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Intersecting Inequalities and Perceived Discrimination in Student Mental Health: Evidence from an MAIHDA Analysis in Germany

Maria Gonzalez[1]*, Javier Ruiz[1], Lucia Torres[2], Elena Ruiz[1]

[1]Department of Social Healthcare Systems, Faculty of Medicine, University of Granada, Granada, Spain.
[2]Department of Behavioral Health Systems, University of Seville, Seville, Spain.

***E-mail** ✉ maria.gonzalez@gmail.com

Abstract

Discrimination constitutes a major risk factor for the mental health of university students, above all for those experiencing social inequality. Yet, insight into its intersectional consequences remains insufficient. The current study examines how social inequalities intersect with perceived discrimination to identify differences in mental health outcomes among students in Germany. Information drawn from the cross-sectional "Survey on study conditions and mental health of university students" (n = 14,592) was examined with Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA). Depressive symptoms, cognitive stress symptoms, and exhaustion were assessed across 48 intersectional strata constructed from gender, first academic generation, family care tasks, and perceived discrimination.

MAIHDA results showed notable variance between strata. Most of this variance stemmed from additive effects instead of intersectional interactions. Perceived discrimination, female or diverse gender, first academic generation status, and family care responsibilities (limited to exhaustion) were each related to poorer mental health. The clear links between perceived discrimination and worse mental health in university students require immediate attention and targeted measures within higher education institutions. An intersectional approach is crucial for detecting and reducing existing inequalities.

Keywords: Intersecting inequalities, Perceived discrimination, Mental health, Student

Introduction

When examining discrimination, it is essential to understand that people are rarely affected by only one trait. Instead, multiple social characteristics combine to shape their identity and daily realities [1, 2]. Black feminist intersectional scholars and activists have stressed that features of identity—such as socially defined traits like race or gender—should never be treated as separate or fixed. These features are intertwined and together produce distinct lived experiences. Such experiences, in turn, reveal overlapping systems of power and oppression at the structural level, including racism and sexism [2–4].

Intersectionality is increasingly viewed as a necessary framework for analyzing health inequalities in the health sciences [3, 5]. However, although many studies recognize the existence of multiple or intersectional discrimination, most still concentrate on single dimensions of inequality. They often ignore how different social identities interact and create distinct social positions [6–8]. This narrow focus has left significant gaps in knowledge about the complex ways in which various aspects of identity influence one another [2, 9–11]. As a result, the true scale of multiple discrimination is underestimated, and the greater risk faced by those with overlapping disadvantages receives insufficient attention [6].

Given the broader societal power structures that maintain intersectional inequalities, universities frequently become settings where these dynamics are highly visible

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and embedded in institutional practices. This can intensify disadvantages for particular student groups [10, 12]. Evidence indicates that students differing in race, sexual orientation, and/or gender are especially likely to encounter discrimination on campus [12–17]. Such discrimination—whether directly experienced or subjectively felt—has been consistently tied to negative mental health effects, including elevated stress, anxiety, and depression [13–17]. Even when not personally aimed at an individual, perceived discrimination can heighten feelings of vulnerability and constant alertness to potential bias, thereby increasing stress and anxiety [18–20]. Much existing research on this topic depends on participants' self-reports rather than verified incidents [18]. Since objective confirmation is usually unavailable, this study uses the term "perceived discrimination" to cover both directly experienced and observed forms of discrimination.

Discrimination has been associated with poorer academic outcomes, including lower grades and increased dropout risk [17], which can have long-term effects on students' career opportunities [17, 21]. The complex connection between discrimination, students' psychological well-being, and their educational pathways [17, 22] highlights the pressing need to explore the multiple dimensions of discrimination in higher education settings. Given that certain student groups with specific social traits experience discrimination at markedly higher rates, adopting an intersectional framework is essential to clarify its links with potential mental health consequences [23, 24]. Although earlier research has investigated combinations of disadvantaged social identities in relation to mental health or educational results—for instance, in studies on adolescence and depression [25], university enrolment and mental health disparities [26], or school-based educational inequalities [27]—no prior study, to our knowledge, has directly examined perceived discrimination and its relationship with mental health specifically among university students.

Aligning with the international patterns described above, university students in Germany also represent a particularly vulnerable population concerning mental health. Multiple studies have shown that they face substantially higher levels of issues such as stress, depressive symptoms, or both, when compared with the general population [28–30]. However, precisely estimating the frequency of discrimination in German universities and fully comprehending its impact on the mental health of affected individuals continues to be difficult. A recent nationwide survey found that 26% of university students reported having personally experienced discrimination during their studies, while 46% had witnessed discrimination directed at others. These experiences were associated with decreased study satisfaction and increased stress [19]. Notably, the survey primarily analyzed the isolated effects of different types of discrimination. Therefore, more research is required on the phenomenon of intersectional multiple discrimination in this environment [8, 31, 32]. At present, relatively little is known about the prevalence of multiple discrimination or its consequences for mental health.

For these reasons, the present study examines the contributions of perceived discrimination and overlapping social inequalities to the mental health of university students in Germany. Special attention is given to how these relationships differ across specific combinations of social positions.

Materials and Methods

Data and sample

Data were drawn from the cross-sectional project "Survey on study conditions and mental health of university students" (StudiBiFra), which was conducted at thirteen German universities between June 2021 and March 2023. The participating institutions comprised 10 traditional universities and 3 universities of applied sciences. Information was gathered online through the "Bielefeld Questionnaire on Study Conditions and Mental Health" [33] using LimeSurvey (LimeSurvey GmbH, Hamburg, Germany) in both English and German versions. Invitations were sent via email to all students aged 18 years and older who were enrolled in bachelor's or master's degree programs. The questionnaire included 23 sections addressing various aspects of study conditions (including COVID-19-related factors and future career prospects) and eight outcome scales, three of which directly assessed mental health.

Out of the initial 24,533 students who participated, only those who could be allocated to intersectional strata were retained for analysis. Individuals with any missing data on the social categories needed to form the strata were therefore excluded. The resulting analytical sample comprised 14,592 students. The average response rate across institutions was 11.4%, calculated relative to the total number of enrolled students at each university.

Measures

Outcome: mental health

Three mental health indicators were examined: depressive symptoms, cognitive stress symptoms, and exhaustion. Each indicator was measured using a 5-point Likert-type scale ranging from 1 ["(almost) never"] to 5 ["(almost) always"]. Depressive symptoms were evaluated with five items adapted from the German ProSoB questionnaire on productivity and social capital in business [34] for use in the university context, including statements such as "I found it difficult to enjoy anything." Cognitive stress symptoms were assessed via four adapted items from the Copenhagen Psychosocial Questionnaire (COPSOQ) [35], for example, "I had difficulties concentrating." Exhaustion was measured with three items from the ProSoB questionnaire, such as "I felt burned out from my studies" [35].

A total score was computed for each outcome by summing the scores of the respective items within each topic block (maximum possible scores: 25 for depressive symptoms, 20 for cognitive stress symptoms, and 15 for exhaustion). These total scores were analyzed as continuous variables.

Intersectional strata dimensions

Owing to the secondary use of the dataset, the variables used to create the intersectional strata could not be predetermined. We therefore used the Diversity Minimal Item Set (DiMIS) as a reference framework to help reduce diversity and gender gaps commonly found in health research. The DiMIS approach is grounded in anti-discrimination standards published by the United Nations Human Rights Office. It focuses on elements that matter for health and wellbeing beyond conventional binary notions of gender and age [36].

On this basis, three socio-demographic variables were chosen to capture social positions that may indicate underlying inequalities: gender ("female"/"male"/"diverse"), family care tasks ("I care for children in need of care and/or supervision"/"I care for relatives in need of care and/or supervision"/"I don't have any of the family responsibilities mentioned"), and first academic generation ["In my family (parents/siblings) I am the first person who has taken on studies"] used here as an indicator of socio-economic position [37, 38]. For modeling purposes, family care tasks were simplified into a binary measure (presence or absence of care responsibilities), without distinguishing between caring for children and relatives.

Perceived discrimination by lecturers or fellow students was assessed with two items on a 5-point Likert-type scale ranging from 1 ("strongly agree") to 5 ("strongly disagree"): "To what extent do you agree with the following statements across all courses taken to date: My lecturers discriminate against individual students (e.g., based on gender, disability, age, origin, racist attributions, pregnancy)"; "In my course of studies, individual students are discriminated against by other students (e.g., based on gender, disability, age, origin, racist attributions, pregnancy)." These items were combined and then dichotomized to create four categories of perceived discrimination: discrimination by lecturers only, discrimination by fellow students only, discrimination by both lecturers and students, and no discrimination. Consistent with the DiMIS framework [36], this variable was considered part of social experiences and was therefore included in the definition of the intersectional strata.

Merging all possible categories yielded 48 distinct intersectional strata. Students were placed within these strata according to their gender (3 categories), family care tasks (2 categories), first academic generation (2 categories), and perceived forms of discrimination (4 categories).

Covariates

Because the university's cultural environment can shape students' experiences [39], we controlled for institutional variation by including each university as a dummy variable. We further adjusted for age group to account for potential confounding by age differences among participants.

Analysis

Recent developments in quantitative intersectionality research have introduced new techniques [40] that are gaining wider application [27]. A key example is the Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA). First proposed by Merlo [41], MAIHDA uses a multilevel modeling structure in which individuals are nested within social intersectional strata rather than grouped by a conventional contextual factor, such as university affiliation [40]. These strata are formed by every unique combination of the selected dimensions of identity and social position. The method overcomes several limitations of standard intersectional analyses by allowing more dimensions of social identity to be

included, improving scalability while preserving model simplicity. Conventional approaches often require a sharp increase in the number of fixed parameters, whereas MAIHDA only adds extra level-two units and additive main effects. In addition, it produces more dependable estimates for strata with limited sample sizes by applying shrinkage based on the actual number of observations [25, 40].

Applying this framework, we conducted a separate MAIHDA for each of the three mental health outcomes through a sequence of multilevel linear regression models. In all models, individuals were positioned at level one and nested within the 48 intersectional strata at level two.

Initially, an empty null model (Model 1) was estimated to partition the total variance and compute the Variance Partition Coefficient (VPC). The VPC expresses the proportion of overall variance in the outcome that arises from differences between intersectional strata [42]. By separating variance into within-stratum and between-stratum components, MAIHDA helps clarify how multiple dimensions of social inequality affect health outcomes both across and within strata [40, 41]. A higher VPC in Model 1 signals greater importance of the intersectional strata in accounting for variation in mental health.

Subsequently, a second model (Model 2) was fitted that incorporated the main effects of the variables defining the strata. The Proportional Change in Variance (PCV) was then calculated to determine how much of the between-strata variance could be explained by these additive main effects. A PCV value below 100% means that not all between-strata variance is accounted for by the main effects alone, which points to the presence of multiplicative interaction effects among the intersectional dimensions [42]. Put simply, the higher the PCV, the greater the share of between-strata variance in mental health scores attributable to additive main effects of the strata-defining variables.

In Model 3, covariates for university institutions and age groups were added as fixed effects. This allowed us to assess how much of the remaining variance (i.e., inequalities) could be attributed to these additional factors. We also inspected the strata-level residuals to check whether specific intersectional strata exhibited notable interaction effects. Positive residuals reflected poorer mental health outcomes than expected from additive effects alone, while negative residuals indicated better outcomes (protective effects). A residual near zero meant the stratum's outcome matched the prediction based solely on the main effects.

Data management was conducted using IBM SPSS Statistics (version 27), while all MAIHDA models were estimated using Stata (version 18).

Results and Discussion

Sample characteristics

Basic descriptive information about the study participants is shown in **Table 1**. In the final sample of 14,592 students, 66.92% identified as female, 31.26% as male, and 1.82% as gender-diverse. Furthermore, 37.94% were the first person in their family to enter university, while 13.35% combined their studies with family care responsibilities. Concerning perceived discrimination, 10.11% reported experiencing it from lecturers, 5.40% from fellow students, and 5.17% from both lecturers and fellow students.

Table 1. Summary statistics describing the sample (n = 14,592) (data are based on the study "Survey on study conditions and mental health of university students", conducted in Germany from 2021 to 2023).

Variable	Category	% (n)
Sex	Male	31.26 (4,562)
	Female	66.92 (9,765)
	Diverse	1.82 (265)
First-generation student status	No	62.06 (8,895)
	Yes	37.94 (5,439)
Family caregiving responsibilities	No	86.65 (11,420)
	Yes	13.35 (1,759)
Perceived discrimination experience	No	79.32 (9,525)
	Yes, from lecturers	10.11 (1,214)
	Yes, from peers	5.40 (649)
	Yes, from both sources	5.17 (621)

Table 2 presents the number of participants allocated to each of the 48 intersectional strata. Sample sizes varied widely across strata. Stratum 47 had zero participants (gender-diverse first-generation students with family care tasks who reported discrimination by fellow

students). Five additional strata each contained five or fewer individuals. The most populous strata mainly comprised female students with fewer overlapping disadvantages.

Table 2. Allocation of observations across the various intersectional strata (data are based on the study "Survey on study conditions and mental health of university students", conducted in Germany from 2021 to 2023).

Stratum	Gender			First academic generation		Family care tasks		Perceived discrimination			Number of respondents
	Male	Female	Diverse	No	Yes	No	Yes	No	Lecturers	Students	Both	
1												1,692
2												135
3												93
4												85
5												126
6												18
7												14
8												12
9												908
10												91
11												67
12												65
13												98
14												26
15												16
16												19
17												3,097
18												428
19												186
20												134
21												448
22												67
23												35
24												45
25												1,820
26												209
27												111
28												89
29												327
30												59
31												40
32												44
33												49

34		15
35		10
36		11
37		7
38		2
39		2
40		6
41		40
42		12
43		6
44		8
45		5
46		3
47		0
48		2

Note: Colors in the table are used for visualization purposes only and do not contribute to the analytical content.

Results from MAIHDA

All MAIHDA modeling outcomes are summarised in **Table 3**. The VPC values from the empty Model 1 indicated that 7.02% of the variance in depressive symptoms, 8.28% in cognitive stress symptoms, and 6.14% in exhaustion were associated with differences across the intersectional strata. These levels correspond to moderate discriminatory accuracy, as defined by standard criteria in social epidemiology (VPC between 5 and 10) [42].

Table 3. Outcomes of the Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) intersectional models for the mental health indicators depressive symptoms, cognitive stress symptoms, and exhaustion (data derived from the "Survey on study conditions and mental health of university students", conducted in Germany between 2021 and 2023).

Outcome	**Exhaustion (n = 10,680)**	**Cognitive stress symptoms (n = 10,697)**	**Depressive symptoms (n = 10,648)**
Model	Model 1 Model 3	Model 1 Model 3	Model 1 Model 3
fixed effects	Coef. (95% CI) Coef. (95% CI)	Coef. (95% CI) Coef. (95% CI)	Coef. (95% CI) Coef. (95% CI)
Intercept	10.34 (10.06; 10.61) 8.30 (8.15; 8.46)	12.54 (12.14; 12.95) 10.03 (9.69; 10.36)	16.21 (15.72; 16.70) 12.49 (12.19; 12.80)
Gender			
Male	Ref. Ref.	Ref. Ref.	Ref. Ref.
Female	— —	— 0.66 (0.54; 0.79)	0.63 (0.36; 0.90) 0.96 (0.66; 1.26)
Diverse	— —	— 1.40 (0.94; 1.86)	2.68 (1.90; 3.47) 2.63 (1.98; 3.28)
First academic generation			
No	Ref. Ref.	Ref. Ref.	Ref. Ref.
Yes	— 0.38 (0.26; 0.50)	— 0.47 (0.18; 0.75)	0.56 (0.31; 0.82) 0.47 (0.18; 0.75)
Family care tasks			
No	Ref. Ref.	Ref. Ref.	Ref. Ref.
Yes	— 0.47 (0.29; 0.66)	— 0.08 (−0.25; 0.40)	0.14 (−0.20; 0.48) 0.08 (−0.25; 0.40)

Perceived discrimination			
No	Ref. Ref.	Ref. Ref.	Ref. Ref.
Yes, by lecturers	— —	— 1.22 (1.02; 1.41)	1.65 (1.28; 2.01) 0.91 (0.54; 1.28)
Yes, by fellow students	— 1.24 (0.99; 1.50)	— 1.45 (1.03; 1.87)	2.20 (1.75; 2.66) 1.45 (1.03; 1.87)
Yes, by both	— 1.71 (1.44; 1.99)	— 2.23 (1.80; 2.67)	3.25 (2.78; 3.73) 2.23 (1.80; 2.67)
Measures of variance			
Between-strata variance	0.61 (0.35; 1.08) 0.00 (0.00; 0.01)	1.40 (0.80; 2.46) 0.06 (0.01; 0.33)	2.00 (1.14; 3.51) 0.02 (0.00; 0.83)
VPC (%)	6.14% 0.00%	8.28% 0.37%	7.02% 0.06%
PCV (%)	— —	— 100.00%	99.21% 96.00%

Notes: estimates shown in bold are statistically significantly different from zero. Model 3 has been adjusted using dummy variables for every university institution and age category. Abbreviations: Coef., coefficient; CI, confidence interval; Ref, reference; VPC, variance partition coefficient; PCV, proportional change in variance.

After including the strata-defining variables as fixed effects in Model 2 and adding the covariates in Model 3, the VPC fell to very low levels across all outcomes: 0.06% for depressive symptoms, 0.37% for cognitive stress symptoms, and 0.00% for exhaustion. At the same time, the PCV values were very high: 99.21% for depressive symptoms, 96.00% for cognitive stress symptoms, and 100.00% for exhaustion. This pattern shows that differences in mental health across the intersectional strata were accounted for almost completely, and in some cases entirely, by the simple additive main effects of the variables used to define the strata.

Heterogeneity in mental health outcomes

Female students and those identifying as gender-diverse displayed considerably elevated depressive symptoms, cognitive stress symptoms, and exhaustion in comparison with male students. Individuals who were the first in their families to enter higher education showed substantially increased levels across all three mental health indicators relative to students from non-first-generation backgrounds. Only the presence of family care duties reached statistical significance, and this was limited to exhaustion.

The strongest negative links were found among students who reported discrimination from both teaching staff and fellow students. These students recorded higher predicted values for all three mental health outcomes than their peers who experienced no discrimination. Full details appear in **Table 3**, while the patterns of variation across intersectional strata for each outcome are shown visually in **Figures 1–3**.

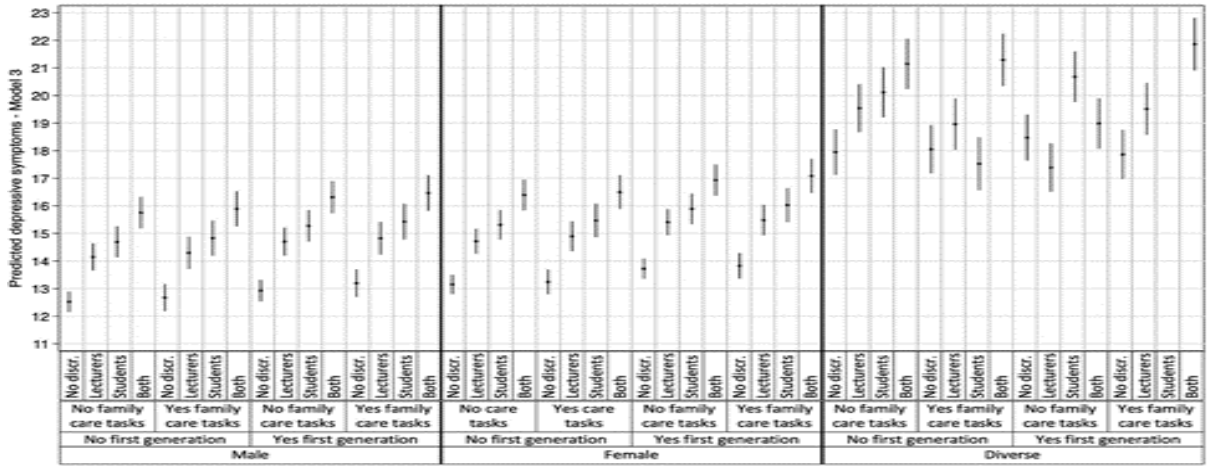

Figure 1. Findings of the multilevel analysis of individual heterogeneity and discriminatory accuracy concerning depressive symptoms (data are based on the study "Survey on study conditions and mental health of university students", conducted in Germany from 2021 to 2023).

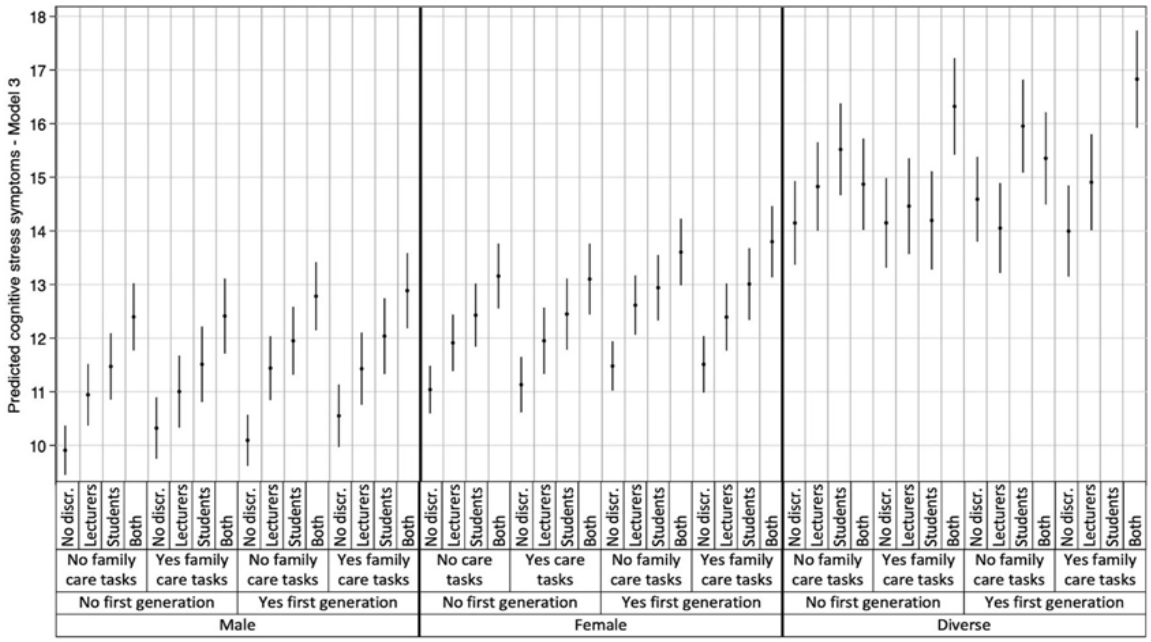

Figure 2. Findings from the multilevel analysis of individual heterogeneity and discriminatory accuracy regarding cognitive stress symptoms (data from the study "Survey on study conditions and mental health of university students", conducted in Germany from 2021 to 2023).

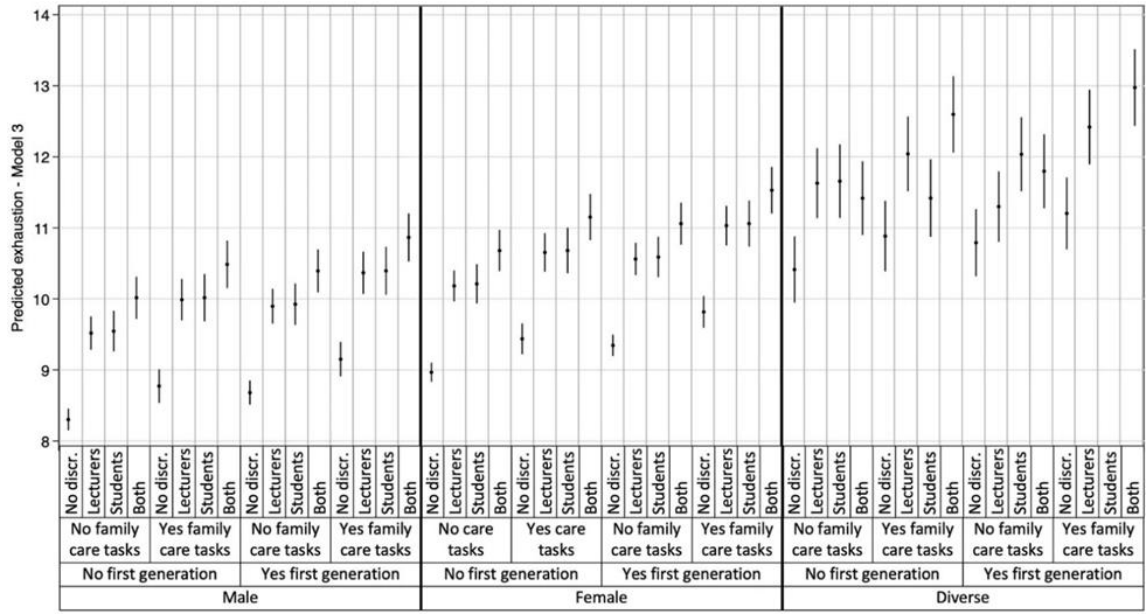

Figure 3. Findings of the multilevel analysis of individual heterogeneity and discriminatory accuracy concerning exhaustion (data are based on the study "Survey on study conditions and mental health of university students", conducted in Germany from 2021 to 2023).

In addition, the plotted stratum-level residuals for each mental health outcome provide a visual illustration of the intersectional interaction effects. Except for a single case, the 95% confidence intervals (CI) included zero, indicating statistical significance only for stratum 9. This stratum showed negative values for cognitive stress symptoms and consisted of male students who were first-generation in higher education and reported no care

responsibilities. Since only one stratum was statistically significant, the differences observed between strata were overwhelmingly due to additive effects. This finding matches the low VPC combined with the high PCV reported in Model 3. More extensive information on the residual analysis is available in the Supplementary Material, which identifies the three intersectional strata with the strongest and weakest interaction effects for each mental health outcome.

The present research set out to investigate the impact of perceived discrimination, together with overlapping forms of social disadvantage, on the mental health of university students in Germany. Data were drawn from the cross-sectional StudiBiFra survey, which covered 13 universities across the country. In total, 48 distinct intersectional strata were constructed to represent different combinations of social inequalities. These strata were examined using intersectional MAIHDA in relation to three mental health indicators: depressive symptoms, cognitive stress symptoms, and exhaustion.

Results showed clear differences in mental health across the intersectional strata. The strata themselves accounted for 7.02% of the variance in depressive symptoms, 8.28% in cognitive stress symptoms, and 6.14% in exhaustion. The least favorable mental health profiles appeared in groups made up of students who identified as gender-diverse or female, belonged to the first academic generation, and reported experiencing discrimination from both lecturers and fellow students. Strata that combined gender-diverse identity with discrimination from both sources were particularly likely to report markedly elevated mental health difficulties.

Most of the variation between strata arose from the simple addition of individual effects, with only limited evidence of interactions. This finding is consistent with the range of VPC values seen in earlier MAIHDA work [27]. Large PCV values further indicated that the greater part of the between-strata differences could be accounted for across all three outcomes. These patterns match those reported in previous MAIHDA studies focused on mental health [25, 26]. Although a few strata displayed non-zero residuals, indicating that their outcomes differed from what additive effects alone would predict [25], only stratum 9 showed a statistically significant deviation in cognitive stress symptoms. Importantly, the small interaction effects that emerged illustrate the distinctive cumulative burdens borne by students who hold multiple marginalized identities at once. These modest interactions do not deny the existence of intersectional disadvantage; instead, they underline how the combined disadvantages within each stratum exert a stronger influence than when the factors are viewed in isolation.

Perceived discrimination was linked to poorer mental health scores for students of all genders, across academic generations, and, to a lesser extent, across groups defined by family care responsibilities. Discrimination was most often attributed to lecturers, in keeping with earlier German research [19, 43]. Experiencing discrimination from both lecturers and fellow students, however, showed the strongest negative relationship with all three mental health measures. This result emphasizes the importance of accounting for multiple sources of discrimination in educational environments when studying their effects on student well-being [43–46].

The combination of perceived discrimination and gender identity proved especially important in shaping mental health inequalities. Students identifying as gender-diverse or as female reported higher levels of all three mental health problems, and these levels rose further when they also faced discrimination from both sources. These observations agree with existing studies showing that people who encounter gender-based discrimination, such as sexism or shaming, are at greater risk of serious consequences, including harassment and sexualised violence [12, 19, 45, 46]. Although females are known to experience worse mental health than males in general [28–30], most earlier research has concentrated on binary gender categories. The current study broadens this perspective by including the experiences of gender-diverse students, thus providing a fuller understanding of gender-related mental health disparities in higher education settings that goes beyond conventional binary distinctions.

Additional insight was gained into other social factors, such as first-generation academic status and family care tasks. First-generation students generally showed poorer mental health, with this effect being strongest among those who also identified as gender-diverse and reported double discrimination. These findings support previous work that has connected first-generation status with increased mental health challenges, particularly stress and depressive symptoms [47]. On a more positive note, the analysis revealed possible protective patterns (negative residuals) for cognitive stress symptoms among male first-generation students who had no family care responsibilities. Regarding family care tasks, a clear link was found only with higher exhaustion, consistent with research on the demands placed on caregivers [48].

Surprisingly, no association was detected between family care tasks and raised stress levels [48], which may reflect the presence of effective coping mechanisms or supportive networks that help mitigate stress [49].

Taken together, the substantial mental health inequalities tied to perceived discrimination, gender identity, first-generation academic generation, and (in the case of exhaustion) family care tasks suggest that future studies and university interventions need to address all these factors together. Special focus should be placed on students who experience discrimination from both lecturers and fellow students and who identify as gender-diverse or female. The present results are in line with earlier intersectional research in health, which has similarly found meaningful differences between strata and a strong ability to explain variation in mental health outcomes [25, 42].

Strengths and limitations

Several important limitations should be noted. To begin with, the survey was not originally developed with a focus on diversity or social inequality. This made it difficult to incorporate all relevant diversity factors into the intersectional strata from the start. As a consequence, several key elements that help define social identities in university life — including race, migration background, neurodiversity, chronic illness, disability, and language ability — had to be excluded from the analysis [19].

Next, the highly uneven sample sizes across the different intersectional strata made generalizing the results difficult, especially since one stratum contained no participants. Later studies would benefit from collecting more balanced, inclusive samples that reflect a wider range of intersectional identities from the planning stage onward. Measures such as the Intersectional Discrimination Index [50] or the DiMIS [36] provide more sophisticated tools for assessing intersectional discrimination and its effects in large-scale population research.

The response rate itself may have led to self-selection bias. More vulnerable groups may have been less inclined to participate, resulting in underrepresentation in the final dataset. Even so, we do not expect this kind of selection bias to have strongly influenced the MAIHDA findings. The study also relied entirely on participants' reports of perceived discrimination, which are inherently subjective. Neutral answers ("neither disagree nor agree") were counted as agreement because discrimination frequently appears in indirect or institutional ways that are not always easy to recognize [18, 32]. People sometimes pick the neutral option when they feel unsure or have mixed feelings, reflecting how complex and personal discrimination can be. This coding choice helped avoid missing more subtle or hidden forms of discrimination. It is worth noting that the questionnaire did not ask about students' personal experiences of discrimination; rather, it asked whether students, in general, face discrimination from lecturers or fellow students. Therefore, our findings reflect overall perceptions rather than the lived experiences of those directly targeted. Future investigations should examine specific types of discrimination, use more precise measurement instruments, and combine these with qualitative methods [19, 50].

In addition, some methodological decisions — for instance, summing item scores for each mental health outcome or treating the 5-point Likert scale for perceived discrimination as a simple yes/no measure — could have affected statistical power and the extent to which the results can be applied. These choices were made deliberately to make the analysis clearer and easier to interpret, while preserving as much of the original data as possible. Likewise, to maintain a large enough sample for robust statistical modeling despite missing responses, we included cases in which up to one-third of the answers were missing [51]. This decision took into account the relatively high likelihood of missing values for both outcomes and predictors. Given how complicated MAIHDA modeling is, other techniques such as multiple imputation would have been very difficult to implement in practice.

Data collection also overlapped with the period of COVID-19 restrictions in Germany [52] (spring 2021 to spring 2022). This was a time of widespread social distancing, lockdowns, and a complete shift to online teaching. Previous research has shown that these pandemic measures were major sources of stress for university students' mental health [53], which may limit the extent to which our results can be generalized. Nevertheless, studies conducted well before the pandemic had already pointed to serious mental health difficulties among university students in Germany [30].

Finally, it is crucial to remember that this study looks at only one direction of the link between discrimination and mental health. The relationship actually goes both ways: mental health conditions or neurodiversity can also increase the risk of facing discrimination, which then further damages well-being [54]. Research specifically

on students with disabilities, mental health difficulties, or neurodiverse characteristics has found clear connections between these conditions and experiences of discrimination and disadvantage at university, often making their existing challenges even worse [55].

Despite the limitations described, the fact that the data came from multiple universities and involved a large overall sample helps increase confidence in the accuracy of the findings. One standout strength is the inclusion of students who identify as gender-diverse—a first for any MAIHDA study on mental health.

Conclusion

This study illustrates the intricate ways in which various dimensions of social inequality combine with personal experiences to create mental health disparities. Using an approach grounded in intersectionality, the results clearly show how overlapping forms of social disadvantage are linked to poorer mental health among university students. The findings highlight the pressing need for action and well-designed interventions in university settings to tackle both structural and intersectional inequalities. These efforts should aim to build genuinely supportive and inclusive environments for every student. Recognizing existing power structures is vital if we are to understand and tackle the underlying causes of these inequalities. Future research should work with more diverse samples, include objective indicators of discrimination, and make greater use of qualitative methods to gain a richer picture of these complex issues. Applying an intersectional framework is an essential first step toward properly identifying and reducing these inequalities.

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