THE ASSOCIATION BETWEEN SELF-ESTEEM AND ACADEMIC MOTIVATION IN DAILY LIFE OF STUDENTS:

AN EXPERIENCE SAMPLING RESEARCH

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Abstract

Academic motivation and self-esteem have been regarded as essential constructs in the academic world. Previous studies have already explored their relations on the trait-level (between-person), indicating a positive correlation and thus inferring conclusions and recommendations for the state-level (within-person). Although studies have shown that the same relations between academic motivation and self-esteem cannot be inferred on the within-person level. Therefore, a knowledge gap exists regarding the association between academic motivation and self-esteem at the momentary level. This study is intended to explore to what extent a student's self-esteem and academic motivation are associated on the state-level and this is conducted based on daily assessments. Moreover, it assesses whether this association can also be found on the trait-level for the sample of the current study. A structured and repeated-measurement, online experience sampling study including 35 participants was conducted. To measure the trait level of self-esteem and academic motivation, the Rosenberg-Self-Esteem Scale (RSES) and the Academic Motivation Scale (AMS) were utilized. To measure the state-level, four state questions were formulated by the researcher, two questions per construct. Fluctuations between and within self-esteem and academic motivation were indicated. A significant positive moderate correlation between state self-esteem and trait self-esteem was demonstrated. The same was indicated for state academic motivation and trait academic motivation. The Linear Mixed Model Analysis proposes that state academic motivation has a much stronger correlation within individuals than at the between-person level with self-esteem. All previously proposed hypotheses could be accepted. Following the outcomes of the current study and previous research, recommendations for future studies are discussed.

Keywords: ESM, ecological assessment, self-esteem, academic motivation, trait, state

The association between self-esteem and academic motivation in daily life of students: An experience sampling study

Since the 1950's, academic -motivation, and self-esteem have been regarded as essential constructs in the academic world, as motivation is considered to be an important predictor of learning and achievement. Studies have demonstrated that students who are more motivated to learn, are more willing to produce higher effort and perform better in classes (Baumeister et al., 2003). In addition, research has indicated that students with high self-esteem are more motivated to strive for their academic goals. Therefore, self-esteem is considered to have a major impact on motivation, since individuals with a positive view of themselves have a better understanding of their own potential (Baumeister et al., 2003). Based on these facts, studies have recognized a strong correlation between academic motivation and self-esteem, arguing self-esteem to be an important determinant of student's motivation (Harlen & Deakin-Crick, 2003).

In the field of psychology, characteristic patterns can be considered from two perspectives; the levels of trait and state. In the literature, permanent or long-lasting characteristics are defined as traits (between-person) (Laborde et al., 2020). In the past decades, the relationship between academic motivation and self-esteem as character traits has gained tremendous attention, because their linkage shows a powerful impact on individual's behavior in educational settings (Komarraju et al., 2009). Almost all previously conducted research has focused on the trait association between the two constructs, using between-person measures, showing a positive correlation on the trait level.

Nevertheless, self-esteem and academic motivation can be also considered as emotional experiences and can thus be measured on the state-level (within-person) as well. States are defined by the literature, as momentary and fluctuating behaviours or feelings (Edwards & Potter, 2005). Until recently, research on the relation between academic motivation and self-esteem at the state-level has been rare. Furthermore, studies have shown that a positive correlation between two constructs on the trait level (between-person) cannot be assumed true on the state-level (within-person) (Curran & Bauer, 2011).

Based on the mentioned fact, it is proposed that state self-esteem correlates positively with state academic motivation, similarly to the positive correlation that can be already indicated on the trait-level.

Self-Esteem on a Trait and a State Level

The term self-esteem originates from the Latin word 'aestimare' which means appraise, implying individual's positive and, negative self- image assessment. Self-esteem is now defined as the central evaluative component of the human self (Edwards, 2011). Various kinds of self-esteem can be distinguished; in the current research the focus will be on global (trait) and specific (state) self-esteem.

For decades, self-esteem was understood to be a relatively stable characteristic, which gave it the form of a trait. Trait self-esteem can be conceptualized as the individual's general evaluation of the self, which is often reflected in people's beliefs of self-worthiness (Von Soest et al., 2016). In other words, trait self-esteem can be considered to be an individual's self-opinion, which is permanent and remains stable over a long time (Robins et al., 2001).

Recently, researchers proposed that self-esteem is much more complicated than only be considered on the trait level. Hence, it has become apparent that people's self-esteem fluctuates with certain situations, therefore it has become meaningful to investigate self-esteem on the state-level (Vrabel et al., 2018). In the literature state self-esteem is defined as a person's self-evaluation in a specific moment or situation (Donnelly et al., 2008). This implies that, self-esteem can be situationally dependent as well, and, contrary to trait, does not remain stable in specific moments. Therefore, it can be also considered as a state of mind, fluctuating up and down with regard to success, failure, and social relations as well as other life experiences (Donnelly et al., 2008).

In addition, many researchers have argued that self-esteem is an important factor to be considered in daily life, work, and education (Standage & Gillison, 2007). Therefore, it is not surprising that self-esteem has gained attention as a fundamental psychological construct and becomes an attractive field of research. A study conducted by Heatherton and Polivy (1991) revealed, that self-esteem on the trait level and on the state-level shows a significant association, indicating that trait self-esteem correlates with state self-esteem. Even though an association has been evidenced between the two levels, little research has been done regarding variability within state self-esteem. Therefore, it is important to explore these temporal relations, offering further insights into the momentary self-esteem experience in university students.

Academic Motivation on a Trait and a State Level

In educational settings, motivation is labelled as 'academic motivation'. The literature defines general (trait) academic motivation as '*the cause of behaviors that are in some way*

related to academic functioning and success, such as how much effort students put forth, how effectively they regulate their work, which endeavors they choose to pursue, and how persistent they are' (Seel, 2011, p.36). In other words, academic motivation is considered to be the concentration and direction of effort towards educational outcomes (Mugabe et al., 2016). The most popular theory in the construct of academic motivation is the Self-Determination Theory (SDT) developed by the researchers Edward Deci and Richard Ryan (Mugabe et al., 2016). The current study utilizes this for the purpose of defining and reaching a better and deeper understanding of the construct and its background.

SDT indicates that behaviour can be intrinsically and extrinsically motivated as well as amotivated. On the one hand, intrinsic motivation (IM) describes the fact of doing an activity for oneself, without expecting any external reward. On the other hand, in extrinsic motivation (EM), a person performs an action with an obvious reason to get a reward. Additionally, to IM and EM, there is the concept of amotivation (AM). People are amotivated when they do not perceive personal possibilities between outcomes and their own actions (Vallerand et al., 1992).

SDT gives an explanation of the extent to which individuals may differ in their academic motivation, hence motivation is viewed as being on a persistent sequence between intrinsic motivation and amotivation, in which extrinsic motivation is seen as an external influence on this relationship (Vansteenkiste et al., 2006). Further, it serves as the theoretical underpinning for the Academic Motivation Scale (AMS), designed to investigate students' academic motivation on a general (trait)-basis. It is important to note that AMS focuses exclusively on the reason why individuals opt for a particular type of education (e.g., school). These decisions are based on the three different types of motivation (Vansteenkiste et al., 2006). Already, in the late 1950's, sociologist Howard Becker conducted a study with the goal to understand the motivational aspects for students in educational settings. In his research, he found that grades were the major motivator for students in attending educational institutions, while personal aspects were less valued. (Van Etten et al., 2008).

Almost all previously published research considers academic motivation merely on the trait-level. Therefore, it can be of further interest to more deeply investigate whether the construct remains stable over time or if fluctuations can be observed. Therefore, academic motivation can be also observed on the state-level. As far as can be ascertained scarce research exists concerning academic motivation on the state level; and no standardized definition of state academic motivation in the literature can be found. Here, the researcher defines state academic motivation, as observable fluctuations in the motivation of students

concerning their studies. Considering the importance of the subject, one can easily understand the necessity of research in academic motivation.

Despite this, research is only been done on academic motivation on the trait-level and rare research exists regarding its course at the state-level. Therefore, exploring temporal and daily relations and changes will offer further insights into the immediate academic motivation experience.

Associations between Self-Esteem and Academic Motivation on a Trait and a State Level

In the past, self-esteem has become of interest in the context of academic motivation, involving many concepts studied by researchers, including students' personal esteem and willpower. A study conducted by Sivrikaya (2019), regarded self-esteem to be the most important factor determining academic motivation and success. Furthermore, according to Ghilay and Ghilay (2015), student esteem has a pervasive impact on behaviour, while also having a powerful effect on their independence, dominance, and ambition. This implies a positive influence on student learning and motivation processes in an academic setting. Furthermore, the literature agrees that good predictors of academic motivation prove to be those that reflect on the students' belief in their performance ability. In this case, individuals show enough trust in their abilities, that their trait self-esteem level around academic motivation increases (Şar et al., 2010).

Additionally, research shows that students with high academic motivation are more likely to be those with a history of high self-esteem (Ghilay & Ghilay, 2015). This implies a positive correlation between trait self-esteem and academic motivation on a trait-basis. For this reason, teachers have tried to support students in boosting their self-esteem because studies found that often first-year students had to deal with issues of low trait esteem (Plecha, 2002). This was based on the fact, that the ability-level of students in universities and within their social network negatively affected individual's perceptions of their personal abilities.

However, another study by Baumeister et al. (2003), found that boosting students' self-esteem (state-self-esteem) does not unequivocally lead people to perform better in school or at work. For the reason that people become anxious, avoid activities, risk failures, and suffer from stress-related health problems when their self-esteem is addressed by the teachers. Thus, when students come to feel incompetent in terms of esteem, this can predict a drop in academic motivation.

Looking at the overall research, it is evident that still, insufficient research exists in this essential field, inferring this from the contradictory statements outlined above. While

some rely on the continuous reinforcement of general self-esteem to achieve higher motivation in academic settings, others argue that this reinforcement can be also considered as a distraction. Therefore, shedding light on the role of state academic motivation and whether it is more dependent on momentary self-esteem or general self-esteem can be of enormous interest. To the author's knowledge, no previous study has looked at the association between self-esteem and academic motivation on the state-level and its dependency on the basis of traits. This is done with the intention of filling in the existing knowledge gap and re-assessing the trait level between the two constructs.

Current study

The current study is intended to investigate daily state-level experiences of self-esteem and academic motivation in university students, as little is known about how university students experience daily self-esteem and academic motivation. Further, it is aimed to re-assess self-esteem and academic motivation on the trait-level based on the data of the current sample; for an adequate comparison with previously conducted studies.

Firstly, it is assumed that individuals having high levels of trait self-esteem, will normally demonstrate high levels of average (within one week) state self-esteem. The same is expected for trait and state academic motivation. As proposed by previously conducted studies, a positive correlation between self-esteem and academic motivation can be expected on the trait-level. In addition, it is investigated whether the relation between state self-esteem and state academic motivation goes mostly on a state-level (within-person) or on a trait-level (between-person). Therefore, five explorative research questions are formulated:

RQ1: To what extent do daily life measurements of self-esteem and academic motivation in students fluctuate during one week?

RQ2: How is trait self-esteem related to average state self-esteem in university students?

RQ3: How is trait academic motivation related to average state academic motivation in university students?

RQ4: How is trait self-esteem related to trait academic motivation in university students?

RQ5: How is state academic motivation associated within-person state self-esteem and between-person state self-esteem in university students?

Methods

Design

In this study, a structured and repeated-measure questionnaire was used to evaluate the trait and state level of self-esteem and academic motivation. Therefore, the current study is in a time-contingent design in the form of daily state questionnaires for self-esteem and academic motivation administered three times daily for seven days. The measurement frequency should provide the researcher an adequate balance between minimizing participants' risks and at the same time providing the researchers with enough valid data (Verhagen et al., 2016). The data points were collected from the end of March 2021 until the middle of April 2021.

Participants

Of 40 participants, who signed up for the study, five students needed to be excluded because of providing insufficient data points (response rate below 60%). The sample was representative of psychology students. Recruitment of potential candidates was done by using two different; convenience-sampling methods and snowball sampling methods. The survey was published on the Test Subject Pool (SONA) System of the University of Twente and shared via several social media platforms (e.g., Facebook) and with social contacts.

The selection criteria for the participants for being able to join the current study were the following: Firstly, they had to be 18 years old or older and being matriculated as psychology students in a university. Secondly, they had to be proficient in the English language to be able to work with the research application Ethica. This required the possession of a smartphone with a compatible operating system to download the app Ethica. Those, who fulfilled the inclusion criteria, received one and a half-credit points on the Test Subject Pool (SONA) as a reward. Those invited via social networks did not receive any reward.

The final sample consisted of 35 participants due to the exclusion of 5 students. The average response rate was 87,5%. In sum 35 participants from age, 18 to 24 (M_{age}=21.17, *SD*=1.71) were included in the present study. The panel included three males (8.6%) and 32 females (91.4%) with 28 being from Germany (80.0%), four from the Netherlands (11.4%), and three from other nations (8.6%).

Materials

The online questionnaires were filled in via the mobile application Ethica (version 450). The survey consisted of questionnaires assessing self-esteem and academic motivation on the trait level, and four daily state questions.

Experience Sampling and Ethica

In order to assess the momentary situation experience, the Experience Sampling Method (ESM) was applied to measure students' daily experiences (state-level) of self-esteem and academic motivation. The ESM is a suitable method for systematically studying individuals' daily life experiences, introducing the in-situation sampling of human behaviour, and provides researchers with valid and timely assessments of a person's psychological state (Rintala et al., 2019). A recent literature review on the use of ESM on a mobile device shows that data collection through smartphones becomes very useful and has been used already for a range of data collection purposes (Hofmann & Patel, 2015). Verhagen et al. (2016), proposes that the most effective method of collecting valid real-time data is to conduct a study with a duration of between 7 and 28 days.

Therefore, Ethica an online end-to-end researcher platform, giving researchers the opportunity to quantitatively measure human behaviour by making use of mobile devices and other electronic devices, for example, wearables, is used. It intends to give the researcher the possibility to create, maintain and deploy surveys and other forms of studies. The online platform enables users to get access to various studies, by utilizing electronic devices to fill in questionnaires. At the same time, they are also providing a web homepage (ethicadata.com) so researchers could observe participants' data. The mobile app can be installed on smartphones, using Android or iOS operating systems. Once the questionnaires, created by the researcher, are published, they can be made accessible to participants. This is done using a variety of triggering logistics, for instance, a fixed time of day publication. Further, the app provides pop-up notifications, which can be set to remind participants when a particular questionnaire needs to be filled in.

Trait Questionnaires

Rosenberg Self-Esteem Scale (RSES). In RSES self-esteem is defined as *'one's positive or negative attitude toward one's self and one's evaluation of one's own thoughts and feelings overall in relation to oneself.'* (Park & Park, 2019, p.1). The RSES questionnaire consists of ten items (Appendix A) which can be answered on a 4-point Likert Scale from 1 (strongly

disagree) to 4 (strongly agree). Items of this questionnaire are for instance 'I feel that I have a number of good qualities 'and 'I take a positive attitude toward myself'. For an adequate evaluation of scores, later on, it is important to re-code the negatively formulated items, 2,5,6,8,9.

Generally, RSES demonstrates a Guttman scale coefficient of reproducibility of .92 and indicates an excellent internal consistency. Further, it demonstrates concurrent, predictive, and construct validity. For the sample of the current study, a good to excellent reliability (α=.82) is demonstrated.

Academic Motivation Scale (AMS). In AMS, academic motivation is defined as students' passion regarding academic subjects when the student's competence is compared and evaluated towards a standard of performance (Alivernini & Lucidi, 2008). Generally, the AMS intends to measure students' motivation in high school and begins with the question 'Why do you go to school?' (Alivernini & Lucidi, 2008). Hence no scale exists assessing students' academic motivation in university, the researcher needed to adapt certain items from the original form of the Academic Motivation Scale, so it fits within the requirements for university students. Therefore, items 1,3,4,5,7,11,14,19,24,26 and 27 needed to be adapted.

The questionnaire consists of 28 items (Appendix B) which can be answered on a 5-point Likert scale ranging from 1 (Does not correspond at all) to 5 (corresponds exactly). Example questionnaire items can be 'For the pleasure, I experience while surpassing myself in my studies' and 'For the pleasure that I experience in broadening my knowledge about subjects which appeal to me'.

The AMS measures intrinsic and extrinsic motivation towards education. Thus, the questionnaire is divided into seven subparts, serving as seven sub-scores. Items 2,9,16 and 23 belong to the category of intrinsic motivation to know. Items 6,13,20 and 27 belong to the cluster measuring intrinsic motivation toward accomplishment. Items 4,11,18 and 25 belong to the category of intrinsic motivation to experience stimulation. While items 3,10,17, and 24 belong to the category of identified extrinsic motivation. Items 7,14,21 and 28 belong to the group of introjected extrinsic motivation. Items 1,8,15 and 22 belong to the category of external regulation extrinsic motivation. Lastly, items 5,12,19, and 26 belong to the category of amotivation with no difference in intrinsic and extrinsic amotivation.

Internal consistency of .81 was reported for all seven subscales. In a study, test-retest, reliability of .79 was estimated for the subscales over a period of one month (Alivernini & Lucidi, 2008). For the sample of the present study, a good to excellent reliability (α =.88) is demonstrated.

Daily State Questionnaires

State Self- Esteem. State self-esteem was measured using two different state questions. Firstly '*At this moment I feel confident about my abilities regarding upcoming educational stuff'.* Secondly, *'I am feeling worthy at this moment'.* The state questions were answered using a 4 -point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). These were inferred from the Rosenberg Self-Esteem-Scale and were transformed to a state question by the researcher to fit in the present study.

The above-mentioned state-items were selected based on their highest factor-loadings (See Table 1) and reformulated in such a way, so they measure a particular moment of time. This method was also used in an Amsterdamer study, as they utilized several trait questions from the Amsterdam Resting-State Questionnaire (ARSQ) and adapted them to state items (Jung et al., 2018).

The split-half reliability for state-esteem item 1'*At this moment I feel confident about my abilities regarding upcoming educational stuff'* was not acceptable with an estimate of .11. The split-half reliability for state-esteem item 2*'I am feeling worthy at this moment'* was not acceptable as well, with an estimate of .16.

State Academic Motivation. State academic motivation was measured by two state items, which were modified and adapted from two questions from the AMS. Firstly, '*Right now, I want to do something that is not related to my studies'.* Secondly, '*Right now, I am following my schedule as planned'.* The state questions were answered using a 4 -point Likert scale as well as the previous ones ranging from 1 (strongly agree) to 4 (strongly disagree).

The state question formulation was inspired by the AMS and adapted to fit the present study. The split-half reliability for state academic motivation item 1, '*Right now, I want to do something that is not related to my studies'* was insufficient with an estimate of .07. and item 2 '*Right now, I am following my schedule as planned'* showed also not acceptable reliability with an estimate of .04. The items have been chosen based on their factor loadings. Table 1 demonstrates a full list of the state items and their factor loadings, as well as their correlations with their trait questionnaire.

Table 1

List of statement questions used for daily state questionnaire showing factor loadings and correlations

Questionnaire	Trait question	Factor loading	Adapted state question	Correlation
RSES	3. I feel that I have a number of good qualities.	.72	At this moment, I am feeling confident about my abilities regarding upcoming educational things.	Negatively correlated with self-esteem
RSES	7. I feel that I am a person of worth, at least on an equal plane with others.	.82	I am feeling worthy right now	Negatively correlated with self-esteem
AMS	5. Honestly, I do not know I am feeling that I am wasting my time.	.74	Right now, I want to do something that is not related to my studies.	Positively correlated with academic motivation
AMS	12. I once had good reasons for going to university, however now I wonder whether I should continue	.75	Right now, I am following my schedule as planned.	Positively correlated with academic motivation

Procedure

Before the questionnaires could be given to the participants, each survey was repeatedly tested and adjusted on the researcher's smartphone to make sure the user interface is user-friendly, meaning unclear design elements are avoided. Therefore, a two-day pilot test was done by the researcher beforehand, to check for the functionality of the questionnaires, reminders, and response functions. Only one single answer could be ticked for each question, before being able to go on to the next question.

Voluntary participation was ensured by an informed consent form that participants had to sign in beforehand. In this consent form, they were asked for their gender, age, and nationality. The informed consent form (Appendix C1) as well as other aspects of the study

were approved by the ethical committee of the Behavioral & Management Sciences faculty of the University of Twente (Request-Nr. 210220), before. After receiving the ethical approval from the BMS, the sharing of the questionnaires began.

The current study took place over eight days in total. The first day was reserved for participants to join the study and making sure they felt ready for the upcoming days. After signing up on SONA or directly through the researcher, participants were requested to download the app 'Ethica' on their smartphone. At first, they had to create an Ethica account and afterward were asked to enter the study registration code (1710). On the first page, they were provided with a general overview (Appendix C2) of the study and what they can expect throughout the eight days. In addition, they were requested to check if they allow pop-up notifications from Ethica. These were serving as a daily reminder. On the first day, students were asked to fill in the two trait questionnaires, RSES for self-esteem and AMS for academic motivation. Filling in the daily questions beforehand would have an impact on their overall score. Thus, it was of importance for the researcher to deliver the trait questions before the participants got access to the daily state questions. Immediately after completing the two questionnaires, participants got the information that they filled in all surveys for that day and further information will be provided to them on the next day.

On the second day for the next six days on (2-8), four state questions were given to the participants, to answer the state questions, three-time frames per day, a morning, an afternoon, and an evening session were set. These sessions were set between three time frames 1) 9:00 am to 10:30 am, 2) 2:00 pm to 4:30 pm and 3) 8:00 pm to 9:30 pm. In order to prevent the habitational response patterns, a random starting time was generated. To guaranty a sequential order of the data, for the statistical analysis, later on, it was set beforehand that the daily state questions expire after 90-minutes. For instance, if an afternoon session was triggered at 2:30 pm participants would have time until 4 pm to fill in the daily state questionnaire. This is a good option for the researcher for preventing the participants to fill in the questionnaire in the evening, thus a bias of the data points is prevented.

In case something did not work out as planned, participants could report any issues with setting up or joining the research, during the study period. Moreover, to be supportive in participants' continual response rate and be able to maintain their retention, appreciative messages were given to the participants at the end of each questionnaire session. Further, the researcher had the opportunity to monitor their response rate on the Ethica homepage.

Data analysis

For the statistical analysis, the data was exported from Ethica and analyzed by using IBM 'Statisical Package for the Social Sciences' (version 27). For visual representations, Microsoft Excel (Office 365) was used. Only those participants with a response rate of above 60% for the daily state questionnaire were included in the final analysis. This is according to Fincham (2008), an essential and sufficient response rate researchers need to reach.

Descriptive statistics were used to calculate the means and standard deviations of participants' demographic data (age, gender, nationality). The same procedure was carried out for the trait questionnaires RSES and AMS. Furthermore, boxplots were constructed to investigate fluctuations within individuals and between persons for self-esteem and academic motivation on a momentary basis.

Before the analyses could be conducted sum scores for trait self-esteem and academic motivation need to be aggregated. In addition, mean and sum scores for trait self-esteem and academic motivation needed to be computed for each participant. The same procedure was carried out for the state questions. Hence data has been collected at multiple points at time, it is essential to disaggregate in one model the between person-measure and within-person effects to avoid an error of interference (Curran & Bauer, 2011). Thus, for self-esteem and academic motivation, the average person mean (PM) score per participant over the course of seven days was calculated. This allows for the between-person analysis, in which data from trait and state questionnaires are compared. To calculate the person-mean centered (PMC) score, which is needed for the within-person analysis; state scores for self-esteem and academic motivation are subtracted from their PM scores.

To check for reliability of Rosenberg-Self-Esteem Scale (RSES) and Academic Motivation Scale (AMS), Cronbach's alpha was calculated. The reliability value Cronbach's Alpha reliability ranges from 0 to 1. The closer Cronbach's alpha is to 1, the better the internal consistency. Therefore, there are the following rules of thumb: an alpha with a value lower than .5 is seen as unacceptable, higher than .5 is poor, .6 is deemed as questionable, .7 is acceptable, .8 is Good and .9 is excellent (Tavakol & Dennick, 2011). Additionally, to assess the reliability of state-items test-retest reliability was used to check for the stability of responses. Pearson correlation is used to examine the stability of responses (reliability) of the state items for self-esteem and academic motivation.

Furthermore, Pearson correlation was also used to calculate the correlation coefficient

between 1) trait self-esteem and average state self-esteem (PM) 2) trait academic motivation and average state academic motivation (PM), and finally 3) trait self-esteem and trait academic motivation. Pearson correlation value of $r > 0.5$ indicates a strong correlation, $r > .3$ is for a moderate, and $r > .1$ is for a weak correlation (Adler & Parmryd, 2010).

In addition, to see the relation between state self-esteem and state academic motivation linear mixed modeling (LMM) was used on standardized variables to obtain standardize parameter estimates for the association. An autoregressive structure (AR1) with time points set as a covariant variable was used. An advantage of the incorporation of the LMM was the exploration of whether the relation between self-esteem and academic motivation a state (within-measure) or trait (between-measure) relation is. For this, state academic motivation was defined as the dependent variable and state self-esteem PM, as well as the respective PMC score were set as predictors.

Results

Descriptives

In total, 40 participants joined in this explorative research. The average response rate was 87.5 %. Table 2 demonstrates the minimum and maximum scores, mean, and standard deviation of the trait self-esteem and trait academic motivation questionnaire for a total of 35 participants.

Table 2

Trait Self-Esteem and Trait Academic Motivation
Descriptives Minimum and Maximum Scores, Mean (M) and Standard Deviation (SD)

Questionnaire	Minimum (possible minimum)	Maximum (possible maximum)	M	SD
RSES	15 (10)	34 (40)	26.68	4.63
AMS	54 (28)	107 (140)	86.06	12.55

Note: N=35

In the following a boxplot will be provided to illustrate the differences between and the spread of students' momentary self-esteem and momentary academic motivation, subdivided by the mean self-esteem (See Figure 1). At first glance it looks as if the boxes are not normally distributed, meaning asymmetric data is represented. Thus, no stable pattern is discernible, indicating fluctuations in momentary self-esteem and momentary academic motivation. However, the boxes shift upwards as the mean self-esteem score increases, the momentary self-esteem as well as the academic motivation also increase. Therefore, an upward trend can be identified, implying a dependency between the mean self-esteem and momentary academic motivation.

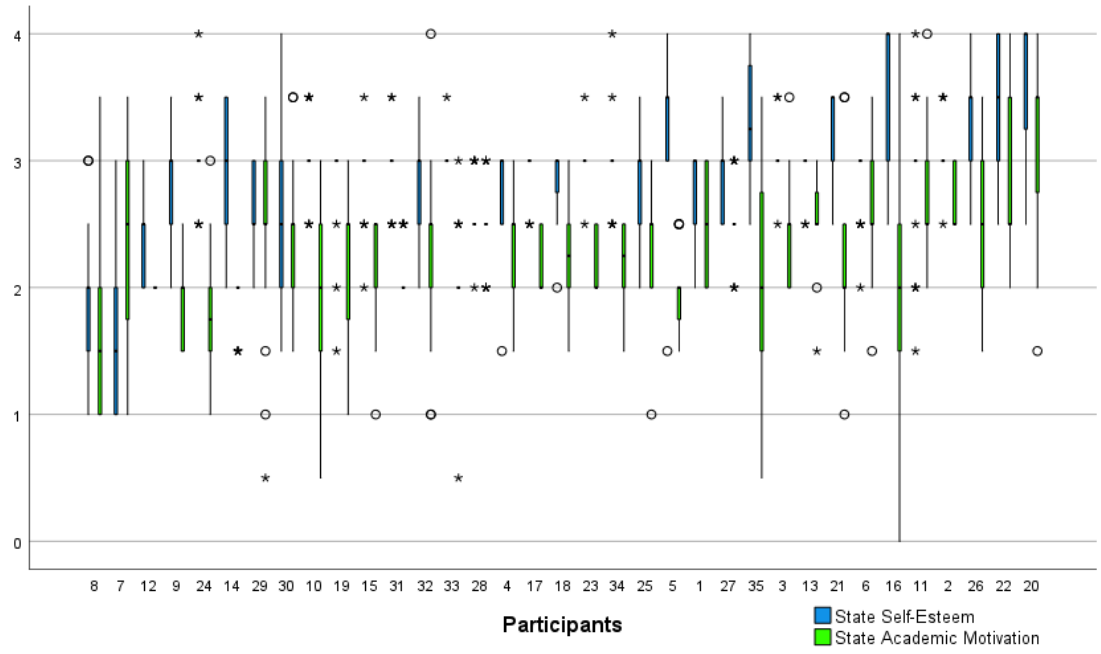
Those participants with the lowest score for mean self-esteem, also scored relatively low for momentary self-esteem and academic motivation, while those with the highest mean self-esteem score, scored relatively high on the momentary basis of both variables. This shift suggests that students with higher mean self-esteem, also score high in a particular moment. The same is inferred for academic motivation. In addition to this indication of positive correlation, it is further notable that there are undefined variations within momentary self-esteem and academic motivation, both for those who scored low on the mean self-esteem scale as well as for those scoring high on the mean self-esteem scale. Therefore, a low or high

mean self-esteem cannot be considered as a meaningful predictor for a momentary self-esteem and academic motivation experience. Furthermore, certain outliers can be noted, as these were not eliminated. These serve to depict the actual variability between the two constructs rather than distorting the overall picture.

Despite these facts, the group seemed to experience a rather high level of state self-esteem (*M*=2.66) and a relatively low level for academic motivation (*M*=2.10) in the range from 1 to 4. In addition, it can be noted that more variability was experienced in momentary academic motivation, while in contrast self-esteem remained constant.

Figure 1

Mean State Levels of Self-Esteem and Academic Motivation for each Participant



Note. 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree), indicating the degree to which participants felt academically motivated or self-confident. Data are ordered ascendingly according to the mean score in state self-esteem. Missing values are not represented.

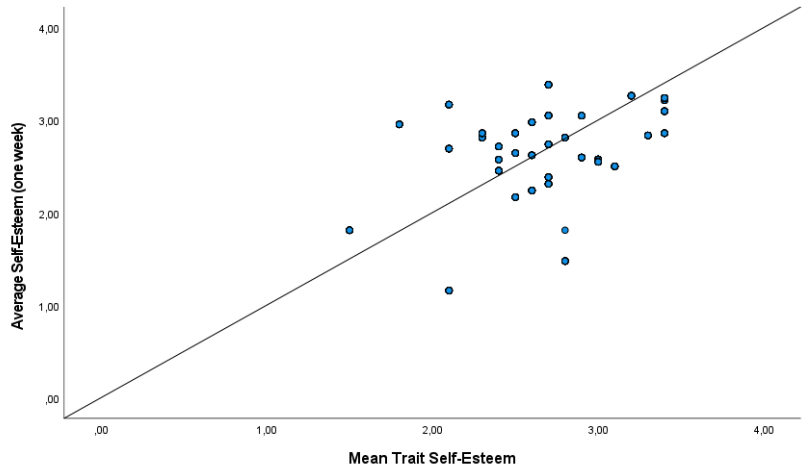
Associations between Self-Esteem and Academic Motivation

The Pearson correlation between trait self-esteem and average state self-esteem (PM) results show a significant positive weak to moderate correlation ($r = .37$, $p < .01$). To get a more precise view of the current correlation a scatter plot will be provided (See Figure 2). As can be seen in the visual representation, as the mean trait self-esteem score increases, also the

average self-esteem score increases. Therefore, a correspondence between the two variables is indicated.

Figure 2

Visual representation of the significant positive weak to moderate correlation between trait self-esteem and average self-esteem.



Similarly, a significant positive, but weak correlation is indicated between trait academic motivation and average academic motivation (PM) ($r=.18$, $p<.01$). Those who score high on the trait academic motivation, mostly display a high average state academic motivation. As the correlation is extremely weak, there is little dependency indicated between the two variables on the scatter plot (Appendix D1).

Considering the two constructs, self-esteem, and academic motivation, on the trait level, as already shown from previous research, a significant positive weak to moderate correlation can be indicated between them ($r=.24$, $p<.01$). This means that those who score high on the trait self-esteem scale, tend to demonstrate high academic motivation as well.

Lastly, for more sophisticated analysis, a Linear Mixed Model analysis was conducted to assess whether state academic motivation is more at a state self-esteem level (within-person) or at a trait self-esteem level (between-person). The results demonstrated that state academic motivation is more at a state self-esteem level (within-person-PMC) ($ß_{pmc}=.65$, $SE=.04$, $p<.01$, 95% CI [.18, .32]) and less on trait self-esteem level (between-person-PM) ($ß_{pm}=.25$, $SE=.02$, $p<.01$, 95% CI [.61, .70]). This means that state academic motivation depends more on state self-esteem than on trait self-esteem. As the estimate of PM is outside

the 95% confidence interval (± 1.95 SE) of the PMC estimate, the within-person association is stronger than the between-person association.

Individual case analysis

After analyzing all 35 participants on the individual level, three clusters of groups could be identified. In the first cluster, 26 participants (75%) displayed a significant correlation. This implies 25 displaying a positive correlation within a range of .46 to .98, whereas one shows a significant negative correlation ($r.=-.437$, $p<.05$), indicating a second cluster (Appendix D2). The third cluster consists of 9 participants (25%), in this no correlation could be indicated between the two variables. The LMM analysis indicated state academic motivation depends more on within self-esteem. For this reason, the data of participant 27 was selected, as it is the most representative of the positive correlation between the two variables ($r=.69$, $p<.05$) and thus demonstrates a dependency between the two variables.

Figure 3 illustrates a more precise overview of participant 27's daily state academic motivation and self-esteem scores on the momentary basis, over a period of one week, obtaining three responses per day. The measurement point scale on the x-axis begins with timepoint 1 in the morning and ends with timepoint 21 in the evening. An evaluation of the data suggests a positive correlation between the two variables. This means when self-esteem increases also academic motivation increases. State self-esteem peaked in the evening at the beginning of the week (point 6, M=3.5) and in the evening (point 12, M= 3.5) at the middle of the week. Academic motivation reached its highest peak three times, always close to M=3.0. Self-esteem and academic motivation showed high variability in their individual measurement points, but in sum the changing patterns of self-esteem and academic motivation seemed similar over time as most of the lines shifted in parallel and in the same direction, therefore no upward trend was observable.

Figure 3

Participant 27 scores for state self-esteem (blue) and state academic motivation (green). Representing cluster of positive correlation.

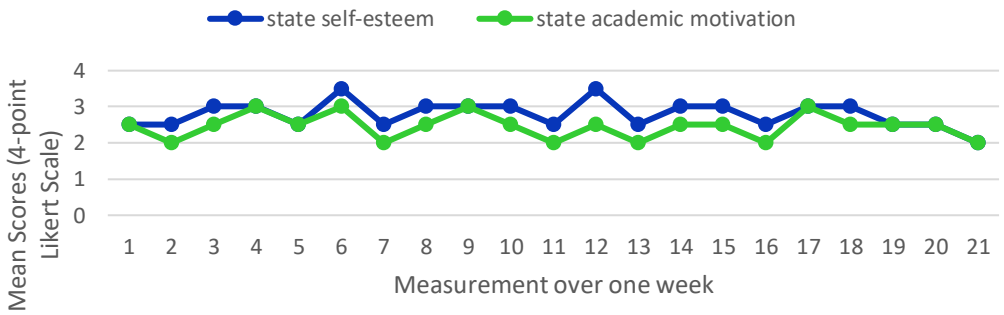
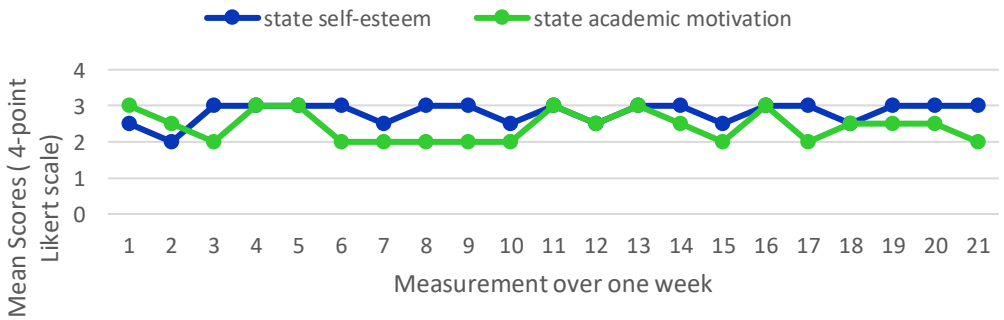


Figure 4 illustrates a more precise overview of the first participant's daily state academic motivation and self-esteem scores on the momentary basis, over a period of one week, obtaining three responses per day. An evaluation of the data suggests no correlation between the two variables (r=.09). This means there is no dependency between self-esteem and academic motivation. Only academic motivation showed some peaks, at the highest at 3.0. Since not extreme peaks are observable in this course, no overall correlation can be indicated. However, taking a look at the individual measurement points, some correlations can be indicated. At the beginning of the first day both variables decrease. In addition, it is noted, that the magnitude of change occurs in academic motivation, while self-esteem remains stable for most of the time. In sum interesting to note is that some minor correlations between the timepoint exist.

Figure 4

Participant 1scores for state self-esteem (blue) and state academic motivation (green). Representing cluster of non- existing correlation.



Discussion

Given the importance of self-esteem and academic motivation in educational settings, the present study aims to fill the current knowledge gap. It was designed to gain further insight into the association between students' self-esteem and academic motivation on a momentary basis (state-level), and to examine whether this relation is reflected in their permanent characteristic (trait-level).

The outcomes of the current study revealed that state self-esteem varies strongly within individuals and between persons. The same course of variability was indicated for state academic motivation. However, in state self-esteem the variability was minimally different to that from state academic motivation. Furthermore, a significant positive weak to moderate correlation was examined between trait self-esteem and average self-esteem. This indicated that those scoring high on the Rosenberg-Self Esteem Scale (trait-level) normally demonstrated high daily state levels of self-esteem. The same is investigated for the academic motivation construct. However, in the self-esteem construct the correlation was found to be stronger, than in academic motivation. In addition, as might have been expected from the previous literature a significant positive weak to moderate correlation between self-esteem and academic motivation on the trait-level was found. Finally, the study demonstrated that state academic motivation depends more on state self-esteem (within-person) and less on trait-self-esteem (between-person). Therefore, the hypothesis that the two constructs are positively associated on the state-level can be accepted.

Interpretation of results with previous studies

The results of the present study show that state self-esteem has the possibility to predict state academic motivation in academic settings. This indicates that state academic motivation is more at state-level self-esteem (within-person) than at trait-level self-esteem (between person). This outcome demonstrates the dependency between state academic motivation and within-person self-esteem, showing the researcher that the state-state correlation on the momentary basis, is stronger than on the between-person basis. These findings are in line with Bieg et al. (2014), revealing a significant discrepancy between trait and state emotions within an academic setting. Their study was conducted within the mathematical field, demonstrating a discrepancy between how students think they feel, referring to the trait level, and how they really feel, drawing on the state-level. This agrees partially with the current study, as it also demonstrates a discrepancy between the within

individuals and the between-person level. This means from the perspective of Bieg et al. (2014), that there is a difference in outcome between to which extent students feel self-confidence in a particular moment of time, and how self-confident students in general feel.

Looking at the two constructs on the state-level in turn, it can be indicated, that self-esteem and academic motivation fluctuate; this is further confirmed by the analysis of the individual case, as self-esteem and academic motivation show variability within the constructs. Keeping in mind, that the measurements were taken three times a day, it could be inferred that the variability was influenced by the time of day. This finding aligns with Bellhäuser et al. (2021), who also investigated academic motivation from an interpersonal perspective, meaning measurements between persons. In their study, they examined the fluctuation of academic motivation over the day and how these fluctuations can occur at several different times of day, as is also demonstrated in the current study. Moreover, they explained these fluctuations by ups and downs in personal well-being (e.g., self-esteem). Even though the constructs show variability on an individual basis, a dependency between these can be revealed.

Furthermore, state self-esteem also showed variability, as with academic motivation, self-esteem was assessed three times a day. The graph, referring to the individual case indicated that self-esteem was mostly at its highest during the middle of the day. This observation of fluctuations was also confirmed by a study conducted by Franck et al. (2016), investigating the instability of self-esteem during the day. They found that self-esteem can fluctuate due to daily concerns, people having to cope with issues such as stress. This would also explain the variability within momentary self-esteem, which is shown in Figure 1.

In addition, the state-state association could be interpreted on a more sophisticated level, by investigating their outcomes with the help of a study done by Rosenberg et al. (1995). Their study shed light on the nature and relevance of the relationship between trait self-esteem and state self-esteem. They have revealed that the two types of self-esteem are strongly correlated, but have totally different meanings, namely that trait self-esteem is more responsible for individual psychological well-being, while state self-esteem is more based on cognitive and educational aspects. This finding is shared by the current study, which shows that state self-esteem, responsible for cognition and educational aspects, belongs more to state academic motivation, than average self-esteem, meaning the overall psychological well-being. In short, if students feel mentally healthy, it is not sufficient and meaningful for their momentary academic motivation.

Nevertheless, even though trait self-esteem and average self-esteem, indicate

completely different outcomes in terms of meaning, the current study finds a positive correlation between them. This implies that if an individual's overall self-esteem is high, the average self-esteem is high as well. These results align with a previous study conducted by Von Soest et al. (2016), who examined the development of trait self-esteem and average self-esteem across the period of adolescence and young adulthood. They found self-esteem in the domain of self-image shows high and stable correlations with trait self-esteem. This correlation can also be found in the current study.

Moreover, a correlation can be found between trait academic motivation and average academic motivation. This indicates that the higher the level of trait academic motivation, the higher the level of average academic motivation. As no previous study has been conducted, comparing the process of academic motivation on the state and trait-level, a comparable study conducted by Choi et al. (2012) was used as an argument for this correlation. They investigated the association between trait and state motivation in people with schizophrenia, revealing that state motivation was significantly and positively associated with the trait-level.

When both constructs are considered on the trait-level, a positive correlation can be found between academic motivation and self-esteem, as could already be expected from the literature. This means the greater the level of self-esteem, the higher will be the level of academic motivation. As Ferkany (2008) has already argued, self-esteem is an essential factor in students' motivation in their educational careers. This implies a positive correlation between self-esteem and academic motivation, as was shown in the present study. He argued that if teachers encourage students to have a higher belief in themselves and thus strengthen their self-esteem, they were more motivated to work hard in order to achieve their personal educational goals. In summary, the results were mostly in accordance with those of previously conducted studies. However, it is necessary to reflect on the strengths and limitations of the current study.

Limitations and Strengths

This study did demonstrate some limitations. A first significant limitation is the non-reliable state-items. Even though the trait questionnaire for academic motivation (AMS) showed a significant positive correlation and the reliability of AMS was good as well, the academic motivation state items indicated poor reliability. These discrepant results can be explained by the fact that AMS is divided into measurements of intrinsic motivation (IM) and extrinsic motivation (EM) because it is based on the Self-Determination Theory. For instance, item *2' I experience pleasure and satisfaction, while I am learning new things'* measures

intrinsic motivation, while item 10 *'It will enable me to enter the job-market correctly'* assesses extrinsic motivation (Alivernini & Lucidi, 2008). For the purpose of the current study, the state items were intended to measure academic motivation from a momentary and emotional perspective; no distinction was made between intrinsic and extrinsic.

Moreover, even though, the RSES showed very good internal consistency, for their trait questions, the results were the opposite for the self-esteem state items, as they indicated poor reliability. This fact made it harder for the researcher to interpret the results correctly. This result was somewhat surprising for the researcher, as the state-items formulation was closely modelled on the RSES items; they were formulated in such a way as to measure the in-moment situation. This finding can be explained by the fact that, to the best of the author's knowledge, no study has been previously conducted that measures state self-esteem with the experience sampling method (ESM), which threatened the reliability of the state-items.

A further limitation was the occasional technical issues on the platform Ethica which threatened the validity of outcomes. Participants reported problems with receiving reminder notifications, as sometimes no notifications popped up for the daily questionnaires. Moreover, some participants received a premature notification before the end of seven days, this was due to mismanagement of setting the duration of study properly. These technical obstacles could be the reason for five participants having insufficient data points (below 60% response rate); and their exclusion from the study. Moreover, regarding the generalizability another limitation was the small sample size and its extremely skewed gender representation, meaning that the majority (91.4%) were female and only the rest (8.6%) were male. Thus, it was difficult to generalize the results to a larger population.

The study's major aim as well as its strength was the primarily step towards filling in the knowledge gap in academic motivation at the state-level, performed by using ESM. Moreover, it was also the first study to investigate the association between general and daily components of academic motivation and self-esteem, at the state as well as at the trait level. In addition, the researcher also looked at fluctuations within academic motivation and self-esteem. A further strength of this study was the use of the Experience Sampling Method (ESM), which provided high validity of the results in terms of the daily life of the students. This is demonstrated by the high response rate of the students.

Directions for future research

This study held important implications for educational research. Hence, there is an association between self-esteem and academic motivation on a daily basis, there is a need for

future research to explore this relation. Based on these outcomes it is hoped that educators will benefit from it.

Green et al. (2007) have argued already, it is necessary to consider academic motivation also from a domain-specific nature (state), postulating clear definitions of trait and state academic motivation. Since the reliability of the state items regarding academic motivation was poor in the current study, this emphasized the need to formulate standardizable and definable state questions and responses, measuring academic motivation on the state-level. As Weiner (1990) has also suggested, there is little specificity in defining academic motivation across domains, and it is clear that there is a need for diverse designs and methods in addressing the complex nature of academic motivation.

Based on the outcomes of this study, it could be of further interest to investigate the causes of fluctuations experienced in both variables. For instance, being surrounded by demotivating environment (external) or feeling stress (internal), referring back to the internal and external motivation sub-division, proposed by the Self-Determination Theory. Therefore, it could be recommended that future studies should include additional categorical variables in the state questionnaire, such as the presence of a stressor, the quality of mental health, and goal orientation. For instance, 'right now, I am feeling stressed, because of upcoming educational events'(internal) or 'right now, I am motivated to finish my work, so I can meet my friends later'(external). In addition, these findings could be further illuminated using additional measures such as teachers' or school/class self-reports.

Regarding the design of the study, previously published studies have shown that socioeconomic status (SES) and cultural backgrounds have an impact on academic careers. Thus, for future research, it is crucial to include participants with diverse SES backgrounds and to focus on specific cultural backgrounds (Marcella & Miller, 2001). Regarding the duration of the study, it has been recommended that constructs should be measured, not only for one week but for a longer time, as the literature suggests a study duration of between 7 and 28 days being appropriate, to support a balance between retaining participants and capturing sufficient measurement points for detailed analysis. (Verhagen et al., 2016). This means in the context of the current study, to investigate whether the patterns between self-esteem and academic motivation on a trait and state level, remain stable over few weeks and receive further valid measurement points in this setting.

As Rosenberg et al. (1995) have already mentioned, educators and policymakers seem to focus on the incorrect kind of self-esteem, meaning trait self-esteem, respecting the introduction of interventions to improve students' motivation and thus performance in school.

In addition, according to Bardel et al. (2010), it is important to encourage the individual's self-esteem in a particular situation in order to motivate them to reach their goal. For this study, it means that paying more attention to the state level would increase the effectiveness of future educational interventions.

Conclusion

The present study can be considered as a preliminary step to fill the knowledge gap in investigating the association between self-esteem and academic motivation, on a trait and state-level. The study reveals a positive correlation between self-esteem and academic motivation on a trait level, as well as on the state-level. In addition, it has been demonstrated that state academic motivation is more dependent on within self-esteem. Even though deeper research is required in this field, a first step is to follow the recommendation of Rosenberg et al. (1995), that future interventions should focus on within self-esteem and try to motivate students in a particular moment, instead of assuming between-person high self-esteem.

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Appendencies

Appendix A: Rosenberg Self-Esteem Scale (RSES)

1. On the whole I am satisfied with myself.
2. At times I think I am no good at all
3. I feel that I have a number of good qualities
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of
6. I certainly feel useless at times
7. I feel that I am a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude towards myself.

Appendix B: Academic Motivation Scale (AMS)

Why do you go to ~~School~~ University?

1. Because ~~I need at least a high-school degree in order to find a~~ with only a college degree I would not find a high-paying job later on.
2. Because I experience pleasure and satisfaction while learning new things.
3. Because I think that a ~~high-school~~ university education will help me better prepare for the career I have chosen.
4. Because I really like going to ~~school~~ university.
5. Honestly, I don't know; I really feel that I am wasting my time in ~~school~~ university.
6. For the pleasure I experience while surpassing myself in my studies.
7. To prove to myself that I am capable of completing my ~~high-school~~ university degree.
8. In order to obtain a more prestigious job later on.
9. For the pleasure I experience when I discover new things never seen before.
10. Because eventually it will enable me to enter the job market in a field that I like.
11. Because for me, ~~school~~ university is fun.
12. I once had good reasons for going to ~~school~~ university; however, now I wonder whether I should continue.
13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.
14. Because of the fact that when I succeed in ~~school~~ university I feel important.

15. Because I want to have "the good life" later on.
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.
17. Because this will help me make a better choice regarding my career orientation.
18. For the pleasure that I experience when I am taken by discussions with interesting teachers.
19. I can't see why I go to ~~school~~ university and frankly, I couldn't care less.
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.
21. To show myself that I am an intelligent person.
22. In order to have a better salary later on.
23. Because my studies allow me to continue to learn about many things that interest me.
24. Because I believe that my ~~high school~~ university education will improve my competence as a worker.
25. For the "high" feeling that I experience while reading about various interesting subjects.
26. I don't know; I can't understand what I am doing in ~~school~~ university~~.~~
27. Because ~~high school~~ university allows me to experience a personal satisfaction in my quest for excellence in my studies.
28. Because I want to show myself that I can succeed in my studies.

Appendix C

C1 Informed consent in Ethica App

Your participation in this study is completely voluntary and all your responses are treated anonymously. None of the responses will be connected to identifying information and wouldn't be shared with third parties. The data and information you give will only be used for statistical analyses. You can withdraw from the study at any time without giving any reasons! You can simply stop answering the daily questions.

If you would like to have further information about the research, now or in the future, feel free to contact us:

Lucie Pieroth (l.j.a.pieroth@student.utwente.nl)

Daniela Jäschke (d.s.jaschke@student.utwente.nl)

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-bms@utwente.nl

C2 General overview of the study in Ethica App

Thank you very much for signing up for our study! Before you start, a short introduction will follow.

The purpose of this study is to measure how you feel throughout the day. By using monitoring tools that help us to identify the daily fluctuations of constructs from mental health, we can obtain an insight into their dynamic interactions. This can then be applied to develop more personalized psychological interventions and therapies.

This study will run for about a week. On the first day we will start with a couple of questionnaires. These initial questionnaires need to be filled in only once and it shouldn't take more than 30 minutes. From the next day onward, you will receive notifications via Ethica where you are asked to answer a couple of questions throughout the day. That will happen three times per day - morning, afternoon and evening and it won't take more than 10 to 15 minutes per day. That will continue for 7 days until the end of the study. Please keep in mind you can withdraw from the study at any moment by simply not answering any questions or deleting Ethica without needing to provide any reason.

We know people are quite occupied nowadays, but we will ask you to fill in these daily questions as much as possible. For this purpose, we are giving you the possibility to fill it in for an hour after receiving a notification instead of immediately. After one hour it will expire and you won't be able to do it. Please, check occasionally if you have some activities to be done.

Additionally, we want to ask you to turn on the notification option for the Ethica app and to adjust the battery optimization settings which sometimes might intervene with the pop-up and sound notifications. We will provide you with some guidelines on how to do it if you don't know, they can be found in the overview of the study.

And that is it for today! ***More information will be provided to you tomorrow in the app. Make sure to check your phone for details. We will send a notification via Ethica as well to remind you.***

Thank you again for joining. If you have any trouble setting up the app or have questions about the study at any point feel free to contact us:

Daniela Jäschke: **d.s.jaschke@student.utwente.nl**

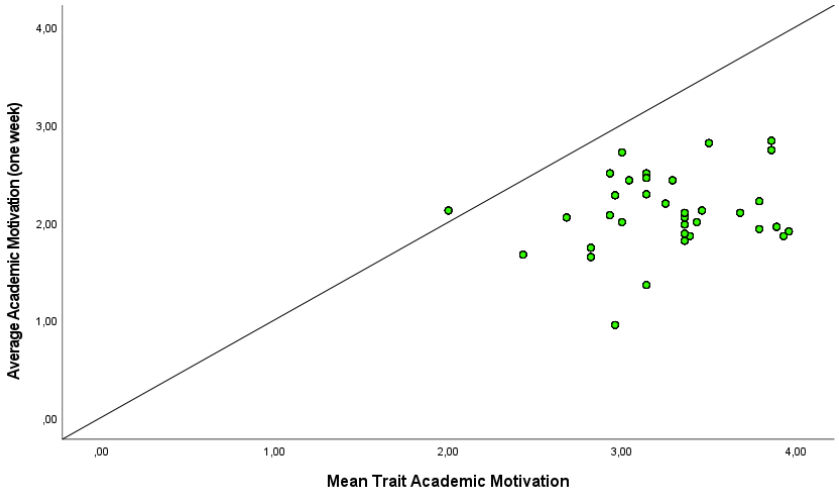
Lucie Pieroth: **l.j.a.pieroth@student.utwente.nl**

Appendix D

D1 Correlation between Trait Academic Motivation and Average Academic Motivation

Figure 1

Visual representation of the association between trait academic motivation and average academic motivation.



D2 Individual case negative correlation

Figure 2

Participant 2 scores for state self-esteem (blue) and state academic motivation (green). Representing cluster of negative correlation.