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Abstract

In recent years, the number of entrance tests at universities and technical colleges has increased. While introduced to create a level playing field for college admissions, previous research has shown that admission tests result in a possible disadvantage for first-generation students. To better understand the mechanisms driving this effect, I conducted a laboratory that ask students to complete an academic ability test that increased in difficulty. In contrast to previous work, I found no difference in perceived ability levels between the first and continuing generation students of my sample. Furthermore, I was able to illustrate that first-generation students were able to perform on par with continuing-generation students when choosing to engage in the task. This highlights the importance the construct of disengagement might play in previous findings and could be a potential theoretical mechanism driving the effect at large.

Keywords: first-generation students, self-perceived talent, performance, admission tests

1 Introduction

Universities aim to select the best students (OECD, 2014). Today, universities have become an environment where talent plays a major role and effort has increasingly taken a back seat (Nyström, Jackson, & Karlsson, 2019). There are already entrance tests at various universities that imply a high level of talent is needed to attend. Talent that many first-generation students do not believe they possess, and therefore will not apply for specific courses of study, especially STEM courses. While these entrance exams were initiated to create a level playing field for all students to illustrate their capability of succeeding in college, it might have instilled the opposite effect. As many first-generation students perceive their talents as significantly lower than their continuing-generation students' counterparts, many believe that they would never be able to pass such an exam designed to measure talent and thus self-select out of such opportunities (Bauer & Hannover, under review). This is further complicated by the findings that first-generation students illustrate the same ability in academic realms as their continuing-generation counterparts, they simply do not perceive it to be so. Thus entrance exams have created the situation where first-generation students, who could ultimately succeed in college, self-select out of college due to a belief that their academic ability is not high enough.

This study aims to connect the topic of first-generation students with the motivation intensity theory, which is designed to predict the influence ability has on task engagement (MIT; Brehm and Self, 1989). In doing so I will be able to highlight the mechanistic pathway perceived ability uses to prompt first-generation students to disengage from tasks in academic settings. After discussing the theoretical background of the study and the ability of MIT to highlight the mechanistic pathway of the phenomenon, the current study is explained, then the method and results are discussed before concluding with the implications of the findings.

2 Theoretical background

2.1 First-generation students

First-generation students are students whose parents did not go to college. They are therefore the first ones in their family to study because no parent or guardian has earned at least a baccalaureate degree (Cataldi, Bennett, & Chen, 2018; Choy, 2001). However, it should also be noted that not all students whose parents attained a baccalaureate declare themselves first-generation students. Some do not see themselves as belonging to this group because siblings or other relatives of theirs have already completed their studies (Canning, LaCosse, Kroeper, & Murphy, 2020). Continuing-generation students, who are also called

second-generation or non-first-generation students, have at least one parent who graduated from a four-year university (Billson & Terry, 1982) and has therefore a baccalaureate degree or a higher level of educational achievement (Redford & Mulvaney Hoyer, 2017).

One fundamental difference between first-generation students and continuing-generation students is often their socioeconomic background. The status of students is highly correlated with their social class and thus with the status of their parents (Davis, 2010). It is important to remember that students whose parents have not yet studied come, in principle, from an environment with less economic capital (Dimaggio, 1979). Households from which first-generation students come often have annual incomes of less than 20,000 dollars per year or incomes between 20,000 and 50,000 dollars per year (Redford et al., 2017). Because of the environment in which they grew up, first-generation students often have less chance of completing their studies. They were less prepared for university life in their childhood, and their previous educational career and thus have lower skills in reading, as well as in mathematics, and critical thinking. As a result, first-generation students often have lower grades on exams than continuing-generation students.

First-generation students make up about one-third of all first-year students (Skomsvold, 2015; Staklis & Bentz, 2016). However, only 17% of them continue to study in the second year, the rest drop out after the first year. In contrast, 46% of students whose parents have a bachelor's degree complete a bachelor's degree themselves, and 49% of students whose parents have a master's degree complete a bachelor's degree themselves (Lauff & Ingels, 2013). Possibly this is related to another difference between first-generation students and continuing-generation students. According to a study by McGregor et al. (1991), continuing-generation students have higher self-esteem than first-generation students. These beliefs, in turn, affect their academic outcomes and lead to significantly lower academic achievement for first-generation students who have less self-worth.

Thus, it can be seen that there is a drastic difference in the life course between first-generation students and continuing-generation students because a secure economic future today is based on a good education (Holmes & Slate, 2017) and this good education is provided by universities.

2.2 The role of universities

Ideally, universities should aim to create the same options for all prospective students, but they tend to create social inequalities and favor students with better economic backgrounds (Aronson, 2008). As we know, higher class students are often also continuing-generation

students, and students from lower economic backgrounds are often first-generation students. At this point the first unconscious preselection of universities takes place.

Objectively, universities should have two different functions. On the one hand, they have the function of selection, as already mentioned. This means that universities should select the best students who can subsequently complete their studies successfully. On the other hand, they also have the function of education. This means that universities have the official role of teaching and imparting skills and knowledge to all students in the same way. Nevertheless, high-social class students represent a higher percentage of university graduates and get higher grades than low-social-class students (OECD, 2014) who are often first-generation students.

The selection function in particular plays an important role in this context. In practical terms, for example, the numerous clauses or admission level are selective (Jury, Smeding, & Darnon, 2015) and if for example admission tests are used in an academic context, first-generation students perform less well. In addition, first-generation students showed more anxiety and a lower level of academic identification when the task was presented as a diagnostic task in which the focus was primarily on intellectual abilities (Jury, Smeding, Court, & Darnon, 2015).

Looking more closely at the function of education, it is important to note that universities are always an environment that also focuses on the talent of students (Bauer & Hannover, under review). At the same time, first-generation students think of themselves as less suited to be successful in academic situations (Bauer, Job, & Hannover, under review) and thus to graduate from a university. The vicious cycle is that universities that are focused on talent trigger the students' feeling that they will not be successful. In addition, another study found that environments that emphasize competition also have a negative impact on first-generation students. Since universities are also a place where students are exposed to constant competition, this also has a negative impact on students. Thus, it follows that first-generation students are less motivated in academic situations, which is not found when first-generation students are in an environment without competition (Sommet, Quiamzade, Jury, & Mugny, 2015).

Second, environments that promote competition have the consequence that first-generation students significantly doubt their abilities (Pulfrey, & Butera, 2013). This is also the case when controlling for the performance factor (Jury, Smeding, & Darnon, 2015). They are led by this environment to compare their abilities with those of other students (Canning et al., 2020) and these doubts then translate into poorer performance. One study found that first-generation students performed worse on a math test than continuing-generation students

because of this competition. So this fearful climate leads to first-generation students being outperformed by continuing-generation students (Jury, Smeding, & Darnon, 2015).

Ultimately, this has resulted in higher dropout rates among first-generation students (Cataldi et al., 2018; Holmes & Slate, 2017) and this climate at universities can also lead to first-generation students not applying for any studies in the first place (Bauer et al., under review).

2.3 Self-perceived talent

Self-perceived talent is abstract beliefs about our abilities as well as beliefs about how good someone's performance is. However, these beliefs often do not correlate with real performance (Rigio, Widaman, & Friedman, 1985). In this concept, self-confidence plays a major role because it significantly predicts performance estimates, so self-images are sometimes more important than actual performance. In a study by Ehrlinger & Dunning (2003), it was found that people with low self-confidence in their abilities estimated their performance as worse than that of other people, although their performance was at least as good. Low self-esteem is found in precisely those groups that are stigmatized and about which there are blatant but also hidden prejudices, whereby hidden prejudices have an even more negative effect on self-esteem than blatant prejudices (Major, Quinton, & Schmader, 2003).

Stigmatized groups are always confronted with stereotypes. Stereotypes are stable processes across time, place, and out-group, which are the product of historical and social accidents. In Phalet and Poppe's (1997) multidimensional scaling of Central and Eastern European stereotypes, they are distinguished in two quadrants. The incompetent but social/moral individuals and the competent but antisocial/non-moral individuals. First-generation students would fall into the quadrant of social/moral but incompetent persons (Fiske, Cuddy, Glick, & Xu, 2002). These stereotypes and subsequently the prejudices that exist against these individuals then have negative effects on their psychological well-being, and also their self-worth (Major et al., 2003). Furthermore, stigmatized groups perform worse on tasks. In particular, when socioeconomic identity is made salient before taking the test, or when the test is presented as an intelligence test, low socioeconomic students perform significantly worse and also report lower self-worth (Spencer, & Castano, 2007).

In general, not only stereotypes, but the entire cultural background, plays an important role in the formation of self-perceived talent. Stereotypes are one product of cultural background. However, in this context, one must also consider other aspects and products of the cultural background such as the focus on the individual or the group, as well as the impact of the cultural background on the expectations of the parents and the motivational characteristics of

the child itself. The difference between the focus on the individual in Americans and the focus in Chinese on the group is an aspect discussed in many contexts. Americans feel more confident when performing things alone, while the Chinese prefer the opposite, that is, performing things in a group (Menon, Morris, Chiu, & Hong, 1999). However, this difference can also be applied to students. This is because individual achievement surveys at universities are not class-neutral either. Students from a working-class context got lower grades when their performance was measured individually. However, when performance was measured in a group, those groups in which there were more students from a working-class context received better grades than those groups in which there were fewer working-class students (Dittmann, Stephens, & Townsend, 2020). Working class students are also often first-generation students, as they come from families with less economic capital and therefore often have to pay for their studies themselves (Stebbleton, & Soria, 2013). A study by Mehta, Newbold, & O'Rourke (2011) also showed that first-generation students work more than 20 hours more than continuing-generation students. Therefore, they often bring different skills with them and the standardized tests at universities could put them at a disadvantage (Dittmann et al., 2020).

Another effect of cultural background on self-perceived talent is also the perception of parents. This also affects the motivational characteristics of the child (Ditton, Bayer, & Wohlkinger, 2019). The question “Can I do this” is a crucial point, because if people answer “yes” to the question, the motivation to choose a challenging task is higher. But due to the stereotypes and beliefs mentioned above, this is often not the case within the group of first-generation students (Eccles, & Wigfield, 2002). But the answer “yes” to the question is so important because children need the feeling of being competent for their self-esteem in the context of schools or even universities. For this reason, students will always try to maximize their self-perceived academic competence or at least protect it as best they can to maintain their self-worth (Covington, 1998). This could also be a possible indication of why so many first-generation students do not even register for an entrance test, drop out of college prematurely (Cataldi et al., 2018), and have lower academic success than continuing-generation students.

When we talk about success at universities, we first need to understand the background of success. The two attributions for success that are considered at universities are ability/talent and effort. At universities and also in all entrance tests related to universities, these attributions and thus the success of students should be measured objectively. Grades, retention grades, but also completed qualifications are used for this purpose. These objective criteria

are set by governments and politicians (Ashley et al., 2015). However, this system puts a lot of pressure on middle-class and first-generation students in particular, because they have different definitions of success depending on their previous achievements, but also on their background (Brown et al., 2016; Nyström et al., 2019). So, to give these people a chance, we have to recognize that success and talent are not objective concepts that lead to success for all of us, but that they are much more created out of a concept of values by our governments and politicians and thus also bring assumptions about ethnicity, gender, race but also other social categories leading to advantages for certain parts of society (McBee, 2006).

A very specific part of our society, to which perhaps special attention should also be paid among first-generation students, is women. Women are underrepresented in science, technology, engineering, and mathematics compared to men (American Association of University Women, 2010). This may be because STEM is still seen as a field where talent is required to succeed. This is also why especially women, who are as well first-generation students show a perceived lack of interest in STEM fields (Cheryan & Plaut, 2010). The lower self-confidence and the resulting belonging uncertainty are argued to produce this reduction in female representation (Smith, Lewis, Hawthorne, & Hodges, 2011). Belonging uncertainty arises when individuals are unsure of their abilities and feel they do not fit into a particular academic environment (Walton & Cohen, 2007, p.83). Thus, the reduction in self-perceived talent amongst first-generation students should also result in higher levels of belonging uncertainty.

In another study, researchers found that effortless achievement is perceived as masculine (Jackson & Dempster, 2009). This means that especially in the area of STEM, individuals who achieve top grades without much effort or stress, are viewed as highly intelligent. In particular, it emerges that intelligence and risky action are closely associated with masculine characteristics (Kimmel, 2008). The stress-less achievement is a very similar approach, which assumes that success is associated with being relaxed and being able to dedicate oneself to some other tasks besides studying (Nyström et al., 2019).

Although to help ensure that all individuals, regardless of their background, have the same opportunity for university education, the effort required for academic achievement must be normalized. Each of us must make an effort to reach certain achievements (Smith, Lewis, Hawthorne, & Hodges, 2011). This is not only the case in education such as medicine but also in the aforementioned STEM disciplines. Normalizing the idea that effort is required for academic achievement would result in first-generation and female students being more

interested in these disciplines. Furthermore, emphasizing effort can lead to better objective results (Aronson, Fried, & Good, 2002).

Thus, the research findings to date suggest that a focus on effort rather than talent, along with the normalization of effort, may increase first-generation students' sense of belonging in universities and thereby increase the interest and achievement of first-generation students as well as other minorities because the low self-perceived talent of first-generation students coupled with the talent-focused and competitive environment at Western universities contributes to the fact that especially first-generation students are still disadvantaged today (Bauer & Hannover, under review) and therefore a focus on effort rather than talent could change the situation.

As a result, the gap between continuing-generation students and first-generation students, and other minorities in terms of their university education could be narrowed (Canning et al., 2020). To date, the studies mentioned only refer to self-perceived talent reported by first-generation students before or after certain tasks or to statements made by first-generation students. My study will focus on behavioral data to examine the influence first-generation students' perceived talent has on their ability to maintain engagement on a task. To do so I relied upon the theorization of one of the most well-tested motivational theories concerning the influence of perceived talent on engagement levels MIT.

2.4 Motivational intensity theory

In general, motivation arises when needs exist or specific outcomes are desired and it is assumed that a certain behavior or our performance could cause these needs or outcomes to occur. The greater the potential motivation, the greater the amount of effort a person is willing to put into pursuing it (Brehm & Self, 1989). However, MIT asserts that the main function of effort is to sustain behavior, not satisfy motives, thus effort is determined directly by the perceived difficulty of the task, not potential motivation (Brehm & Self, 1989). Instead of satisfying motives, success importance creates an upper limit of potential motivation and once this upper limit is reached, the effort will be withheld because it is no longer worthwhile. MIT does not indicate that effort levels predict performance directly, instead, MIT asserts that performance is predicted through disengagement. Disengagement occurs when the perceived difficulty of the task outweighs the potential motivation and one withholds effort.

MIT has received significant empirical support from over three decades of research (for review see Richter et al., 2020). For example, Wright, and colleagues (1989) had participants complete a memory task varied in difficulty to avoid an aversive noise. Cardiovascular indicators of the effort revealed that participants put forth more effort in the hard memory task

condition than in the easy memory task condition or a condition in which they could do nothing to avoid the noise. Illustrating that effort is determined by task difficulty, but only when completing a goal-relevant behavior. Further evidence comes from Richter & Gendolla (2008) where participants had to solve a character recognition task that varied in four levels of difficulty. The difficulty was manipulated by reducing the time to memorize the characters of a modified version of the Sternberg memory task. Again results illustrated that effort-related cardiovascular response increased with effort until the difficulty become too much and disengagement occurred.

Support for the moderating role of success importance comes from a study that presented participants with either a low or high difficulty D2-letter cancelation task and manipulated their success importance with an objective self-awareness manipulation, by either including or removing a mirror from the participant's workstation (Silvia et al., 2010). Participants who saw themselves in a mirror performed a little bit better in the easy task difficulty condition than their no mirror counterparts, but enormously better than their no mirror counterparts in the hard task difficulty condition, as their no mirror counterparts chose to disengage. This result supports MIT's performance prediction. Specifically, as both groups engaged in the low difficulty task performance differences were minimal, but when difficulty was increased participants with lower potential motivation (i.e. no mirror condition) saw the task as no longer worthwhile and thus chose to disengage. This disengagement led them to perform significantly worse than their counterparts with higher potential motivation (i.e. mirror condition) as they still saw the task as worthwhile and thus chose to engage.

Specifically, relevant to my thesis is work concerning the influence perceived ability has on task engagement. MIT predicts that a person who perceives their ability as lower will perceive a task as more difficult. Therefore, a person with lower perceived ability will have to put more effort to maintain their behavior when success is possible and worthwhile, and disengage at objectively lower difficulty levels as the increase in perceived difficulty will increase the likelihood that a task will outweigh potential motivation (Wright, 2009). The study was illustrated by Wright and colleagues (1997) when they showed that perceptions of our ability can influence the cardiovascular response. They linked the perceptions of ability to one's identification as being male or female. Specifically, the researchers informed half of the participants that previous research had illustrated that either males or females had consistently performed better on the current task. All participants then completed the same task that was either set at an objectively high or low difficulty, When the difficulty level of the task was low, there was a greater cardiovascular engagement for the participants who were informed

that their identified group performed worse on the task. Theoretically, this was due to a decrease in perceived difficulty making the task appear harder and thus requiring more effort to engage in. When the difficulty of the task was high there was a greater cardiovascular engagement for participants who were informed that their identified group performed better on the task. Theoretically, this was due to the decrease in perceived ability leading the task to be no longer worthwhile for those that identified with the group who performed worse on the task resulting in them disengaging from it.

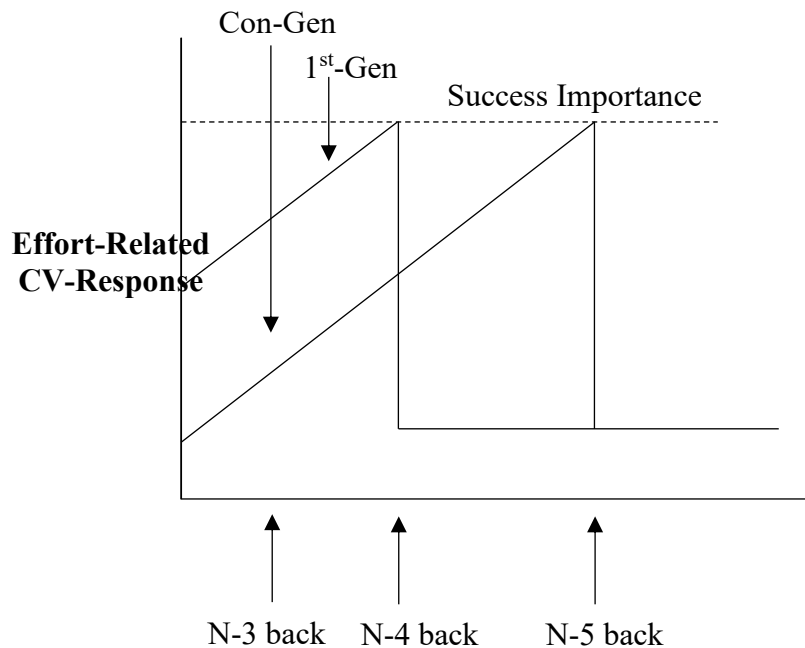
2.5 The present research

In my thesis, I combined the knowledge about first-generation students with MIT to test the specific mechanistic pathway at play. In doing so I can provide researchers and practitioners a clearer picture of what type of intervention strategies can be utilized to help prevent the detrimental effect of first-generation student status on academic performance. To test the mechanistic pathway I had first- and continuing-generation students complete a memory task that increased across three difficulty levels. This task was described to students as a test of their academic ability.

I hypothesize that no performance differences will occur between first- and continuing-generation students when they begin the memory task. As the task starts at a low difficulty level both groups should see it as worthwhile given their potential motivation and thus engage. However, as difficulty begins to increase I predict that the first-generation students' performance will decline more rapidly than continuing-generation students. As first-generation students should perceive all academic challenges as more difficult, increases in the objective difficulty of the academic challenge should result in a higher likelihood that first-generation students, as compared to continuing-generation students, choose to disengage from the task. This higher likelihood of disengagement by first-generation students should result in a more rapid decline in performance than their continuing-generation student counterparts.

Figure 1

Overview of our study



3 Question and hypothesis

The study aims to demonstrate the difference in engagement in easy and difficult tasks between first-generation students and continuing-generation students. Based on the theoretical framework as well as the current research gaps, the following research question emerged and will now be addressed in more detail.

Question: Do first-generation students' performance decrease at a more rapid pace than continuing-generation students' performance when task difficulty increases?

Hypothesis 1: First-generation students will perform on par with continuing-generation students when task difficulty is low.

Hypothesis 2: First-generation students will have a more rapid decline in performance when difficulty increases compared to their continuing-generation student counterparts.

4 Method

4.1 Sample

The estimated sample size should have consisted of 210 participants, to fulfill our power analysis. Due to various issues, our final sample consists of 200 participants. Therefore, I could not fulfill the power analysis. The individuals were between 17 and 45 years old. Within this sample, 82 (41%) individuals reported being first-generation students, while 118 (59%) individuals reported being continuing-generation students. 144 (72%) of the individuals identified themselves as female, 53 (26.5%) as male, and 3 (1.5%) as diverse.

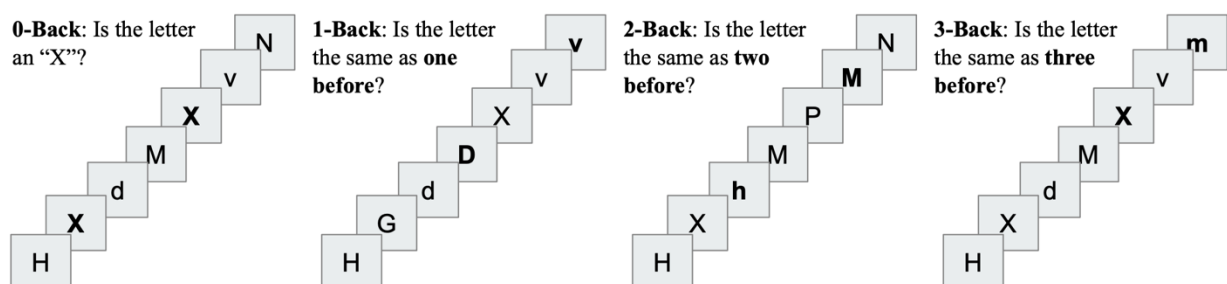
4.2 Measures

4.2.1 N-back task

The N-back Task (Kirchner, 1958) has been introduced as an Intellectual Ability Test. Participants had to remember in each trial if the letter, which was shown to them was the same as the one before. For example, in the 3-back Task, the participants had to remember whether the letter they saw was the same as the three before, and this principle was also followed in the 4-back and 5-back Tasks. 25% of the trials were target trials and to pass the task, at least 80% had to be solved correctly. Within this task, there were 60 trials of 1-back Task as training. After training the participants had to complete 60 trials each of the 3-back, 4-back, and 5-back Tasks.

Figure 2

N-3, N-4, and N-5 back task



4.2.2 Self-perceived talent

To assess self-perceived talent concerning their intellectual abilities I used a 7-point Likert scale and participants had to rank themselves on two different statements: "I consider myself as gifted" and "I consider myself as talented" (Bauer et al., under review).

4.2.3 Wakefulness

To measure wakefulness I used the Multidimensional Mood Questionnaire (MDMQ) scale (Steyer et al., 1997). On a 5-point Likert scale, participants ranked themselves by different adjectives such as “awake” or “unsatisfied”, with 1 representing “not at all” and 5 representing “very”. Cronbach's alpha for the long form ranges from $\alpha = .86$ to $\alpha = .94$, and for the short forms from $\alpha = .73$ to $\alpha = .89$.

4.3 Procedure and operationalization

The study took place in a laboratory at the University of Vienna and lasted approximately 45 minutes to an hour depending on the speed of the participants. Four participants at a time were able to participate in the study in a staggered manner. There were a total of seven computers in the room, but only four were used simultaneously. Each participant was assigned his or her own computer space. There was also a separate place where participants could store their cell phones and personal belongings during the duration of the study. The experimenters wore white lab coats to make the setting more authentic.

Before the study, participants are informed that participation is completely voluntary and that they can also drop out at any time. After the participant had agreed, he or she was guided through the various questionnaires and tasks. First, I asked participants to watch a neutral nature video set to music, this allowed for all participants to start the experiment in a rested state. The video lasted about eight minutes. Following the neutral videos, a pre-task measure was administered, which measured their self-perceived talent.

Afterward was the training session which was the 1-back version of the N-back Task (Kirchner, 1958). After the participants had completed the training, 60 trials each of the 3-back, 4-back, and 5-back Tasks followed.

Next came the first post-task measure which measured wakefulness using the Multidimensional Mood State Questionnaire (MDMQ) scale (Steyer et al., 1997). The next post-task measure was intended to ascertain how important the task is for the participants. For the perceived importance of the task, people had to rate “How important was it for you to succeed in the intellectual ability test?” on a 10-point Likert scale of one (“not important at all”) to ten (“very important”). Additionally, I measured their perceived threat during the task. Concerning the perceived threat participants had to respond with seven different statements like “I felt nervous” or “I felt relaxed” on a 7-point Likert scale of one (“strongly disagree”) to seven (“strongly agree”) which was adapted from a study of Bian and colleagues (2018).

The last part of the study was the collection of social as well as demographic data. I assessed social class measures by asking how many books they had at home during their childhood as well as their entitlement, for which I asked them how they perceive themselves

in comparison to other students in the presented study program. They had to choose a diagram out of seven options that described their self-perception best. Additionally, I asked them about their subjective class. They were asked to imagine a ladder with ten rungs that would show where people in Austria stand. At the top are the people with the most money, the highest education, and the best jobs, while at the bottom are the people with the least money, the lowest education, and the worst jobs or no jobs. The higher you are on the ladder, the closer you are to the people at the top; the lower you are, the closer you are to the people at the bottom. The participants were now asked to place themselves on the rung that represents their current position in their current phase of life compared to other Austrians.

Referring to the demographic data, I collected the age, gender, and field of study of the participants. In addition, I also collected their prior performance level by asking them about their current average grade in their studies, their average grade in their university entrance qualification, the number of books at their childhood home as well as their self-assessments on a ladder designed to reflect social status (Adler, Epel, Castellazzo, & Ickovics, 2000). The first-generation student status was determined by asking the participants about the highest educational level of their parents. The possible answers ranged from "no school-leaving qualification" to "habilitation".

4.4 Analysis

In analyzing and answering the question, two repeated measures ANOVAs were performed using R and descriptive statistics were also determined. P-values between .05 and .15 were interpreted as a trend according to Cohen (1992), and the alpha error level was set at 5% for all calculations. Additionally, when the results were significant, the effect size was determined.

4.4.1 Hypothesis 1

The first hypothesis tested the assumption that first-generation students performed equally well at the first difficulty level of the academic ability test. The first hypothesis was evaluated using an independent samples t-test. For significant results, the effect size Cohen's *d* was reported and classified as follows: < 0.5 as a small effect, 0.5 – 0.8 as a medium effect, and > 0.8 as a large effect.

4.4.2 Hypothesis 2

The second hypothesis tested the assumption that first-generation students' performance would more rapidly decline as compared to continuing-generation students when difficulty increased. The second hypothesis was evaluated using repeated measures ANOVA. For significant results, the effect size partial eta squared was reported and classified as follows: 0.1 as a small effect, 0.6 as a medium effect, and .14 as a large effect.

5 Results

5.1 Student status by initial difficulty

The first hypothesis was to test the assumption that first-generation students would perform on par with continuing-generation students at the initial difficulty level of the intellectual ability test. The first hypothesis was evaluated using an independent samples *t*-test with student status serving as the independent variable.

The difference in performance between first-generation students ($M = .665$; $SD = .272$) and second-generation students ($M = .665$; $SD = .267$) was not significant ($t(198) = .012$, $p = .991$). Thus, first-generation students perform on par with continuing-generation students at the initial difficulty level.

5.2 Student status by difficulty increases

The second hypothesis was to test the assumption that first-generation students' performance would more rapidly decline compared to continuing-generation students when difficulty increased. The second hypothesis was evaluated using repeated measures ANOVA with student status as a between-subjects factor. The Mauchly's Test of Sphericity is significant ($p = .029$), which requires more restrictive tests like the Lower-bound.

Table 1

Performance variation between the N-back tasks and the influence of the social status.

Cases	Sum of Squares	df	Mean Square	F	p
N-back Difficulty	0.83 ^a	2 ^a	0.42 ^a	20.04 ^a	< .01 ^a
N-Back Difficulty * FG	0.05 ^a	2 ^a	0.03 ^a	1.31 ^a	0.27 ^a
Residuals	8.24	396	0.02		

Note. Type III Sum of Squares

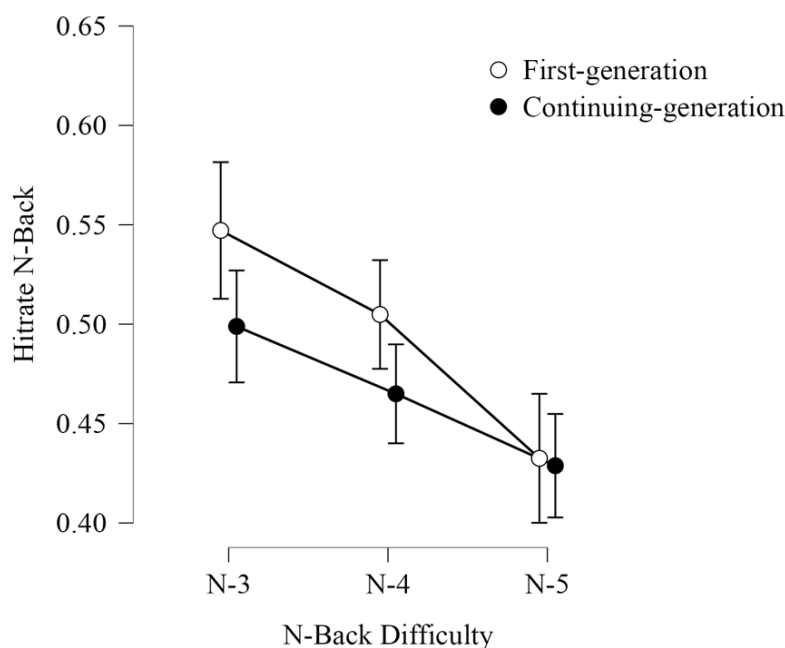
^a Mauchly's test of sphericity indicates that the assumption of sphericity is violated ($p < .05$).

The repeated measures ANOVA determined that independent of the student status, the performance varies significantly across three different N-back tasks, ($F(2, 396) = 20.036$, $p < .001$, partial $\eta^2 = .092$). However, the interaction of student status and difficulty did not

reach significance ($F(2, 396) = 1.305, p = .272$, partial $\eta^2 = .007$). The hit rate between first-generation students and continuing-generation students on the N-3, N-4, and N-5 back Tasks did not significantly differ. In the N-3 back condition the first-generation ($M = 0.547, SD = 0.255$) showed a higher hit rate than the continuing-generation students ($M = 0.499, SD = 0.215$), this was repeated in the N-4 back condition. The first-generation students ($M = 0.505, SD = 0.211$) performed again better than the continuing-generation students ($M = 0.465, SD = 0.244$). In the N-5 back condition, the two groups showed approximately equal hit rates, with the first-generation students ($M = 0.433, SD = 0.206$) still showing higher hit rates than the continuing-generation students ($M = 0.429, SD = 0.209$).

Figure 3

Student's hit rate during the N-3, N-4, and N-5 back task



5.1 Exploratory analysis

5.1.1 Self-perceived talent

To test if self-perceived talent varied between our first- and continuing-generation students I completed a Mann-Whitney U test. The Shapiro-Wilk test of normality was significant ($p < .001$) and the assumption of a normal distribution is therefore violated. The non-parametric Mann-Whitney U test was insignificant ($U = 5025.500, p = .63$). Thus, there is no indication that the first-generation students and the continuing-generation students differ in their self-

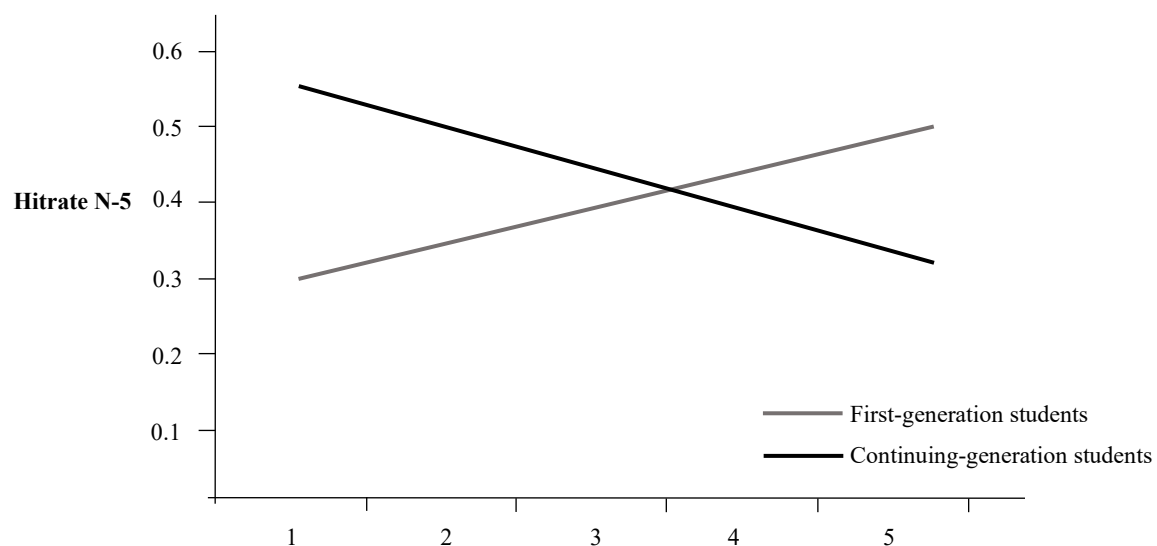
perceived talent which is not in line with previous studies (Bauer & Hannover, under review; Bauer et al., under review).

5.1.2 Wakefulness

To show how the factor of first-generation students influences the impact of wakefulness on performance, moderation analysis was calculated. The model shows that social status first-generation student significantly strengthen the influence of wakefulness on performance on the N5-back task ($R^2 = .044$, $F(2,197) = 8.782$, $p < .003$). This effect was illustrated in Figure 4.

Figure 4

The influence of wakefulness on performance in the 5-back task with the moderation of the social status.



6 Discussion

I set out to evaluate the influence first-generation student statues had on task performance. I tested two key hypotheses building off of understanding concerning the influence perceived ability has on task engagements derived from MIT. I was able to support my initial hypothesis that both first- and continuing-generation students would perform equally well on the initial difficulty of the intellectual ability test. Building of off understanding from MIT, I predicted that both first- and continuing-generation students would find the initial difficulty level of the intellectual ability test worthwhile given their level of potential motivation and thus engage. As both groups engaged on the test no difference in performance should occur. This illustrates

that first-generation students are able to perform on par with continuing-generation students when both engage in academic tests, and the difference in performance seen commonly seen in past research (Lauff & Ingels, 2013) is produced by higher levels of disengagement amongst first-generation students.

I was unable to find support for my second hypothesis that first-generation students' performance would decline more rapidly as difficulty increases due to disengagement. On the contrary, I found that both first- and continuing-generation students performed at the same standard at all difficulty levels of the intellectual ability test. Instead, performance declined at the same rate on the intellectual ability task as difficulty increased.

A possible explanation for the outcomes could be the sample bias present in the current study. My sample consisted almost entirely of psychology students who were already self-selected for a difficult entrance exam at the beginning of their studies. Thus the first-generation students that comprise my thesis might represent a subsample of first-generation students in general. This could have biased the results, as the first-generation students most affected by the status could of already self-selected out of psychology and instead pursued a career path that does not require an entrance exam.

This assumption was supported by the finding that self-perceived talent did not significantly differ between the first- and continuing-generation students in the sample. This high level of self-perceived talent would theoretically lead the first-generation students in my sample to find all difficulty levels of the intellectual ability test to be worthwhile, given their high level of potential motivation, resulting in engagement as was apparent by the results.

Furthermore, I did not collect data concerning whether the students perceived our environment as focusing on effort or talent. Possibly students did not perceive the study environment as talent-focused. Previous research has illustrated that the detrimental effects of first-generation student status on performance only occur in a talent-focused environment (Sommet et al., 2015). Thus if I was not able to successfully create such an environment the disengagement predicted by my second hypothesis should have not occurred. While I made many design choices in hopes of creating a talent-focused environment (e.g. wearing white lab coats, naming the task, and intellectual ability test), without data to confirm our assumption I cannot check if these steps were successful in creating such an environment.

Another aspect that could also have distorted the perception of my environment is the fact that my sample was almost exclusively psychology students and was carried out by the motivational psychology lab. Through their studies, they have learned that motivational psychologist focus on the effort and motivation of participants thus creating effort focused

environment despite my best efforts to prevent this. It is possible that this preconception could have led them to believe that the environment was not talent-focused, but a study with a focus on effort. Future studies should look at including students from other faculties and preferably from other universities or colleges to obtain a sample as large and heterogeneous as possible.

6.1 Practical implications of the results

This study was the first to combine theoretical understanding from MIT concerning self-perceived talent with research concerning the influence first-generation student status has on one's perceptions of talent. While it was unsuccessfully in demonstrating the exact mechanistic pathway first-generation students use to perform worse on intellectually focused tasks, it does provide considerable information concerning the influence disengagement plays in the phenomenon. Specifically, I was able to illustrate that first-generation students' status plays no role in performance on intellectual ability tests if all students engage in the test. This highlights their ability to perform in such situations and points to disengagement as the primary factor producing previous results illustrating performance decrements (Brehm & Self, 1989).

This study also forms the basis for further experiments that can explore this connection in more detail and also investigate various alternative explanations for our results. Furthermore, this study provided new knowledge related to student performance, especially on difficult tasks that must be completed under pressure. This knowledge can be used in the future for various entrance tests and also for various other exams to make them as fair as possible.

Further studies could, for example, find out whether and to what extent it is possible to increase the engagement of first-generation students in situations such as entrance tests and thus create a level playing field for first-generation students and continuing-generation students. The basis, according to this study, is situations in which the difficulty is not too high.

The study also provided additional evidence that lower ability in the past need not be responsible for the lower performance of first-generation students.

6.2 Conclusion

In my thesis, I have discussed the possible disadvantages of first-generation students compared to continuing-generation students in terms of their self-perceived talent and their performance on entrance tests. While I was not able to replicate the results of previous studies, I was able to illustrate how the performance of first-generation students can be on par with continuing-generation students when they both choose to engage in intellectually

focused behavior. Furthermore, self-perceived talent did not differ between the two groups, which again contradicts previous studies, and could highlight a potential limitation of the use of convenient samples in this research design. These contradictory results provide a research basis for further studies and should therefore highlight possible guidelines for future studies to follow.

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Appendix

Abstract

In recent years, the number of entrance tests at universities and technical colleges has increased. While introduced to create a level playing field for college admissions, previous research has shown that admission tests result in a possible disadvantage for first-generation students. To better understand the mechanisms driving this effect, I conducted a laboratory that ask students to complete an academic ability test that increased in difficulty. In contrast to previous work, I found no difference in perceived ability levels between the first and continuing generation students of my sample. Furthermore, I was able to illustrate that first-generation students were able to perform on par with continuing-generation students when choosing to engage in the task. This highlights the importance the construct of disengagement might play in previous findings and could be a potential theoretical mechanism driving the effect at large.

Keywords: first-generation students, self-perceived talent, performance, admission tests

Zusammenfassung

In den letzten Jahren hat die Zahl der Zulassungstests an Universitäten und Fachhochschulen zugenommen. Obwohl sie eingeführt wurden, um gleiche Bedingungen für die Hochschulzulassung zu schaffen, haben frühere Forschungen gezeigt, dass Zulassungstests zu einer möglichen Benachteiligung von Studierende der ersten Generation führen. Um die Mechanismen, die zu diesem Effekt führen, besser zu verstehen, habe ich eine Laborstudie durchgeführt, bei der Studierende einen akademischen Fähigkeitstest mit steigendem Schwierigkeitsgrad absolvieren sollten. Im Gegensatz zu früheren Arbeiten konnte ich keinen Unterschied in den wahrgenommenen Fähigkeiten zwischen den Studierenden der ersten und der zweiten Generation in meiner Stichprobe feststellen. Darüber hinaus konnte ich zeigen, dass Studierende der ersten Generation in der Lage waren, die gleiche Leistung zu erbringen wie Studierende der zweiten Generation, wenn sie sich für die Aufgabe entschieden. Dies unterstreicht die Bedeutung des Konstrukts des Disengagements für die bisherigen Ergebnisse und könnte ein potenzieller theoretischer Mechanismus sein, der den Effekt im Allgemeinen beeinflusst.

Schlüsselwörter: Studierende der ersten Generation, selbst wahrgenommene Begabung, Leistung, Zulassungstests

Questionnaires

MDBF Pre-Task

Bitte geben Sie an, wie Sie sich jetzt in diesem Moment fühlen.

	gar nicht				sehr
1. zufrieden	1	2	3	4	5
2. schlecht	1	2	3	4	5
3. gut	1	2	3	4	5
4. unwohl	1	2	3	4	5
5. ausgeruht	1	2	3	4	5
6. schlapp	1	2	3	4	5
7. müde	1	2	3	4	5
8. munter	1	2	3	4	5
9. ruhelos	1	2	3	4	5
10. gelassen	1	2	3	4	5
11. unruhig	1	2	3	4	5
12. entspannt	1	2	3	4	5

MDBF Post-Task

	gar nicht				sehr
1. wohl	1	2	3	4	5
2. unglücklich	1	2	3	4	5
3. unzufrieden	1	2	3	4	5
4. glücklich	1	2	3	4	5
5. schläfrig	1	2	3	4	5
6. wach	1	2	3	4	5
7. frisch	1	2	3	4	5
8. ermattet	1	2	3	4	5
9. ausgeglichen	1	2	3	4	5
10. angespannt	1	2	3	4	5
11. nervös	1	2	3	4	5
12. ruhig	1	2	3	4	5

Self-perceived talent

In Bezug auf Ihre **intellektuellen Fähigkeiten**: Wie sehr treffen die folgenden Aussagen Ihrer Meinung nach auf Sie zu?

[illegible]

Perceived threat during the first-task

Wenn Sie daran denken, wie Sie sich gerade bei der Aufgabe gefühlt haben- inwiefern treffen die folgenden Aussagen zu?

[illegible]

Perceived importance of a task

1. Wie wichtig war es Ihnen, im intellektuellen Fähigkeitstest erfolgreich zu sein?

0	1	2	3	4	5	6	7	8	9	10
Überhaupt nicht wichtig					Sehr wichtig					

Perceived difficulty

2. Wie schwierig war es für Sie, im intellektuellen Fähigkeitstest erfolgreich zu sein?

0	1	2	3	4	5	6	7	8	9	10
Nicht schwierig					sehr schwierig					

Demographics and Social

Number of books at home

Wenn Sie an Ihre Kindheit denken und wie Sie aufgewachsen sind: Wie viele Bücher gab es bei Ihnen zu Hause? (Hinweis: Auf einen Meter Regalbrett passen ungefähr 40 Bücher)

- keine
- 1-10
- 11-50
- 51-100
- 101-250
- 251-500
- mehr als 500

Subjective class

Stellen Sie sich bitte einer Leiter mit 10 Sprossen vor, die zeigen soll, wo die Menschen in Österreich stehen.



Ganz oben stehen die Menschen mit dem meisten Geld, der höchsten Bildung und den besten Jobs. Ganz unten stehen diejenigen mit dem wenigsten Geld, der niedrigsten Bildung und den schlechtesten Jobs oder ohne Job. Je höher man auf der Leiter steht, desto näher ist man den Personen ganz oben, je niedriger, desto näher den Personen ganz unten.

Wo würden Sie sich auf der Leiter platzieren?

Bitte kreuzen Sie an, auf welcher Sprosse Sie Ihrer Meinung nach in Ihrer aktuellen Lebensphase im Verhältnis zu anderen Menschen in Österreich stehen.

- ☐ 1 (1)
- ☐ 2 (2)
- ☐ 3 (3)
- ☐ 4 (4)
- ☐ 5 (5)
- ☐ 6 (6)
- ☐ 7 (7)
- ☐ 8 (8)
- ☐ 9 (9)
- ☐ 10 (10)

Age

Wie alt sind Sie? _____

Gender

Mit welchem Geschlecht identifizieren Sie sich?

Männlich, weiblich, sonstiges

Area of study

Studiengang Was studieren Sie?

- Psychologie
 - Sonstiges, und zwar:
-

Time spent studying

Studiendauer Im wievielten Semester studieren Sie gerade? (**Gesamt-Anzahl** der Semester an einer Hochschule)

- ☐ 1 (4)
- ☐ 2 (5)
- ☐ 3 (6)
- ☐ 4 (7)
- ☐ 5 (8)
- ☐ 6 (9)
- ☐ 7 (10)
- ☐ 8 (11)
- ☐ 9 (12)
- ☐ 10 (13)

Anderes, und zwar: (14) _____

Prior performance levels (at uni etc)

Was ist Ihre momentane Durchschnittsnote im Studium?

Was war Ihre Durchschnittsnote bei Ihrer Hochschulzugangsberechtigung (z.B. Abitur)?

First-generation student status

Was ist der höchste Bildungsabschluss Ihrer Mutter? (Wenn Ihre Mutter außerhalb Deutschlands ausgebildet wurde: Welchem Abschluss entspricht der Abschluss am ehesten?)

- ☐ kein Schulabschluss (1)
 - ☐ Hauptschulabschluss (2)
 - ☐ Realschulabschluss (3)
 - ☐ abgeschlossene Lehre/ Berufsausbildung (4)
 - ☐ Abitur/ Matura (5)
 - ☐ Abschluss einer Fachhochschule (6)
 - ☐ Abschluss einer Universität (z.B. Bachelor, Master, Diplom, Staatsexamen) (7)
 - ☐ Promotion (8)
 - ☐ Habilitation (9)
 - ☐ Sonstiges, und zwar: (10)
-

Was ist der höchste Bildungsabschluss Ihres Vaters? (Wenn Ihr Vater außerhalb Deutschlands ausgebildet wurde: Welchem Abschluss entspricht der Abschluss am ehesten?)

- ☐ kein Schulabschluss (1)
- ☐ Hauptschulabschluss (2)
- ☐ Realschulabschluss (3)
- ☐ abgeschlossene Lehre/ Berufsausbildung (4)
- ☐ Abitur/Matura (5)
- ☐ Abschluss einer Fachhochschule (6)
- ☐ Abschluss einer Universität (z.B. Bachelor, Master, Diplom, Staatsexamen) (7)
- ☐ Promotion (8)
- ☐ Habilitation (9)

Sonstiges, und zwar: (10) _____