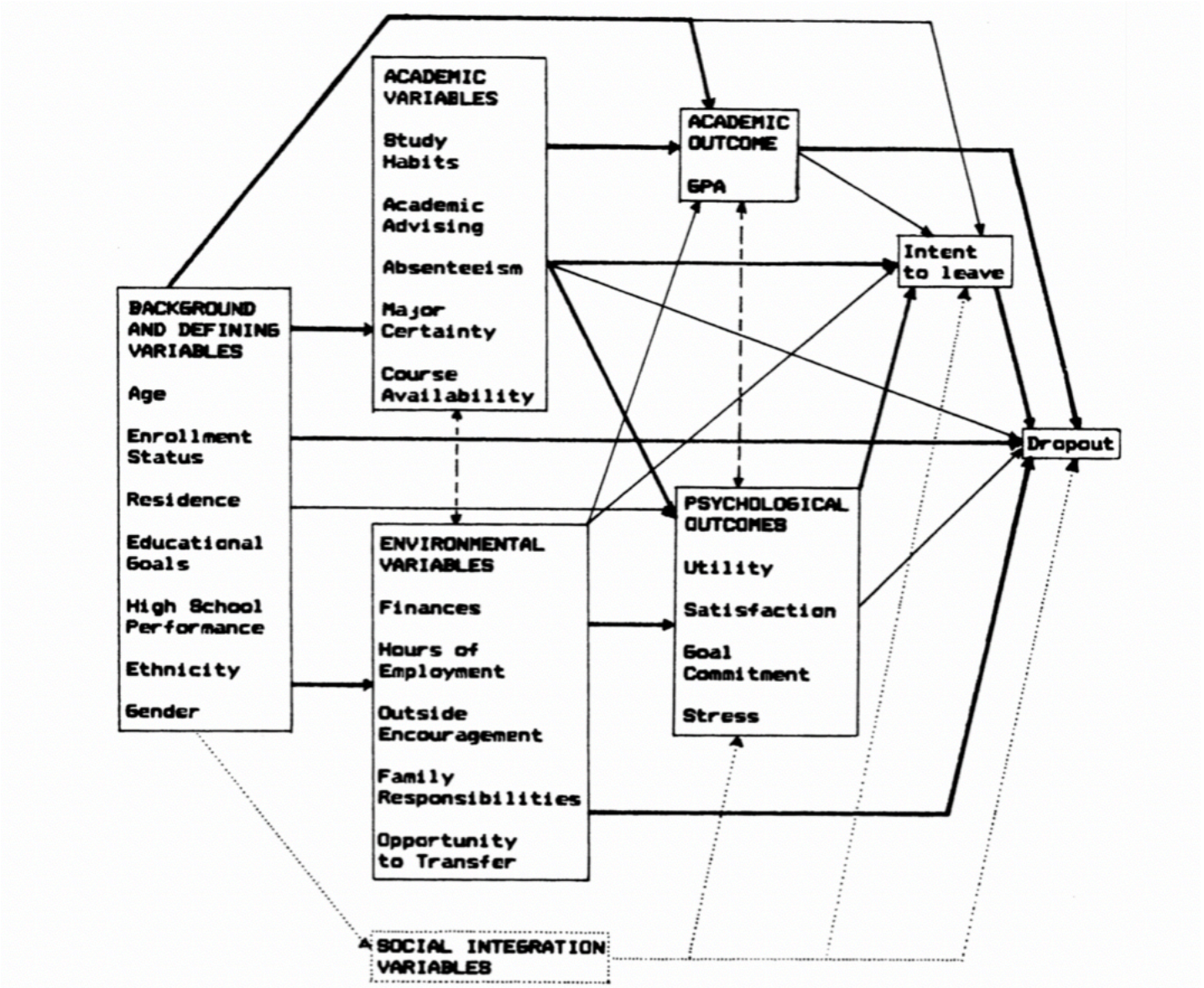

Figure 1. A conceptualization of Bean and Metzner's (1985) model of academic attrition. Adapted from Bean, J. P., & Metzner, B. S. (1985). A Conceptual Model of Nontraditional Undergraduate Student Attrition. *Review of Educational Research, 55*(4), p. 491.

Appendix C

Rovai's model of academic attrition

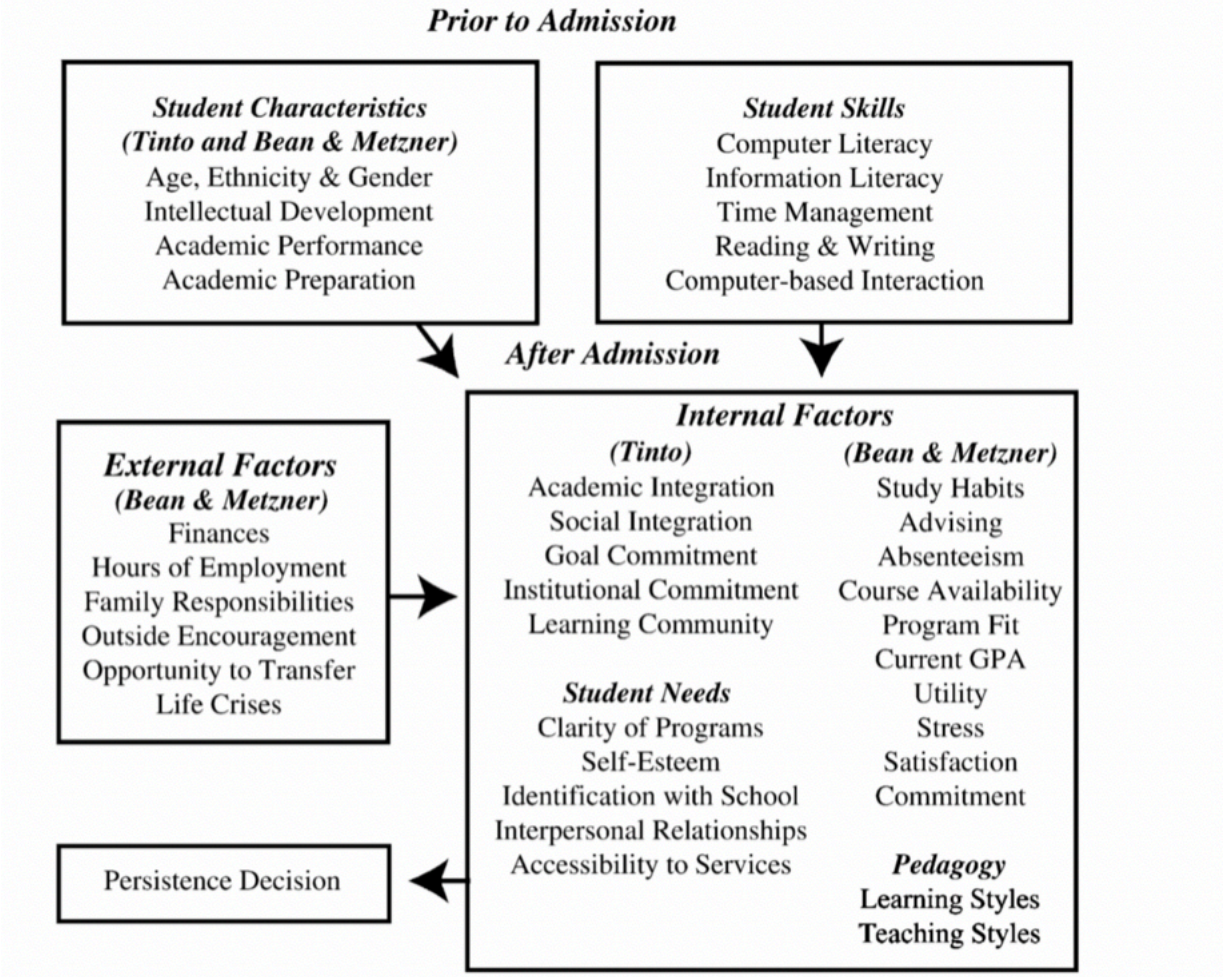

Figure 1. A conceptualization of Rovai's (2003) model of academic attrition. Adapted from Rovai, A. P. (2003). In Search of Higher Persistence Rates in Distance Education Online Programs. *Internet and Higher Education, 6*(1), p. 9.

Appendix D
Questionnaire

INTROD

Undersøkelse om studievaner

Hei!

Vi ber deg her svare på noen spørsmål knyttet til dine studievaner. 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.

Svarene gis *anonymt*, og kan ikke spores tilbake til den som svarer. Du deltar frivillig og kan når som helst avslutte undersøkelsen. Dette prosjektet utføres av Efim Nemtcan og ledes av professor Frode Svartdal, UiT, og er godkjent av forskningsetisk komité.

Svarene du gir vil gi oss informasjon om hvordan studievaner har betydning i studiesituasjonen. Det tar 5-10 minutter å besvare spørsmålene.

Om du ønsker mer informasjon om dette prosjektet, får du en lenke med informasjon når du er ferdig med svarene. Der kan du også være med i trekningen om et gavekort på 5000 kr.

På forhånd tusen takk!

Bakgrunn

Kjønn

- ○ Kvinne
- ○ Mann

Alder

Jeg er student på ___

1. året	2. året	3. året	4. året	5. året	6. året eller mer
○	○	○	○	○	○

Hvilket fagfelt tilhører du til (f.eks. psykologi, sosiologi, biologi, språkfag)?

Vi ber deg om å oppgi litt mer bakgrunnsinformasjon. Denne informasjonen skal kun brukes til forskning.

Kryss av for dine foreldre / foresattes høyeste fullførte utdanning

	Grunnskole	Videregående utdanning	Høyere utdanning	Annet
Mor	○	○	○	○
Far	○	○	○	○

Min familie støtter meg når det gjelder min utdanning

1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer av og til	4. Passer ofte	5. Passer svært godt
○	○	○	○	○

Mine foreldre er interessert i utdanningen min

1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer av og til	4. Passer ofte	5. Passer svært godt
○	○	○	○	○

Study Skills

Nedenfor finner du noen påstander som angår *hvordan du jobber med det faget du nå studerer*. Kryss av for det som passer i ditt tilfelle (1 = passer ikke i det hele tatt; 5 = passer svært godt).

	1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer av og til	4. Passer ofte	5. Passer svært godt
Jeg tester meg selv i det stoffet jeg leser	○	○	○	○	○
Jeg leser om igjen ting jeg har lest før	○	○	○	○	○
Før hver forelesning forbereder jeg meg ved å gjøre meg kjent med stoffet	○	○	○	○	○
Jeg samarbeider med andre også utenfor seminarene	○	○	○	○	○
Jeg trener på å forstå vanskelige begreper/temaer ved å forklare for meg selv eller andre	○	○	○	○	○
Jeg deltar jevnlig på seminarer og kollokvier	○	○	○	○	○
Jeg er aktiv på seminarer og forelesninger	○	○	○	○	○
Jeg synes jeg har gode studieferdigheter	○	○	○	○	○

Dropout/Retention intentions DOI 10.1037/0022-0663.95.2 + Hang, Kaur & Nur,2017

Nedenfor finner du noen *påstander om tanker rundt din studiesituasjon*. Kryss av for det som passer i ditt tilfelle (1 = passer ikke i det hele tatt; 5 = passer svært godt).

	1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer av og til	4. Passer ofte	5. Passer svært godt
Av og til vurderer jeg å slutte på universitet	○	○	○	○	○
Jeg kommer til å slutte på universitet	○	○	○	○	○
Av og til er jeg usikker på om jeg kommer til å fortsette studiene	○	○	○	○	○
Jeg kommer til å fortsette på studiene til jeg blir ferdig	○	○	○	○	○
Jeg vurderer å bytte universitet	○	○	○	○	○

Jeg kommer til å bytte universitet	○	○	○	○	○
Jeg vurderer å ta en pause fra universitetet i nær framtid	○	○	○	○	○
Jeg kommer til å ta en pause fra universitetet i nær framtid	○	○	○	○	○

Self-efficacy

Nedenfor finner du noen *påstander om erfaringer fra din studiesituasjon*. Kryss av for det som passer i ditt tilfelle (1 = passer ikke i det hele tatt; 5 = passer svært godt).

	1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer litt	4. Passer ofte	5. Passer svært godt
Når jeg får en studieoppgave å jobbe med, sliter jeg med å finne løsning	○	○	○	○	○
Jeg har liten tiltro til mine evner til å studere effektivt	○	○	○	○	○
Det er vanskelig for meg å følge leseplanen når noe uventet skjer	○	○	○	○	○
Jeg er i stand til å lære det som blir undervist i år	○	○	○	○	○
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	○	○	○	○	○
Jeg er sikker på at jeg klarer å oppnå de akademiske målene jeg har satt for meg selv	○	○	○	○	○
Jeg er på etterskudd med studiearbeidet	○	○	○	○	○

Irrational Procrastination Scale 6 items

Nedenfor finner du noen *påstander som angår tendens til å gjøre noe annet enn du burde*. Vurder i hvilken grad disse utsagnene passer på deg (1 = passer ikke i det hele tatt; 5 = passer svært godt).

	1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer av og til	4. Passer ofte	5. Passer svært godt
Jeg utsetter ting så lenge at det går ut over velvære og effektivitet	○	○	○	○	○
Livet mitt ville vært bedre om jeg hadde gjort ting tidligere	○	○	○	○	○
Når jeg burde gjøre noe, gjør jeg gjerne noe annet i stedet	○	○	○	○	○
Når jeg ser tilbake på dagen, vet jeg at jeg kunne utnyttet tiden bedre	○	○	○	○	○
Jeg venter med å gjøre ting mer enn hva som er fornuftig	○	○	○	○	○
Jeg utsetter ting	○	○	○	○	○

Karakter

Hvilket karakternivå vil du si er typisk/vanlig for deg?

E/D	C	B	A

○	○	○	○

Motivation_Før_og_Etter (Spørsmål foreslått av Frode 19.09.2018)

Vennligst besvar følgende spørsmål om din *motivasjon* til å studere.

	Ikke i det hele tatt	Lite motivert	Verken motivert eller umotivert	Litt motivert	Veldig motivert
Hvor motivert var du til å jobbe med studiene da du begynte å studere?	○	○	○	○	○
Hvor motivert er du til å jobbe med studiene i dag?	○	○	○	○	○
Hvor motivert er du til å bli ferdig med studiene som planlagt?	○	○	○	○	○

TIDSBRUK

Fortell oss noe om hvor mye du jobber med faget

Hvor mange timer per uke har du undervisning?

Opp til 3 timer	3-5 timer	6-8 timer	9-11 timer	12 timer eller mer
○	○	○	○	○

Når du er på universitetet, hvor lang er en typisk arbeidsdag?

1-3	4-5	6-7	8-9	10 eller mer
○	○	○	○	○

Hvor mange timer per uke jobber du med faget utenom undervisning?

Opp til 10 timer	10-20 timer	20-30 timer	30-40 timer	Mer enn 40 timer
○	○	○	○	○

På en typisk dag med studiearbeid, hvor mye energi opplever du at du legger i studiearbeidet?

Veldig litte	Svært litte	Verken mye/litte	Svært mye	Veldig mye
○	○	○	○	○

LACK OF ENERGY/EFFORT (Steel et al, 2018; (Butler, 2007) DOI 10.1037/0021-9010.9

Vi er nesten ferdig. Vennligst vurder følgende påstander:

	1. Passer ikke i det hele tatt	2. Passer stort sett ikke	3. Passer litt	4. Passer av og til	5. Passer svært godt
Når jeg må gjøre noe motvillig, må jeg manne meg opp for å komme i gang	○	○	○	○	○
Jeg har ingen interesse av å komme i gang med oppgaver jeg misliker	○	○	○	○	○

Jeg føler meg uninteressert eller utmattet når jeg må gjøre ubehagelig arbeid	○	○	○	○	○
Hvis en oppgave er ubehagelig, må jeg virkelig anstrenge meg for å komme i gang	○	○	○	○	○
Jeg investerer mye innsats på studietarbeidet	○	○	○	○	○
Jeg studerte virkelig hardt til mine eksamener	○	○	○	○	○
Jeg gjorde mitt beste med skolearbeidet	○	○	○	○	○

Takk for din deltakelse!

Lykke til med videre studier :-)

Hvis du har spørsmål ta kontakt med Efim Nemtcan (ene014@post.uit.no).

Vil du vite mer om dette prosjektet, gå til www.procrastination.no.

Vil du være med i trekningen om et gavekort kr 5000, skriv inn ditt telefonnummer i boksen under. Vi sletter denne informasjonen straks undersøkelsen er avsluttet, slik at du forblir anonym.

Mitt telefonnr.:

Takk. Alle svar er registrert

Appendix E

Exploratory factor analysis of self-efficacy scale

EFA was run on the whole questionnaire to scan for cross-loadings. Items from self-efficacy and IPS scales were indicated to have a considerable number of cross-loadings. Consequently, the scale consisting of seven self-efficacy items was thoroughly investigated. Item seven ("I am behind my study plan") was indicated to have a low communality score ($h^2 = .26$). Additionally, due to its higher loadings on IPS factor, it was decided to exclude the item from subsequent analyses.

The suitability of EFA was assessed. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than .30. The overall Kaiser-Meyer-Olkin (KMO) measure was .77. It corresponds to "middling" level according to the classification of Kaiser (1974). Bartlett's Test of Sphericity was statistically significant ($\chi 2\ (15) = 669.09$, $p < .001$), indicating that the data was likely factorizable.

EFA (maximum likelihood rotation) revealed two factors that had eigenvalues greater than one and which explained 36% and 10% of the total variance, respectively. Visual inspection of the scree plot indicated that two components should be retained (Cattell, 1966). A Promax oblique rotation was employed to aid interpretability. The rotated solution exhibited a simple structure. The interpretation of the data was consistent with assumed construct's structure with strong loadings of items one, two and three on Factor 1 (representing a negative perception of own capabilities) and items four, five and six on Factor 2 (representing a favorable perception of own capabilities). The obtained factor structure is in line with previous research and was acquired in the current study (Bandura, Locke, & Zedeck, 2003). Component loadings and communalities of the rotated solution are presented in Table E1.

Table E1

Factor loadings (Self-efficacy Positive, Self-efficacy Negative), communalities (h^2).

	Self-Efficacy (P)	Self-Efficacy (N)	h^2
Når jeg får en studieoppgave å jobbe med, sliter jeg med å finne løsning	.04	**.61**	.35
Jeg har liten tiltro til mine evner til å studere effektivt	-.12	**.65**	.52
Det er vanskelig for meg å følge leseplanen når noe uventet skjer	.08	**.67**	.40
Jeg er i stand til å lære det som blir undervist i år	**.59**	-.18	.50
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	**.83**	.18	.56
Jeg er sikker på at jeg klarer å oppnå de akademiske målene jeg har satt for meg selv	**.62**	-.09	.46
Eigenvalues	2.69	1.15	
Explained covariance % (not-rotated)	44.89	19.17	64.07
Factor correlations (Self-Efficacy (P))	1.00	-.55	
Factor correlations (Self-Efficacy (N))	-.55	1.00	

Note. Factor loadings over .40 appear in bold

Appendix F

Exploratory factor analysis of lack of energy scale

First, the suitability of EFA was assessed. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than .30. The overall Kaiser-Meyer-Olkin (KMO) measure was .77. It corresponds to "middling" level according to the classification of Kaiser (1974). Bartlett's Test of Sphericity was statistically significant ($\chi 2$ (21) = 1302.599, $p <$ .001), indicating that the data was likely factorizable.

EFA (maximum likelihood rotation) revealed two factors that had eigenvalues greater than one and which explained 36% and 22% of the total variance, respectively. Visual inspection of the scree plot indicated that two components should be retained (Cattell, 1966). A Promax oblique rotation was employed to aid interpretability. The rotated solution exhibited a simple structure. The interpretation of the data was consistent with assumed construct's structure with strong loadings of items one, two, three and four on Factor 1 (lack of energy to initiate study behavior) and items five, six and seven on Factor 2 (lack to maintain study behavior). Component loadings and communalities of the rotated solution are presented in Table F1. The obtained factor structure is in line with previous research findings showing that ego depletion influences both decision-making processes and subsequent task execution, or motivational and volitional phases of behavior (Baumeister & Vohs, 2016, Gollwitzer, 2014).

Table F1

Factor loadings (Lack of energy to initiate action, Lack of energy to maintain action), communalities (h^2).

	Lack of energy (I)	Lack of energy (M)	h^2
Når jeg må gjøre noe motvillig, må jeg manne meg opp for å komme i gang	**.59**	-.16	.35
Jeg har ingen interesse av å komme i gang med oppgaver jeg misliker	**.66**	-.25	.44
Jeg føler meg uninteressert eller utmattet når jeg må gjøre ubehagelig arbeid	**.80**	-.16	.64
If an errand or project is unpleasant, it takes a lot of energy to finally get started	**.83**	-.17	.69
Jeg investerer mye innsats på studietarbeidet	-.18	**.82**	.67
Jeg studerte virkelig hardt til mine eksamener	-.21	**.79**	.62
Jeg gjorde mitt beste med skolearbeidet	-.22	**.82**	.67
Eigenvalues	2.96	1.89	
Explained covariance % (not-rotated)	42.31	27.06	69.37
Factor correlations (Self-Efficacy (P))	1.00	-.25	
Factor correlations (Self-Efficacy (N))	-.25	1.00	

Note. Factor loadings over .40 appear in bold

Appendix G

Exploratory factor analysis of attrition intentions scale

Before conducting EFA, internal consistency of the 8-items aimed to measure attrition intentions was performed. It indicated that an item measuring students' intentions to continue their education ("I will study until graduation") had a low communality score ($h^2 = .17$). Consequently, the item was excluded from subsequent analysis.

First, the suitability of EFA was assessed. Inspection of the correlation matrix showed that all variables had at least one correlation coefficient greater than 0.3. The overall Kaiser-Meyer-Olkin (KMO) measure was .69. Bartlett's Test of Sphericity was statistically significant ($\chi 2$ (21) = 1965.807, $p < .001$), indicating that the data was likely factorizable.

EFA revealed two components that had eigenvalues greater than one and which explained 35.5% and 24.5% of the total variance. Visual inspection of the scree plot indicated that two factors should be retained (Cattell, 1966). Parallel analysis also supported the two previous conclusions.

The two-component solution explained 60% of the total variance. A Promax oblique rotation was employed to aid interpretability. The interpretation of the data was not consistent with the expected factorial structure of the scale. It did not differentiate between drop-out and stop-out intentions (Table G1). However, it did differentiate transfer-out intentions from the first factor interpreted as drop-out intentions.

Consequently, we decided to exclude items measuring students' intentions to take a break from studies (stop-out): "I think of taking a break from university in the near future" and "I intend to take a break from university in the near future". EFA was a suitable method for data analysis with all variables having at least one correlation greater than 0.3. The overall Kaiser-Meyer-Olkin (KMO) measure was .62. Bartlett's Test of Sphericity was statistically significant ($\chi 2$ (21) = 1143.683, $p < .001$), indicating that the data was likely factorizable.

Table G1

Factor loadings (all items, «Jeg kommer til å fortsette på studiene til jeg blir ferdig» excluded), communalities (h^2).

	Factor 1	Factor 2	h^2
Av og til vurderer jeg å slutte på universitet	**.51**	.07	.29
Jeg kommer til å slutte på universitet	**.50**	.07	.27
Av og til er jeg usikker på om jeg kommer til å fortsette studiene	**.52**	.09	.31
Jeg vurderer å bytte universitet	.01	**.96**	.93
Jeg kommer til å bytte universitet	.05	**.84**	.74
Jeg vurderer å ta en pause fra universitetet i nær framtid	**.95**	-.08	.87
Jeg kommer til å ta en pause fra universitetet i nær framtid	**.90**	-.03	.80
Eigenvalues	3.40	1.53	
Explained covariance % (not-rotated)	48.58	21.91	70.49
Factor correlations (Self-Efficacy (P))	1.00	.29	
Factor correlations (Self-Efficacy (N))	.29	1.00	

Note. Factor loadings over .40 appear in bold

EFA revealed two components that had eigenvalues greater than one and which explained 36.14% and 34.05% of the total variance. Visual inspection of the scree plot indicated that two factors should be retained (Cattell, 1966). Parallel analysis also supported the two previous conclusions.The two-component solution explained 70.2% of the total variance. A Promax oblique rotation was employed to aid interpretability. The interpretation of the data was consistent with the expected factorial structure of the scale. It differentiated transfer-out intentions from drop-out intentions (Table G2).

Table G2

Factor loadings (Drop-out and Transfer-out Intentions), communalities (h^2).

	Drop-out	Transfer-out	h^2
Av og til vurderer jeg å slutte på universitet	**.85**	-.04	.70
Jeg kommer til å slutte på universitet	**.58**	.09	.37
Av og til er jeg usikker på om jeg kommer til å fortsette studiene	**.87**	-.02	.74
Jeg vurderer å bytte universitet	.07	**.81**	.70
Jeg kommer til å bytte universitet	-.04	**1.01**	.99
Eigenvalues	2.54	1.46	
Explained covariance % (not-rotated)	50.78	29.20	79.98
Factor correlations (Self-Efficacy (P))	1.00	.27	
Factor correlations (Self-Efficacy (N))	.27	1.00	

Note. Factor loadings over .40 appear in bold

Appendix H

Steps in testing moderation

Confirmation of the third variable having a moderation effect requires that the nature of the relationship between independent and dependent variables changes as the values of moderator variable change (Hayes & Little, 2013). This is done by including an interaction effect (between academic study skills and academic self-efficacy) in the model and checking to see if the interaction is significant and helps to explain the variation in the response variable (attrition intentions) better than before. More precisely, the following steps were followed and tested:

1. The variables were standardized to make interpretation easier and avoid multicollinearity.
2. We fitted a regression model (Block 1) predicting the outcome variable (attrition intentions) from both the predictor variable (academic study skills) and the moderator variable (academic self-efficacy). Both effects and the model in general (R^2) should be significant.
3. We added the interaction effect between academic study skills and academic self-efficacy (Block 2) to the previous model and checked for significant change in explained variance (R^2 change) of the predicted variable (attrition intentions). Interaction term should be statistically significant. If both are significant, then moderation is present.

The described steps were performed with PROCESS macro for SPSS v3.3 by Andrew F. Hayes. Also, we controlled for heteroscedasticity through the application of heteroscedasticity-consistent standard errors, because the assumption of homoscedasticity was violated.

Appendix I

Steps in testing mediation

Confirmation of mediation effects being present requires that the mediator (academic self-efficacy) should be caused by the independent variable (academic study skills) and is the cause of dependent variable (attrition intentions). The independent variable should lose its significance when the mediator is present (Hayes & Little, 2013). The following steps were performed and tested:

1. Test of the relationship between independent and dependent variables (study skills and attrition intentions). It should be significant.
2. Test of the relationship between independent and mediator variables (study skills and self-efficacy). It should be significant.
3. Test of the relationship between the mediator and dependent variables (self-efficacy and attrition intentions). It should be significant.
4. Test of the relationship between independent and dependent variables (study skills and attrition intentions) when the meditator (self-efficacy) is included in the model. It should be insignificant.

The overmentioned steps (or sets of regression models) were performed with PROCESS macro for SPSS v3.3 by Andrew F. Hayes. Also, we controlled for heteroscedasticity through the application of heteroscedasticity-consistent standard errors, because the assumption of homoscedasticity was violated.