UiT The Arctic University of Norway

Department of Psychology, Faculty of Health Sciences

The effects of experiencing stereotype threat and internal attribution of failure among women's intentions to drop out from university

Tina Kofoed Eriksen

Master's thesis in Psychology PSY-3900 May 2021

Preface

The idea to my study came after Karrieredagen (Career day) arranged by The Arctic University of Norway (UiT) in 2019, where I talked to a HR university recruiter from Microsoft. She was interested to know why Microsoft have problems finding and recruiting female students as engineers, and why female engineers often distrust their own abilities at university compared to men. After reading more about the problems of recruiting more female students to become engineers, I found out that this is often a problem among female students studying science, technology, engineering, and mathematics (STEM). I also found previous research that show that it was very common for women to doubt their own abilities more compared to men, which then reduced their motivation. Because of this, my supervisor and I wanted to figure out why women tend to leave university, but with a specific interest in female STEM students.

The time during writing my thesis has been interesting, while learning more about reasons why female students chose to leave university, Covid-19 hit Norway. A normal day at campus was changed into home office and little socializing with others. This led to little collaboration with my fellow students, as we could not drop by each other with questions regarding our thesis.

Still, I would not have been able to complete this project without the help from my supervisor professor Sarah E. Martiny. Creating the questionnaire, developing my hypotheses, structuring my text and the statistical analysis. A great thanks to The Prestige Project, contacting Sarah E. Martiny, wanting us to join their project. This led to us having contact with every Faculty leader at UiT, which then shared our questionnaire to staff and students at the university.

I also want to thank professor Tove Irene Dahl, associate professor Mikołaj Hernik and advisor for master's in psychology Jon-André Dalbakk trying to make the best out of our time as students while everything got digitalized as a result of Covid-19.

Finally, I want to thank my loved ones that cheered on me during writing my thesis. My own personal cheering squad! And to my dearest late friend, one of the best girls I have ever known, who was so happy that I got into master's in psychology as we started the journey studying psychology together. Wish you were still here.

---------- ----------

Tina Kofoed Eriksen

Master's student

Prof. Sarah E. Martiny

Thesis adviser

Tromsø, May 17, 2021

Forfatter: Tina Kofoed Eriksen

Tittel: Effekten av opplevd stereotype trussel og intern attribusjon til nederlag blant kvinners intensjoner til å forlate universitetet

Masteroppgave i psykologi

Våren 2021

Abstrakt

Formålet ved denne studien var å undersøke årsaken til at kvinner velger å forlate universitetet, med et spesifikt fokus på kvinner innen realfag (kjent som science, technology, engineering & mathematics på engelsk [STEM]). Vi utviklet derfor tre hypoteser basert på teorien om stereotype trussel (Steele & Aronson, 1995) og attribusjonteori (Heider, 1958). Hypotesene var som følgende: H1) Opplevelsen av stereotype trussel er relatert til høyere intensjoner om å forlate universitetet. H2) Internt attribusjon for nederlag er relatert til høyere intensjoner om å forlate studier, og H3) Hyppigere opplevelse av stereotype trussel er positivt relatert til negativt attribusjonsmønster. Data ble samlet fra kvinnelige studenter ved Norges arktiske universitet (UiT) (n = 171) og det ble brukt et korrelasjonelt design. Analysen foregikk ved bruk av Pearsons korrelasjon og lineær regresjon. H1 viste positiv trend mellom stereotype trussel og intensjoner om å forlate studier. H2 viste relasjon mellom intern attribusjon for nederlag blant kvinner i STEM studenter. H3 viste ingen relasjon mellom stereotype trussel og negativt attribusjonsmønster. Dette styrker argumentet om at stereotype trussel og intern attribusjon for nederlag, kan være en årsak til at kvinner velger å forlate studier på universitetsnivå.

Nøkkelord: attribusjon, kvinner, STEM, sosial identitetsteori, stereotype trussel, studenter, universitet

Author: Tina Kofoed Eriksen

Title: The effects of experiencing stereotype threat and internal attribution of failure among women's intentions to drop out from university.

Master Thesis in Psychology

Spring 2021

Abstract

The aim of the present study was to investigate why women drop out from university, with specific focus on female students from science, technology, engineering and mathematics (STEM). We developed three hypotheses based on stereotype threat theory (Steele & Aronson, 1995) and attribution theory (Heider, 1958). The hypotheses were as following: H1) The experience of stereotype threat is related to higher intentions to drop out. H2) Internal attribution of failure is related to higher intentions to drop out, and H3) more stereotype threat experiences are positively related to negative attribution pattern. Data was gathered from female students at The Arctic University of Norway (UiT) (n = 171) and we used a correlational design. Data was analyzed by using Pearson's correlation and linear regression. H1 show a positive trend between stereotype threat and intentions to drop out. H2 show a relation between negative attribution pattern of failure and drop out intentions among female STEM students. H3 show no relation between stereotype threat and negative attribution pattern. This strengthens the suggestion that the experience of stereotype threat and internal attribution of failure could be a reason to why female students choose to leave their field of study at university level.

Keywords: attribution, social identity theory, stereotype threat, STEM, students, university, women

The effects of experiencing stereotype threat and internal attribution of failure among women's intentions to drop out from university.

In 2020, women accounted for 60% of all students in Norway (Statistisk sentralbyrå [SSB], 2021). Although women are well represented at the universities in Norway the general dropout rate among female students in 2017 was high (24.52%; Norsk senter for forskningsdata [NSD], 2021). Among the women that chose to drop out from their studies, only one in three female students studying science, technology, engineering, and mathematics (short for STEM) completes a higher degree (Næringslivets Hovedorganisasjon [NHO], 2018). Statistics from 2017 show that female students at The Arctic University of Norway (UiT) show a dropout rate of 50% in information technology, 60% in mathematics and 45,45% in engineering (Norsk senter for forskningsdata [NSD], 2021), these studies are examples of typical STEM field of study. This also applies to countries outside Norway. In the US results from a longitudinal study show that female STEM students are 18% less likely to complete their degree compared to men (Astorne-Figari & Speer, 2018). The prevalence of gender differences in dropout rates in STEM across the globe shows that this is an ongoing global problem, and not specific for Norway. At the same time, there is high a demand for people with STEM education (Marrero et al., 2014). This demand as a consequence of technological developments and tools to cope with modern day issues, as global health crises (virus pandemics), climate change and other crucial technological tools where STEM education is fundamental. Because of this, we are generally interested in reasons for dropout of female students from university, then in a second step focus on female students in STEM, as the demand for employees with STEM education to this day are increasing and women are a large available workgroup.

The present study aims to achieve more insight into why women tend to leave university, by focusing on psychological variables namely experiencing negative stereotypes (stereotype threat) and internal attribution of failure, that might contribute to women's low interest to stay at the university and high dropout rates in STEM. More precisely, the present master thesis tries to asses why female students from Norway tend to abandon their field of study, especially within STEM as statistics show that Norwegian women are well represented at the universities and tend to have a slightly higher grade in STEM related subjects in high school compared to men (Statistisk sentralbyrå [SSB], 2020; Statistisk sentralbyrå [SSB], 2021).

Social groups, stereotype threat and attribution

Social identity theory (SIT).

SIT by Tajfel and Turner (1979) was developed to explain how interaction between different social groups (called intergroup relations) has an influence on biases and motivation among humans, and how membership to social groups can influence a person in that degree that is goes against a persons own interest (Abrams et al., 2018). According to SIT, people are not only defined by their personality traits, but also by their membership to different social groups where people develop their own evaluation of themselves (self-concept) and an understanding of who they are (social identities) (Abrams et al., 2018). People develop their self-concept and social identities by establishing personal networks and comparing themselves with people they do not associate with (Abrams et al., 2018). Self-esteem is according to SIT built by a persons personal identity and social identities (Kassin et al., 2013; Tajfel & Turner, 1979). The social groups that a person is member of (called in-groups) are based on social categories that members from the same social group share with each other.

Social groups made of social categories that a person does not share or is not acknowledged as a member of, is known as out-groups (Tajfel et al., 1979, p. 33 – 47). This means that a membership to a social group will only be the case when a group of individuals see themselves as a member of the same social category. Examples on different social groups a person might belong to are social categories as gender, age, political affiliation, or workplace (for more examples of social categories and its distinctive social groups, see: Figure 1).

Social categories	Distinctive social groups		
Gender	Female	vs.	Male
Nationality	Norwegian	vs.	Swedish
Political affiliaction	Republican	vs.	Democrat
Religion	Hinduism	vs.	Christianity

Figure.1. A visual presentation of categorized social groups and its distinctive social groups.

Previous research has illustrated that people strive to maintain their membership to their social groups, as it will help to which degree a person values themselves (self-esteem) (Abrams et al., 2018; Biswas-Diener, 2018, Kassin et al., 2013; Murphy et al., 2007; Reber & Reber, 2001). People enhance or maintain their self-esteem which is related to group identities by either (1) focusing on their in-group's social success, or (2) by conducting intergroup comparison to other social out-groups (Biswas-Diener, 2018). Should a person identify strongly with one of the categories above, this person would also generalize (stereotype) themselves by having a fixed image of themselves (Biswas-Diener, 2018). For example, should a persons social group based on a specific social category be viewed by out-groups as highly intellectual, that person would identify themselves as being highly

intellectual even if this might not be the case. The reason to why people do this, is because it will boost their own self-esteem by having a connection with successful groups (Kassin et al., 2013) (see: Figure 2.).

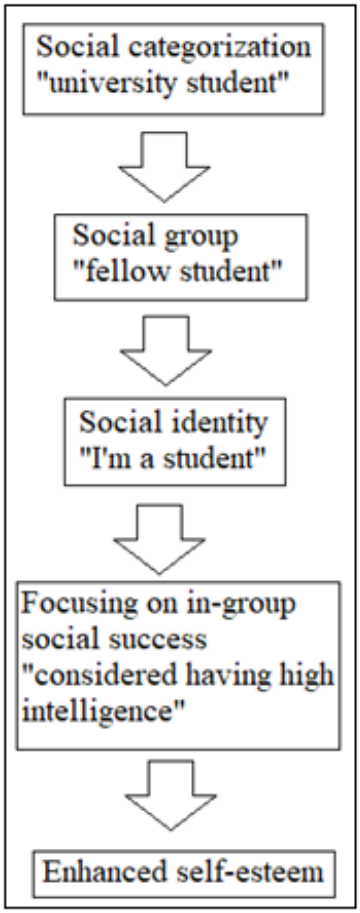

Figure.2. A visual representation of how focusing on an in-group social success leads to enhanced self-esteem.

Intergroup comparison and it's consequences

When conducting intergroup comparison, Tajfel et al. (1971) demonstrate that in-group members would often be motivated to exaggerate across the groups by discriminating or look down at out-group members. Members from that in-group will often as a result conclude that they deserve more, compared to out-group members. People do so to get an understanding of their own in-groups' value and a persons own social identity (Abram et al.,

2018; Kassin et al., 2013). To test this assumption, Tajfel et al. (1971) conducted a study where participants were randomly divided into two groups based on small similarities, no hostile attitudes across the groups and were given the exact same setting. Results from that same study show that members would favour their own in-group members more compared to members from their respected out-group, even if they had no specific reason to do so. This pattern of discrimination across the groups were as a result called ingroup favouritism (Kassin et al., 2013), and has been found in several later studies (Capozza & Brown, 2000; Pinter & Greenwald, 2011; Scheepers et al., 2006). As a result, it was developed two predictions from SIT; (1) when experiencing threats within the in-group that could reduce their self-esteem, there will be an increase of intergroup favouritism and out-group discrimination and stereotype threat by social comparison, and (2) when performing in-group favouritism, members from that respective ingroup will experience an increase in self-esteem (Kassin et al., 2013) (see: Figure 3).

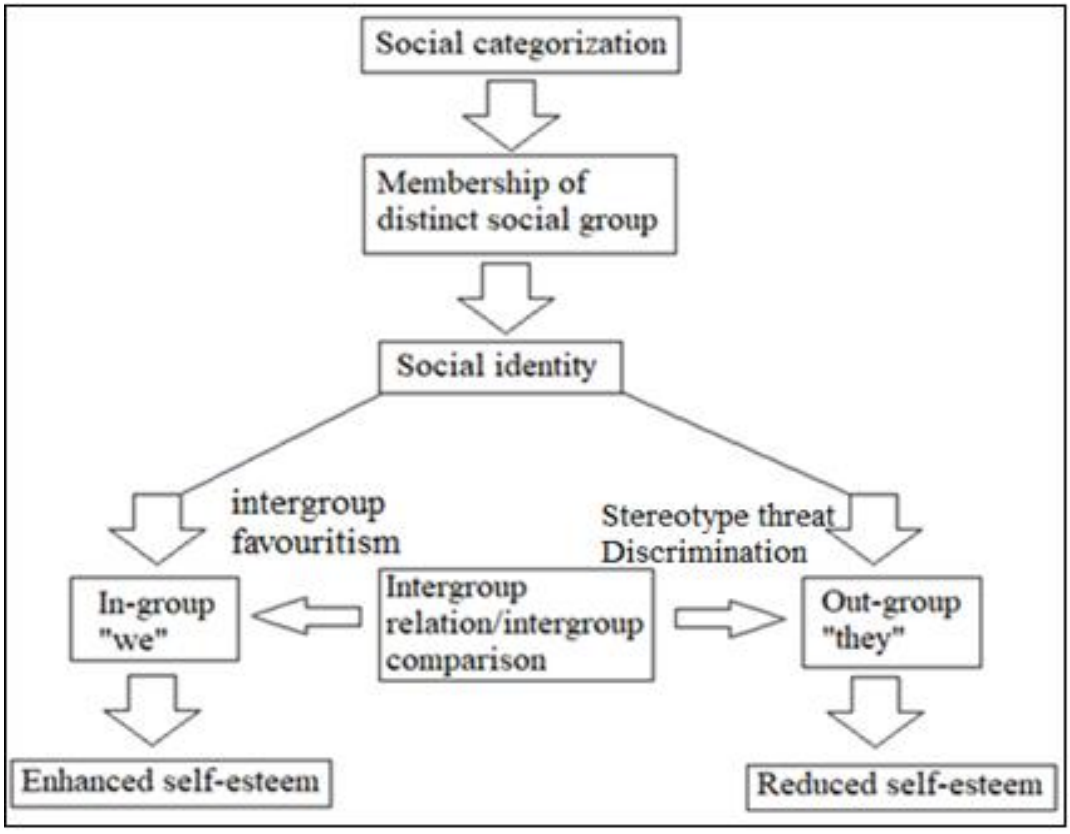

Figure.3. A visual presentation of SIT, on how intergroup relation/intergroup comparison could lead to enhanced or reduced self-esteem across distinctive social groups.

Stereotype threat and its consequences. When a social group carries out intergroup comparison to enhance their own self-esteem, they may activate stereotype threat towards out-group members. Stereotype threat is a form of activated concern or fear among typically stigmatized social groups, as they are afraid that they might confirm negative stereotypes related to their social group (Cialdini et al., 2010; Spencer et al., 2016; Steele & Aronson, 1995). When there is an activation of stereotype threat, members from the social group being exposed stereotype threat could as a result experience reduced self-esteem. This assumption was supported by a study on social identities conducted by Ethier and Deaux (1994, p. 249) were participants reported subsequent drops in self-esteem. Because of this, it is debated that pressure of activating stereotype threat makes in-group members from a typically stigmatized

and stereotyped social group more strained. Stereotyped in-group members become more strained because they are afraid that they will confirm and live up to anticipated stereotypes by members from other out-groups (Shapiro et al., 2013). Spencer et al. (2016) explains this by telling a story about a black male student at an elite college. This student had problems trying to succeed in a subject even if he was studying several hours a day, he was afraid that he might be stereotyped because of his race and was not sure if he belonged to the elite college. As a result, this student was not motivated to study with fellow students or ask for help from his professors. This story is supported by previous study on stereotype threat conducted by Walton and Cohen (2007) where results show that the experience of stereotype threat influences peoples motivation, where the stereotyped social group chose to withdraw from the situation. Based on their own results, Walton and Cohen (2007) demonstrate that when people from social groups that typically are stigmatized or stereotyped feel uncertain of their social bonds at for example university or work, they may be more sensitive towards signs of stereotypical threats compared to non-stereotyped people. Their argument puts emphasis on the debate that the concern of activating stereotype threat makes certain social groups more worried as they don’t want to confirm stereotypes about themselves. As a result. members from that stereotyped group experience loss in motivation (see: Figure 4).

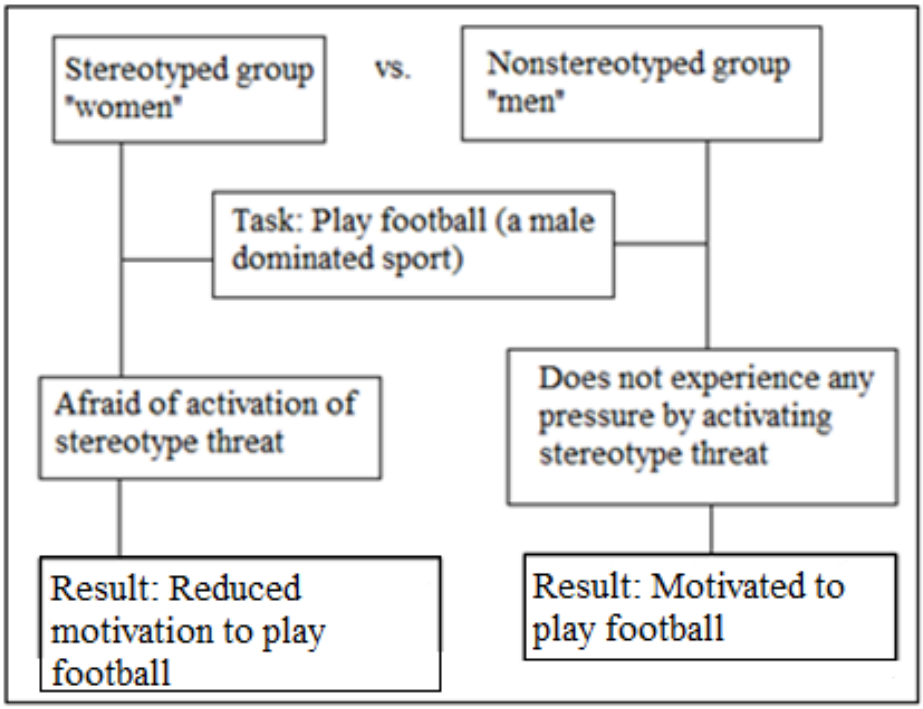

Figure.4. A visual presentation of how the concerns of activation stereotype threats may lead to reduced motivation (Walton & Cohen, 2007).

Stereotype threats effect on different domains. The activation of stereotype threat has also shown to have a negative effect on other domains than motivation. Studies on stereotype threat have shown that when members of social groups experience the pressure of stereotype threat, will often experience reduced feeling of belonging, reduced performance, lack of acceptance, psychological burnout, feelings of incompetence, or separation from their own self and avoidance from the area where they are exposed to stereotype threat (domain disidentification) (Davies et al., 2002; Good et al., 2012; Hall et al., 2015; Woodcock et al., 2012). Martiny and Nikitin (2019) goes as far as suggesting that when people experience stereotype threat, it can be harmful to the quality of peoples social lives. This as a result of people repressing their interpersonal relationships as it seems to decrease peoples motivation to seek positive social interactions (social approach motivation). Social approach motivation

is indicated to be essential for both psychological and physical health and is considered to be a basic psychological need (Beumeister & Leary, 1995; Crosnoe et al., 2010; cited by Martiny & Nikitin, 2019). Research has shown that high social approach motivation is related to well-being, higher feeling of belonging and satisfaction with social bonds (Gable, 2006; Mehrabian, 1994; Nikitin et al., 2012; cited by Martiny & Nikitin, 2019). Based on this, Sarah and Nikitin (2019) suggest that low social approach motivation as a result of stereotype threat, would negatively influence work-related success.

Results from a naturalistic observation study on stereotype threat conducted by Holleran et al. (2011) showed that females working within STEM felt more disengaged towards their career when talking about research with their male colleagues. Even if the female and male sample were matched of equal rank and research productivity. In contrast, when men talked to their male colleagues, they reported it as a benefit. Hall et al. (2019) found supporting results where women in STEM reported higher activation of stereotype threat when talking to their male colleagues as they experienced a lack of acceptance. Steele et al. (2002) assessed female and male students in various field of study, their participating female students studying STEM, reported the highest level of experienced stereotype threat compared to other field of studies. This support the notion that being exposed to stereotype threat could reduce a female student's motivation to stay at university, especially when it comes to STEM related fields of study.

Attribution pattern, how humans explain situations.

In addition to a social psychological approach to how the activation of stereotype threat can influence female students' motivation to drop out from university, the present study propose that attribution pattern may also be a factor. Heider's attribution theory demonstrate

that humans are motivated to self-explain their own success and failures, that humans are motivated to find the underlying causes of events happening towards them (Heider, 1958; Shaver, 1985; cited by Andrews, 1987). Attribution is grounded in two types of casual explanations, internal attributions versus external attributions (Andrews, 1987). Internal attribution depends on characteristics and properties of the person, for example by their ability or effort (Gardner et al., 2019). In contrast, external attribution depends on characteristics given from the environment or the situation, by for example luck or task difficulty (Gardner et al., 2019).

According to the attribution theory, when people try to explain situations in their lives, they are heavily influenced by their attribution pattern. Should a person with positive attribution pattern receive a grade E on an exam, they will attribute to failure to external factors as for example the exam being too difficult, or they had bad luck. Should they receive the grade A, they would attribute to success internally, to their ability or knowledge. Students with a positive attribution pattern would typically not explain failure to their own abilities (Andrews, 1987). In contrast, should a person with negative attribution receive the grade E on an exam. They will as a consequence of their negative attribution interpret it internally, as them not being smart enough. Should that same person receive the grade A on an exam, they would typically attribute the success externally, as if the university gave that person the wrong grade (see: Figure 5).

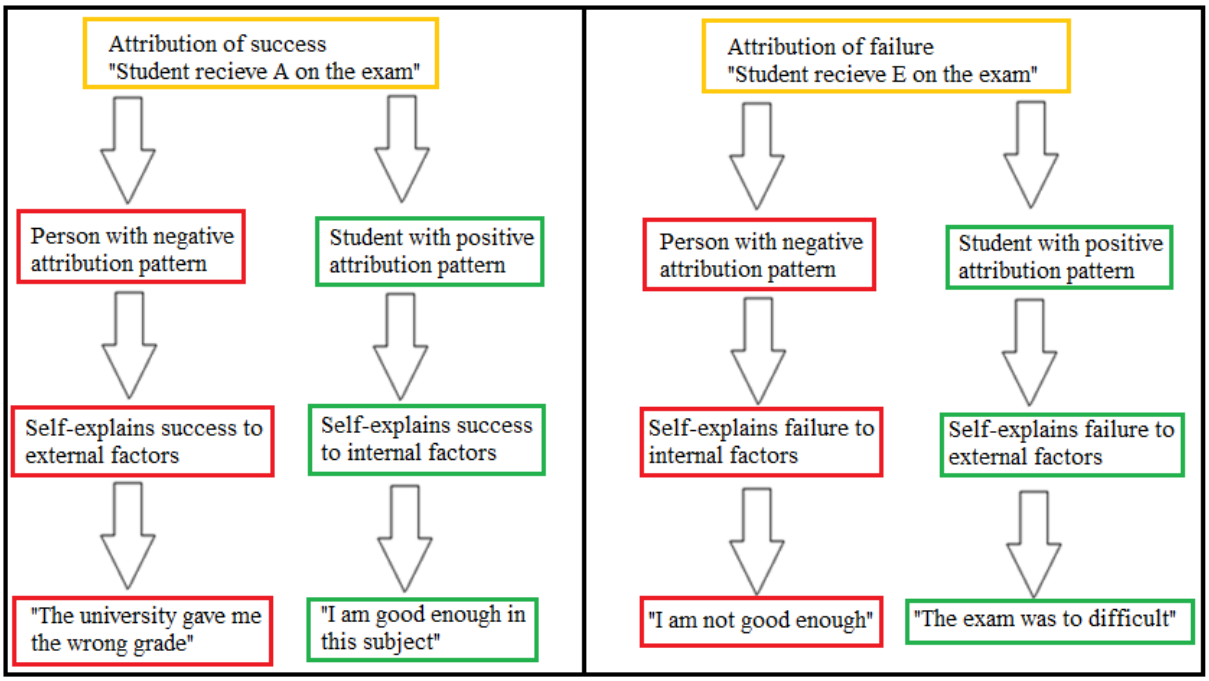

Figure.5. A visual presentation of attribution of success (negative versus positive) and attribution of failure (negative versus positive).

Negative attribution of failure and its consequences.

Empirical research testing the theory of attribution found that having negative attribution pattern influences people's motivation (Bar-Tal, 1918; Dweck et al., 1978; cited by Campbell, 1990) (see: Figure 6). While testing the theory of attribution, researchers showed that women tend to negative attribute to failure to their own abilities more compared to men (Andrews, 1987; Beyer, 1998). Findings from these previous studies therefore say that women typically have a negative attribution pattern, where they underestimate their own abilities to that extent that it affects their motivation As a result of these previous studies on women's attribution pattern, the aim of this study is to assess if female students at UiT report experiencing internal attribution pattern of failure and test if this is related to higher intentions to drop out from university, with a specific focus on female STEM students.

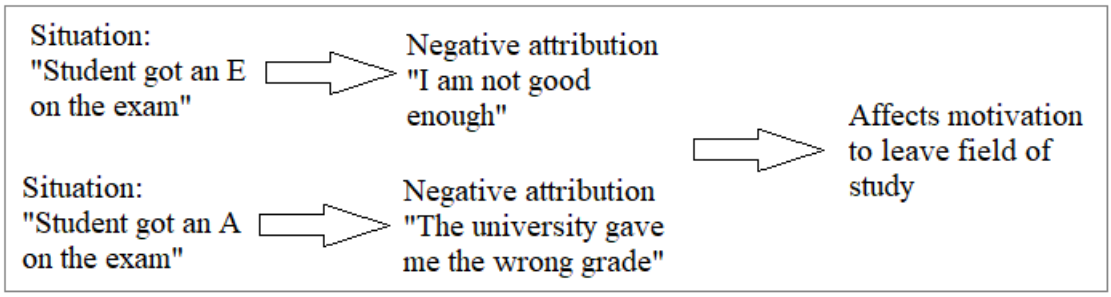

Figure.6. A visual presentation of how negative attribution may influence motivation to leave field of study.

Stereotype threats influence on attribution.

A study by Koch et al. (2008) investigated whether experiencing stereotype threat could affect a woman's attribution of failure while working on an impossible computer task, since there is a social stereotype that men are more competent with computers compared to women, and as a consequence computers are seen as a male dominated field. 44 men and 42 women between age 16 and 21 were randomly assigned into two different experimental groups and one control group. The first experimental group was exposed to negative threat condition by stereotype threat, where the scientist stated that "women have previously performed worse than men have in this test". The second experimental group was exposed to positive condition "women have previously performed better than men have in this test". There was no additional information given to the control group. The participants were tasked to save a file to a memory stick, but the driver needed to do so was not installed, which made the task impossible to complete.

Results show that women from the negative threat condition, negatively attributed failure more internally compared to men from the same experimental group, and more compared to women from the positive condition and control group. Women from the negative condition group attributed failure more to their own abilities, while men from the same negative condition group attributed the failure externally, to the equipment (Koch et al.,

2008). Dar-Nimrod and Heine (2006) conducted a similar study where they investigated the reduction of stereotype threat by manipulating attribution of failure among their participants. Results indicate that when their female and male participants were told that performance in mathematics was controllable instead fixed to internal abilities or external factors, activation of stereotype threat effects was reduced between the genders. Results from these studies infer a connection between negative attribution of failure and experienced stereotype threat (Dar-Nimrod & Heine, 2006; Koch et al., 2008). This study aims to test the relationship between the experience of stereotype threat and women's attributional of failure, to see if these to theoretical approaches work together to explain dropout effects in female students.

The present research

The purpose of this present study is to assess if stereotype threat or negative attribution of failure has any relations to female students drop out intentions from university. This study is particularly interested if results show this effect for female students studying STEM. To test this prediction, both STEM and non-STEM female students were included in the present study. Based on the theoretical models outlined above, the following hypotheses were developed: H1) The more female university students experience stereotype threat, the higher their intentions to drop out will be. H2) Negative attribution of failure relates to more intentions to drop out. H3) Experiencing more stereotype threat relates to more negative attribution of failure.

Method

Ethical approval

The study was approved by NSD (Norwegian Centre for Research Data; Ref no: 903273) and by Ethical Committee at the Institute for Psychology, UiT (see Appendix A for approvals).

Design and data analysis

This study used a correlational design. To test our hypotheses, bivariate correlational analysis and linear regression analysis, were used. To examine whether field of study had a significant effect, female students were split to their respected field of study, by being placed either in the STEM sample or non-STEM sample, and it was investigated if field of study moderated the predicted patterns. To test for inter rater reliability when assigning female students to either STEM sample or non-STEM sample, a Cohen's kappa was conducted. Whenever the interaction between subject major and the predictor was significant, it was conducted two separate regression analysis where female students was split between female STEM students and female non-STEM students to investigate the different effects depending on study major.

The data was gathered by using electronic questionnaire, to be able to reach out to as many female students as possible. Knowing that UiT is distributed over several geographical areas or sectioned into several different buildings. Considering that one of the strengths of using an electronic questionnaire is the ease of sharing it to the participants wanted to this present study, as it is not as time consuming as trying to share the questionnaire only by paper (Lefever et al., 2007).

Participants

Both women and men, students and staff were recruited due to our collaboration with the Prestige project to gather data (see Appendix B to read more about Prestige project). This work focuses on female students only, both studying STEM related field of study or studies outside STEM. In 2020 there were 17 124 students at UiT, where 58.73% (approximately 10 057) of them were female students (Norsk senter for forskningsdata [NSD], n.d.). In total there were 576 responders, 177 of them were female students. 1.7% of female students at UiT responded to our questionnaire. 65.5% of the participating female students were between the age group of 18 – 24, 33.3% between age group 25 – 34 and 1.2% between age group 45 – 54 (age groups missing had 0 responders). Female students were sorted into two samples, where 34 of the 171 students were studying STEM related studies, and the remaining 137 where female students studying non-STEM related field of study. Six of the female students were excluded as they failed the study criteria. The criteria were as follow: Answered more than one of the two different attention checks wrong, spent an abnormally long time completing the study, showed a response pattern or if they were younger than 18 years of age. In summary this study used data from 171 female students (n = 171).

Procedure

To assess this present study hypotheses, an electronic questionnaire was developed by using Qualtrics which was shared to every student and staff at UiT. The questionnaire was first shared to the university faculty leaders per e-mail, who were then encouraged to forward the e-mail to their respective faculty students and staff. The questionnaire were also shared on social media by the department of psychology at the university and on pamphlets including a QR code, which led participants straight to the study when scanning it with their mobile phone (see Appendix C for the e-mail and advertisements).

A brief description about the study was included with information about a possible participation prize and shared using e-mail, social media, and pamphlets. When pressing the link added to the e-mail, students and staff would get more information about what the study was about and how the questionnaire was built. They were then informed that they could withdraw from the questionnaire whenever they want, without any consequences, that the questionnaire would take around 15 – 20 minutes to complete and that they were anonymous. To differentiate between students and staff, our participants were asked at the beginning of the questionnaire what occupation they had, as a result they were given the correct questionnaire depended on them being either student or staff. Before starting the questionnaire, each participant had to give their informed consent. Our participants were also encouraged to make contact if they had any questions regarding the study.

Material

Questionnaire

In total the questionnaire contained eleven different scales, as a collaboration with the Prestige project. This master thesis only used three of the eleven scales (the original scales can be found in the appendix D). Our participants were informed that question regarding attribution was answered by giving a score between 1 (“low ability”) to 7 (“high ability”), while for the rest of the scales where answered by giving a score between 1 (“strongly disagree”) to 7 (“strongly agree”). Next, a chronological presentation of the scales used for this present study. The rest of the scales are presented as footnotes at the end of this section.[1]

Attribution of failure

When measuring attribution of failure among our participants, four items by Bailey et al. (1975) were implemented in the questionnaire. The main question was “Think about the most recent situation in which you had a success/failure in your studies. Please indicate what lead to the success/failure.”, the participants had to answer with four different items “High ability versus low ability”, “High effort versus low effort”, “Ease of the task versus difficulty of the task” and “Good luck versus bad luck”. One of the four items to our analysis were used, the “High ability versus low ability” to answer the question “Think about the most recent situation in which you had failure in your studies. Please indicate what lead to the failure” as this study were interested to test if our female student participants reported doubting their own ability, based on results from previous studies, where result did show that female tend to internally attribute failure to their own abilities (Andrews, 1987; Beyer, 1998).

Stereotype threat

In order to measure experienced stereotype threat among our participants there was used four items (α = .90) by Shapiro (2011), questioning concerns about stereotype threat. Two examples “Are you concerned that at university you will confirm negative stereotypes about your genders abilities?” and “Are you concerned that negative stereotypes about your genders abilities might hinder your performance?”.

Drop out intentions

The last scale used in this study were questions regarding withdrawal from the institution/drop out intentions by Hardre and Reeve (2003), with a total of fifteen items, there was used six items (α = .83). Two examples “I sometimes consider dropping out of university before graduating” and “I sometimes think that other job opportunities suit me better than those I can get with my current education”.

This study only used six out of its fifteen items from Hardre and Reeve (2003), because some of the items were specifically meant for staff. The rest of the questions where pretty similar, which is why this study focused only on the negatively loaded questions instead of having both negative and positive questions regarding the same situation. Example of negative "I avoid social events for students", positive "I like to participate in social gatherings in learning groups". In this situation this study chose to add "I avoid social events for students" into its analysis.

Demographic questions

Participants were also asked to give information about their demographics. There were in total fourteen questions about demographics. Demographic information asked was as following: gender, age, faculty, study major (for students), study year (for students), career level (for staff), numbers of years in position (for staff), research group leader/project leader (for staff), applications for funding in the last 5 years (for staff), parental leave in the last 5 years (for staff), migration background, grade in high school (for students), grade in university course math (for students) and kind of math classes in high school (for students).

---

[1] In addition to the variables used in the present study, the following constructs were assessed: Measure of perceived discrimination (Noh & Kaspar, 2003), facing negative stereotypes (Spencer, 1993), discrimination in specific situations or context (Sipe et al., 2016), sense of belonging to university (Good et al., 2012), social approach and avoidance motivation (Martiny & Nikitin, 2019), attitudes towards math (Grundmeier, 2002), self-efficacy and self-confidence (Opstad & Årethun, 2019) and value of math (Opstad & Årethun, 2019).

Results

IBM SPSS Statistics 26.0 was used to conduct a Pearson's correlation analysis and linear regression analysis for each of the three hypotheses. H1) The more female students experience the activation of stereotype threat at university the more would they report intentions to leave their studies. H2) The more female students attributed their failures internally, the higher leave intentions they would report. H3) Experiencing stereotype threat was related to attributions of failure. In addition, it was aimed to test whether these relationships were particularly strong for female students studying a STEM-subject in which they are underrepresented.

Correlation

A Pearson's correlation analysis was used to test interrelations between the main variables; stereotype threat, negative attribution of failure and drop out intentions. Female students where split into two sample groups: female non-STEM students (n = 137) and female STEM students (n = 34). The correlation analysis (Table 1) shows within female non-STEM students, there was a significant, small positive correlation (r = .307, p < .001) between experienced stereotype threat and drop out intentions. This also applied to female STEM students as the relation between experienced stereotype threat and drop out was moderate positive (r = .454, p = .007). The correlation between negative attribution of failure and drop out intentions among female non-STEM students was not significant (r = 0.17, p = .849). In contrast, there was a significant positive correlation (r = .388, p = .023) between negative attribution of failure and drop out intentions among female STEM students. Finally, the correlation between experienced stereotype threat and negative attribution of failure among

female non-STEM students was positive, but in the edge of significance (r = .163, p = .059). There was no significant correlation for female STEM students (r = .206, p = .243).

Table 1. Correlation table

Pearson Correlation. Summary of interrelations, means and standard deviations for scores on drop out intentions, experienced stereotype threat and negative attribution of failure.

Variables	1	2	3	*M*	*SD*
1. Drop out intentions	-	.307**	.017	2.23	1.24
2. Stereotype threat	.454**	-	.163	2.33	1.60
3. Neg. attribution	.388*	.206	-	4.21	1.30
M	2.19	2.51	4.47		
SD	1.32	1.64	1.56		

Note. Correlation for female non-STEM student (n = 137) are presented above the diagonal, and correlation for female STEM students (n = 34) are presented below the diagonal. Means and standard deviation for female non-STEM students are presented in the vertical columns and means and standard deviation for female STEM students are presented in the horizontal rows.

*p <.05. **p <.01.

In general, the results of the correlational analyses suggest that the more female students experience stereotype threat both in STEM and non-STEM related field of studies the more they think about dropping out of their studies. Whereas negative attribution of failure only tends to affect female STEM students' intentions to drop out. And finally, results

suggest that the relationship between experienced stereotype threat and negative attribution of failure in either sample was significant.

Regression analysis

Stereotype threat and drop out intentions.

In a next step, linear regression analysis was conducted to test whether study major interacted with the effect of activation of stereotype threat on drop out intentions. A linear regression was conducted to test H1) The more experience of stereotype threat is related to higher intentions to drop out from the university. Our model contained main effect standardized z-score of experienced stereotype threat, the main effect of field of study, and the interaction between stereotype threat and field of study (STEM versus non-STEM) as the independent variables, and intentions to drop out as the dependent variable. Participants were coded into STEM or non-STEM groups by looking at reported field of study. Cohen's kappa was conducted to determine if there was an agreement between two judges (inter rater reliability) about which field of study fit into the STEM sample or the non-STEM sample. Result show that the agreement between the judges were almost perfect, $\kappa = .918$ (95% CI, .847 to .989), $p < .001$. Results from the regression show that the complete regression model was significant but small, $R^2 = .119$, $F(3, 167) = 7.493$, $p < .001$. Results (see Table 2) show that the main effect of experiencing stereotype threat did not reach the conventional significance level, but it a positive trend ($\beta = .79$, $t = 1.901$, $p = .059$). The main effect of study major and its interaction with stereotype was not significant. This indicated that there seems to be a non-significant trend that the more stereotype female students report, the higher are their drop-out intentions. This is independent of whether female students are studying STEM or not.

Table 2.

Summary of linear regression analysis for H1.

Variables	Estimate	*SE*	*t*	95% CI		*p*
				LL	UL	
Intercept	2.030	.420	4.837	1.202	2.859	<.001
Field of study	.150	.227	.463	-0.344	0.554	.644
Stereotype threat	.789	.415	1.901	-0.031	1.609	.059
Interaction	-.204	.226	-.905	-0.649	0.241	.367

Note. Intercept is drop out intentions. Standardized z-score of stereotype threat, interaction was computed by multiplying standardized stereotype threat z-score with field of study (STEM vs. non-STEM).

Negative attribution of failure and drop out intentions.

A linear regression to test if study major interacted with the effect of negative attribution of failure. A linear regression was conducted to examine H2, where was predicted that internal attribution of failure is related to higher intentions to drop out. Our model contained main effect standardized z-score of negative attribution to failure, the main effect of field of study, and the interaction between negative attribution of failure and field of study (STEM versus non-STEM) as the independent variables, and intentions to drop out as the dependent variable.

Results from the regression show that the complete regression model was not significant, R^2 =.033, $F(3, 166) = 1.889$, $p = .133$. Results (see Table 3) show that the main

effect of negative attribution of failure had a significant relation to intentions to drop out (β = .86, t = 2.210, p = .028). The main effect of study major was not significant (p = .625), whereas it's interaction to negative attribution to failure was very close to significance (p = .055).

Table 3.

Summary of linear regression analysis for H2.

Variables	Estimate	*SE*	*t*	95% CI		*p*
				LL	UL	
Intercept	2.001	.443	4.517	1.127	2.876	<.001
Field of study	.118	.240	.490	-0.356	0.591	.625
Neg. attribution	.861	.390	2.210	0.092	1.631	.028
Interaction	-.420	.218	-1.930	-0.850	0.010	.055

Note. Intercept is drop out intentions. Standardized z-score of negative attribution of failure, interaction was computed by multiplying standardized negative attribution of failure z-score with field of study (STEM vs. non-STEM).

Because of the marginally significant interaction between field of study and negative attribution of failure (p = .055), two separate regressions was conducted for non-STEM students (n = 137) and for STEM students (n = 34). Results from the complete regression model with the non-STEM students did not reach the conventional statistical level, R^2 =.00, $F(1, 134) = 0.037$, p = .849. Results (see table 4) show that the main effect of negative

attribution of failure did not have any significant relation to intentions to drop out among female non-STEM students (β = .02, t = 0.191, p = .243).

Table 4.

Summary of linear regression analysis for H2 for female non-STEM students.

Variables	Estimate	*SE*	*t*	95% CI		*p*
				LL	UL	
Intercept	2.236	.107	20.934	2.025	2.448	<.001
Neg. attribution	.021	.112	.191	-0.200	0.243	.849

Note. Intercept is drop out intentions. Neg. attribution is standardized z-score of negative attribution of failure.

When conducting a linear regression that included female STEM students only, results from the complete regression model were significant but weak, R^2 =.150, $F(1, 32) = 5.665$, p = .023. Results (see Table 5) show that the main effect of negative attribution of failure had a significant relation to intentions to drop out among female STEM students (β = .44, t = 2.380, p = .023). This indicates that the more negative attribution to failure female STEM students experience, the higher their intentions to leave STEM related field of studies.

Table 5.

Summary of linear regression analysis for H2 for female STEM students.

Variables	Estimate	*SE*	*t*	95% CI		*p*
				LL	UL	
Intercept	2.119	.214	9.922	1.684	2.554	<.001
Neg. attribution	.441	.185	2.380	0.064	0.819	.023

Note. Intercept is drop out intentions. Neg. attribution is standardized z-score of negative attribution of failure.

Stereotype threat and negative attribution.

At the end a linear regression was conducted to test whether study major interacted with the effect of activation of stereotype threat on negative attribution of failure. A linear regression was conducted to test H3; the more stereotype threat experiences are positively related to negative attribution pattern. Our model contained main effect of standardized z-score of experienced stereotype threat, the main effect of field of study and the interaction between stereotype threat and field of study (STEM versus non-STEM) as the independent variables, and negative attribution of failure as the dependent variable.

Results from the regression shows that the complete regression model was not significant, R^2 =.036, $F(3, 166) = 2.083$, $p = .104$. Results (see Table 6) show that the main effect of experiencing stereotype threat did not have a significant relation to negative attribution ($\beta = .42$, $t = .890$, $p = .375$). The main effect of study of major and its interaction with experiencing stereotype threat was not significant. This indicates that there seems to be a

(non-significant) trend that the more stereotype threat female students report, the higher their negative attribution are.

Table 6.

Summary of linear regression analysis for H3.

Variables	Estimate	*SE*	*t*	95% CI		*p*
				LL	UL	
Intercept	4.670	.474	9.859	3.735	5.606	<.001
Field of study	-.227	.257	-.884	-0.734	0.280	.378
Stereotype threat	.417	.469	.890	-0.508	1.342	.375
Interaction	-.103	.255	-.406	-0.606	0.399	.685

Note. Intercept is negative attribution of failure. Standardized z-score of stereotype threat, interaction was computed by multiplying standardized stereotype threat z-score with field of study (STEM vs. non-STEM).

Discussion

In this correlational study of female students at The Arctic University of Norway the main findings show: H1) A positive trend between the relation of experienced stereotype threat and drop out intentions among female non-STEM and STEM students. H2) A relation between negative attribution of failure and drop out intentions among only female STEM students. H3) No relation between the experience of stereotype threat and negative attribution among female non-STEM students or STEM students.

Regarding H1, results yielded a p-value above the significance level while showing a positive trend. This suggests that there could be a relation between the experience of stereotype threat and intentions to drop out from university among female students in the present study, which is consistent with previous research concerning stereotype threat and its consequences (Davies et al., 2002; Good et al., 2012; Hall et al., 2015; Holleran et al., 2011; Woodcock et al., 2012). Although the result in the present study was above the statistically significant level, the margins were still close. It was also tested if field of study had any effect on the relation of experienced stereotype threat and drop out intentions, this effect was not found.

Reasons to why the p-value in the present study are less strong than previous research, might be because there are currently more female students compared to male students at the university where participants was recruited. This also applies to female STEM students, even if they are the underrepresented social group, they are not the underrepresented social group at the entire university. Consequently, this could have reduced their pressure of experiencing stereotype threat. A second reason could be due to cultural differences, as previous studies have been conducted in other countries than Norway. This suggest that previous studies have confirmed that the experience of stereotype is prominent among people in that specific country, but this might not be generalized to Norway. Finally, reasons to why our present study did not reach the statistical level of significance, could be due to the low number of participants, as only 1.7% (n = 171) of all female students at UiT chose to respond. This also applies to when controlling for field of study as it was fewer female STEM students (n = 34) compared to non-STEM students (n = 137).

Regarding H2, results show that there was a relation between internal attribution of failure and higher drop out intentions from university among female students at UiT. This suggest that the present study's results support the findings from previous research where negative attribution of failure were related to reduced motivation (Bar-Tal, 1918; Dweck et al., 1978; cited by Campbell, 1990). It was also tested if field of study had any effect on the relation of internal attribution of failure and drop out intentions, results show marginally significant effect. Therefore, it was computed two separate regression analysis where female students where split between female non-STEM students and female STEM students. There was no relation between internal attribution of failure and drop out intentions among non-STEM female students, but results did show a statistically significant relation among female STEM students. Reasons to why our results show that STEM female students report a relation between negative attribution to failure and drop out intention could be due to the fact of low number of participation (n = 34).

Regarding H3, results suggest that there is no relation between the experience of stereotype threat and internal attribution of failure among female students at UiT. This means that our results do not support previous research where the experience of stereotype threat has been related to internal attribution of failure (Koch et al., 2008). Field of study were also tested to see if it had any effect on the relation of experienced stereotype threat and internal attribution of failure, this effect was not found. Because of our results conflicting with previous studies on the relation between stereotype threat and internal attribution of failure, it shows that the relation between the two variables cannot be generalized beyond the population.

Limitations

The low number of female STEM students is a limitation because it reduces statistical power to test our hypotheses. The low number could have implicated the results, it would therefore be an advantage to replicate the study and try to recruit more participants. The number of non-STEM students could also have been an implication to our study, as a larger sample size would help generalize the results beyond the population. Another problem was the use of correlational design, which means we could not make any casual inferences based on data.

Covid-19 hit Norway at the same time as the recruitment of participants were going on. As a result, the university closed, and all lectures were digitalized which forced students to stay at home instead of being on campus. According to my supervisor, previous research at universities has shown that students account for the main part of participation, but in our case the generality of participation were staff instead of students. We believe that the main reason for this is because it is easier to recruit participants on campus in presence of other students. As we assume that the best ambassadors for our study are those students who have already participated in the study.

There is a possibility that because the university had to close, it was more difficult for students to establish new friendships or maintain contact with fellow in-group members, which could have influenced their feeling of belonging to their respected field of study. As a result, there may be a possibility that the participants responded to questions about experiencing stereotype threat and intentions to drop out were unable to distinguish between the relation between experiencing stereotype threat and drop out intentions, with the relation between Covid-19 lockdown and drop out intentions. In compliance with stereotype threat during Covid-19, negative attribution may also have been affected by the lock down. As

lectures during the collection of data were digitalized, some students at the university expressed reduced motivation due to lack of digital knowledge among the lecturers. This could mean that the digitalized lectures lead to a higher degree of negative attribution, compared to the experience of stereotype threat. It may be that the quality of the lectures increased negative attribution, which consequently lead to an increase of intentions to drop out from their field of study.

Furthermore, an unexpected obstacle regarding the field of study related to STEM was encountered, as there was no clear indication on this. At UiT there are 260 fields of study, science in Norwegian directly translates into "research". As a result, we had to inductively decide which fields of study would fit into the STEM sample. For this reason, there is a possibility that we have omitted possible STEM field of study or included fields of study that is not relevant for STEM, as we did not have any clear description from UiT's study catalogue for each of the 260 field of study to know if they were relevant to STEM or not.

Finally, using electronic questionnaires to gather data do have some major pitfalls. For example, when participants report their own experience, they could be affected by desirability bias or inaccurate perceptions of their own behaviour, they could also pose as another person which would not be ideal for our results (Holt et al., 2012; Lefever et al., 2007). The flexibility given to the participants where they can decide when and where to complete the electronic questionnaire could also be an disadvantage as the participants can start filling out the questionnaire, then forget about it, or they could experience technical problems or be disturbed while filling out the questionnaire, which could lead to the participant not completing the questionnaire (Lefever et al., 2007). We also chose to use one item to assess negative attribution, and we did not conduct a test-retest to test the reliability. This could have

a major impact on our results as we do not know if that single item regarding negative attribution is reliable.

Conclusion

What we learned from this present study based on data reported from female students at The Arctic University of Norway, is that there seems to be a positive but small trend in the relation between experiencing stereotype threat and drop out intentions. Negative attribution of failure seems to have a relation to drop out intentions, but only among female STEM students. In contrast, results suggest that there is no relation between the experience of stereotype threat and negative attribution. If we were able to gather more individually knowledge about the function of stereotype threat and negative attribution of failure. We would be able to establish preventative measures that could reduce the number of female students dropping out from university, especially within STEM.

References

Abrams, D., Masser, B., Houston, D., & McKimmie, B. (2018). A social identity model for education. https://doi.org/10.1093/oxfordhb/9780190263362.013.1

Andrews, P. H. (1987). Gender differences in persuasive communication and attribution of success and failure. *Human Communication Research*, *13*(3), 372-385. https://doi.org/10.1111/j.1468-2958.1987.tb00110.x

Astorne-Figari, C., & Speer, J. D. (2018). Drop out, switch majors, or persist? The contrasting gender gaps. *Economics Letters*, *164*, 82-85. https://doi.org/10.1016/j.econlet.2018.01.010

Bailey, R. C., Helm, B., & Gladstone, R. (1975). The effects of success and failure in a real-life setting: Performance, attribution, affect, and expectancy. *The Journal of Psychology*, *89*(1), 137-147. https://doi.org/10.1080/00223980.1975.9923915

Beyer, S. (1998). Gender differences in causal attributions by college students of performance on course examinations. *Current Psychology*. *17*(4). 346-358. https://doi.org/10.1007/s12144-998-1016-5

Biswas-Diener, R. (2018). *Together: The science of social psychology.* Noba. https://open.umn.edu/opentextbooks/textbooks/393

Campbell, N. J. (1990). High school students' computer attitudes and attributions: Gender and ethnic group differences. *Journal of Adolescent Research*, *5*(4), 485-499. https://doi.org/10.1177%2F074355489054007

Capozza, D. E., & Brown, R. E. (2000). Social identity processes: Trends in theory and research. In *Small Group Meeting'Intergroup Relations: Current Work and Future Perspective', Sep, 1996; The idea for this book was born during the aforementioned conference.*. Sage Publications Ltd. http://dx.doi.org/10.4135/9781446218617.n9

Cialdini, R. B., Kenrick, D. T. & Neuberg, S. T. (2010). *Social psychology: Goals in interaction* (5th ed.). Pearson.

Dar-Nimrod, I. & Heine, S.J. (2006). Exposure to scientific theories affects women's math performance. *Science*, *314*(5798), 435-435. http://dx.doi.org/10.1126/science.1131100

Davies, P. G., Spencer, S. J., Quinn, D. M., & Gerhardstein, R. (2002). Consuming images: How television commercials that elicit stereotype threat can restrain women academically and professionally. *Personality and Social Psychology Bulletin*, *28*(12), 1615-1628. https://doi.org/10.1177/014616702237644

Ethier, K. A., & Deaux, K. (1994). Negotiating social identity when contexts change: Maintaining identification and responding to threat. *Journal of personality and social psychology*, *67*(2), 243. https://doi.org/10.1037/0022-3514.67.2.243

Gardner, W. L., Karam, E. P., Tribble, L. L., & Cogliser, C. C. (2019). The missing link? Implications of internal, external, and relational attribution combinations for leader–member exchange, relationship work, self-work, and conflict. *Journal of Organizational Behavior*, *40*(5), 554-569. https://doi.org/10.1002/job.2349

Good, C., Rattan, A., & Dweck, C. S. (2012). Why do women opt out? Sense of belonging and women's representation in mathematics. *Journal of personality and social psychology*, *102*(4), 700-717. https://doi.org/10.1037/a0026659

Grundmeier, T. A. (2002). University students' problem posing abilities and attitudes towards mathematics. *Problems, Resources, and Issues in Mathematics Undergraduate Studies*, *12*(2), 122-134. https://doi.org/10.1080/10511970208984022

Hall, W. M., Schmader, T., & Croft, E. (2015). Engineering exchanges: Daily social identity threat predicts burnout among female engineers. *Social Psychological and Personality Science*, *6*(5), 528-534. https://doi.org/10.1177/1948550615572637

Hall, W., Schmader, T., Aday, A., & Croft, E. (2019). Decoding the dynamics of social identity threat in the workplace: a within-person analysis of women's and men's interactions in STEM. *Social Psychological and Personality Science*, *10*(4), 542-552. https://doi.org/10.1177/1948550618772582

Hardre, P. L., & Reeve, J. (2003). A motivational model of rural students' intentions to persist in, versus drop out of, high school. *Journal of educational psychology*, *95*(2), 347. http://dx.doi.org/10.1037/0022-0663.95.2.347

Holleran, S. E., Whitehead, J., Schmader, T., & Mehl, M. R. (2011). Talking shop and shooting the breeze: A study of workplace conversation and job disengagement among STEM faculty. *Social Psychological and Personality Science*, *2*(1), 65–71. https://doi.org/10.1177/1948550610379921

Holt, N. J., Bremner, A., Sutherland, E., Vliek, M., Passer, M., & Smith, R. (2012). *Psychology: The science of mind and behaviour*. McGraw-Hill Education.

Kassin, S., Fein, S. & Markus, H. R. (2013). *Social psychology* (International ed of 9th revised ed). Wadsworth Publishing Co Inc.

Koch, S. C., Müller, S. M., & Sieverding, M. (2008). Women and computers. Effects of stereotype threat on attribution of failure. *Computers & Education*, *51*(4), 1795-1803. https://doi.org/10.1016/j.compedu.2008.05.007

Lefever, S., Dal, M., & Matthiasdottir, A. (2007). Online data collection in academic research: advantages and limitations. *British Journal of Educational Technology*, *38*(4), 574-582. https://doi.org/10.1111/j.1467-8535.2006.00638.x

Marrero, M. E., Gunning, A. M., & Germain-Williams, T. (2014). What is STEM education?. *Global Education Review*, *1*(4). https://ger.mercy.edu/index.php/ger/article/view/135/91

Martiny, S. E., & Nikitin, J. (2019). Social identity threat in interpersonal relationships: Activating negative stereotypes decreases social approach motivation. *Journal of Experimental Psychology: Applied*, *25*(1), 117-128. https://doi.org/10.1037/xap0000198

Murphy, M. C., Steele, C. M., & Gross, J. J. (2007). Signaling threat: How situational cues affect women in math, science, and engineering settings. *Psychological science*, *18*(10), 879-885. https://doi.org/10.1111%2Fj.1467-9280.2007.01995.x

Noh, S., & Kaspar, V. (2003). Perceived discrimination and depression: moderating effects of coping, acculturation, and ethnic support. *American Journal of Public Health*, *93*(2), 232-238. https://doi.org/10.2105/AJPH.93.2.232

Norsk senter for forskningsdata. (2021, 19. February). Database for statistikk om høgre utdanning. https://dbh.nsd.uib.no/statistikk/rapport.action?visningId=269&visKode=false&admde

bug=false&columns=arstall!8!arstall_normert&index=1&formel=1054!8!1058!8!1055!8!1065&hier=insttype!9!instkode!9!fakkode!9!ufakkode!9!progkode&sti=&param=arstall%3D2017!9!dep_id%3D1!9!utdkode%3DBA30!9!kjonn%3D1

Norsk senter for forskningsdata. (2021, 19. February). Database for statistikk om høgre utdanning. https://dbh.nsd.uib.no/statistikk/rapport.action?visningId=276&visKode=false&admdebug=false&columns=arstall!8!arstall_normert&index=3&formel=1106!8!1110!8!1111!8!1112&hier=insttype!9!instkode!9!fakkode!9!ufakkode!9!progkode&sti=Universiteter!9!Universitetet%20i%20Troms%C3%B8%20-%20Norges%20arktiske%20universitet&param=arstall%3D2017!9!dep_id%3D1!9!utdkode%3DBA30!9!kjonn%3D1!9!insttype%3D11!9!instkode%3D1130

Norsk senter for forskningsdata. (n.d.). Database for statistikk om høgre utdanning. https://dbh.nsd.uib.no/nokkeltall/nokkeltall_htmlrapport.action?undermeny=nokkeltall_inst&valgtTab=1&valgtArstall=2020&ValgtinstDetail=1130&sektorKode=0

Næringslivets Hovedorganisasjon (2018). *Verden og oss. Næringslivets perspektivmelding 2018.* https://www.nho.no/siteassets/publikasjoner/naringslivets-perspektivmelding/pdf-er-30okt18/nho_perspektivmeldingen_hele_web_lowres.pdf

Opstad, L. T., & Årethun, T. (2019). Choice of Courses in Mathematics at Upper-Secondary School and Attitudes towards Mathematics among Business Students. The case of Norway. http://dx.doi.org/10.26803/iijlter.18.7.15

Pinter, B., & Greenwald, A. G. (2011). A comparison of minimal group induction procedures. *Group Processes & Intergroup Relations*, *14*(1), 81-98. https://doi.org/10.1177/1368430210375251

Reber, A. S., & Reber, E. R. (2001). *The penguin dictionary of psychology* (third edition). Pengiun books.

Scheepers, D., Spears, R., Doosje, B., & Manstead, A. S. (2006). Diversity in in-group bias: Structural factors, situational features, and social functions. *Journal of personality and social psychology*, *90*(6), 944. https://doi.org/10.1037/0022-3514.90.6.944

Shapiro, J. R. (2011). Different groups, different threats: A multi-threat approach to the experience of stereotype threats. *Personality and Social Psychology Bulletin*, *37*(4), 464-480. https://doi.org/10.1177%2F0146167211398140

Shapiro, J. R., Williams, A. M., & Hambarchyan, M. (2013). Are all interventions created equal? A multi-threat approach to tailoring stereotype threat interventions. *Journal of Personality and Social Psychology*, *104*(2), 277. https://doi.org/10.1037/a0030461

Sipe, S. R., Larson, L., Mckay, B. A., & Moss, J. (2016). Taking off the blinders: A comparative study of university students' changing perceptions of gender discrimination in the workplace from 2006 to 2013. *Academy of Management Learning & Education*, *15*(2), 232-249. https://doi.org/10.5465/amle.2014.0139

Spencer, S. J. (1993). *The effect of stereotype vulnerability on women's math performance*. (Unpublished doctoral dissertation, University of Michigan, Ann Arbor). https://deepblue.lib.umich.edu/handle/2027.42/103673

Spencer, S. J., Logel, C., & Davies, P. G. (2016). Stereotype threat. *Annual review of psychology*, *67*, 415-437. https://doi.org/10.1146/annurev-psych-073115-103235

Statistisk sentralbyrå. (2021, 25. March). Studenter i høyere utdanning. https://www.ssb.no/utuvh

Statistisk sentralbyrå. (2020, 25. August). Karakterer ved avsluttet grunnskole. https://www.ssb.no/kargrs

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of personality and social psychology*, *69*(5), 797. https://doi.org/10.1037/0022-3514.69.5.797

Steele, J., James, J. B., & Barnett, R. C. (2002). Learning in a Man's world: Examining the perceptions of undergraduate women in Male-Dominated academic areas. *Psychology of women quarterly*, *26*(1), 46-50. https://doi.org/10.1111/1471-6402.00042

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European journal of social psychology*, *1*(2), 149-178. https://doi.org/10.1002/ejsp.2420010202

Tajfel, H., Turner, J. C., Austin, W. G., & Worchel, S. (1979). An integrative theory of intergroup conflict. *Organizational identity: A reader*, *56*(65), 9780203505984-16. http://ark143.org/wordpress2/wp-content/uploads/2013/05/Tajfel-Turner-1979-An-Integrative-Theory-of-Intergroup-Conflict.pdf

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: race, social fit, and achievement. *Journal of personality and social psychology*, *92*(1), 82. doi:10.1037/0022-3514.92.1.82

Woodcock, A., Hernandez, P. R., Estrada, M., & Schultz, P. (2012). The consequences of chronic stereotype threat: domain disidentification and abandonment. *Journal of personality and social psychology*, *103*(4), 635. https://dx.doi.org/10.1037%2Fa0029120

Appendix A: Ethical approvals

Melding
25.11.2020 13:39

Det innsendte meldeskjemaet med referansekode 903273 er nå vurdert av NSD.

Følgende vurdering er gitt:

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet den 25.11.2020 med vedlegg, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde: nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle særlige kategorier av personopplysninger om helse og alminnelige kategorier av personopplysninger frem til 03.05.2021.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 nr. 11 og art. 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse, som kan dokumenteres, og som den registrerte kan trekke tilbake.

Lovlig grunnlag for behandlingen vil dermed være den registrertes uttrykkelige samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a, jf. art. 9 nr. 2 bokstav a, jf. personopplysningsloven § 10, jf. § 9 (2).

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke viderebehandles til nye uforenlige formål

- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

Qualtrics er databehandler i prosjektet. NSD legger til grunn at behandlingen oppfyller kravene til bruk av databehandler, jf. art 28 og 29.

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og eventuelt rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Kontaktperson hos NSD: Tore Andre Kjetland Fjeldsbø
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

UiT Norges arktiske universitet

Institutt for psykologi
Arkiv ref.: 2017/1912
Dato:24.09.2020
offl. § 26,4

Professor Sarah Martiny
Dept of Psychology
UiT

Ethical evaluation of research project

Dear colleague,

Your research project (MA thesis Kofoed Eriksen)

Hvordan er sosial identitet trussel med på å påvirke attribusjonsmønstre hos kvinner innen mannsdominerte yrker?

has been ethically evaluated by the Department of Psychology's internal research ethics committee based on received information. Your project has been exempted from full review and thus approved by the Department of Psychology's Research Ethics Committee.

Sincerely yours, on behalf of the Committee

Vedlegg:

Kopi:
John Vegard Bjørklund
Ole Asli

Postboks 6050 Langnes, NO-9037 Tromsø / + 47 77 64 40 00 / postmottak@uit.no / uit.no / organisasjonsnummer 970 422 528

Appendix B: Prestige project.

Prestige project is both a research and an intervention project financed by the BALANSE Program, Research Council of Norway, and UiT Arctic University of Norway. The project has twofold goal: (1) advance knowledge on gendered quality assessments and implicit biases by uncovering how they impact career opportunities and the distribution of power and resources in research; (2) promote research-based organizational changes at the UiT by creating mechanisms for fostering gender balance in top positions.

Prestige's home page: https://uit.no/research/prestige

Appendix C: Advertisements used to recruit participants.

1) Shared e-mail to faculty leaders:

Hei!
I samarbeid med Prestige Project (Ass. Prof. Melina Duarte og Adrianna Kochanska, UiT) ønsker forskere ved Institutt fra Psykologi ved UiT (masterstudent Tina K. Eriksen og professor Sarah Martiny) å rekruttere ansatte og studenter ved UiT som deltakere til en studie.
I den forbindelse håper vi du som instituttleder har mulighet til å videresende vår spørreundersøkelse til ansatte (inkl. stipendiater og postdoktorer) og alle studenter (inkl. årstudium, enkeltemner, BA, MA, profesjon) ved ditt institutt. Deltakelse vil være anonym. Formålet ved prosjektet er å fremme kunnskap om arbeidsklimaet og personlige opplevelser ved UiT med et spesifikt søkelys på kjønn.
Vi setter stor pris på om du har muligheten til å dele spørreundersøkelsen videre til ansatte og studenter ved instituttet. Vennligst send teksten nedenfor som en e-post til ansatte og studenter ved ditt institutt.
Link: https://uitpsych.qualtrics.com/jfe/form/SV_2sELeJHVake9H93

E-post til ansatte og studenter:
Din mening er viktig: Delta i spørreundersøkelsen "Hverdagen til studenter og ansatte ved UiT»
//
Your opinion is important: Participate in the questionnaire "Everyday life of students and staff at UiT"
Scroll down for an English version.
//
Vi søker studenter og ansatte ved UiT som vil fylle ut en online spørreundersøkelse (15-20 minutter) om hvordan de opplever hverdagen med jobb/studier ved UiT. Din mening er viktig fordi den kan bidra til å forbedre arbeids- /studieforholdene ved UiT.
Deltakelse er frivillig, og data lagres anonymt. Svarene vil ikke kunne spores tilbake til enkeltpersoner.
Ved å delta har du muligheten til å vinne et av tre gavekort på 700 NOK.
Om du ønsker å delta, trykk
her: https://uitpsych.qualtrics.com/jfe/form/SV_2sELeJHVake9H93
Dette forskningsprosjektet er et samarbeid mellom forskere fra institutt for psykologi ved UiT (masterstudent Tina K. Eriksen, Prof. Sarah Martiny), og forskere fra Prestige Project (Ass. Prof. Melina Duarte, Adrianna Kochanska, UiT).
//
We are looking for students and employees at UiT to fill out an online questionnaire (15-20 min) about how they experience their daily work/study at UiT. Your opinion is it important because it can contribute to improving the work/studying conditions at UiT.
Participation is voluntary and the data will be saved anonymously. It will not be possible to identify individuals.
Among participation, you will have the opportunity to win one of tree gift cards of 700 NOK.
If you wish to participate, please click
here: https://uitpsych.qualtrics.com/jfe/form/SV_2sELeJHVake9H93

This research project is a collaboration between researchers from the Department of Psychology (master student Tina K. Eriksen, Prof. Sarah Martiny), and researchers from the Prestige Project (Ass. Prof. Melina Duarte, Adrianna Kochanska, UiT).

2) Shared on social media.

Nettbasert studie om dine daglige opplevelser ved UiT

Din mening teller! Delta i en nettbasert studie om dine daglige opplevelser ved UiT. Undersøkelsen tar 15–20 minutter.

Publisert: 18.01.21 13:48
Oppdatert: 20.01.21 19:19

Bærekraft | Om UiT | Økonomi

Prestige. Gender Balance in Research Leadership trenger deltakere til en nettbasert studie.

FOTO: UiT

Vi ser etter studenter og ansatte ved UiT som vil delta i en nettbasert spørreundersøkelse om deres opplevelser på jobb og studier ved UiT. Alle svar vil bli lagret anonymt, og som deltaker får du muligheten til å vinne ett av tre gavekort med en verdi på 700 kroner.

Klikk her om du ønsker å delta!

Forskningsprosjektet er et samarbeid mellom forskere ved Institutt for psykologi og Prestige Project. Formålet med prosjektet er å kartlegge trivsel ved universitetet og kunne tilrettelegge for et forbedret arbeidsklima.

Kortnytt fra Institutt for psykologi, Senter for kvinne- og kjønnsforskning

3) Shared on campus.

Din mening teller! Delta i en nettbasert studie om dine daglige opplevelser ved UiT (15-20 min.)!

Vi ser etter studenter og ansatte ved UiT til å delta i en nettbasert spørreundersøkelse om deres opplevelser på jobb/studier ved UiT.

Alle svar vil bli lagret anonymt og du vil ha muligheten til å **vinne et av tre gavekort med en verdi på 700 kr.**

Om du ønsker å delta, scan QR koden nedenfor.

Dette forskningsprosjektet er i et samarbeid av forskere ved Institutt for Psykologi og Prestige Project.

Appendix D: Original scales

a) Attributions (for all)

Think about the most recent situation in which you had a success/failure at work/in your studies. Please indicate what lead to the success/failure:

High ability/Low ability

High effort/Low effort

Ease of the task/Difficulty of the task

Good luck/Bad Luck

b) Measure of Perceived Discrimination

Because of my ethnicity I have experienced violence

Because of my ethnicity I have been insulted or bullied

Because of my ethnicity I have been treated rudely

Because of my ethnicity I have been treated unfairly

Because of my ethnicity I have been threatened

Because of my ethnicity I have experienced bad service or been rejected on public places

Because of my ethnicity I have been excluded or ignored

Because of my ethnicity I have experienced negative chants

Because of my ethnicity I have experienced negative comments

Concerns about negative stereotypes

Are you concerned that at work/university you will confirm negative stereotypes about your gender's abilities?

Are you concerned that negative stereotypes about your gender's abilities might hinder your performance?

Are you concerned that negative stereotypes about your gender group are true?

Are you concerned that the negative stereotypes about your gender might influence how others judge your performance at work/university?

Facing negative stereotypes

Because of my gender, some people believe that i have lower abilities.

Because of my gender, some people believe that i have higher abilities.

Sometimes I have to convince others that my abilities are not lower than that of others.

Because of my gender, people often expect poor performance from me.

Because of my gender, people often expect excellent performance from me.

If I perform poorly, people will assume its because of my gender.

The opinion that men have higher abilities than women is widespread.

c) Discrimination in specific situations/contexts (Employees only)

Because of my gender…

I feel that i face obstacles to my career.

I feel that i have more opportunity for advancement in my career.

Parental leave could interfere with my career success.

I feel that I have more opportunity for networking.

I feel that I have less opportunity for mentoring

I feel that I have more time to devote to my career.

I feel that I am paid less.

I feel that I am promoted more.

I feel that I am evaluated more negatively.

I feel that my career is percieved at less important

I feel that people expect me to behave in a certain way.

People react more negatively if I make a mistake than if others make a mistake.

People are surprised if I don't behave in a way that is consistent with stereotypes about my gender.

I feel that i receive more (administrative) support.

I am asked more often to do unpopular tasks.

d) Sense of belonging to university (for all)

I feel like I belong to my work group/ to university

I feel like a member of my work group/the group of university students.

I feel connected with other people in my work group/university students.

I feel like I am a part of my work group/the university.

At university/at work, I feel accepted.

At university/at work, I feel respected.

At university/at work, I feel valued.

At university/at work, I feel appreciated.

e) Social approach and social avoidance motivation (for all)

I find it exciting to discuss numerous topics with collegues/other students.

I need to feel accepted by collegues/other students

I approach collegues/other students because I don't want to be alone.

Interactions with collegues/other students allow me to discover a lot about others.

I try to share many fun and meaningful experiences with colleagues/other students

I try to avoid disagreements and conflicts with colleagues/other students.

I don’t want to be rejected by colleagues/other students

I have a lot of contact with colleagues/other students

I like having contact with colleagues/other students

f) Withdrawal from the institution / drop out intentions

I sometimes consider dropping out of university before graduation./ I sometimes consider looking for a job at a different institution.

I intend to drop out of university before graduation. / I intend to quit my job at UiT

I sometimes think that other job opportunities suit me better than those I can get with my current education./ I sometimes think that other jobs suit me better than the one I am working in at the moment

I sometimes consider changing my study subject. /I sometimes consider changing my job

I sometimes consider changing my study subject because the general requirements are too high

I sometimes consider changing my study subject because the requirements in mathematics are too high

I like to participate in social gatherings of the research group/in learning groups…

I avoid social events at the department/research group/social events for students…

I try to attend as few meetings/lectures at the department as possible…

I avoid socializing during meetings/after class at UiT…

I prefer to do my research/my school work by myself…

I would like to be a research group leader at some point in the future… (only for students)

I am used to encourage people to perform better. (only for employees)

I openly acknowledge when people do a good job. (only for employees)

I prefer working with people of my gender. (for both)

g) Attitudes towards math (only for students)

I enjoy going beyond the assigned work and trying to solve new problems in mathematics

Mathematics is enjoyable and stimulating to me

I have never liked mathematics and it is my most dreaded subject.

I have always enjoyed studying mathematics in school

I would like to develop my mathematical skills and study this subject more.

Mathematics makes me feel uncomfortable and nervous.

h) Self-efficacy/self-confidence (only for students)

I have a lot of self-confidence when it comes to mathematics. / I have a lot of self-confidence when it comes to my field of study

I learn mathematics easily. / I learn the subjects in my study program easily

I believe I am good at solving mathematics problems. / I believe I am good at performing the tasks related to my studies

I am able to solve mathematics problems without too much difficulty. / I believe I am able to perform the tasks related to my studies without too much difficulty

Mathematics does not scare me at all. / Studying (or the university?) does not scare me at all

I expect to do fairly well in any mathematics class that I take. / I expect to do fairly well in the classes that I take

i) Value of math (only for students)

Mathematics is a very worthwhile and necessary subject

Mathematics is one of the most important subjects for people to study

Mathematics is important in everyday life

A strong mathematics background could help me in my professional life

I think studying advanced mathematics is useful

I can think of many ways in which I use mathematics outside of school