

Master Thesis – Social, Health and Organisational Psychology

**Unravelling Physiology in Intergroup Discussions:
Exploring Stress Responses among Dutch and
International Students**



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Abstract

The ever-increasing presence of multicultural societies requires us to understand the processes that occur when different groups interact. It is especially important to address the changes within the higher education setting, as the population of international students is increasing rapidly. With this empirical study of intergroup communication between Dutch and international students, we aimed to investigate how factors such as group status and perceived intergroup threat relate to psychological and physiological stress responses. The study was designed in the form of framed intergroup discussion between two participants belonging to different status groups (Dutch students as the high-status group versus international students as the low-status group), with the topic proposing benefit of the low-status group at the expense of high-status group. Self-report anxiety and heart rate measures were taken as indicators of stress. Additionally perceived intergroup threat was assessed. We found no significant differences between the status groups on either of the stress response measures, although the heart rate increased significantly on the overall sample during the discussion compared to baseline. However, we were not able to conclude whether this was indeed an indication of stress. Our key finding was that low-status group members scored significantly higher on perceived intergroup threat, despite the discussion putting them in a better position. This suggests that intergroup threat might be more influenced by the general experiences, which raises concerns regarding psychological safety of international students and calls for further investigation into the reasons behind our findings.

Introduction

In the era of globalization, social change has become a part of our everyday lives, marked by alterations of value systems and rules of behaviour. One major contributor to social change is increased migration, often for reasons such as work and education, but also due to wars, poverty, or climate change etc. In the EU alone, 8% of the people had a nationality other than their country of residence in 2019 (Eurostat, 2019). When looking at higher education, we see a similar pattern, according to Eurostat, there were 1.46 million tertiary students in the EU coming from abroad in 2020. These numbers tell us that there is an increasing number of multicultural and multi-ethnic societies present. In such societies, groups with different value systems and beliefs are coming into contact. It is important to understand how groups react to such structural changes within the society. The current research aims to identify the social-psychological processes that occur when diverse groups interact with one another with regards to changes in the educational system. Specifically, we aim to determine whether negative outcomes of intergroup interactions (such as increased stress) are present among university students in the Netherlands, and if we can explain this through intergroup threat theory.

The findings of intergroup studies suggest that the outcomes of intergroup interactions can vary depending on factors such as the nature of interaction or the specific context of interaction. While some studies have identified negative outcomes such as increased discrimination (Filindra, & Pearson-Merkowitz, 2013), increased intergroup anxiety (Hyers & Swim, 1998 as cited in MacInnis, & Page-Gould, 2015), and polarization (Bliuc et al., 2021), other studies have found evidence of positive outcomes such as reduced prejudice (Pettigrew, & Tropp, 2006) and increased empathy (Batson et al., 2002). These findings suggest that understanding and manipulating the underlying factors in intergroup interactions could help us diminish the negative outcomes and promote positive relations. With the increasing number of international students, addressing the changes within the higher education setting is particularly important, in order to reduce the negative outcomes and provide both domestic and international students with the most optimal, psychologically safe learning environment.

Social identity in the intergroup context

In order to define the context of intergroup relations, we must first understand the processes that drive individuals to define themselves as group members and the emotional significance of such identities. Humans are naturally prone to systematise and simplify their general environment. They do the same in their social environment, by mentally grouping

people into meaningful cognitive entities or categories, through a process called *social categorization* (Tajfel, 1974). However, this process does not involve only how people categorize others, but also how they perceive themselves as group members rather than just individuals, which ultimately drives intergroup behaviour. This concept forms the basis of the *Social identity theory* (SIT), which uses the concept of *social identity* to describe what drives people to define themselves as members of a group (and are defined as such by others) and what emotional significance that has for them. Examples of such identities can include ethnic membership identity or social class identity (Tajfel & Turner, 1979). By recognizing that individuals sharing group membership possess a common social identity characterized by shared norms, attitudes, attributes, and behaviours (Hogg & Abrams, 2001 as cited in Seyranian, 2014), we can gain insight into the distinctiveness of groups and its implications for intergroup dynamics. Therefore, understanding of social identity is essential for exploring the factors underlying negative (or positive) outcomes in the context of intergroup interaction, providing us foundational framework for the present study.

While one's group membership is salient, a person makes both in-group as well as out-group comparisons, meaning that on the one hand they for example identify own similarities to their own group, and on the other they differentiate oneself from another group. Such intergroup comparisons are aiming to make positive distinctiveness of the in-group, mainly through competition for status or superiority over an out-group in some way (Brewer, 1999; Tajfel & Turner, 1979). General findings suggest that it is not even necessary that the groups in comparison have incompatible interests to provoke conflict, but the mere awareness or perception of belonging to distinct groups is enough to trigger competitiveness. Moreover, there is a large body of research suggesting omnipresence of in-group bias (in the sense of in-group favouritism and out-group discrimination) in intergroup relations (Tajfel et al. 1971; Billig & Tajfel, 1973; Turner, 1975 as cited in Tajfel & Turner, 1979). Overall, the mentioned intergroup processes influence the dynamics of intergroup interactions, through shaping the perceptions, attitudes, and behaviours. Furthermore, the valence of outcomes depends on how these processes are experienced and enacted.

Exploring negative outcomes of intergroup communication

Within multicultural societies, it is impossible to completely avoid intergroup interaction, nor is it plausible. Therefore, the activation of intergroup processes (e.g., comparison and competition) is increasing as well, which can as mentioned result in either negative or positive outcomes. Negative outcomes tend to arise when intergroup comparisons

are accompanied by a sense of threat (Tajfel & Turner, 1979), or when competition is perceived as intense or hostile (Sherif, 1956). The negative outcomes connected to social identity threats include lowered self-esteem (Ellemers et al., 1997 as cited in Scheepers et al., 2009), increased anxiety and stress (Hyers & Swim, 1998 as cited in MacInnis, & Page-Gould, 2015; Shelton et al., 2009), and physiological responses consistent with threat (Blascovich et al., 2001 as cited in MacInnis, & Page-Gould, 2015).

Intergroup interactions occur in the most vivid way when we directly participate, such as in any form of *intergroup communication* (e.g., discussion, negotiation, intimacy), which is why it is the focus of this study. *Intergroup communication* is defined as receiving or sending messages that are influenced by group membership identification of the individuals involved in the exchange (Harwood et al., 2005). It is specifically the influence of group membership that makes it distinct from simple interpersonal communication. As such, it is noteworthy to examine the potential negative outcomes of group membership influence in intergroup communication context, namely increased anxiety, and uncertainty (Gudykunst, 2005) and stress that can be measured also via cardiovascular responses (Chang et al., 2016; Seery, 2013).

Because intergroup communication can result in either positive or negative outcomes, it is important to determine what is it that elicits negative responses. As previously mentioned, situations sensing threat is especially detrimental in intergroup interactions. The *Intergroup Threat Theory* (ITT; Stephan et al., 2009) defines that when members of one group perceive another group is in a position to cause them harm, they experience intergroup threat. The theory delineates two distinct subtypes of intergroup threats: symbolic threats, which target ingroup values, religion, or way of life (e.g., "immigrants are threatening our nation's fundamental values"), and realistic threats, which pertain to ingroup well-being, safety, or material resources (e.g., "immigrants are threatening our economy"). These subtypes often cooccur and are highly correlated. Importantly, the ITT emphasizes that the mere perception of threat, regardless of its accuracy or the presence of an actual threat, can have detrimental consequences for intergroup relations and the emergence of prejudice. What is more, different groups to experience threats in different contexts and situations, depending on their social status. For high-status groups, such as national majorities, the perceived threat to their status stability (the likelihood or possibility that the current status relation between groups will change in the future; Tajfel & Turner, 1979) is especially triggering. More specifically, research suggests that when intergroup status differences are perceived as unstable, individuals belonging to high-status groups may experience social identity threat, triggering

increased physiological stress responses such as heightened systolic blood pressure and pulse pressure (Scheepers et al., 2009). These findings together offer a comprehensive framework for understanding the multifaceted nature of intergroup interactions and their implications for intergroup dynamics and relationships.

Drawing from the insights of the previous studies, we have designed a study of intergroup communication, more specifically focusing on stress responses during an intergroup discussion. Typically, intergroup settings enhance salience of relevant social identities, which results in activation of social identity related norms, beliefs, and motives (Hogg et al., 2017). We want to assess threat responses in relation to status, by facilitating a discussion between members of groups with different group statuses: Dutch students being the national majority (high-status group) and international students as immigrants (low-status group). This will be done by framing the discussion to challenge the social stability and promote positive status change for minority group. We predict:

H1: Dutch students will report experiencing more anxiety compared to international students during intergroup discussion.

Although self-report measures have traditionally been used in sociopsychological research, to assess constructs such as attitudes, beliefs, and feelings, they have some methodological problems. They require participants to be consciously aware of the constructs that are being measured, which is not always the case (especially with threat, or stereotypes). Additionally, people tend to avoid reporting socially inappropriate beliefs or attitudes (Greenwald, & Banaji, 1995). A solution to this is using implicit measures, such as physiological responses (e.g., heart rate), which are obtained without the individual's conscious control or even awareness and can allow us to reliably infer psychological states that lead to the responses (Seery, 2013). Scheepers and colleagues (2009) state physiological measures are better in indicating emergence of social identity threat in intergroup relations than self-report measures. By including diverse kinds of measures of threat responses (heart rate measures in addition to self-reported anxiety) we will be able to also distinguish the relatively automatic threat responses (Scheepers et al, 2009). We predict:

H2: Dutch students will display a larger increase in heart rate, in relation to baseline, during intergroup discussion in comparison to international students.

H3: Threat response measures (anxiety and heart rate) will be correlated.

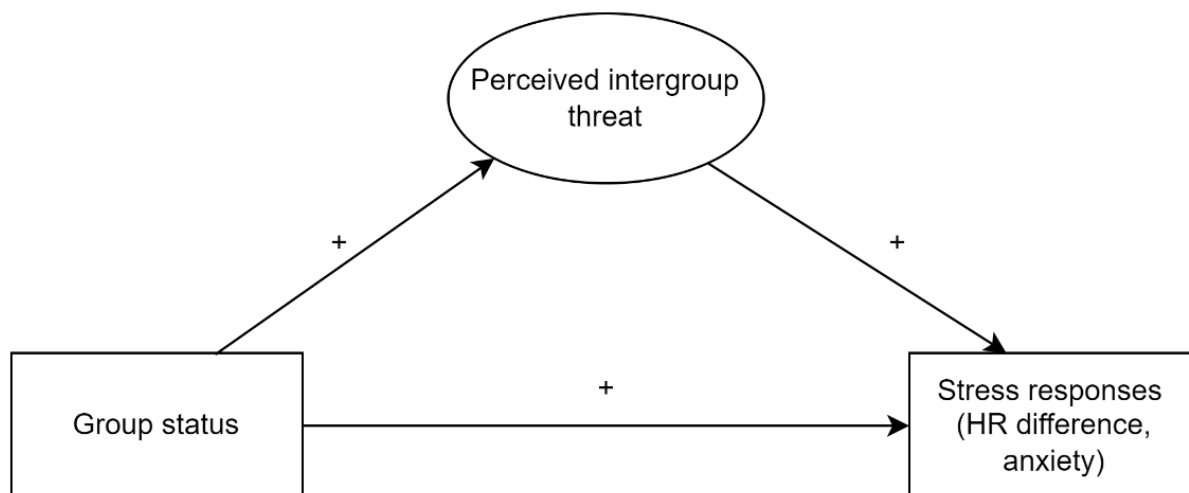
In state of social change, majority-group typically demonstrates a stronger stress response in intergroup interaction, whereas minority-group does so in states of social stability (Scheepers et al, 2009). As previously mentioned, we are using discussion framing to induce the state of social change. Therefore, we believe the high-status group members will perceive increased intergroup (symbolic) threat, which in term could explain the differences in the stress response measures between the high-status and low-status group members (according to ITT the perception or threat and not actual threat is crucial). Further, we will assess the level of perceived intergroup threat through administration of a self-report questionnaire after the discussion segment of the study. We anticipate the following:

H4a: Dutch students will report higher levels of perceived intergroup threat compared to international students.

H4b: Perceived intergroup threat will mediate the relationship between group status and both anxiety and heart rate. Specifically, high group status (being Dutch) will be associated with increased perceived intergroup threat, which, in turn, will be positively correlated with higher levels of anxiety and heart rate (see Figure 1).

Figure 1

Model of predicted relationships between variables



Methodology

Sample

The sample consists of 50 participants (25 match dyads), who self-identified as Dutch ($N = 24$), international ($N = 24$), or part Dutch ($N = 2$). Participants were paired up in dyads, such that each dyad included one (part) Dutch and one international. A higher majority of participants reported their ethnicity to be white (Caucasian), followed by Asian (5), and one participant per Latino, Turkish, Caribbean, Arab, Surinamese/Javanese. The sample consists of 84% females and 16% males. The inclusion criteria were age above 18 years (for legal and ethical reasons), being a student (the discussion topic was framed for this specific target group) and being able to communicate in English, as it was the main language of the study. The age of participants ranged from 18-29 years ($M = 22.76, SD = 2.54$). Majority of participants were either Bachelors (50%) or Masters (44%) level students, additionally there was one PhD student and two HBO students. Participants were recruited via fliers distributed at university, social media, university SONA system, and recruitment at the Science Park. They were offered a compensation for their time in the form of 6 euro or 1 course credit. The participants in the dyad were required to be strangers, which they indeed confirmed in a question at the end of the experiment. They were also required to complete all the correct questionnaires, however one international participant received the PIT scale for Dutch students, so we had to exclude that result. The final sample thus included 49 participants. The power analysis for an independent samples t-test to detect a medium effect size ($d = 0.5$), with a power of .80 and an alpha level of .05, showed that we should recruit 102 participants. However, due to the limited time for data collection and the difficulty in recruitment of participants, we have compromised with using a smaller sample, and thus somewhat reducing the power.

Design and Procedure

This study employed a correlational research design, to examine the relationships between the dichotomous independent variable *group status (high status - Dutch students vs low status – international students)*, and dependent variables *anxiety, heart rate and perceived intergroup threat* during an intergroup discussion context. The study protocol has received ethical approval from FERB (UU-SER approval number: 22-2276).

After participants were recruited, they were paired with another participant and invited to participate (one dyad consisted of one Dutch and one international student) in the lab study

at the Langeveld building of Utrecht University. They first received the informed consent form and were asked to sign it. We then attached three ECG electrodes to them (grounding lead on the right wrist, positive lead on the left wrist, and negative lead on the right collar bone), and gave them noise cancelling headphones. Both participants were in the same room during the study but separated with a divider screen. We then started collecting physiology responses using Acqknowledge software. Baseline measure was taken while they were watching a relaxing 2-minute video. Afterwards they filled in a demographics questionnaire and received the problem description followed by instructions for the framed discussion on the topic of language in Dutch higher education (this topic was chosen because of the recent heated debates in the Dutch Parliament and media, e.g. DUB's Editor-in-chief Ries Agterberg (2023) expressed opinion on language at UU). They were given approximately 5 minutes to read the text and the questions to think about (see Appendix A). They had the option to write down their answers and opinions before the discussion started. We then removed their headphones and the divider between them for the duration of discussion. They were given 3-minutes for the discussion, during which we measured their heart rate. At the end they filled in another survey, including the state anxiety scale and the perceived intergroup threat scale.¹ When they finished, we asked them to read the debriefing form, compensated the participants, and removed their electrodes.

Measures

All self-report measures were collected using Qualtrics software questionnaires (demographics, anxiety, perceived intergroup threat).

Anxiety was measured with a 5-item state anxiety scale (STAIS-5) of the short version of Spielberger state—trait anxiety inventory developed by Zsido and colleagues (2020). Participants were instructed to rate each statement, such as “*I feel frightened*”, on a scale from 1 (*highly disagree*) to 5 (*highly agree*), indicating how they felt “right now” (for all items see appendix B). The five items show high internal consistency (*Cronbach's* $\alpha = .90$; Zsido et al., 2020).

Perceived intergroup threat (PIT) was measured using seven items. The items were collected and adapted from multiple intergroup threat scales (e.g., Infante et al., 2019; Outten et al., 2012; Stephan and Stephan, 2000). The statements included a combination of realistic (e.g., “International students are favoured in opportunities and benefits over Dutch students.”)

¹ The complete study procedure contained another condition and some additional tasks that go beyond the scope of this thesis, and as such won't be further explained here.

and symbolic threats (e.g., “International students are threatening the personal identity and sense of belonging of Dutch students.”). The same seven items were used for both Dutch and international students, but with adapted rephrasing (for all items see Appendix C). All items were rated on a scale from 1 (*highly disagree*) to 5 (*highly agree*). The seven items formed a reliable index (*Cronbach's* $\alpha = .84$).

Physiological measures were collected as heart rate (HR) measures using Acqknowledge software. HR data was extracted from ECG measurements at two timepoints: mean HR during baseline and mean HR during discussion. We then calculated the difference in HR between the two timepoints and used it as the outcome variable depicting physiological stress response in further analyses. For one of the participants (PPN 68) we did not collect the baseline HR due to technical issues, thus we used the average baseline HR of their status group to calculate the HR difference.

Results

The analyses were carried out using the SPSS software. For all tests the significance level was set at $\alpha = .05$. Before conducting the analyses, we carefully examined the underlying assumptions, such as normality of distribution and homogeneity of variances and choose the tests accordingly. Results of Shapiro-Wilk test of normality of distribution show violation for most variables ($p < .05$). Only the variable anxiety showed normal distribution when split on groups of Dutch ($p = .33$) and international students ($p = .05$). Therefore, we were able to use a parametric test for testing the first hypothesis. For all other variables the normality of distribution assumption was violated in at least one of the groups, therefore non-parametric tests were used for the following inferential analyses. First, we employed descriptive statistics to provide an overview of the variables of interest (see table 1).

Table 1*Descriptive Statistics*

	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
<i>Overall (N=49)</i>				
Anxiety	1.00	3.20	1.72	.52
HR difference	-35.43	63.85	6.63	15.53
PIT	1.00	3.29	1.85	.70
<i>Dutch (N=25)</i>				
Anxiety	1.00	3.20	1.81	.52
HR difference	-29.22	63.85	9.34	17.50
PIT	1.00	2.29	1.39	.36
<i>International (N=24)</i>				
Anxiety	1.00	2.80	1.63	.53
HR difference	-35.43	20.47	3.80	12.93
PIT	1.29	3.29	2.33	.65

To evaluate the hypotheses regarding the relationship between group status and anxiety (H1), we used the independent samples *t*-test.

With hypothesis 1, we predicted that self-reported anxiety would be higher for the high-status group. To assess this, we used an independent samples *t*-test. Assessing for homogeneity of variance using Levene's test indicated the assumption was not violated, $F(1,48) = .06, p = .81$. The results of the *t*-test showed that on average self-reported anxiety levels in high-status group (*Dutch*; $M = 1.80, SE = .11$) were slightly higher than those of low-status group (*International*; $M = 1.63, SE = .11$). This difference, -0.17 , BCa 95% CI $[-.14, .47]$, was not significant $t(46), p = .28$. This hypothesis was thus rejected. However, the results showed a small to medium effect ($d = 0.33$), which might have been non-significant in our case due to the small sample size.

With hypothesis 2, we predicted that the displayed HR difference would be larger in high-status group members. To evaluate the difference between group status and heart rate, we used the Mann-Whitney U -test, the nonparametric equivalent of the independent samples t -test. The HR difference in high-status group (*Dutch*; $Mdn = 6.20$) did not differ significantly from low-status group (*International*; $Mdn = 3.85$), $U = 260.00, z = -.80, p = .424, r = -.11$.² There was however an indication of small effect. Based on these results, we had to reject our second hypothesis.

We have run an additional within-subject analysis to assess whether there are at least differences between the baseline HR and the HR during discussion on the overall sample. Results of the Wilcoxon signed-rank test (non-parametric alternative to the paired-samples t -test) have shown there was significant increase in the heart rate from the baseline ($Mdn = 78.25$) to during discussion ($Mdn = 85.62$), $T = 982.00, p < .001, r = .37$, indicating a medium to large effect based on Cohen's criteria. This showed that, despite the absence of a between subject difference based on group status, overall participants were engaged during the discussion task, on average displaying higher heart rate then compared to during the baseline task.

With hypothesis 3, we wanted to assess whether there is a positive relationship between anxiety and HR difference. For that, Spearman correlation coefficients were computed. Although the Spearman correlation coefficients indicated weak positive correlations between anxiety and HR difference, none of them were statistically significant (*Internationals*: $r_s = .18, p = .410$; *Dutch*: $r_s = .12, p = .586$; *Total sample*: $r_s = .17, p = .232$). Therefore, we had to reject our third hypothesis.

In hypothesis 4a, we predicted that high-status group would score higher on PIT. The potential differences between high- and low-status groups in PIT were analysed through Mann-Whitney U -test, and to further assess the relationship between group status and PIT, a regression model was fitted as part of the mediation analysis (see H4b). There was a significant difference between high-status group (*Dutch*; $Mdn = 1.29$) and the low-status group (*International*; $Mdn = 2.50$) on the PIT score, $U = 541.00, z = 4.84, p < .001, r = .69$, indicating a large effect size. However, contrary to our prediction, the score was higher for the low-status group. Therefore, hypothesis 4a was rejected.

² Checking for outliers indicated one potentially extreme outlier on this variable. The sensitivity analysis proved it did not have a substantial influence on the results. Therefore, we did not exclude it. There were also some non-extreme outliers, but considering we had a small sample size and were using robust non-parametric tests, we decided to not exclude them.

Hypothesis 4b aimed to determine the potential mediation effects of PIT. Our prediction was that PIT would mediate the relationship between group status and both stress response measures. More specifically, we anticipated a positive relationship between high-group status and PIT, which would in turn positively predict anxiety and HR difference. The potential mediation effect of PIT on the relationship between group status and stress responses was assessed through estimation of indirect effect using the PROCESS macro for SPSS version 4.2 (Hayes, 2022). We have conducted two separate mediation analyses, one for anxiety and one for HR difference.

In the first model we tested for PIT as mediator of the relationship between group status and self-reported anxiety. The results showed group status to be a significant predictor of PIT ($b = .94, t_{(47)} = 6.30, p < .001$), indicating that majority group members were less likely to report perceived intergroup threat. Regression of group status on anxiety while ignoring the mediator was not significant ($b = -.17, t_{(47)} = -1.17, p = .246$). Similarly, there were no significant effects for the regression of PIT on anxiety, while controlling for group status ($b = .23, t_{(46)} = 1.63, p = .111$), and the regression of group status on anxiety while controlling for PIT ($b = -.39, t_{(46)} = -1.98, p = 0.054$). These results indicate that although group status is a good predictor of PIT, (high-group status has a negative effect on PIT), PIT does not work as a mediator between group status and anxiety.

The second model tested PIT as the mediator of relationship between group status (IV) and HR difference (DV). The fitting of regression models showed very similar results as in the previous model. The regression of group status on HR difference while ignoring the mediator ($b = -5.54, t_{(47)} = -1.26, p = .215$), regression of PIT while controlling for group status ($b = .92, t_{(46)} = .21, p = .834$) and lastly regression of group status while controlling for PIT ($b = -6.41, t_{(46)} = -1.06, p = .295$), were not significant predictors of HR difference. Again, although the pathway between group status and PIT is significant, PIT does not act as a mediator explaining the relationship between group status and HR difference. Based on the results of both mediation analyses, we have rejected hypothesis 4b.

Discussion

In the recent years, international mobility among students in higher education increased significantly. It is clear that various contextual factors, such as group status, or perceived threat, can differently influence interactions between groups. Understanding these factors could help establish a psychologically safe educational environment, which is often an issue in ethnically/racially diverse classrooms (De Leersnyder et al., 2021). That is why in this present study, we aimed to explore the dynamics of intergroup interactions in a diverse student population in the higher education in the Netherlands. Specifically, we sought to uncover the intricate relationships between group status and stress responses in the context of intergroup discussion between Dutch and international students. We additionally attempted to explain these relationships through perceived intergroup threat. Although the results did not confirm our initial hypotheses, the unexpected findings offer interesting insights into understanding the multifaceted nature of these dynamics and further highlight the importance of contextual factors.

With the first two hypotheses we wanted to get an insight into both psychological stress (anxiety) as well as physiological stress responses (HR difference) within an intergroup discussion setting. Framing the discussion to elicit the state of social change, we predicted the Dutch students (high-status group) would show a larger stress response on both measures in line with previous findings (e.g., Scheepers et al, 2009). Both hypotheses were rejected as there were no significant differences between the two status groups. However, taking a closer look at the results, they indicate the mean trends to be in the direction we predicted for both anxiety and HR difference. Furthermore, as previously mentioned, it is important to note that a small to medium effect size was observed when assessing the differences on anxiety scores. This suggests that there may be some meaningful differences between the groups, but they might not have reached statistical significance in our study.

The scores indicating overall anxiety levels in our sample were found to be moderately low. This could potentially be explained by the fact that the two groups we studied, Dutch and international students, have likely had positive interactions with each other or have formed cross-group friendships within the educational setting. It may also be that the salience of their common group identity of being students in the Netherlands has reduced the feeling of intergroup threat. All these factors can contribute to improved outgroup attitudes and decreased negative beliefs and intergroup anxiety (Çakal et al., 2021; Page-Gould et al., 2008;

Riek et al., 2010; Turner et al., 2007). To this end, it is important to consider whether a different intergroup context might be able to elicit higher anxiety than occurred in our study.

Looking more thoroughly at the HR measures, we have found some interesting insights as well. Since we could not find any significant differences between the groups, we took a closer look at the within-subject processes and found that the heart rate had indeed increased significantly during the discussion compared to the baseline. There are multiple possible explanations for the increase in HR. While it is possible it was a threat response, as observed in some studies (e.g., Scheepers et al, 2009; Seery, 2013), some other possible explanations include that the HR increased due to the fact the subjects were talking and listening (Liehr, 1992), it could have been a result of mere cognitive engagement in the task (Darnell, & Krieg, 2019), or the subjects had perceived a challenge (Seery, 2013), which in contrast to threat is generally positive.

We aimed to further explore the relationship between the two stress response measures used in this study (self-reported anxiety and HR difference) in our third hypothesis. We used the two different measures with the aim to improve the chances of capturing the stress response and the interpretability of results. A positive correlation between HR and anxiety score could serve as an indication of a threat response during the discussion (Scheepers et al., 2009). The lack of correlation between anxiety and HR indicates that these two measures might not be the best combination for assessing the threat responses. Our findings align with the understanding that individual stress responses can vary along different measures, due to subjective factors, such as perception of the stressor and coping mechanisms (Crosswell, & Lockwood, 2020). Since the HR measure on its own is also not sufficient for drawing conclusions about psychological states, it may be important to consider different measures for future research. For example, cardiac output, total peripheral resistance, or cortisol levels might be better for determining the reasons behind the HR increase.

Lastly, we wanted to assess whether PIT could be used to predict stress responses, depending on the group status. Although results indicate that PIT cannot be used to explain the relationship between group status and either of the stress responses, our findings suggest group status can be used to predict the level of PIT. Contrary to our prediction, it was the international students (low-status group members) that reported significantly higher PIT scores and not the Dutch students (high-status group members). Even though the discussion was concerning social changes that may to some extent disadvantage local students, international students still reported higher intergroup threat. It therefore seems that in our case, the short discussion framed to induce the state of social change was not enough to

change the perception of intergroup threats. Since previous research suggests the instability of status differences leads to experiences of social identity threat in high-status groups (Scheepers et al., 2009), our findings suggest that PIT might have been more influenced by the general experiences of people than the situational experience. This does further confirm findings that generally minority or low-status group members score much higher on measures of realistic and symbolic threats (Corenblum, & Stephan, 2001; Stephan et al., 2002). These findings raise a concern, suggesting that international students in the Netherlands might feel somewhat threatened by the majority group. Furthermore, psychological safety is a factor crucial for learning, creativity, and ultimately academic performance (De Leersnyder et al., 2021; Newman et al., 2017). A thorough investigation should be made into the reasons why the international students perceive to be threatened by the national majority group, and to determine how we can support them with establishing a safe learning as well as living environment.

Limitations

While the findings of this study contribute valuable insights to understanding intergroup dynamics, it is crucial to acknowledge several limitations that may have influenced the interpretation and generalizability of the results, some of which had already been briefly mentioned together with the findings. First of all, our study did not include a control condition, which meant we could only assume correlational relationships between the variables and not causality. Our sample size was relatively small, which unfortunately limited the power of our analyses to detect smaller effects. On top of that, when signing up for the study, the participants knew they would be participating in a discussion with a stranger and that it would be in English. Thus, we might have attracted a generally more open-minded population, which could result in bias and limited generalizability of results. There is also a chance our selected discussion topic was not sufficiently provoking for the participants to perceive the threat to the stability of social status differences. Although we chose the topic based on recent heated media debates, doing more research into triggering topics for this specific target population in the future research could perhaps lead to a topic eliciting greater threat responses.

Conclusion

The findings of this study further highlight the complexity of the dynamics between contextual factors and outcomes of intergroup interactions. By examining how different stress measures work in combination, we were able to conclude that heart rate as measured by ECG and self-reported anxiety might not be the best combination to infer psychological states. With that we have provided further evidence that stress responses can be expressed differently across measures and across individuals, especially since the HR measures did show a significant increase during the discussion. To this end, we recommend that in the future, the compatibility of stress measures is more thoroughly examined, as that would enable more accurate interpretation of results. Although we could not find differences in the stress responses between high-status and low-status group related to the discussion context, there was one perhaps key finding of our study. Even when the low-status group benefited at the expense of the high-status group, the perception of intergroup threat remained stronger among the low-status group. This highlights the need to carefully examine the overall experiences of migrant groups in order to understand why they tend to feel threatened by the majority group. Additionally, it might be important to take a closer look at different ethnicities/races, to determine whether the length of the cultural distance from the majority group might contribute to the explanation of the intergroup threat dynamics. By gaining a better understanding of these dynamics, we can work towards fostering improved relationships between groups and creating inclusive and psychologically safe environments. This could be a crucial step in enhancing the retention and integration of international students as a skilled workforce after graduation.

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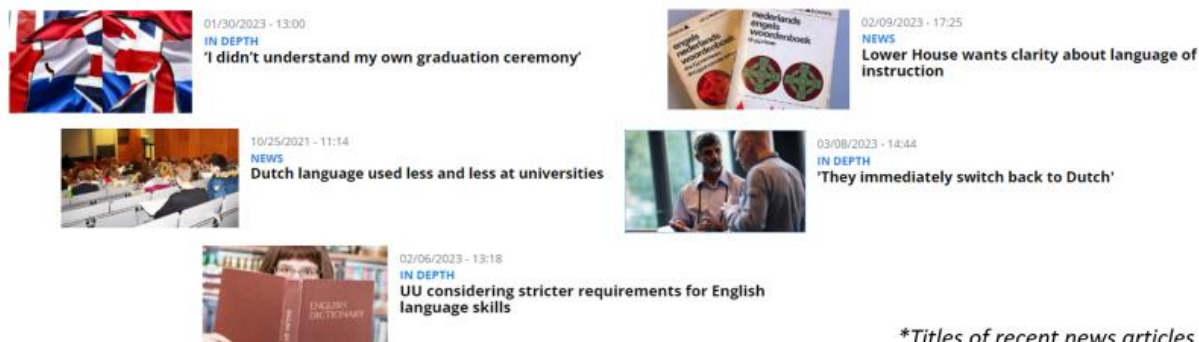
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Appendices

Appendix A Problem Framing and Instructions for Discussion

Problem framing



Please think about yourself and your own situation.

In The Netherlands, there has been a focus on integrating international students especially within higher education at different universities across the country. However, it is now clear that there are some advantages and disadvantages to this. **We would like for you to think about the use of Dutch and English language within higher education in the Netherlands. Recent debate says there should be more attention towards internationals and use of the English language to create more opportunities for internationals (for example more availability of English internships, more examples in English during classes and educational events...). There is even a recently proposed policy that asks whether the official language in all university courses should be changed to English or not. This would mean that no more courses would be offered in Dutch.**

- How do you think this all affect you?
- How does this make you feel?
- Share your thoughts, opinions, or concrete examples that support your opinion.

You can for example write about whether you think the situation can be problematic, or whether you think the situation is fair. In the text box under you can write your answers.

Please think about yourself and your own situation.

Instructions for discussion

Now, you will go on to sharing your opinion and discussing together with an international student.

*We would like for you to **first share your opinion for 30 seconds each**. This means that at the beginning, one person will speak at a time, while the other will listen only. The experimenter will tell you who can start. After this, you will have **3 minutes to talk together, discuss, express your thoughts and opinions**. This speech will be recorded by the laptop microphone.*

Appendix B *Short Version of The Spielberger State–Trait Anxiety Inventory (STAI-5)*

During the discussion I felt...

Item nr.		Highly disagree				Highly agree
1	I feel upset.	1	2	3	4	5
2	I feel frightened.	1	2	3	4	5
3	I feel nervous.	1	2	3	4	5
4	I am jittery.	1	2	3	4	5
5	I feel confused.	1	2	3	4	5

Appendix C *Perceived Intergroup Threat Scales*

Perceived Intergroup Threat – Dutch Students

Please rate the following statements.

*The items are rated on a 5-point scale ranging from 1 (highly disagree) to 5 (highly agree).

1. I think there are too many opportunities provided for international students.
2. International students are favoured in opportunities and benefits over Dutch students.
3. International students are taking over and dominating social and cultural spaces on campus.
4. International students are forcing their cultural values and beliefs on Dutch students.
5. International students are threatening the personal identity and sense of belonging of Dutch students.
6. International students are creating tension and conflict between Dutch and international students.
7. International students are insensitive and disrespectful towards the culture and beliefs of Dutch students.

Perceived Intergroup Threat - International Students

Please rate the following statements.

*The items are rated on a 5-point scale ranging from 1 (highly disagree) to 5 (highly agree).

1. I think there are too many opportunities provided for Dutch students.
2. Dutch students are favoured in opportunities and benefits over international students.
3. Dutch students are taking over and dominating social and cultural spaces on campus.
4. Dutch students are forcing their cultural values and beliefs on international students.
5. Dutch students are threatening the personal identity and sense of belonging of international students.
6. Dutch students are creating tension and conflict between Dutch and international students.
7. Dutch students are insensitive and disrespectful towards the culture and beliefs of international students.