

## **The Influence of Students' Perceived Dissimilarity on Academic Performance**

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### **Abstract**

This research aims to investigate how perceived deep-level dissimilarity influences academic performance, and whether this relationship is stronger compared to the impact of perceived surface-level dissimilarity on academic performance. Additionally, we examined an indirect relationship of perceived deep-level dissimilarity on academic performance through students' sense of belonging. The moderating role of the institutional commitment to diversity in the relationship between perceived deep-level dissimilarity and students' sense of belonging was also investigated. In total, a sample of 128 Dutch and international students took part in our online questionnaire. Correlational – and regression analyses showed that perceived deep-level dissimilarity was not related to academic performance. The mediating role of students' sense of belonging and the moderating role of institutional commitment to diversity were not found. Interestingly, students' sense of belonging positively predicted academic performance. This research helps to emphasize the importance of students' sense of belonging on academic performance. It also demonstrates that perceived deep-level dissimilarity is not necessarily negatively related to academic performance.

*Keywords:* perceived deep-level dissimilarity, sense of belonging, institutional commitment to diversity, academic performance.

## **The Influence of Students' Perceived Dissimilarity on Academic Performance**

Nowadays, a lot of organizations are becoming more diverse than ever. This increase in diversity can lead to increased awareness of dissimilarities between individuals, which in turn can bring various challenges (Guillaume et al., 2012; Hobman et al., 2004; Jansen et al., 2017). For example, Jansen et al. (2017), found that gender dissimilarity was related to two types of negative work outcomes. They found a negative relationship between gender dissimilarity and perceived work group inclusion, and a positive relationship between gender dissimilarity on absenteeism through inclusion. Related, another study (Tepper et al. 2011) examining predictors of abusive supervision showed that perceived dissimilarity positively predicts relationship conflict, negatively predicts subordinate performance and positively predicts abusive supervision. Where the studies mentioned above focused on a working environment, dissimilarity was found to have negative consequences in an academic context as well. For example, students who perceived themselves as being dissimilar to the prototypical student, performed worse academically in terms of grade point average (Lane & Gibbons, 2007). In the current study, we aim to expand previous findings by examining how perceived deep-level dissimilarity is related to student's academic performance. Additionally, we will examine the mediating role of students' sense of belonging within this relationship and the moderating role of institutional commitment to diversity on the relationship between perceived deep-level dissimilarity and students' sense of belonging.

### **Perceived Dissimilarity**

One can note the difference between the types of dissimilarity mentioned in the section above. Where Jansen et al. (2017) used objective measures of dissimilarity based on gender, other studies focus on subjective measures of dissimilarity (e.g., the degree in which participants feel dissimilar to others; Hobman et al., 2004; Tepper et al., 2011). In the current

study, we are specifically interested in student's experiences of dissimilarity, hence we will focus on perceived dissimilarity rather than objective measures of dissimilarity.

### **Perceived Surface-level Dissimilarity versus Perceived Deep-level Dissimilarity**

A number of studies showed various negative outcomes of perceived dissimilarity on social inclusion and absenteeism (e.g., Jansen et al., 2017), work withdrawal (Liao et al., 2008) and various other outcomes such as job satisfaction and work-related stress (Şahin et al., 2019). In most of the literature about perceived dissimilarity, a distinction is made between perceived surface-level and perceived deep-level dissimilarity. Perceived surface-level dissimilarity refers to visible attributes such as age, gender and ethnicity, whereas perceived deep-level dissimilarity refers to more underlying attributes such as personality, attitudes, beliefs and values (Liao et al., 2008; Şahin et al., 2019).

Effects of perceived deep-level dissimilarity seem to be more established compared to perceived surface-level dissimilarity. For example, Guillaume et al., (2012) found that both surface -and deep-level dissimilarity were related to performance and social integration in working teams, but found larger effect sizes for deep-level dissimilarities compared to surface-level dissimilarities. More recently, Sahin et al. (2019), showed that perceived deep-level dissimilarity was negatively related to job satisfaction and positively related to work-related stress as well as turnover intentions. Additionally, perceived deep-level dissimilarity was negatively related to felt inclusion, where perceived surface-level dissimilarity was not related to felt inclusion. Despite much research examining the effects of perceived dissimilarity being conducted in a working context, the outcome measures are likely to be present in an academic context as well (e.g., satisfaction, stress, absenteeism, turnover intentions). Lane and Gibbons (2007) studied perceived dissimilarity in this specific context; they showed that students with certain personality traits (i.e., depressed mood or neuroticism) who perceived themselves as dissimilar to the typical student, showed a drop in academic

performance and were less likely to stay enrolled. The current research aims to add to existing literature on the relationship between perceived deep-level dissimilarity on perceived academic performance through students' sense of belonging and on the role of institutional commitment to diversity on the relationship between perceived deep-level dissimilarity and perceived academic performance.

### **Student's Attitudes towards COVID**

Perceived deep-level dissimilarities exist in many forms and can be based on various topics. One domain where people may perceive deep-level dissimilarity is, health choices, which are highly important to personal values (Allicock et al., 2008; Rokeach, 1973). A current topic where personal values and attitudes seem to vary a lot between individuals might be values and attitudes towards corona-related issues. Examples of this could be attitudes towards COVID-vaccination or towards COVID-measures. In the Netherlands, the population seems to be divided between people who are getting a COVID-vaccine and people who are not getting a COVID-vaccine ('Bij twijfel over vaccinatie', 2021). Recent research already showed the presence of differences in attitudes towards the seriousness of COVID-19 (Galasso et al., 2020). According to this study, women were more likely to perceive COVID-19 as a serious health problem, more likely to agree with policy measures and more likely to comply with policy measures regarding COVID-19 compared to men. Related, a literature review showed differences in attitudes towards human papillomavirus (HPV) vaccination on social media (Troiano & Nardi, 2021).

The influences of these health-related attitudinal differences on constructs like sense of belonging or performance were not yet examined. However, since differences in attitudes are considered as deep-level dissimilarities, we can build upon existing literature on the influence of perceived deep-level dissimilarities by examining a similar negative relationship, but

within a unique focus. Specifically, we will examine the relationship between perceived attitudinal differences regarding COVID and academic performance.

### **Sense of Belonging**

According to the literature, the negative relationship between perceived dissimilarity and working- or academic outcomes is well-established (Hobman et al., 2004; Jansen et al., 2017; Lane & Gibbons, 2007; Liao et al., 2008; Şahin et al., 2019). Additional findings in some of these studies, showed an important role of (perceived) inclusion within the relationship between dissimilarity and working outcomes. For example, Jansen et al. (2017) showed that gender dissimilarity was associated with higher absenteeism through lower levels of perceived inclusion. In a similar context, Sahin et al. (2019) showed that perceived inclusion can act as a mediator between perceived deep-level dissimilarity and various working outcomes (e.g. job satisfaction and turnover intention). In an academic context, Suhlmann et al., 2018 showed a mediating role of sense of belonging between student-university fit and academic outcomes. Specifically, they found that a low fit between student's self-construal and university norms can lead to a lower sense of belonging, which in turn can lead to lower academic performance and an increase in dropout intention. Thus, we expect a negative relationship between perceived deep-level dissimilarity and perceived academic performance (H1a) and we expect this relationship to be mediated through students' sense of belonging (H2).

### **Institutional Commitment to Diversity**

Dissimilarities might not have to lead to negative consequences in some cases. For example, Jansen et al., (2017) found that a positive diversity climate can buffer the negative effect of dissimilarity on feelings of inclusion. Dissimilarity was only related to reduced feelings of inclusion when employees perceived the diversity climate at work as negative. Similarly, Li et al., (2017) found that a team climate for inclusion can positively moderate the

indirect relationship between cultural diversity and team creativity via information exchange. This indirect relationship was found to be stronger when the team climate for inclusion is stronger. In an academic context, Hussain & Jones (2021) examined the role of institutional commitment to diversity in effects of discrimination and bias on students' sense of belonging. They found that students of color who perceived the institutional commitment to diversity as positive, experienced less adverse effects of discrimination and bias on sense of belonging. Both a positive diversity climate and institutional commitment to diversity refer to the acceptance and perception of differences, which are applicable to the context of our current study as well. Therefore, we expect that institutional commitment can buffer the negative effects of perceived deep-level dissimilarity on students' sense of belonging. In other words, we expect that perceived deep-level dissimilarity will only be related to a decrease in students' sense of belonging when students perceive a negative institutional commitment to diversity (H3).

### **The Present Study**

The aim of the present study is to investigate how perceived deep-level dissimilarity is related to academic performance through students' sense of belonging. Additionally, we aim to investigate how institutional commitment to diversity influences the relationship between perceived deep-level dissimilarity and students' sense of belonging. Where previous research focused mainly on perceived dissimilarity in a working context, we will examine the influence of perceived deep-level dissimilarity on academic performance. The focus regarding perceived deep-level dissimilarity will center on dissimilarity in attitudes towards COVID-vaccination and COVID-measures. Accordingly, we aim to answer the following research question: How does perceived dissimilarity influence students' perceived academic performance? A visual representation of the theoretical model we will examine in this study, is shown in figure 1. We will test the following hypotheses:



H1a: Perceived deep-level dissimilarity negatively relates to students' perceived academic performance.

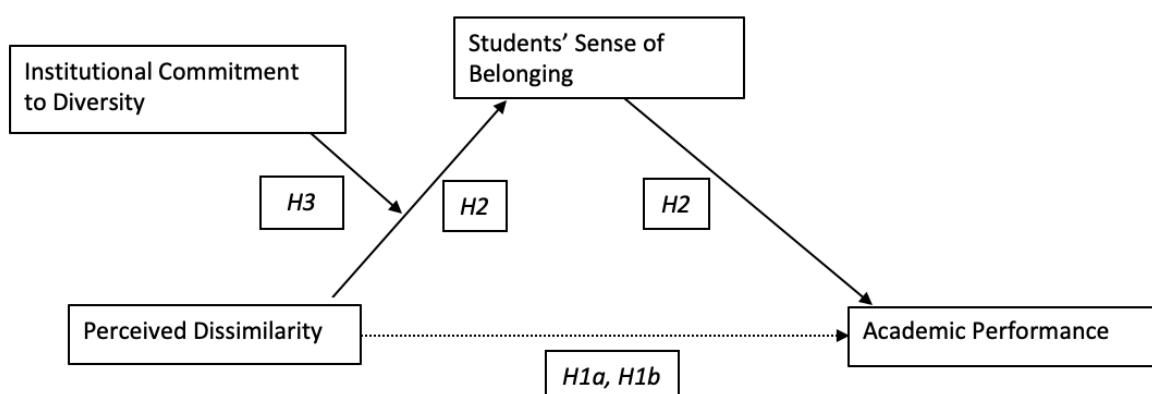
H1b: Perceived deep-level dissimilarity is more strongly related to students' perceived academic performance compared to perceived surface-level dissimilarity.

H2: Students' sense of belonging positively mediates the relationship between perceived deep-level dissimilarity and perceived academic performance.

H3: Institutional commitment positively moderates the relationship between perceived dissimilarity and students' sense of belonging.

## Figure 1

### *Theoretical Model*



## Methods

### Participants

In total, a sample of 128 students (23 males, 104 females, 1 other)<sup>1</sup> of the psychology program at the University of Groningen took part in our study. The age of participants ranged from 17 to 31 years old ( $M = 20.05$ ,  $SD = 2.03$ ). The sample consisted of Dutch and international psychology students (84 Dutch, 24 German, 20 other)<sup>2</sup>. Most of the participants

<sup>1</sup> Participants 77 and 95 were indicated as outliers, but had no significant impact on our outcomes. Therefore these participants were not removed from our sample.

<sup>2</sup> From all participants, 15 students did not finish the questionnaire, thus have been removed from our sample.

were first-year students (72.2%), the second and third year (15.6% and 10.9% respectively) were less represented.<sup>3</sup>

### **Research Design and Procedure**

Participants took part in an online questionnaire through Qualtrics (average duration: 5 minutes). We obtained ethical approval for this research from the Ethical Committee of Psychology at the University of Groningen. In this study, we employed two tactics to invite participants. First, participants were recruited via researchers' personal networks in WhatsApp groups by asking students at the faculty of psychology to take part in our study. Second, participants were recruited through the SONA-system of the University of Groningen, which is exclusively for first year psychology students. The first-year students that participated through the SONA-system were offered a compensation in the form of credits within the system (0.4 SONA-credits), other students did not receive any compensation for participating.

### **Measures**

#### ***Perceived surface-level and deep-level dissimilarity***

We assessed participants' (in)visible perceived dissimilarity with items adapted from Şahin et al. (2019). To assess **perceived surface-level dissimilarity** participants were asked to indicate to what extent they agreed with the statement "In terms of visible characteristics (e.g. appearance, gender, nationality), I am different than most students in the psychology program". To assess **perceived deep-level dissimilarity** participants were asked to indicate to what extent they agreed with two statements regarding perceived dissimilarity in attitudes towards vaccination choices and COVID-measures. More specifically, participants were asked to what extent they agreed with the statements: "In terms of attitudes towards COVID-vaccination, I am the same as most others in the psychology program", and "In terms of

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<sup>3</sup> Participant 14 showed a missing value on this item, therefore the percentages do not add to 100%.

attitudes towards COVID-measurements, I am the same as most others in the psychology program” ( $r(126) = .52, p < .001$ ). Both of the items measuring attitudes towards COVID-related attitudes were reverse coded. All items were answered on a five-point Likert-scale, ranging from 1 (definitely not) to 5 (definitely yes).

### ***Sense of Belonging***

We assessed students’ sense of belonging with the five-item scale from Williams et al., (2020). To assess students’ sense of belonging, participants were asked to indicate to what extent they agreed with statements like “I feel close or will soon become close to the students in the psychology program” ( $\alpha = .74$ ). Items of this scale were answered on a five-point Likert scale, ranging from 1 (definitely false) to 5 (definitely true).

### ***Institutional Commitment to Diversity***

We assessed institutional commitment to diversity with the five-item scale from the Diverse Learning Environments survey (Ng et al., 2013). To assess institutional commitment to diversity, participants were asked to indicate to what extent they agreed with items like “My university sets a high priority to diversity” and “My university supports the professional needs of faculty members from other countries” ( $\alpha = .74$ ). Items of this scale were answered on a five-point Likert-scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

### ***Academic Performance***

We assessed student’s perceived academic performance with the four-item scale from (Hsiao et al., 2017). To assess perceived academic performance, participants were asked to indicate to what extent they agreed with items like “I am confident in my academic and learning abilities” and “I do well in university” ( $\alpha = .86$ ). Items of this scale were answered on a five-point Likert-scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

## **Results**

In this study, we examine how perceived dissimilarity influences perceived academic performance. Table 1 provides an overview of the means, standard deviations and zero-order correlations for all study variables. We controlled for the variable age. As this variable was not correlated with our variables of interest, we will run the analysis without the variable age. We conducted a cross-sectional, correlational analysis using SPSS software 27.0.1.0. Participants expressed relatively high levels of sense of belonging ( $M = 3.96$ ,  $SD = 0.56$ ), institutional commitment ( $M = 3.65$ ,  $SD = 0.58$ ) and perceived academic performance ( $M = 3.68$ ,  $SD = 0.82$ ). A total of 105 (82.0%) participants indicated that they probably or definitely perceive themselves as being dissimilar to other students in terms of attitudes towards COVID-vaccination. A total of 91 (71,1%) of the participants indicated that they probably or definitely perceived themselves as being dissimilar to other students in terms of attitudes towards COVID-measures.

### **Preliminary Analysis**

We will conduct simple and multiple linear regression – and mediation analyses. Therefore, we will test the assumptions of normality, homoscedasticity, linearity and multicollinearity. The assumptions of normality (see figure 1 in Appendix A for a PP-plot), homoscedasticity (see figure 2 in Appendix A for a scatterplot of residuals), and linearity (see figure 2 in Appendix A for a scatterplot of residuals) were met. The assumption of multicollinearity was met ( $VIF = 5.30$ ) and we assume that the data had independent observations. The regression output can be found in Appendix A.

**Table 1**

#### *Descriptive Statistics and Correlations*

	<i>M</i>	<i>SD</i>	<i>1.</i>	<i>2.</i>	<i>3.</i>	<i>4.</i>	<i>5.</i>	<i>6.</i>
1. Perceived deep-level dissimilarity	2.21	0.71	-					
2. Perceived surface-level dissimilarity	2.33	1.13	.03	-				
3. Sense of Belonging	3.96	0.56	-.17	-.18*	-			

4. Institutional Commitment to Diversity	3.66	0.58	-.18*	-.06	.34**	-		
5. Perceived Academic Performance	3.68	0.82	-.09	-.10	.33**	.32**	-	
6. Age	20.05	2.03	.06	.12	-.08	.02	.04	-

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Hypothesis Testing

### *The Relationship between Perceived Dissimilarity and Academic Performance*

To test our first subhypothesis (H1a), we conducted a simple linear regression-analysis to test if perceived deep-level dissimilarity predicted academic performance. Contrary to our expectations, results of the regression indicated that perceived deep-level dissimilarity did not predict students' perceived academic performance ( $F(1, 123) = 0.91, p = .341, R^2 = .01$ ).

Since both perceived deep-level dissimilarity and perceived surface-level dissimilarity were not significantly correlated with academic performance, our second subhypothesis (H1b) was not supported. No further examinations were conducted.

### *Students' Sense of Belonging as a Mediator*

Results from the zero-order correlation matrix showed a non-significant correlation between perceived deep-level dissimilarity and perceived academic performance. Next to this, the correlation analysis showed a non-significant correlation between perceived deep-level dissimilarity and students' sense of belonging. Therefore we were not able to conduct a mediation analyses and we had to conclude that students' sense of belonging did not mediate the relationship between perceived deep-level dissimilarity and perceived academic performance. However, students sense of belonging was significantly correlated with academic performance ( $r = .33$ ). A simple linear regression analysis showed that students' sense of belonging positively predicted academic performance ( $F(1, 122) = 14.54, p < .001, R^2 = .11$ ).

### *Institutional Commitment as a Moderator between Dissimilarity and Sense of Belonging*

Results from the zero-order correlation matrix showed a non-significant correlation between perceived deep-level dissimilarity and students' sense of belonging. Therefore we were not able to conduct a moderated mediation analysis. Institutional commitment to diversity did not moderate the relationship between perceived deep-level dissimilarity and sense of belonging. However, institutional commitment was negatively correlated to perceived deep-level dissimilarity ( $r = -.18$ ), positively correlated to students' sense of belonging ( $r = .34$ ) and positively correlated to perceived academic performance ( $r = 0.32$ ). A simple linear regression analysis showed that institutional commitment to diversity positively predicted students' sense of belonging ( $F(1, 121) = 15.26, p < .001, R^2 = .11$ ), and positively predicted perceived academic performance ( $F(1, 119) = 13.73, p < .001, R^2 = .10$ ).

### **Exploratory Analysis**

We conducted exploratory correlational- and regression analyses, correlation tables and the regression output are presented in Appendix B.

#### ***Female participants***

An exploratory correlation analysis showed that for female participants, perceived deep-level dissimilarity was negatively related to student's sense of belonging ( $r = -.25$ ) and students' sense of belonging was positively correlated to academic performance ( $r = .32$ ). However, perceived deep-level dissimilarity was not significantly related to academic performance. A simple linear regression analysis showed perceived deep-level dissimilarity negatively predicted students' sense of belonging ( $F(1, 102) = 6.85, p = .010, R^2 = .06$ ). Additionally, students' sense of belonging positively predicted academic performance ( $F(1, 99) = 11.42, p = .001, R^2 = .10$ ).

#### ***Participants of 21 years and older***

Further examinations on a higher age subsample were conducted, specifically to see whether the contrary findings compared to previous research in working environments could

be diminished. An exploratory correlation analysis showed that for participants with the age of 21 years and older, perceived deep-level dissimilarity was negatively related to students' sense of belonging ( $r = -.39$ ). Next to this, a simple linear regression analysis showed that perceived deep-level dissimilarity negatively predicted students' sense of belonging ( $F(1, 38) = 6.86, p = .013, R^2 = .15$ ).

### **Discussion**

The purpose of this study was to investigate how perceived dissimilarity influences perceived academic performance. Contrary to our expectations (H1a and H1b), we found that perceived dissimilarity (both deep-level and surface-level) was not significantly correlated to perceived academic performance. Next to this, a simple linear regression showed that perceived deep-level dissimilarity did not significantly predict perceived academic performance. This is not in line with previous research examining the relationship between perceived dissimilarity and performance (Jansen et al., 2017; Şahin et al., 2019). Additionally, Jansen et al. (2017) found a significant relationship between gender dissimilarity and feelings of inclusion, and a significant relationship between gender dissimilarity and absenteeism at work through feelings of inclusion. Şahin et al. (2019) found a significant relationship between perceived deep-level dissimilarity and work outcomes, as well as a mediating role of sense of belonging in this relationship. However, contrary to our expectations (H2) in our research, student's sense of belonging did not mediate the relationship between perceived deep-level dissimilarity and academic performance. An additional finding from Jansen et al. (2017) showed that a positive diversity climate can buffer the negative effect of dissimilarity on feelings of inclusion. Again, contrary to our expectations (H3), these findings were not extended by our research, since institutional commitment to diversity did not moderate the relationship between perceived deep-level dissimilarity and students' sense of belonging.

Our finding that perceived deep-level dissimilarity was not related to academic performance is interesting, considering that earlier research showed a negative relationship between these two constructs (Hobman et al., 2004; Şahin et al., 2019). Apparently, students' attitudes towards COVID might not have consequences on their sense of belonging or academic performance. A first explanation of this finding might concern the specific focus of perceived deep-level dissimilarity that we used in our research. Previous research did not yet examine the effects of perceived dissimilarity in attitudes towards COVID on academic performance. Perceived dissimilarity in attitudes towards COVID might lead to different outcomes than the deep-level focuses in previous research did. Additional explanations for this finding might concern the measuring of this perceived deep-level dissimilarity, which we will further discuss in our limitations section.

Another explanation for the non-significance of the relationship between perceived deep-level dissimilarity and academic performance might be the influence of factors such as perceived openness to diversity, which we did not take into account. According to research examining the negative relationship between perceived dissimilarity and work group involvement, perceived group openness to diversity acted as a moderator in this relationship (Hobman et al., 2004). Specifically, perceived dissimilarity was negatively related to work group involvement, but when participants perceived a positive group openness to diversity, there was no relationship between perceived dissimilarity and work group involvement. It might be the case that participants in our study perceived their group of students to be open to diversity, which would mitigate the negative effect of perceived dissimilarity on academic involvement or perceived academic performance.

Interestingly, we found a positive relationship between students' sense of belonging and academic performance in the current study, which is consistent with earlier research on this relationship. For example, Suhlmann et al. (2018) found that students' sense of belonging



to their university increased motivation and lowered the intention to drop out. We add to this literature by showing that students' sense of belonging can predict academic performance at the university of Groningen. To influence academic performance, universities should probably look at how students can feel belonged at the university. However, specific constructs that influence both sense of belonging and academic performance, need further examination.

Additional exploratory analyses showed that for female participants, perceived deep-level dissimilarity negatively predicted sense of belonging, and sense of belonging positively predicted academic performance. This finding shows that perceived dissimilarity in attitudes towards COVID can have negative effects. Interestingly, these relationships were only present for female participants. One explanation for this might be the differences between males and females in attitudes towards corona (Galasso et al., 2020). For example, this research showed that women were more likely to perceive COVID-19 as a serious health problem, compared to men. Possibly, women are more concerned with this topic and pay more attention to possible dissimilarities regarding this topic. For participants with an age of 21 years and older, perceived deep-level dissimilarity was also negatively related to students' sense of belonging. This is in line with Sahin et al. (2019), who already demonstrated a negative relationship between perceived deep-level dissimilarity and feelings of inclusion at work. Together with this previous work, our results show that this relationship between perceived deep-level dissimilarity and sense of belonging might be stronger for older students or employees.

### **Limitations and Future Research**

There are four main limitations in our study that we will discuss. First, an explanation of our findings might direct towards the measuring of perceived deep-level dissimilarity. Where the largest part of the items in our questionnaire were coded regular, the two items measuring perceived deep-level dissimilarity were reverse coded. Instead of indicating to

what extent students felt dissimilar, students were asked to what extent they felt similar to other students. Previous research on the consequences of using both regular and reversed items in the same test, found that using reversed items in a test with regular items can negatively influence the reliability and unidimensionality of a test (Suárez-Alvarez et al., 2018). Result of this study showed that the precision of the test and the discriminatory power of the items decrease when regular and reversed items are used in the same test. As this is the case in our current study, future research on perceived deep-level dissimilarity might consider to more consistently assess only regular, or only reversed items.

Second, our results could be explained due to the focus of perceived deep-level dissimilarity we used in this research. The items measuring perceived deep-level dissimilarity in this study were based on items from Sahin et al. (2019). We changed the phrasing to our current focus however, and we don't know the impact of this on the reliability and validity of the scale. Additionally, we asked students to indicate to what extent they felt (dis)similar to other students in terms of attitudes towards COVID vaccination – and measures. COVID is a highly actual topic, which has major consequences all over the world. Since this topic led to a division in attitudes between people, it might have been difficult for participants to disclose their feelings of dissimilarity. Research on sensitive information disclosure already stated that individuals are often reticent to disclose sensitive information because of potential risks, which can impact the validity of the data (Pickard et al., 2018). For example, participants in our study may have chosen to answer relatively neutral to our dissimilarity items, to avoid disclosure of sensitive information. When we look at the distribution of answer options of our two items measuring perceived deep-level dissimilarity, respectively 11 (8.6%) and 29 (22.7%) participants answered “Neither true or false” on the questions for attitudes towards COVID-vaccination – and attitudes. Future research might consider to use a 4 or 6 Likert scale, to avoid neutral answers in the questionnaire.

Third, our results could be explained on the basis of the current study program at the university. Current students at the faculty of Psychology are following online or hybrid education for a large amount of their study time. Were previous research on perceived dissimilarity and performance focused on physical working environments, our participants had to perform in an (mainly) online environment. Students were not able to meet each other at the faculty and had classes online, which is certainly different compared to a physical context. Due to this less vivid form of contact with other students, our participants might not even know how other students feel towards topics like COVID. This might have had an impact on how dissimilar students feel at the faculty and the relationship between this and students' sense of belonging and academic performance. Therefore, future research should keep in mind that current students might experience another type of studying than students in earlier studies. One way to deal with this might be to ask students to what extent they have social interaction with and are aware of attitudes of the other students at their faculty.

Fourth, another explanation of these contrary findings might be the context of the studies; where Jansen et al. (2017) and Sahin et al. (2019) conducted their research in a working context, we conducted our research in an academic context. Our current sample consists of students in the age of 17-31 years old ( $M = 20.05$ ), where the participants of Jansen et al. (2017) and Sahin et al. (2019) showed an average age of 45.05 and 45.61 years old respectively. Interestingly, exploratory analyses of the older participants in our sample did show similar patterns to those mentioned by Jansen et al. (2017) and Sahin et al. (2019). For students aged from 21 years old, perceived deep-level dissimilarity was negatively correlated to students' sense of belonging. This could mean that younger students might not feel a strong decrease in belonging when feeling dissimilar, compared to older students. It could also mean that older students who perceive themselves as dissimilar experience a stronger decrease in belonging. Therefore, future research could focus on examining whether the age of

participants and type of environment matters in experiencing (deep-level) dissimilarity. A comparison could be made between the student environment with relatively young participants and a working environment with older participants.

### **Implications**

In this study we found that students' sense of belonging can play an important role in the academic performance of students. Educational institutions could focus on the students' sense of belonging at their faculty, to enhance (perceived) academic performance. A first step to increase the sense of belonging among students might be based on the "Pride and Prejudice" pathways to belonging (Brannon & Lin, 2021). According to this research, educational institutions should focus on two pathways to increase belonging among students. Firstly, ingroup solidarity of marginalized groups should be increased, for example by supporting culture and strengths of marginalized groups. The university could create a course where working groups actively address (positive) characteristics of the students' culture. Secondly, separation from the outgroup should be decreased, for example by addressing and mitigating threats and stigma of marginalized groups. The university could create an educational program where students discuss possible threats and stigma of marginalized groups. After addressing these possible threats and stigma, the education could focus on how students think threats and stigma could be reduced. Based on our results, students are likely to have a more positive perception of their academic performance when they experience an increased sense of belonging. Additionally, also previous research on the effects of sense of belonging already showed that university students' sense of belonging was positively related to motivation and well-being, and negatively related to dropout intention (Suhlmann et al., 2018). Therefore it would be highly relevant for educational institutions to focus on students' sense of belonging by using the proposed implementations.

### **Conclusion**

In summary, this research adds to the existing literature by demonstrating that feeling dissimilar in an academic environment does not necessarily lead to a change in academic performance. However, our results show that the sense of belonging can play an important role in predicting students' academic performance. Next to this, perceived deep-level dissimilarity can lead to a decrease in sense of belonging for older participants at the university, as well as for female participants. Further research is necessary to discover whether perceived deep-level dissimilarity can have a direct impact on academic performance. Future research on this relationship could focus on comparing perceived deep-level dissimilarities between gender, while taking the age of participants into account. In the short term, educational institutions can focus on improving students' sense of belonging, to increase performance and well-being of students.

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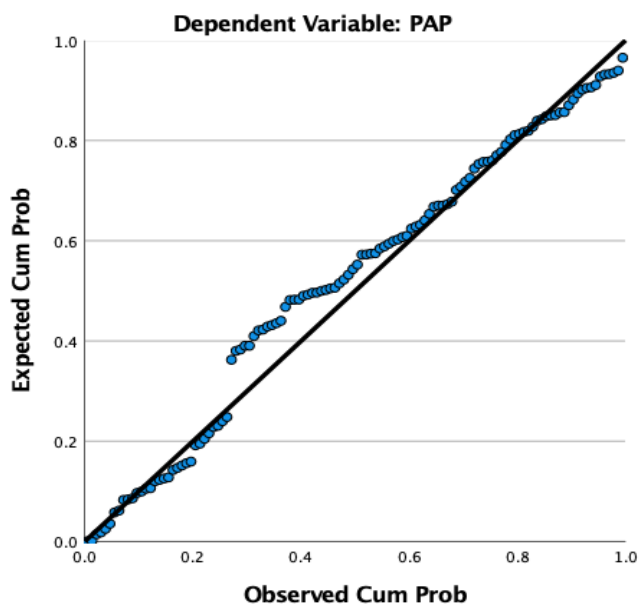


## Appendix A

### Regression Output for Assumption Checks

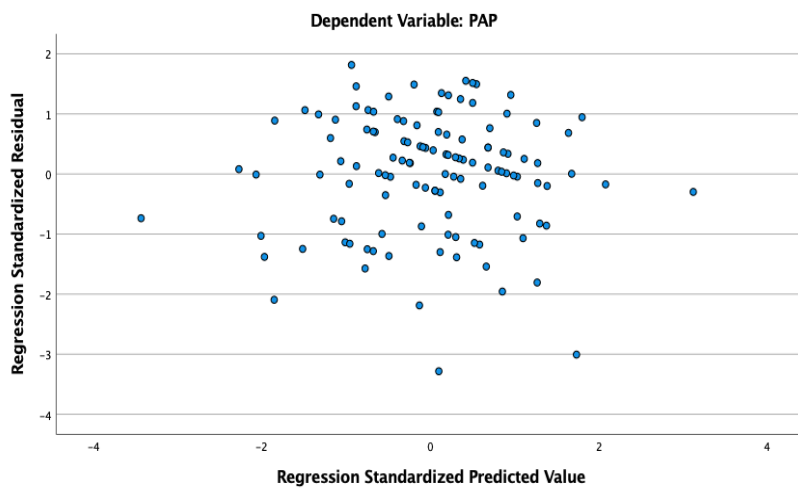
**Figure A1**

*Normal PP-plot of regression standardized residual*



**Figure A2**

*Scatterplot of the residuals*



**Table A1***Multiple Linear Regression, ANOVA*

<i>Model</i> <sup>a</sup>		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
1	<i>Regression</i>	13.03	4	3.26	5.74	<.001
	<i>Residual</i>	65.31	115	0.568		
	<i>Total</i>	78.342	119			

*Note.* The dependent variable is perceived academic performance.

<sup>a</sup> The Durbin-Watson statistic for this model was 2.018.

**Table A2***Multiple Linear Regression, Coefficients of the Complete Model*

<i>Model</i>		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>95% CI for B</i>		<i>VIF</i>
		<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			<i>LB</i>	<i>UB</i>	
1	<i>(Constant)</i>	2.59	0.65		3.97	<.001	1.30	3.88	
	<i>Perceived deep-level dissimilarity</i>	-.62	0.22	-.54	-2.77	.007	-1.06	-0.18	5.30
	<i>Perceived surface-level dissimilarity</i>	-.03	0.06	-.05	-0.54	.592	-0.16	0.09	1.03
	<i>Sense of belonging</i>	.34	0.14	.23	2.49	.014	0.07	0.61	1.17
	<i>COVxIC<sup>a</sup></i>	.15	0.06	.53	2.75	.007	0.04	0.26	5.18

*Note.* The dependent variable is perceived academic performance.

<sup>a</sup> COVxIC is the interaction between perceived deep-level dissimilarity and institutional commitment to diversity.

## Appendix B

### Correlation- and Regression Output of Exploratory Analyses

**Table B1**

*Descriptive Statistics and Correlations, Female Participants*

	<i>M</i>	<i>SD</i>	<i>1.</i>	<i>2.</i>	<i>3.</i>	<i>4.</i>	<i>5.</i>	<i>6.</i>
1. <i>Perceived deep-level dissimilarity</i>	2.16	0.61	-					
2. <i>Perceived surface-level dissimilarity</i>	2.26	1.10	.001	-				
3. <i>Sense of Belonging</i>	3.94	0.57	-.251*	-.226*	-			
4. <i>Institutional Commitment to Diversity</i>	3.63	0.58	-.139	-.068	.313**	-		
5. <i>Perceived Academic Performance</i>	3.65	0.82	-.113	-.061	.322**	.360**	-	
6. <i>Age</i>	19.88	1.59	.117	.041	-.004	.062	.084	-

\*Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Table B2**

*Descriptive Statistics and Correlations, Age of 21 years and older*

	<i>M</i>	<i>SD</i>	<i>1.</i>	<i>2.</i>	<i>3.</i>	<i>4.</i>	<i>5.</i>	<i>6.</i>
1. <i>Perceived deep-level dissimilarity</i>	2.26	0.60	-					
2. <i>Perceived surface-level dissimilarity</i>	2.40	1.24	.010	-				
3. <i>Sense of Belonging</i>	3.94	0.59	-.391*	-.167	-			
4. <i>Institutional Commitment to Diversity</i>	3.73	0.62	-.169	-.020	.242	-		
5. <i>Perceived Academic Performance</i>	3.88	0.87	-.276	-.129	.173	.222	-	
6. <i>Age</i>	22.40	1.95	.073	0.23	-.173	-.089	-.155	-

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Table B3**

*Regression Output Female Participants, Perceived Deep-level Dissimilarity Predicting Sense of Belonging*

<i>Model</i>		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>VIF</i>
		<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			
1	<i>(Constant)</i>	4.45	0.20		22.04	<.001	
	<i>Perceived deep-level dissimilarity</i>	-.24	0.09	-.25	-2.62	.010	1.00

*Note.* The dependent variable is students' sense of belonging.

**Table B4**

*Regression Output Female Participants, Sense of Belonging Predicting Academic Performance*

<i>Model</i>		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>VIF</i>
		<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			
1	<i>(Constant)</i>	1.86	0.53		3.49	<.001	
	<i>Sense of Belonging</i>	0.45	0.13	-.32	3.38	.001	1.00

*Note.* The dependent variable is perceived academic performance.

**Table B5**

*Regression Output Older Subsample (Age 21 and older), Perceived Deep-level Dissimilarity Predicting Sense of Belonging*

<i>Model</i>		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>VIF</i>
		<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			
1	<i>(Constant)</i>	4.81	0.35		13.92	<.001	
	<i>Perceived deep-level dissimilarity</i>	-.387	0.15	-.391	-2.62	.013	1.00

*Note.* The dependent variable is students' sense of belonging.