Chapter 3

Workplace Bullying in Academia: Interaction of Gender, Nationality, Age, and Work Context of Scientific and Non-Scientific Employees in a Large German Research Organization

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Abstract

Purpose: The study elaborates the contextual conditions of the academic workplace in which gender, age, and nationality considerably influence the likelihood of self-categorization as being affected by workplace bullying. Furthermore, the intersectionality of these sociodemographic characteristics is examined.

Basic Design: The hypotheses underlying the study were mainly derived from the social role, social identity, and cultural distance theory, as well as from role congruity and relative deprivation theory. A survey data set of a large German research organization, the Max Planck Society, was used. A total of 3,272 cases of researchers and 2,995 cases of non-scientific employees were included in the analyses performed. For both groups of employees, binary logistic regression equations were constructed. The outcome of each equation is the estimated percentage of individuals who reported themselves as having experienced bullying at work occasionally or more frequently in the 12 months prior to the survey. The predictors are the demographic and organization-specific characteristics (hierarchical position, scientific field, administrative unit) of the respondents and selected interaction terms. Using regression equations, hypothetically rel-

evant conditional marginal means and differences in regression parameters were calculated and compared by means of t-tests.

Results: In particular, the gender-related hypotheses of the study could be completely or conditionally verified. Accordingly, female scientific and non-scientific employees showed a higher bullying vulnerability in (almost) all contexts of the academic workplace. An increased bullying vulnerability was also found for foreign researchers. However, the patterns found here contradicted those that were hypothesized. Concerning the effect of age analyzed for non-scientific personnel, especially the age group 45–59 years showed a higher bullying probability, with the gender gap in bullying vulnerability being greatest for the youngest and oldest age groups in the sample.

Interpretation and Relevance: The results of the study especially support the social identity theory regarding gender. In the sample studied, women in minority positions have a higher vulnerability to bullying in their work fields, which is not the case for men. However, the influence of nationality on bullying vulnerability is more complex. The study points to the further development of cultural distance theory, whose hypotheses are only partly able to explain the results. The evidence for social role theory is primarily seen in the interaction of gender with age and hierarchical level. Accordingly, female early career researchers and young women (and women in the oldest age group) on the non-scientific staff presumably experience a masculine workplace. Thus, the results of the study contradict the role congruity theory.

Keywords: Self-labeling; survey; Max Planck Society; intersectionality; work climate in academia; work culture; social identity theory

Bullying in Academia …

… has received increased attention in terms of media coverage in recent years (Devlin, 2018; Siegel, 2018; Science, 2020). In this context, there has also been international attention due to individual cases of bullying at the Max Planck Society, one of Germany's largest non-university research organizations (Else, 2018). In response to these specific cases, the Max Planck Society conducted an organization-wide survey on the work climate in its institutes and facilities among all scientific and non-scientific employees and implemented additional measures to address bullying and harassment (Schraudner et al., 2019).[1] The output of the

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[1]The author is aware of the debate about an appropriate designation of "non-scientific personnel" and of "early career researchers." As the importance of "non-scientific personnel" for research should be appreciated, it might therefore not be appropriate to merely describe such members of staff with a negative demarcation. An alternative could thus be the term "structural personnel." In this study, however, the term "non-scientific personnel" is used in accordance with the official designations of the

survey that was conducted is the world's largest data set on work climate, bullying, and sexual discrimination in a single research organization with a total of 9,078 valid responses from its employees (response rate: 38%).

It is important to note that this work does not claim that bullying in academia is more relevant than bullying in other parts of society, as understanding workplace bullying as a social phenomenon and enabling organizations to design effective measures for prevention and management are always relevant. However, individual psychological vulnerability and social vulnerability are inextricably intertwined due to a person's specific positioning in an organization. Current research indicates that there is, for example, no gender that is fundamentally discriminated against. Discrimination and subsequent discriminatory bullying only arise from a specific organizational context that stigmatizes a person as a minority or otherwise as a "worse fit" (Salin, 2021). Due to its high number of cases, the data set used here allows for more complex analyses that also consider interaction effects between demographic characteristics and the work context of scientific and non-scientific employees in a large research organization with numerous institutes and other facilities.

The primary aim of this study was to analyze how the socio-demographic characteristics gender and nationality of researchers in the Max Planck Society affect the likelihood of experiencing workplace bullying in the context of their respective hierarchical position and discipline. Secondly, for non-scientific staff, the effects of age and gender in combination with the respective administrative unit on the likelihood of self-labeling as being bullied were investigated. The guiding hypothesis of this study was that gender, age and nationality are more likely to be socially sanctioned in some organizational contexts than in others and the results thus contribute to our understanding of these contexts.

The following section presents a comprehensive literature review. First, the concept of workplace bullying and the relationship of bullying to discrimination are discussed. Furthermore, the specifics of bullying in academic workplaces are outlined. The main part of the section is the derivation of the study hypotheses and a detailed presentation of the related theories. The section ends with a brief discussion of the specifics of the Max Planck Society in academia.

Following the theoretical foundations of this study, the research approach is presented, more specifically: the data set used, the variable model, and the methodology. Binary logistic regression equations were set up for both scientific and non-scientific employees. The binary outcome variable of the equation indicates whether a person reported having been bullied occasionally or more often (1) or not (0). The predictors are the aforementioned demographic as well as

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respective status group in the Max Planck Society. The term "early career researchers" is problematic because it implies a junior status with regard to the work experience of the group in question, which is an improper generalization in many cases, especially with regard to postdocs. This article uses the terms "early career researchers" and the concrete differentiation into doctoral candidates and postdocs in a similar way – but not without having drawn attention to the associated problems at this stage.

organization-specific characteristics of the respondents and selected interaction terms. Using the regression equations, the hypothetically relevant conditional marginal means were calculated and compared using t-tests.

The results section of the study is followed by a detailed section on the interpretation of the statistical results in light of the formulated hypotheses. In the conclusion of the study, its limitations are presented and the theoretical, as well as practical implications that can be derived from the results, are discussed.

Literature Review

The following is a comprehensive description of the state of the art this study is based on. The concept of workplace bullying and its specifics in the academic workplace are explained, and the theoretical framework of the hypothesis testing conducted is comprehensively presented. The section ends with a reflection on the specific contextual conditions of the Max Planck Society.

Workplace Bullying: Conceptualization, Prevalence, And Relationship To Discrimination

This study is guided by a European, especially Scandinavian, tradition of the concept of bullying (Leymann, 1990; Einarsen et al., 1990). Characteristic of this tradition is a thematic focus on workplace bullying, a disciplinary anchoring in occupational and organizational psychology, and the evaluation of bullying based on individual data collected using questionnaires. The programmatic definition of bullying regularly includes the following elements (Matthiesen and Einarsen, 2010, 2020): (1) a circumstance of "workplace victimization" is present. This means that the well-being of an employee or employees is impaired by one or more people in an organization; (2) there is an imbalance of power between the victim and the perpetrator(s). Because of this, the victim has difficulty defending themselves against the attacks on their person; and (3) there is a need for regularity. The victim faces systematic, repeated, and at least partially intentional inappropriate aggression.

A limitation of this occupational psychology approach is the regular reduction of bullying to a conflict between an individual as a victim and an individual or group of individuals as perpetrators. This is accompanied by the assumption that at least one of the two parties engages in behavior that is inappropriate to the situational circumstances of the workplace but it ignores the character of bullying as a sociological phenomenon. Bullying cases are often the result of a reciprocal interaction dynamic in which, at least initially, it may not be possible to clearly differentiate between a victim and a perpetrator. Another limitation is that the approach does not consider the organizational context. However, it is the organizational context that predetermines clashes of interests, the instruments of power available to the bullying parties, and other factors that promote or inhibit escalation (Hodgins et al., 2020; Mittelstaedt, 1998).

On the other hand, the strength of the Scandinavian school is that it focuses on the self-perceptions of the organizational members surveyed: who would

describe themselves as being bullied? What types of misconduct do the respondents experience in the organization? It is these questions that primarily interest HR managers and employee representatives of organizations in the context of the existing structural conditions of an organization and thus presumably explain the great popularity of the Scandinavian occupational psychology approach.

The measurement of bullying using a questionnaire is accomplished through one, or ideally both, of two established approaches (Nielsen et al., 2010). The first approach consists of the use of behavioral item batteries to enquire about the types of behavior that are referred to as "bullying" in the socio-scientific literature, but which only in some cases conform to people's everyday understanding of the term. A distinction can be made between behavior that is work-related, personally directed, or physically intimidating according to the Negative Acts Questionnaire in its revised version (Einarsen et al., 2009).[2] Following this approach, respondents indicate how often they have experienced several different types of behavior at work, for example, during the 12 months preceding the survey. The second approach, and the one used here, centers on self-assessment, whereby respondents are asked how often they were subjected to bullying in a specific period preceding the survey and beyond. Following the practice in comparable studies, respondents are provided with a definition of bullying to go along with the question (Salin, 2021; see below for definition).

The type of survey approach used has important consequences for the prevalence rates that can ultimately be determined from a given study. Nielsen et al. (2010) showed this in a meta-study in which they evaluated the bullying prevalence rates of 70 studies. In random samples measuring bullying by behavioral items, an average of 14.4% of respondents were identified as being bullied. In random samples that use the self-labeling approach and do not provide respondents with a definition of bullying, an average of 17.4% of respondents identified themselves as bullied, whereas if a definition was provided, on average 9.3% of respondents categorized themselves as bullied.

In the same article, the authors also demonstrated the importance of the national context. While the prevalence rate of self-labeling with definition was 4.6% in Scandinavia, it averaged at 13.8% in other European countries and 19.8% in non-European countries. Even for the data set used here, the possible prevalence rates resulting from different measurement methods and assessment concepts vary considerably (Schraudner et al., 2019, p. 60).

The survey approach has been shown to influence not only the prevalence rates determined, but also the results for the variable correlations examined, especially in gender analyses. For example, using a probability sample of the Swedish population, it was shown that women tend to categorize themselves as bullied somewhat more frequently, whereas according to the behavioralist approach, men experience bullying significantly more often (Rosander et al., 2020).

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[2]Also established are the Leymann Inventory of Psychological Terror and the Workplace Aggression Research Questionnaire.

Although especially the self-labeling method is not free of biases resulting from the personality of the respondent and their cultural context, the study presented here follows Salin and Hoel's (2013) view that this approach allows for a holistic assessment of social misconduct, taking factual dependencies between the involved parties into account, and their possibilities to harm and defend each other.

While there are numerous empirical studies on the prevalence and affectedness of bullying and the concept of discrimination, there has been little discussion on the specific relationship between the two concepts (exceptions include Lewis et al., 2020; Parkins et al., 2006; Salin and Hoel, 2013).

There is a large overlap between bullying and discrimination, which is why it seems justified to examine bullying in the context of the main topic of discrimination (which is of particular interest due to the focus of this edited collection). At the same time, the two concepts also have essential unique characteristics. In both bullying and discrimination, a person experiences treatment, by one or more other persons, that is viewed as inappropriate in the respective work context. In the case of both, the conflict dynamics and the occupational and health consequences for those affected heavily depend on the contextual and individual psychological preconditions of the conflict parties (Parkins et al., 2006).

The main criteria that distinguish discrimination from bullying are, firstly, that discrimination does not necessarily have to be permanent as a person may have been discriminated against once in the workplace in a legally relevant way but not bullied once as, by definition, bullying is a processual conflict. Secondly, different types of behavior can be clearly distinguished. Exclusively specific to gender-based discrimination are, for example, unwanted sexual attention or sexual coercion. Thirdly, discrimination is based on a person's membership in an identity group that is defined by primary identity characteristics – that is, characteristics that are regularly visible, have been present since birth, and relevantly influence a person's socialization (Jenkins, 2004). In contrast, the target groups of bullying are broader and more heterogeneous. They can also include members of primary identities but also result from situational clashes of interests in an organization or simply from purely affective antipathies based on external appearance, individual value orientations, personality, and others.

There is no clear hierarchy between bullying and discrimination, and it is often difficult for victims to classify themselves according to one of the two concepts (Parkins et al., 2006; Lewis et al., 2020). Exemplary studies dealing with the intersection of bullying and discrimination come from Misawa (2015), who discussed the intersectional dynamics of bullying based on sexual orientation and race under the hierarchical contextual conditions of academia, or Fox and Stallworth (2005), who developed and tested an item scale to measure racial/ethnic bullying. Accordingly, the present study investigated the influence of primary identity characteristics on the likelihood of classifying oneself as affected by bullying at the workplace as a function of further organizational characteristics. In this respect, the study relates to the literature on identity-related bullying experiences and its results provide insights into the extent to which the bullying experienced by employees of the Max Planck Society has a discriminatory character.

Workplace Bullying in Academia

This study examines bullying in academic settings at Max Planck Society institutes and facilities. Academic bullying is defined as a form of bullying that victims experience in academic workplaces such as universities and research institutions. The bullying can come from faculty, administrators, and students (Prevost and Hunt, 2018).

Compared to the general working population, higher bullying rates are regularly found in academic institutions (Keashly, 2021). However, compared to other specific industries, the prevalence rates of bullying in academia are often significantly lower and within individual institutions, faculty members are generally less affected by bullying than non-scientific staff (Keashly, 2021). In a comprehensive literature review, Keashly (2021) determined the prevalence rates for faculty bullying measured by self-labeling with a definition and in the past six-month period within the range from 6.2% in a Norwegian study to 37.7% in a US study. Based on the past 12 months prior to the survey, the prevalence rates varied from 26% to 52.6%. The different prevalence rates are only comparable to a very limited extent, as the respondent groups, their organizational and national context, and the specific question and item formulation vary greatly between the individual studies.

Leaving aside the question of the prevalence of bullying in academia, the predictors for bullying identified among scientific employees differ from those identified for broader samples of the working population, which can be taken as an indication of the specificities of the contextual conditions of the scientific system. In a large and heterogeneous sample of Flemish-speaking Belgians, Notelaers et al. (2011) showed that the bullying risk is higher among employees in the 35–54 age group and lower among employees under 25 and on a temporary contract (similarly, Daly et al., 2018). In contrast, among academic staff, it is those who are generally on temporary contracts and pursuing doctoral degrees who have the highest bullying risk (Prevost and Hunt, 2018). A similar pattern could also be found in the work with the present data set, which is why two separate theoretical models explaining bullying for scientific and for non-scientific employees were set up below and examined in the following.[3]

Roughly summarized, the distinctive features of the academic workplace are a workforce with an above-average level of education and a higher-than-average level of fixed-term contracts.[4] There is probably no other profession that has such comparably well-trained staff working under similarly insecure career conditions. The interplay of the factors of fixed-term contracts and high qualifications yields

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[3]Since only a limited number of variables could be included in the regression equations presented here for data protection reasons (see footnote 5), among other things, the duration of employment (tenure) and a distinction between permanent and temporary contracts were not considered.

[4]In Germany, the share of fixed-term contracts among researchers is 67.9 percent. For female researchers, the fixed-term contract rate was 74.5 percent and for male researchers it was 63.6 percent (Banscherus, 2020, p. 34).

further specifics such as a high level of one-sided dependence of doctoral candidates and postdocs on their supervisors, strong competition for permanent positions, and low levels of family-friendliness due to the lack of ability to plan an academic career (Milojević et al., 2018; Leemann, 2010). From the perspective of non-scientific employees, a distinctive feature of the academic workplace is that their institutions are often run by scientific employees, and they are often in a service relationship with scientific employees and students (Keashly, 2021).

Theoretical Framework: Scientific Employees and Categorial Predictors of Bullying

In this study, the influence of the sociodemographic characteristics of gender and nationality on the likelihood of bullying experiences was modeled for scientific employees of the Max Planck Society.[5] The hierarchical position and the section affiliation of the respondents were considered as being contextual factors.

Generally, sex, gender, and nationality are proxy variables from which concrete implications for bullying in the workplace can only be derived indirectly, depending on further contextual factors (Salin, 2021). This indeterminacy is reflected in the mixed results of studies on the impact of gender on bullying probability (Prevost and Hunt, 2018; Salin and Hoel, 2013). In contrast, in studies on the effect of ethnicity or race, the results are clearly pertinent (Prevost and Hunt, 2018; Bergbom and Vartia, 2021).

One approach to explaining the indirect effects of gender is the social role theory. This assumes that a person's gender is associated with certain stereotypical role expectations, against which a person defines their own identity and is subject to evaluation of their actions (Eagly and Wood, 2012; Salin and Hoel, 2013). According to these expectations, certain behaviors (e.g., related to work-family balance) are considered more or less appropriate, and there is pressure on individuals to conform to gendered roles. Accordingly, gender differences in bullying would be expected to be particularly salient in contexts in which, first of all, women or men violate the behavioral expectations associated with their gender. Secondly, an increased bullying probability can be expected if typical male or female behaviors are discriminated against by organizational conditions.

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[5]In the following, two different theoretical models are formulated to predict the probability of self-labeling as bullied for scientific and for non-scientific employees. Different predictors are used, except for gender. Ideally, the same regression models could have been set up for both groups of employees to achieve optimal comparability of results between the two groups. This had to be dispensed with for reasons of data protection. The two regression models were put together in such a way that no individual person involved in the survey can be identified on the basis of their sociodemographic characteristics or their response behavior be estimated. The only combined predictor model that would meet this privacy requirement would include age, gender, and section. Here, however, it was decided to set up regression models that were as informative and hypothesis-driven as possible and that allow, in particular, the consideration of the influence of hierarchical position and administrative unit as key contextual conditions.

Conceivable examples of this are the difficult reconciliation of care duties with the expectation of a high and temporally flexible presence. Thirdly, Salin and Hoel (2013) argue that it is presumably due to differences in gender roles that women more often tend to perceive themselves as being bullied than men.

The indirect effects of gender can also be explained by social identity theory. According to this theory, people derive part of their self-confidence from comparing themselves with other people. For this purpose, the self and fellow human beings are divided into groups based on certain visible characteristics and a distinction is made between in- and out-groups. The individual strives for a self-image that is as favorable as possible by looking for what they consider to be positive distinguishing features from the in-group. If this is not possible, the individual tries to become part of it, to negate it, or to enter into direct confrontation with it (Tajfel and Turner, 1986). In work groups, gender is an important salient factor and an influence on the self-concept of a subgroup in an organization is very likely (Salin and Hoel, 2013). Accordingly, an increased bullying probability would be expected if men or women are in the minority in their work group in a specific work context and are thus perceived as non-prototypical group members.

In light of social role and social identity theory, female researchers would generally be expected to have an increased bullying probability for the following reasons. First, women are underrepresented in research occupations in the EU and especially in Germany. In the German higher education sector, the proportion of women in 2018 was 38.7% and in the business enterprise sector 14.7% (She Figures, 2018, pp. 65–67). Second, male role expectations shape science and there is a broad body of research that describes the socially embedded ideal type of male researcher as rather masculine and Caucasian (Finson, 2002; Thornton, 2013; van den Brink and Benschop, 2012). Third, discrimination against the conservative female role by the structural conditions of the research system is documented by the evident "leaky pipeline" (Zacharia et al., 2020). Thus, the hypothesis is formulated that a higher probability of self-labeling as bullied can generally be established for female researchers:

> *H1*. A higher proportion of female than male researchers categorize themselves as bullied.

In the following, hypotheses about the interaction of the gender gap in bullying according to different intersectionality and contextual factors of the work are discussed. Concerning the influence of the nationality of the respondents on the gender gap, the organizational cultural studies of Hofstede (2001) can be taken up. Following his cultural distance theory, the shared norms and values of populations of individual countries differ, with some countries having greater cultural similarities than others. Hofstede's research continues as part of the Globe project, with the currently available data set dating back to 2004 when 17,000 middle managers worldwide were surveyed about the leadership culture in their workplace and their value orientations (Globe, 2021a).

Nine dimensions were identified to characterize the respective national culture. One was gender egalitarianism, which is defined as the degree to which a

collective minimizes (and should minimize) gender inequality (Globe, 2021b). Based on the data, it is possible to differentiate how respondents evaluate gender equality practice in their country and what normative attitudes they had toward gender equality. Accordingly, Germany was characterized by a below-average assessment of gender equality practice, with an above-average normative claim to gender equality on the part of the respondents (Globe, 2021c).[6]

Due to their age, the data of the Globe project are not suitable for differentiated hypotheses on the influence of nationality on the gender gap in bullying experiences. For example, the retraditionalization of the image of women in several Eastern European countries in the last two decades is to be mentioned here. From the research of the Globe project, however, the hypothesis is derived that two people are more likely to have internalized different concepts of gender roles if these people come from different cultures. Conflicts may also arise when different gender role conceptions meet, as the actors involved may find the gendered behavior of the other actor irritating or inappropriate.

The Max Planck Society and almost all its institutes and facilities are located in Germany. Accordingly, the majority of the employees surveyed, especially among the non-scientific staff, stated that they were of German nationality. It would be expected that the cultural distance between Germany, as part of the cultural area of "Germanic Europe," and the cultural areas with which there has historically been less cultural exchange (e.g., Southern and Confucian Asia) is the greatest. In line with this assumption, in the present study nationality was grouped into the categories German, EU, and non-EU. The cultural areas covered by the non-EU group are very heterogeneous and the group includes countries such as the USA, China, India, or even the UK and Switzerland. Nevertheless, it can be assumed that there are relevant differences in the mean values of the various groups since the group with non-EU nationalities has a higher average cultural distance to Germany than the group with EU nationalities.

The hypothesis presumes that only the gender role conception of one gender conflicts with the hegemonic conception of the gender role in Germany in the case of people from other cultural groups – otherwise there would be no gender gap in the bullying probability by nationality. Hofstede's (2011) own studies using a large data set of IBM employees in the 1970s imply that, in particular, men's gender role conceptions show strong variation. However, it is unclear how this observation would be reflected practically in the context at hand: do men from other cultural backgrounds feel bullied more often on average because they do not conform to the German image of men; do women from other cultural backgrounds feel bullied more often because they are irritated by the different behavior of German men; and of course, can the results of the time of Hofstede's

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[6]The assessment is derived from own calculations, based on a data set from the Globe project. The mean value calculated for the 62 states included in the data set is 3.38 on the Gender Egalitarianism Societal Practices Scale (Germany, West: 3.10/Germany, East: 3.06) and 4.50 on the Gender Egalitarianism Societal Values Scale (Germany, West: 4.89/Germany, East: 4.90).

study be transferred to the present at all? Due to the uncertainties involved, the hypothesis was formulated openly in this regard.

> *H2*. The difference between female researchers and male researchers who categorize themselves as bullied is larger among researchers with EU nationality than among German researchers, and largest among non-EU researchers.

Regarding the interaction of the gender and hierarchical position of researchers, two effects are conceivable. Striebing (in this collection) raises the issue of role congruency when examining the perception of the work climate. According to Eagly and Karau (2002), professional pressure and the probability of professional failure increase more strongly among women compared to men with each further level of the hierarchy. Striebing's study, however, showed the clearest gender gap in the evaluation of the work climate at the level of doctoral candidates. Taking this result into account, and considering the higher bullying probability of women in research discussed above, the hypothesis was formulated that the gender gap in bullying probability is highest at the entry-level of the research career. At higher career levels, a flattening of the gender gap among respondents in the sense of self-selection would be expected, as the specific contextual conditions of the research system were either accepted or those women who reacted with resistance at lower career levels did not advance in the hierarchy (Brorsen Smidt et al., 2020).

> *H3*. The difference between female researchers and male researchers who categorize themselves as bullied decreases with increasing hierarchy level.

Furthermore, it is hypothesized that section affiliation is an important contextual factor that influences differences in bullying probability by gender. The Max Planck Society divides its scientific institutes into the Biology and Medicine Section (BMS), the Chemistry, Physics and Technology Section (CPTS), and the Humanities and Social Sciences Section (HSS).

According to social identity theory, it is hypothesized that women researchers tend to categorize themselves as bullied more than male researchers, especially in those fields in which they are in a clear minority. In Germany, such fields of study are information and communication technologies and engineering, manufacturing, and construction, whereas in education studies, for example, women make up a clear majority of doctoral graduates (She Figures, 2018, p. 23). In the data set used here, the proportion of women researchers is 51.4% in BMS, 52.4% in HSS, and 26.2% in CPTS.[7]

> *H4*. The difference between female and male researchers who classify themselves as bullied is most pronounced in the CPTS when comparing the sections of the Max Planck Society.

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[7]$N = 3{,}899$.

In a meta-study of the role of ethnicity in workplace bullying, Bergbom and Vartia (2021) summarize that social identity theory and the similarity-attraction paradigm imply that "otherness" is regularly socially sanctioned. Concerning the cultural distance theory, they add that the respective cultural similarity of a person in relation to a target context has a decisive influence on the extent to which this person is perceived as "different."

The hypothesis formulated here on the effect of nationality on researchers' likelihood of self-reporting as bullied again draws on Hofstede's (2001) cultural distance theory (also Triandis, 1994). Using a sample of employees of a transport company in Finland, Bergbom et al. (2015) showed that bullying risk increases with cultural distance and that no statistically significant differences were found between groups socialized in the same or a similar cultural space. Using a sample of Danish healthcare students, Hogh et al. (2011) similarly showed that "non-Western" immigrants exhibited increased vulnerability to bullying experiences.

It is also conceivable that a higher likelihood of self-labeling as bullied is a result of concrete contradictions in the clashing cultures. Using an Australian-Singaporean sample of employees, Loh et al. (2010) suggest that the power distance acceptance imparted in the two cultures may be crucial for the fact that experiences of workplace bullying had a higher impact on the job satisfaction of Australians than Singaporeans.

A third aspect could be a social integration barrier, which increases with increasing cultural distance. Accordingly, a higher bullying risk among non-EU researchers would not be a consequence of social group conflicts, but rather the result of greater language barriers, a greater geographical distance to relatives and friends, and possibly less familiarity with organizational structures and processes (see Gewinner in this collection). Certain experiences of foreignness are simply intrinsic to an internationally mobile research career, without these necessarily being the results of exclusion and marginalization processes.

> *H5*. A higher proportion of non-EU than German and EU researchers categorize themselves as bullied.

In the same way as for the prediction of the interaction of gender and hierarchy on the bullying risk above, two perspectives are conceivable for the prediction of the interaction of nationality group and hierarchy. According to social identity theory, it is reasonable to assume that foreign researchers are more likely to experience bullying than German researchers, especially in the case of early career researchers. As discussed above, working abroad is inevitably accompanied by a certain degree of social disintegration. In this sense, the experiences of foreign researchers during the doctoral phase or the postdoc phase are different from those of local researchers. It presumably makes a considerable difference whether one's cultural experiences abroad are as a researcher being courted for a leading position or as one of many young talents. In interviews with employees of the Max Planck Society, early career researchers also highlighted conflicts with non-scientific employees. It is plausible that doctoral candidates experience such conflicts more often than researchers who are more senior due to the hierarchical

structure of the Max Planck institutes. Typical conflicts arise, for example, from language barriers between the mostly German non-scientific employees and the scientific employees, who are very heterogeneous in terms of their nationality.

On the other hand, according to the role congruity theory, it could be assumed that, due to a higher cultural distance, directors and research group leaders from non-European cultures have greater problems being recognized as legitimate superiors compared to German and EU researchers (Eagly and Karau, 2002) and experience more bullying than early career researchers due to their exposed position. Both these ideas were tested with the following hypotheses:

> *H6a*. The difference between German researchers compared to EU and non-EU researchers who categorize themselves as bullied decreases with increasing hierarchy level.

> *H6b*. The difference between German and EU-researchers compared to non-EU researchers who categorize themselves as bullied increases with increasing hierarchy level.

To predict the influence of the interaction of nationality group and section, social identity theory can again be applied. According to this theory, differences in the bullying probability between German and foreign researchers would be particularly pronounced in those departments in which there is a considerably lower proportion of foreigners, that is, both EU and non-EU employees.

Table 6 shows that the proportional ratio of German, EU and non-EU researchers in the three sections of the Max Planck Society is largely similar. In this respect, it can be expected that no relevant interaction effect between nationality and section will result from the specific distribution of nationalities in the individual sections of the Max Planck sample investigated here.

However, it can be assumed that specific subject cultures exist in the sections that discriminate against nationality to varying degrees. It would be plausible, for example, that researchers in Humanities and Social Sciences are more

Table 6.   Cross-tabulation of the Proportion of the Respective Nationality Groups of Researchers in the Sections of the Max Planck Society ($n = 3{,}904$).

	Biology and Medicine (BMS) (%)	Humanities and Social Sciences (HSS) (%)	Chemistry, Physics and Technology (CPTS) (%)	Total (%)
Other EU country	22.8	17.1	22.1	21.5
Non-EU country	20.7	23.9	19.2	20.5
German	56.5	59.1	58.7	58.0
Total	100.0	100.0	100.0	100.0

vulnerable to bullying because the German language may be more important here (e.g., in legal studies) and the research teams are smaller on average and, thus, more affected by personal relationships. Keashly (2021) provides a literature overview of studies considering the influence of disciplinary cultures. She concludes that all relevant studies could prove a corresponding effect. In explicit comparisons, a higher prevalence of bullying was found in more practice-oriented rather than theory-oriented disciplines, as well as in arts, humanities, and social studies (Keashly, 2021). However, it is unclear to what extent differences between the disciplines can be attributed to different working modes or cultures or to the disciplinary sensitization of the respondents (which would be plausible, e.g., in psychology).

It is to be noted that, first, an interaction effect between Max Planck sections and nationality does not already result from the distribution of the two characteristics in the sample, and second, it is likely that the sections have cultures that are more conducive to experiences of (self-reported) bullying in different ways. However, it can only be speculated how these different disciplinary cultures shape the interaction effect of section and nationality. Given the current state of research, one would expect HSS to have the highest prevalence of self-reported bullying. However, as mentioned, this does not necessarily mean that a nationality gap is associated with it. In fact, the opposite could be conceivable, namely that if all researchers are more likely to report having experienced bullying, there might even be weak or no differences between nationalities. Given these theoretical uncertainties, an open exploratory hypothesis was formulated.

> *H7*. There are differences between the sections of the Max Planck Society in the degree to which EU and non-EU researchers classify themselves as bullied in contrast to German researchers.

Theoretical Framework: Non-scientific Employees and Categorial Predictors of Bullying

While the social role and social identity theories have been used to explain why a general gender gap in bullying self-labeling is assumed for researchers, the two theories suggest a comparatively lower gender gap for non-scientific employees. From the perspective of social role theory, employment relationships in the structural sector are more often of a permanent nature, can more easily be temporarily converted into part-time relationships, and are thus more family-friendly than the employment relationships of early career researchers in particular. Regarding social identity theory, female employees are more frequently represented in the non-scientific area and are thus not minorities in their respective fields of work. In the data set used here, there are six men and four women for every 10 researchers, whereas there are four men and six women for every 10 non-scientific employees.

At the same time, the existence of a gender gap in self-labeling as being bullied can also be expected among non-scientific personnel and the bullying probability is particularly high between two actors with a structural power imbalance (Keashly, 2021). This power relation is of a gendered nature, as supervisors, in

general, tend to more often be male and females are less likely to bully male employees whereas men bully both women and men (Salin and Hoel, 2013; Keashly, 2021; Gardner et al., 2020).

> *H8*. A higher proportion of female than male non-scientific employees categorize themselves as bullied.

The likelihood that experiencing workplace bullying also increases with age can be hypothesized. In a study with a sample from the Australian Nursing and Midwifery Federation, De Cieri et al. (2019) showed that individuals aged 36 and older were significantly more likely to experience downward bullying (bullying exerted by a leader) than young employees in the age group 18–25. In turn, upward bullying, that is, bullying by subordinates, affected individuals aged 46 and older significantly more often than young employees. Notelaers et al. (2011) also came to similar conclusions based on a Belgian sample, whereas Ortega et al. (2009) did not find any statistically significant differences between the age groups using a sample of Danish employees.

Regarding age, this study predicts that of the four age categories examined here, the group of persons aged 60 and older most frequently categorizes themselves as being bullied. This hypothesis can be plausible in several ways. First, bullying constellations usually escalate over a longer period. There is a multistep progression that roughly comprises a phase of conflict hardening, a phase of increasingly conscious self-defense, and an escalation phase in which increasingly ruthless attempts are made to defeat the perceived opponent (Mittelstaedt, 1998). The tenure of younger workers in an organization is often simply too brief to have fully experienced this dynamic. Second, younger workers are less likely to have leadership responsibilities, whereas middle managers may be equally exposed to downward and upward bullying. Third, the influence of ageism, or age discrimination, is conceivable and discrimination against employees according to their age group affects all employee groups equally (Triana et al., 2017). In this context, it can be deduced from the relative deprivation theory (Triana et al., 2017) that older employees, in particular, have clearer expectations than younger employees as to what kind of treatment they "deserve" from their colleagues and what kind of behavior they consider disrespectful, discriminatory, or inappropriate due to their more extensive work experience.

> *H9*. The proportion of non-scientific employees who categorize themselves as bullied increases with age.

For the interaction of gender and age, a deepening of the gender gap in the categorization as being bullied with increasing age is presumed. This can also be explained in several ways (Kirton and Greene, 2010, p. 109). First, youth is sometimes a gendered requirement for certain jobs, conceivably for the event sector, for example. Second, potential employers discriminate against women with children and attribute lower levels of commitment and less time availability to them. Third, the social role of women is often accompanied by higher individual

care responsibilities, which means that women often invest less energy in their work than their male colleagues in the decisive career years. When women then invest more in their careers in later years, they suddenly find themselves competing against younger male colleagues as well.

> *H10*. The difference between female and male non-scientific employees who categorize themselves as bullied increases with age group.

The effect of the interaction of gender and the work unit in which a non-scientific employee operates can be predicted using social identity theory. In the data set used here, the percentage of women in "Technology and IT" is 18.6%, in "Administration" 77.8%, and in "Other Services" 74.9%. Accordingly, it is reasonable to assume that the likelihood of categorizing oneself as bullied is higher for women in Technology and IT than for men. In the other two areas, men would be expected to categorize themselves as bullied more often than women.

> *H11*. In the Technology and IT unit, a gender gap to the advantage of men can be found. In the Administration and Other Services units, a gender gap to the advantage of women can be found.

Context

The basis of the study conducted here is an online survey of employees of the Max Planck Society. With more than 23,600 employees and 86 institutes and facilities in Germany and abroad, the Max Planck Society is one of the largest non-university research institutions in Germany (Max-Planck-Gesellschaft [Max Planck Society], 2020).

As a research association solely committed to basic research, the Max Planck Society has several special features that set it apart from universities and other non-university research institutions in Germany such as the Helmholtz Association or the Fraunhofer Society. Striebing in his contribution on work climate (in this collection) already presents various specifics of the Max Planck Society, which are repeated only to the extent of adding aspects relevant here.

First, the Max Planck Society is a pure research organization and it thus places no teaching obligation on its scientific staff. Teaching, that is, the regular unavoidable contact with students, is one of the most frequent sources of bullying for scientific staff (Lampman et al., 2009). In this respect, it can be assumed that female researchers at universities generally have more frequent experiences of contrapower harassment, namely situations in which they are harassed by persons who have less formal power within the shared academic institution than are Max Planck scientists.

Second, the scientific staff of the Max Planck Society is significantly more international than the average German standards in academia. It can be assumed that the integration of foreign researchers and the interaction between German and foreign researchers as well as the interaction between mostly German non-scientific staff and foreign staff is commonplace. Accordingly, a foreign origin would be a

less frequent cause of bullying and discrimination experiences in the Max Planck Society than is presumably the case in other German research workplaces.

Research Approach

This section explains the data set used, describes the variables of the two binary logistic regression models, and the methodological procedure.

Data

A data set of the Max Planck Society was used, in which its scientific and non-scientific employees and scholarship holders were surveyed about their work climate and their experiences of bullying and sexual discrimination. The data set, which was collected in February and March 2019, is described in more detail in Striebing's contribution on work climate (in this collection).

To consider the different employment and career conditions of scientific and non-scientific employees, the data set was split and separate analyses were conducted for researchers and non-scientists. The data set contains 4,308 documented cases of researchers, of which 3,272 cases could be used for the analysis due to a sufficient variable coverage. Non-scientists are represented in the data set with 3,817 cases of which 2,995 cases could be processed.

The data set was treated as a full survey whereby the meaningfulness of the data interpretation is limited to the sample and its specific organizational and national context. Therefore, the interpretation of the results is focused on the effect sizes – here as conditional differences of the estimated marginal means. However, the results of the Wald test statistics including significance values of the conducted t-tests and the confidence intervals of the effect sizes were also provided to discuss the robustness of the effects.

Variables

In the survey, behavioral items and a general question for self-labeling were used to measure the prevalence of bullying at the Max Planck Society. In this study, only bullying according to self-labeling was analyzed and the respective question was positioned after the battery of behavioral items. Therefore, it can be assumed that the respondents were primed in some way with a broad concept of bullying. The original item wording was as follows:

> **"Bullying" here denotes repeated and persistent negative behavior directed towards one or several individuals, which creates a hostile work environment. The targeted individuals have difficulty defending themselves; in other words, bullying is not a conflict between parties of equal strength.**
> Have you been subjected to bullying at your current workplace at the Max Planck Society during the last 12 months? (Never – Occasionally – Monthly – Weekly – Daily)

Here, all those persons were defined as "bullied" who indicated in the self-ascription to have experienced bullying at least occasionally (or monthly, weekly, daily) in the sense of the above definition. In the questionnaires analyzed here, 8% of scientific employees and 12% of non-scientific employees reported having been bullied in the sense of the definition (see Table 7).[8]

As in other studies, the frequency of bullying in the Max Planck data set used here differs depending on how it is measured, that is, by self-labeling or through behavioral items (Schraudner et al., 2019, p. 61; Rosander et al., 2020). Both measurement approaches by no means lead to congruent results – not even in the analyses conducted here. In this study, only the influence of sociodemographic and organizational factors on self-labeling as bullied were examined. The relationship between the two approaches and the extent to which sensitivity to self-ascription to bullying and sexual discrimination varies by sociodemographic characteristics is the subject of Striebing's contribution on gender aspects in self-reporting (in this collection).

The predictors of the study are shown in Table 7. For both non-scientific and scientific staff, gender was investigated. The gender of the respondents was differentiated into male and female. An alternative gender was only queried in the form "No answer/Other gender" and could therefore not be processed. This coding was necessary because, in addition to gender, other socio-demographic characteristics of the respondents were queried that would not have been possible while preserving the anonymity of the respondents when asking for another gender separately.

The other predictors were included either only for scientific or only for non-scientific employees. Data protection reasons were decisive for the division of the predictors. The variable nationality, for example, was not considered for non-scientific employees, as they have a lower proportion of foreigners and hence taking this category into account would have led to subcategories with very few cases, which would have made it possible to identify individual persons from the regression equations presented here.[9]

The predictors nationality, hierarchical position, and section were exclusively considered for scientific employees. As mentioned, the nationality of the respondents was differentiated into German, other EU countries, and Non-EU countries. For the position, respondents from scientific staff could choose between the

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[8]There is some contradiction between the definition in the questionnaire and the coding done here. It is questionable to what extent it is valid that the respondents stated to have "occasionally" experienced a behavior defined as "repeated and persistent." We do not evaluate respondents' answers in terms of the extent to which self-attribution as "bullied" is valid compared to the scientific definition. The variable is considered to be an appropriate indicator of a repeated experience of social misconduct in the workplace that was sufficiently severe in nature that the respondent would classify it as bullying and, in particular, would perceive themselves as bullied.

[9]For the scientific employees, 207 of a total of 240 groups based on the regression predictors have a case number of 20 or more cases. The minimum group population is four. For non-scientific employees, 56 of the 60 possible groups have at least 20 cases and the minimum group population is 13.

Table 7.   Descriptive Statistics of Outcome, and Predictor Variables in the Two Regression Models.

Variable Name	Category	Scientific Staff		Non-scientific Staff	
		N	Margin %	N	Margin %
Outcome					
Self-ascription to occasional or more frequent bullying (yes/no)	No	3,011	92.0	2,637	88.0
	Yes	261	8.0	358	12.0
Predictors					
Age	15–29	-	-	265	8.0
	30–44	-	-	1,068	35.7
	60 and older	-	-	246	8.2
	45–59	-	-	1,416	47.3
Gender	Female	1,267	38.7	1,736	58.0
	Male	2,005	61.3	1,259	42.0
Nationality	Other EU country	664	20.3	-	-
	Non-EU country	669	20.4	-	-
	German	1,939	59.3	-	-
Position of scientific staff	Postdoc	965	29.5	-	-
	Other research associates employed	798	24.4	-	-
	Director, research group leader	368	11.2	-	-
	Doctoral candidate	1,141	34.9	-	-

(*Continued*)

Table 7. (*Continued*)

Variable Name	Category	Scientific Staff		Non-scientific Staff	
		N	**Margin %**	*N*	**Margin %**
Unit of non-scientific staff	Technology and IT	-	-	944	31.5
	Other services	-	-	910	30.4
	Administration	-	-	1,141	38.1
Section	Biology and Medicine	1,162	35.5	-	-
	Humanities and Social Sciences	518	15.8	-	-
	Chemistry, Physics and Technology	1,592	48.7	-	-
Valid		3,272	76.0	2,995	78.5
Missing		1,036	24.0	822	21.5
Total		4,308	100	3,817	100

answer options doctoral candidate, postdoc, other research associates employed, and director or research group leader. The scientific sections of the Max Planck Society are the BMS, CPTS, and HSS.

Age and the unit of the respondents were only included as predictors in the regression model for the non-scientific employees. The age was divided into the categories 15–29,[10] 30–44, 45–59, and 60 years and older. The variable "unit of non-scientific staff" indicates whether a respondent is assigned to the Administration, Technology and IT, or Other Services area.

Methods

The questionnaire was reviewed in detail by a specially established task force of the Max Planck Society. The task force consisted of employee representatives, institute directors, and employees of the General Administration. This ensured that the questionnaire was formulated in a coherent and meaningful way for all employees of the Max Planck Society. The original English questionnaire was translated into German by a professional translation agency, pretested, and the German and English questionnaires were then proofread by the translation agency already involved.

Two binary logistic regression equations were set up for scientific employees and non-scientific employees. Using the respective regression equations, the *estimated marginal means* were calculated for groups of people of interest from a theoretical point of view. These estimated marginal means were compared using t-tests to examine the hypotheses formulated here. Furthermore, to test the formulated hypotheses, especially the *differences of differences* were examined. These tests which, for example, compare whether the gender gaps in the self-assessment as bullied differ statistically significantly between two sections, were either taken directly from the regression equations in Appendices 1 and 2 or calculated using the logistic regression parameters.[11] The conditional differences between the estimated marginal means and the differences between the regression parameters including their confidence intervals and *p* values were reported. The analyses were performed using SPSS. The syntax and output of the analyses can be viewed in the online appendix.[12]

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[10]The age group starts at the age of 15 in order to include persons who pursue their dual vocational training at an institution of the Max Planck Society.

[11]The following formula was used to manually calculate the hypothesis tests (Paternoster et al., 1998):

$$z = (\beta_1 - \beta_2)/ \sqrt{((SE\ \beta_1)^2 + (SE\ \beta_2)^2)}.$$

The *p*-value was calculated using the following formula (Altman and Bland, 2011):

$$p = \exp(-0.717*z - 0.416*z^2).$$

Standard errors were calculated with the formula in Altman and Bland (2011):

$$SE = Estimate/z.$$

[12]The online appendix can be accessed at: https://github.com/clemensstriebing/diversity_and_discrimination_in_RPOs.

Results

For scientific employees of the Max Planck Society, the following binary logistic regression equation was established using the outcome and predictor variables presented:

$$P_{\text{Scientific employees}}(y=1)$$

$$= \frac{1}{1 + e^{-\left(\beta_0 + \beta_{\text{Female}} + \beta_{\text{EU}} + \beta_{\text{Non-EU}} + \beta_{\text{BMS}} + \beta_{\text{HSS}} + \beta_{\text{Postdocs}} + \beta_{\text{Other research associates}} + \beta_{\text{Directors and RGLs}} + \beta_{\text{Female*EU}} + \cdots\right)}}$$

The equation is shortened due to space limitations. A full list of the predictors, the model effect tests, and their parameter estimates can be found in Appendix 1. The equation estimates the mean of researchers in the survey reporting to have been bullied at least occasionally at their workplace in the 12 months prior to the survey. These estimated marginal means, which are calculated and compared for different sociodemographic groups below, thus represent the mean values of the outcome for the respective characteristic values (e.g., female/male), controlled for the mean values of the other variables in the regression equation. The reference group for the regression is German male doctoral students at CPTS.

The regression equation set up for non-scientific employees is:

$$P_{\text{Non-scientific employees}}(y=1)$$

$$= \frac{1}{1 + e^{-\left(\beta_0 + \beta_{\text{Female}} + \beta_{15-29} + \beta_{30-44} + \beta_{60 \text{ and older}} + \beta_{\text{Technology\&IT}} + \beta_{\text{Other services}} + \beta_{\text{Female*25-29}} + \cdots\right)}}$$

This equation is also shortened and reported in full including tests of model effects in Appendix 2. The reference group for the non-scientific employees is men from the Administration aged 45–59.

In the following, the differences in the estimated marginal means of the respective main groups of gender and nationality, of the subgroups of the interaction of gender with nationality, and of the subgroups of the interaction of gender and nationality with the context conditions of position and section are presented. Subsequently, the results of the group comparisons for the non-scientific employees are reported for the differences in the estimated marginal means of gender and age, the interaction of gender and age, and the interaction of gender and the context factor unit of non-scientific staff.

To test the formulated hypotheses, 65 t-tests were performed. Due to the large number of tests performed, there is a higher probability of a false positive error if the conventional significance level (usually $p = 0.05$ or $p = 0.1$) is not corrected (Benjamini and Hochberg, 1995). The Max Planck data set is considered an organization-specific full survey that is difficult to generalize, and the focus of the interpretation is therefore on the calculated effect sizes, that is, the magnitude of the differences in the estimated marginal means of the tested groups. Additionally, to assess the robustness of the results, the confidence intervals of the effects and their p values are also considered. To control the p values of the tests

performed for the problem of alpha error accumulation, the significance level can be corrected according to Bonferroni.[13] The significance level of 0.05 corrected for the number of 65 tests is thus 0.0008. To allow the reader to apply an alternative alpha error correction, if necessary, the significance values presented in the following section are provided uncorrected.[14] Only those effects that are below the corrected significance level are interpreted as "statistically significant."

As described, however, the reader is advised to only take into account the significance rating as a secondary consideration and the relevance of the results should instead be assessed based on the effect sizes given. These are valid for the approximately 6,000 employees surveyed, regardless of their statistical significance.

Scientific Employees

a) H1: Effect of Gender

Fig. 3 shows the conditional differences in the estimated marginal means of the compared groups with a relationship to gender including their confidence intervals (95%). Tables 8–10, arranged section by section, contain the test statistics of these conditional differences. Furthermore, the tables contain the statistics of the tests that were carried out to check whether the estimated gender gaps are statistically significantly different between nationalities, positions, and sections.

The estimated marginal mean of male researchers is 7% and that of female researchers is 4 percentage points higher (95% CI: 0.009/0.061, SE = 0.013, $p = 0.008$).

b) H2: Interaction Effect of Gender and Nationality

The estimated marginal mean of German male researchers is 6%. In comparison, the estimated marginal mean of German female researchers is 3 percentage points higher. For male researchers from another EU country, the estimated marginal mean is 10%, which also corresponds to that of EU female researchers. The proportion of self-reported bullied male researchers from a non-EU country is estimated at 6%, while the estimated proportion of non-EU females is 8 percentage points higher.

It was hypothesized that the difference between male and female researchers (gender gap) in self-attribution as being bullied would be larger for researchers with an EU nationality than for German researchers and that the gender gap

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[13]For the Bonferroni correction, the desired significance level is divided by the number of tests performed on the same data set. There are several different procedures for correcting for alpha error accumulation, of which the Bonferroni procedure is the most conservative with the least statistical power (Benjamini and Hochberg, 1995).

[14]For example, the number of tests to be included in the alpha error correction can also be discussed. Here, all 65 tests performed were included in the calculation of the Bonferroni correction. However, it is also conceivable to include only 38 tests directly relevant to the hypothesis tests, which would result in a significance level of 0.0013.
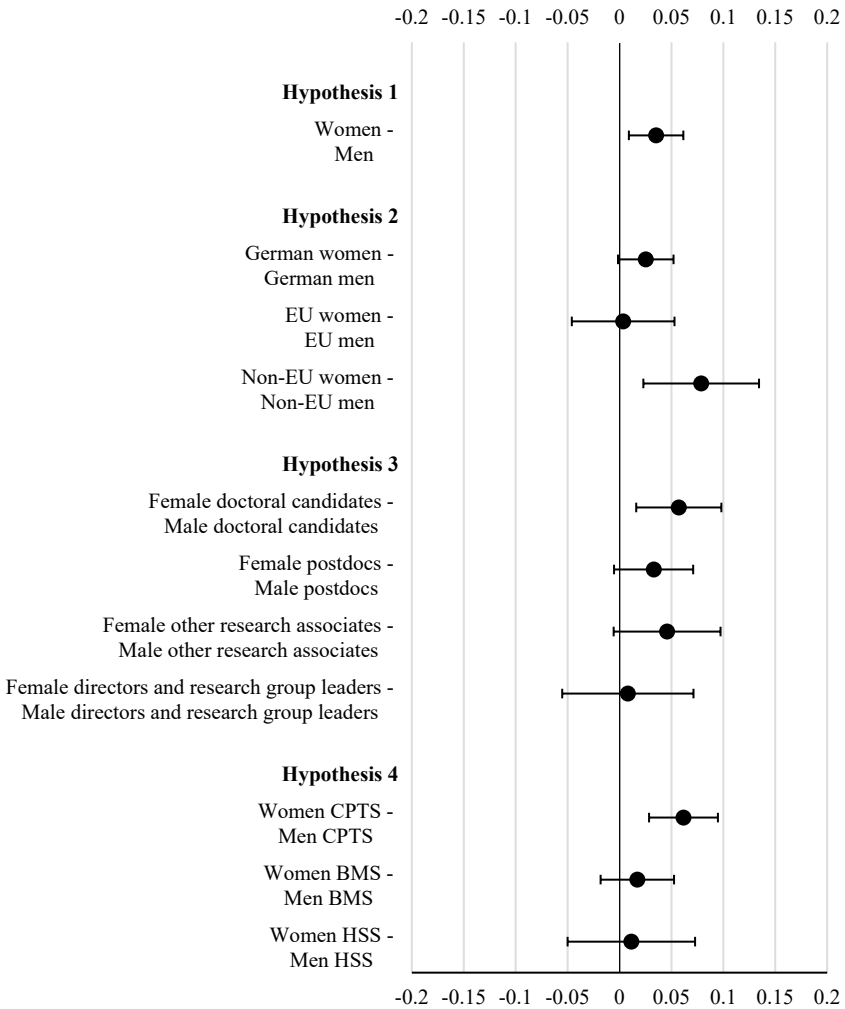
Fig. 3.   Gender-related Conditional Differences Between the Estimated Marginal Means for the Hypothetical Relationships of Scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No). 95% Confidence Interval.

would be largest for non-EU researchers (German < EU < non-EU). This pattern cannot be supported based on the estimated marginal means. The gender gap of EU researchers is 2 percentage points lower than among German researchers ($\beta_{Female*EU}$). Between German and non-EU researchers, the difference is −5 percentage points ($\beta_{Female*non-EU}$). Gender gaps among EU and non-EU researchers differ by −8 percentage points ($\beta_{Female*EU} - \beta_{Female*non-EU}$).

Table 8. Test statistics for *H2*.

Tests for *H2*	Conditional Mean Differences	Differences in Logistic Regression Parameters	SE	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
German women – German men	0.025	/	0.014	0.064	−0.001	0.052
EU women – EU men	0.003	/	0.025	0.890	−0.046	0.053
Non-EU women – Non-EU men	0.079	/	0.028	0.006	0.023	0.135
Tests for Differences in Gender Gaps by Nationality (Tests based on Logistic Regression Parameters)						
Gender gap German – EU	0.022	−0.353	0.337	0.294	−1.012	0.307
Gender gap German – non-EU	−0.054	0.492	0.369	0.182	−0.231	1.125
Gender gap EU – non-EU	−0.076	−0.845	−0.499	0.090	−1.824	0.134

Table 9. Test statistics for *H3*.

Tests for *H3*	Conditional Mean Difference	Differences in Logistic Regression Parameters	SE	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
Female doctoral candidates – Male doctoral candidates	0.057	/	0.021	0.006	0.016	0.100
Female postdocs – Male postdocs	0.033	/	0.019	0.88	−0.005	0.071
Female other research associates – Male other research associates	0.046	/	0.026	0.081	−0.006	0.097
Female directors and research group leaders – Male directors and research group leaders	0.008	/	0.032	0.803	−0.055	0.071
Tests for Differences in Gender Gaps by Position (Tests based on Logistic Regression Parameters)						
Gender gap doctoral candidates – Postdocs	0.024	−0.169	0.341	0.619	−0.837	0.498
Gender gap postdocs – Other research associates	−0.013	0.115	0.500	0.830	−0.865	1.095
Gender gap other research associates – Directors or research group leaders	0.038	−0.353	−0.332	0.291	−1.004	0.298
Gender gap postdocs – Directors or research group leaders	0.025	−0.468	−0.350	0.182	−1.154	0.218

Table 10. Test Statistics for *H4*.

Tests for *H4*	Conditional Mean Difference	Differences in Logistic Regression Parameters	SE	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
Women CPTS – Men CPTS	0.062	/	0.017	0.000	0.028	0.095
Women BMS – Men BMS	0.017	/	0.018	0.342	–0.018	0.053
Women HSS – Men HSS	0.011	/	0.031	0.716	–0.050	0.073
Tests for Differences in Gender Gaps by Section (Tests based on Logistic Regression Parameters)						
Gender Gap CPTS – BMS	0.045	–0.768	0.304	0.011	–1.364	–0.173
Gender Gap CPTS – HSS	0.051	–0.880	0.360	0.014	–1.583	–0.178
Gender Gap BMS – HSS	0.006	–0.112	–0.470	0.823	–1.033	0.809

c) H3: Interaction Effect of Gender and Hierarchical Position

Among male doctoral candidates, an estimated 8% of the respondents indicated that they would describe themselves as bullied, while among females the proportion is 6 percentage points higher. Among male postdocs, the estimated marginal mean is 6% and among women, it is 3 percentage points higher. For other research associates, the estimated proportion of men bullied is 7% and is 5 percentage points higher for women. For male directors and research group leaders, the self-assessment of being bullied is 9%. The self-assessment of female directors and research group leaders differs by 1%.

It was hypothesized that the gender gap in self-labeling as bullied would decrease with increasing hierarchical level (PhDs > postdocs > other research associates > directors and research group leaders). This pattern can only be supported if the group of other research associates is not considered. The gender gaps at the level of doctoral candidates and postdocs differ by 2 percentage points ($\beta_{Female*Postdocs}$). The difference in gender gaps between postdocs and other research associates is −1 percentage point ($\beta_{Female*Postdocs} - \beta_{Female*Other\ research\ asscoiates}$). Between other research associates and directors or research group leaders, the difference in the gender gap is 4 percentage points ($\beta_{Female*Postdocs}$). Since the hierarchical assignment of other research associates is complex and can have intersections with both postdocs and directors or research group leaders, the difference in gender gaps of postdocs and directors or research group leaders was also examined and was found to be 3 percentage points ($\beta_{Female*Postdocs}$).

d) H4: Interaction Effect of Gender and Section

Within the BMS, 8% of the men surveyed estimated themselves to be bullied. The conditional difference from the estimated marginal mean of female researchers is 2 percentage points. For the HSS, the estimated marginal mean among male researchers is 12%, from which the estimated marginal mean of females differs by 1 percentage point. For male researchers at CPTS, the estimated marginal mean of those bullied can be estimated at 4%. The estimated marginal mean of female researchers turns out to be 6 percentage points higher.

It was hypothesized that the gender gap would be most pronounced in CPTS in comparison to BMS and HSS (CPTS > BMS, CPTS > HSS, and HSS = BMS). This prediction can be considered true. There is a difference of 5 percentage points between the gender gaps of CPTS and BMS ($\beta_{Female*BMS}$). The CPTS and HSS difference are 5 percentage points ($\beta_{Female*HSS}$). The BMS and HSS difference in gender gaps is 1 percentage point ($\beta_{Female*BMS} - \beta_{Female*HSS}$).

e) H5: Effect of Nationality

Fig. 4 shows the results of the tests for the nationality-related groups with their confidence intervals (95%). The detailed test statistics are shown in Tables 11 and 12. These tables also contain the statistics of the tests to check whether the
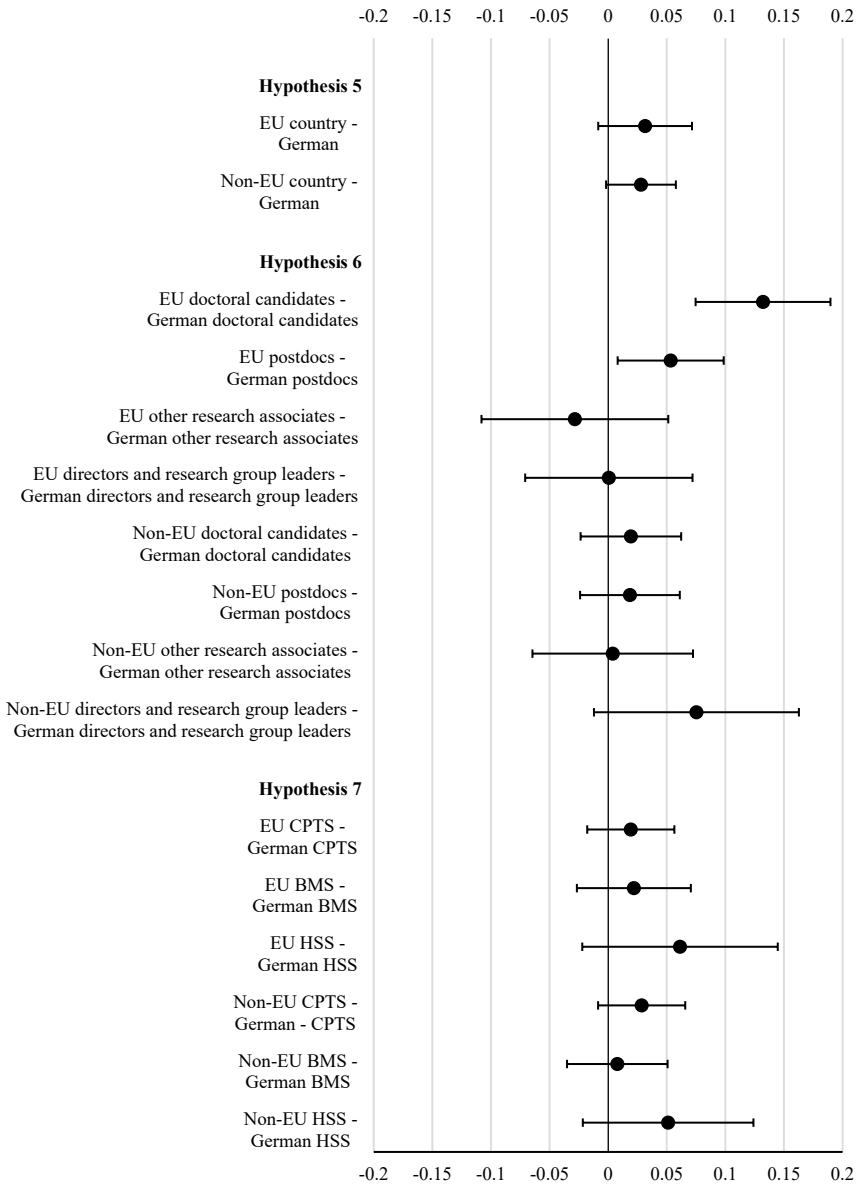
Fig. 4.   Nationality-related Conditional Differences Between Estimated Marginal Means for the Hypothetical Relationships of Scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No). 95% Confidence Interval.

Table 11. Test Statistics for *H6*.

Tests for *H6*	Conditional Mean Difference	Differences in Logistic Regression Parameters	SE	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
EU doctoral candidates – German doctoral candidates	0.132	/	0.029	0.000	0.075	0.190
EU postdocs – German postdocs	0.053	/	0.023	0.021	0.008	0.099
EU other research associates – German other research associates	−0.028	/	0.041	0.485	−0.108	0.051
EU directors and research group leaders – German directors and research group leaders	0.001	/	0.063	0.987	−0.071	−0.072
Non-EU doctoral candidates – German doctoral candidates	0.019	/	0.022	0.376	−0.024	0.062
Non-EU postdocs – German postdocs	0.019	/	0.022	0.391	−0.024	0.061
Non-EU other research associates – German other research associates	0.004	/	0.035	0.911	−0.065	0.072
Non-EU directors and research group leaders – German directors and research group leaders	0.075	/	0.045	0.091	−0.012	0.163

Tests for Differences in Nationality Gaps by Position (Tests based on Logistic Regression Parameters)

German – EU

Nationality gap doctoral candidates – postdocs	0.079	−0.574	0.383	0.134	−1.324	0.176
Nationality gap postdocs – other research associates	−0.081	1.097	0.773	0.156	−0.418	2.612
Nationality gap other research associates – directors or research group leaders	0.029	−0.388	−0.920	0.686	−2.192	1.416
Nationality gap postdocs – directors or research group leaders	0.052	−0.709	0.736	0.341	−0.735	2.153

German – Non-EU

Nationality gap doctoral candidates – postdocs	0.000	0.009	0.455	0.983	−0.882	0.901
Nationality gap postdocs – other research associates	0.015	0.258	0.447	0.575	−0.617	1.133
Nationality Gap other research associates – directors or research group leaders	−0.071	−0.801	−0.731	0.277	−2.234	0.632
Nationality Gap postdocs – directors or other research group leaders	−0.056	−0.543	−0.708	0.452	−1.931	0.845

Table 12   Test Statistics for *H7*.

Tests for *H7*	Conditional Mean Difference	Differences in Logistic Regression Parameters	SE	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
EU CPTS – German CPTS	0.019	/	0.019	0.308	–0.018	0.057
EU BMS – German BMS	0.022	/	0.025	0.376	–0.027	0.071
EU HSS – German HSS	0.061	/	0.043	0.150	–0.022	0.145
Non-EU CPTS – German CPTS	0.029	/	0.019	0.132	–0.009	0.066
Non-EU BMS – German BMS	0.008	/	0.022	0.721	–0.035	0.051
Non-EU HSS – German HSS	0.051	/	0.037	0.168	–0.022	–0.124
Tests for Differences in Nationality Gaps by Section (Tests based on Logistic Regression Parameters)						
German – EU						
Nationality gap CPTS – BMS	–0.003	–0.069	0.345	0.842	–0.744	0.606
Nationality gap CPTS – HSS	–0.042	0.261	0.425	0.539	–0.572	1.094
Nationality gap BMS – HSS	–0.039	–0.330	–0.547	0.558	–1.402	0.742
German – Non-EU						
Nationality gap CPTS – BMS	0.021	–0.375	0.408	0.358	–1.175	0.424
Nationality gap CPTS – HSS	–0.022	0.042	0.445	0.924	–0.829	0.914
Nationality gap BMS – HSS	–0.043	–0.417	–0.603	0.500	–1.600	0.766

nationality gaps found are statistically significantly different between the hierarchical positions and the sections.

Among German researchers, an estimated 7% reported having been bullied occasionally, monthly, weekly, or daily at work in the 12 months prior to the survey. The value is 3 percentage points higher among researchers from other EU countries and also among researchers from non-EU countries.

f) H6: Interaction Effect of Nationality and Hierarchical Position

An estimated 6% of doctoral candidates with German nationality reported having experienced bullying. For EU doctoral candidates, this value is 13 percentage points higher and for non-EU doctoral candidates, it is 2 percentage points higher. German postdocs have an estimated self-labeling rate of 6%, while for EU postdocs the value is 5 percentage points higher and among non-EU postdocs, it is 2 percentage points higher. The estimated proportion of self-perceived bullied researchers among German other research associates is 10%. This value is 3 percentage points lower for EU other research associates and about the same for non-EU other research associates than for Germans. Directors and research group leaders with German nationality have an estimated probability of self-ascription as bullied of 7%. The value for scientific leaders from another EU country is just as high, whereas the value for non-EU scientific leaders is estimated to be 8 percentage points higher.

To describe the interaction of nationality and hierarchical position on self-labeling as bullied, two competing hypotheses were formulated. According to *H6a*, a decrease in the nationality gap between German and non-German (both EU and non-EU) researchers was predicted with an increase in hierarchical level (PhDs > postdocs > other research associates > directors and research group leaders). Alternatively, *H6b* predicted that an increase of the nationality gap between German and non-EU researchers with increasing hierarchy level was considered possible (German vs. non-EU: PhDs < postdocs < other research associates < directors and research group leaders). If the other research associates are not considered, the comparison of German and EU researchers suggests the validity of *H6a*, while the comparison of German and non-EU researchers suggests that *H6b* is valid.

The nationality gaps between German and EU researchers for doctoral candidates and postdocs differ by 8 percentage points ($\beta_{EU*Postdocs}$) and between postdocs and other research associates the difference in nationality gaps is -8 percentage points ($\beta_{EU*Postdocs} - \beta_{EU*Other\ research\ associates}$). For German and EU other research associates and directors or research group leaders, the difference in nationality gaps is 3 percentage points ($\beta_{EU*Other\ research\ associates} - \beta_{EU*directors\ and\ research\ group\ leaders}$). When comparing postdocs and directors or research group leaders, the difference in nationality gaps was found to be 5 percentage points ($\beta_{EU*Postdocs} - \beta_{EU*Directors\ and\ research\ group\ leaders}$).

The nationality gaps between German and non-EU researchers at the levels of doctoral candidates and postdocs do not show any difference ($\beta_{non-EU*Postdocs}$). When comparing postdocs and other research associates, the difference is 2

percentage points ($\beta_{\text{non–EU*Postdocs}} - \beta_{\text{non–EU*Other research associates}}$). The nationality gaps between German and non-EU researchers for other research associates and directors or research group leaders differ by −7 percentage points ($\beta_{\text{non–EU*Other research associates}} - \beta_{\text{non–EU*Directors and research group leaders}}$). When comparing postdocs and directors or research group leaders, the difference is −6 percentage points ($\beta_{\text{non–EU*Postdocs}} - \beta_{\text{non–EU*Directors and research group leaders}}$).

g) H7: Interaction Effect of Nationality and Section

In the CPTS, a proportion of self-labeled bullied people of 5% was calculated for German researchers. This proportion is 2 percentage points higher for EU researchers and 3 percentage points higher for non-EU researchers. In the BMS, an estimated 8% of German researchers categorized themselves as being bullied. For EU researchers, this value is 2 percentage points higher, while for non-EU researchers it is 1 percentage point higher. In the HSS, an estimated 9% of German researchers indicated that they would categorize themselves as bullied. For EU researchers, this proportion is 6 percentage points higher. For non-EU researchers, it is 5 percentage points higher.

It was hypothesized that no differences in nationality gaps would be found between the sections (BMS = CPTS = HSS). However, according to the results, it is only when looking at the estimated marginal means that this prediction cannot be supported. Based on the comparison between German and EU researchers, there was no difference in the nationality gaps of CPTS and BMS ($\beta_{\text{EU*BMS}}$), whereas between CPTS and HSS the nationality gaps differ by −4 percentage points ($\beta_{\text{EU*HSS}}$). There is a difference of −4 percentage points for BMS and HSS $\beta_{\text{EU*BMS}} - \beta_{\text{EU*HSS}}$). When comparing German and non-EU researchers, a difference in nationality gaps of 2 percentage points was found between CPTS and BMS ($\beta_{\text{non–EU*BMS}}$), and between CPTS and HSS a difference of −2 percentage points ($\beta_{\text{non–EU*HSS}}$) was derived. Between BMS and HSS, the nationality gaps between German and non-EU researchers differ by −4 percentage points ($\beta_{\text{non–EU*BMS}} - \beta_{\text{non–EU*HSS}}$).

Non-scientific Employees

a) H8: Effect of Gender

Fig. 5 shows the conditional differences in the estimated marginal means of the groups calculated for the hypothesis tests of the non-scientific employees with their confidence intervals (95%). The detailed test statistics are reported in Tables 13–15. Table 14 also contains the statistics of the "difference of differences" analyses used to test whether the gender gaps between age groups were statistically significantly different.

Among non-scientific employees, an estimated 9% of men categorized themselves as bullied. For women, this figure is 3 percentage points higher (95% CI: −0.003/0.066, SE = 0.018, $p = 0.078$).
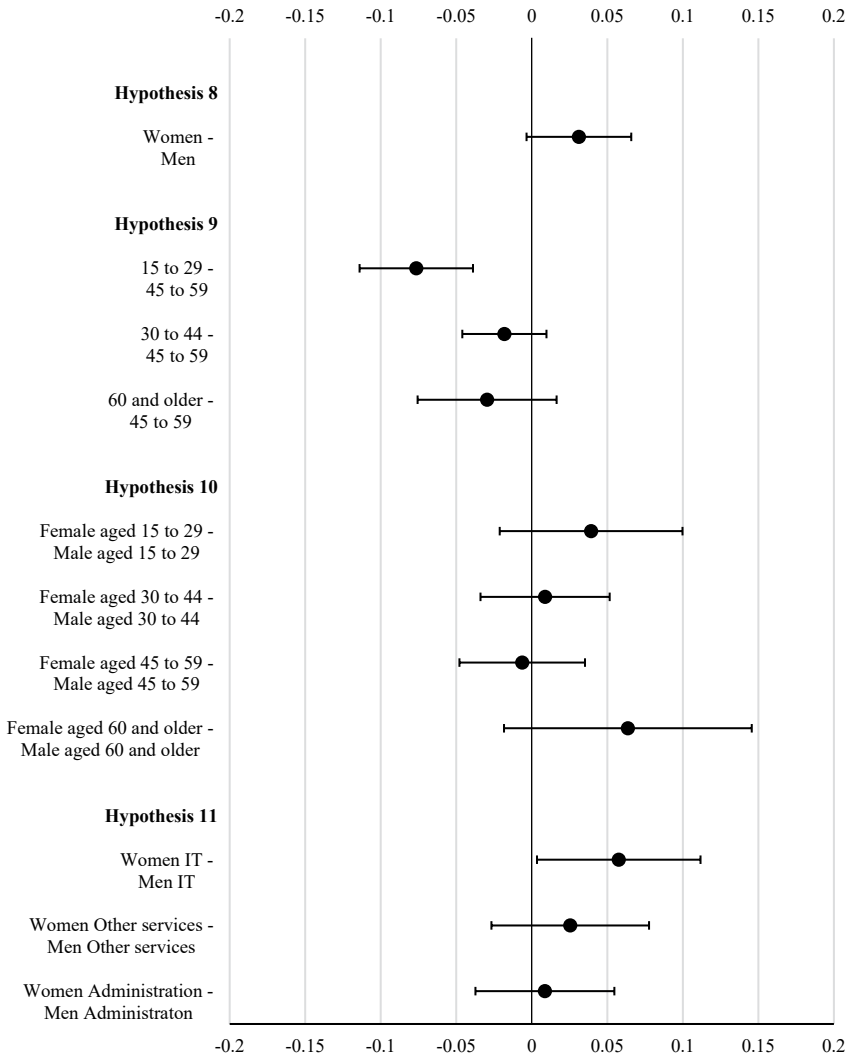
Fig. 5.   Gender- and Age-related Conditional Differences Between Estimated Marginal Means for the Hypothetical Relationships of Non-scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No). 95% Confidence Interval.

b) H9: Effect of Age

In the reference age group 45–59 years, the proportion of those who categorize themselves as bullied is estimated at 14%. This proportion is 8 percentage points lower in the 15–29 age group, 2 percentage points lower in the 30–44 age group, and 3 percentage points lower in the 60 and older age group.

Table 13.   Test statistics for *H9*.

Tests for *H9*	Conditional Mean Difference	SE	Sig.	95% Wald Confidence Interval	
				Lower	Upper
Tests for Differences in Estimated Marginal Means					
15–29 to 45–59	–0.076	0.019	0.000	–0.114	–0.040
30–44 to 45–59	–0.018	0.014	0.202	–0.046	0.010
60 and older – 45 to 59	–0.030	0.023	0.208	–0.076	0.016
15–29 to 30–44	0.058	0.019	0.003	0.020	0.097

It was hypothesized that the proportion of non-scientific employees who report being bullied increases with age (15–29 < 30–44 < 45–59 < 60 and older). To test the hypothesis, it was still necessary to examine the difference between the age groups 15–29 and 30–44. In the youngest age group, the percentage of staff who categorize themselves as bullied is 6%, which is 6 percentage points lower than in the 30–44 age group. Thus, the predicted pattern could only be supported by not considering the age group 60 and older.

c) H10: Interaction Effect of Gender and Age

Among men in the 15–29 age group, an estimated 5% describe themselves as bullied and the conditional difference in estimated marginal means compared to women in the same age group is 4 percentage points. For men in the 30–44 age group, the proportion of those who would categorize themselves as bullied was calculated to be 12%, while the value for women is 1 percentage point higher. In the 45–59 age group, the proportion of self-assessed bullied men is estimated to be 14% and the value for women is almost 1 percentage point lower. For men in the age group 60 and older, a value for self-categorization as bullied of 8% was calculated. For women in this age group, the value is 6 percentage points higher.

The gender gap in self-labeling as bullied was predicted to increase with age (15–29 < 30–44 < 45–59 < 60 and older) but this prediction was not supported by the data. The gender gap in the 30–44 age group is 3 percentage points lower than in the 15–29 age group ($\beta_{Female*30-44}-\beta_{Female*15-29}$), and in the 45–59 age group, the gender gap is nearly 2 percentage points smaller than in the 30–44 age group ($\beta_{Female*30-44}$). In the age group 60 and older, the gender gap is 7 percentage points larger than in the group 45–59 ($\beta_{Female*60\ and\ older}-\beta_{Female*45-59}$).

d) H11: Interaction Effect of Gender and Section

Of the men in the Technology and IT unit, an estimated 7% categorize themselves as being bullied while for women in the same unit, the proportion is 6 percentage

Table 14   Test Statistics for *H10*.

Tests for *H10*	Conditional Mean Difference	Differences in Logistic Regression Parameters	Std. Error	Sig.	95% Wald Confidence Interval	
					Lower	Upper
Tests for Differences in Estimated Marginal Means						
Female aged 15–29 – Male aged 15 to 29	0.039	/	0.031	0.168	−0.021	0.100
Female aged 30–44 – Male aged 30–44	0.009	/	0.022	0.687	−0.034	0.052
Female aged 45 to 59 – Male aged 45–59	−0.006	/	0.021	0.765	−0.048	0.035
Female aged 60 and older – Male aged 60 and older	0.064	/	0.042	0.128	−0.018	0.146
Tests for Differences in Gender Gaps by Age (Tests based on Logistic Regression Parameters)						
Gender Gap 30–44 to 15–29	−0.030	−0.566	−0.619	0.367	−1.780	0.648
Gender Gap 45–59 to 30–44	−0.015	0.134	0.251	0.593	−0.358	0.627
Gender Gap 60 and older – 45–59	0.070	0.693	0.461	0.133	−0.211	1.597

Table 15.   Test Statistics for *H11*.

Tests for *H11*	Conditional Mean Difference	SE	Sig.	95% Wald Confidence Interval	
				Lower	Upper
Tests for Differences in Estimated Marginal Means					
Women IT – Men IT	0.058	0.028	0.037	0.003	0.112
Women Other services – Men Other services	0.025	0.027	0.339	−0.027	0.078
Women Administration – Men Administration	0.009	0.023	0.711	−0.037	0.055

points. In the Other Services unit, the estimated proportion of self-ascribed bullied men is 11% and for women, the proportion is 3 percentage points higher. In the unit Administration, an estimated 10% of men categorize themselves as bullied. For women, it is nearly 1 percentage point higher. Thus, the prediction that men are more likely than women to have experiences of bullying in areas where they are in the minority cannot be supported.

Interpretation

The prevalence rates determined here for self-categorization as bullied are comparatively low and vary between 4 and 14% for the reference groups shown. Given these low prevalence rates, even small differences of a few percentage points in the estimated marginal means of the individual employee groups compared here mark relevant insights into the structural vulnerability of a group to bullying. In accordance with the nature of the study conducted as a full survey with validity for the Max Planck Society, the following interpretation is based on the differences in the estimated marginal means, that is, the effect sizes.

In summary, the following picture emerges (Table 16): Regarding the occurrence of the predicted effects, *H1, H4*, and *H8* can be accepted. With modifications or restrictions, *H2, H3, H6a, H6b, H9*, and *H11* might be accepted and *H7* and *H10* should be regarded as refuted. For none of the hypotheses do all the performed t-tests meet the strict Bonferroni-corrected significance threshold of 0.0008, especially none of the conducted "difference of difference" tests.

Accordingly, the validity of the hypothesis interpretations exclusively refers to the 6,267 individuals in the Max Planck cross-sectional sample. In the following, the interpretation focuses on the non-validated hypotheses. If individual significance tests meet the strict threshold for a hypothesis, this is stated explicitly.

H2 predicted for researchers that the nationality groups studied here have different gender role conceptions and that the potential for conflict between the norm prevailing in the German context and the gender role conceptions of non-EU researchers is potentially the greatest. The data partially support this

Table 16.   Interpretation of the Hypotheses According to Effect Sizes.

Hypotheses	Factors on Self-ascription as bullied	Hypothesis	Interpretation	Condition of Confirmation
Scientific employees				
1	Gender	A higher proportion of female than male researchers categorize themselves as bullied	Supported	–
2	Gender* Nationality	The difference between female researchers and male researchers who categorize themselves as bullied is larger among researchers with EU nationality than among German researchers and largest among non-EU researchers	Conditionally supported	If only the gender gap of German and non-EU researchers is considered
3	Gender* Position	The difference between female researchers and male researchers who categorize themselves as bullied decreases with increasing hierarchical levels	Conditionally supported	If other research associates are excluded
4	Gender* Section	The difference between female and male researchers who classify themselves as bullied is most pronounced in the CPTS when comparing the sections of the Max Planck Society	Supported	–
5	Nationality	A higher proportion of non-EU than German and EU researchers categorize themselves as bullied	Not supported	
6a	Nationality* Position	The difference between German researchers and EU as well as non-EU researchers who categorize themselves as bullied decreases with increasing hierarchy level	Conditionally supported	If only the gap between German and EU researchers is considered.

(Continued)

Table 16. (*Continued*)

Hypotheses	Factors on Self-ascription as bullied	Hypothesis	Interpretation	Condition of Confirmation
6b	Nationality* Position	The difference between German, EU researchers, and non-EU researchers who categorize themselves as bullied increases with increasing hierarchical levels	Conditionally supported	If only the gap between early career researchers (doctoral candidates and postdocs) and directors and research group leaders is considered
7	Nationality* Section	There are differences between the sections of the Max Planck Society to the degree to which EU and non-EU researchers classify themselves as bullied in contrast to German researchers	Supported	–
Non-scientific employees				
8	Gender	A higher proportion of female than male non-scientific employees categorize themselves as bullied	supported	–
9	Age	The proportion of non-scientific employees who categorize themselves as bullied increases with age	Conditionally supported	If employees 60 years and older are excluded
10	Gender* Age	The difference between female and male non-scientific employees who categorize themselves as bullied increases with age group	Not supported	–
11	Gender* Section	In the Technology and IT unit, a gender gap to the advantage of men can be found. In the administration and other services units, a gender gap to the advantage of women can be found	Conditionally supported	If only IT is considered

hypothesis with regards to the role conception of "being female." While the gender gap in self-categorization as being bullied is even lower for EU researchers than for Germans, it was correctly predicted to be largest for non-EU researchers. Regarding the corrected significance values of the conducted hypothesis test, the gender gap among non-EU researchers was found to be robust.

In *H3*, for researchers, it was assumed that the gender gap in bullying would decrease with an increase in hierarchical level. This hypothesis is supported by the data, but only insofar as other research associates are not considered. The gender gap is lower for postdocs than for doctoral candidates and lower for directors and research group leaders than for postdocs. The bullying self-categorization scores for women and men among other research associates are between doctoral candidates and postdocs.

H5 predicted that non-EU researchers would categorize themselves more often as bullied and that the differences in response behavior between German and EU researchers would be negligible. The results of the estimation performed partially support this hypothesis. A higher probability than German researchers of categorizing themselves as bullied was found for both EU and non-EU researchers.

To answer the question of how nationality group and hierarchical position interact, two possible hypotheses were formulated. *H6a* claimed that early career researchers are most vulnerable to bullying, whereas *H6b* formulated the opposite expectation, namely that senior researchers – and in particular non-EU researchers due to a more pronounced cultural distance on average – regard themselves as being bullied.

Regarding EU researchers, the data supported *H6a* if other research associates are not considered. Doctoral candidates and postdocs from other EU countries more frequently categorize themselves as bullied than do Germans. However, other research associates from EU countries categorize themselves as bullied even less frequently than Germans. At the level of directors and research group leaders, no difference between German and EU researchers is discernible and only the conditional differences found among the doctoral candidates are statistically robust with respect to the corrected significance level. For non-EU researchers, the data rather support *H6b*. At all hierarchical levels, non-EU researchers are somehow more likely to categorize themselves as bullied than Germans, but at the level of doctoral candidates, postdocs, and other research associates, there are only small and not robust conditional differences in the estimated marginal means. At the level of directors and research group leaders, non-EU researchers showed a considerably increased probability of being categorized as bullied.

In *H7*, the prediction was made for researchers that differences in the size of the nationality gaps regarding the comparison between German and EU and German and non-EU in the individual sections of the Max Planck Society would be detected. The results support this explorative hypothesis, at least for the sample analyzed here. In all three scientific sections of the Max Planck Society, foreign researchers categorized themselves more often as being bullied than their German counterparts. However, the difference is particularly apparent in the HSS. EU researchers are more likely to report having experienced bullying in HSS than in

CPTS and BMS. The same holds for non-EU researchers, with a lower difference in nationality gaps between CPTS and HSS.

For non-scientific personnel, the influence of age on the likelihood of categorizing oneself as bullied was examined. *H9* predicted that as age increases, more individuals will classify themselves as experiencing bullying and the results partially support this hypothesis. In the 15–29 age group, the proportion of employees who reported experiencing bullying was estimated to be lower than in the 45–59 age group. Comparable in its direction, but less pronounced, is the conditional difference between the age groups 30–44 and 45–59. Deviating from the formulated hypothesis, it was found that in the age group 60 years and older there is a lower bullying probability compared to the age group 45–59 years. Only the age gap between the groups 15–29 and 45–59 is robust with regards to the corrected significance level.

H10 assumed that women suffer more from age discrimination among non-scientific personnel than men, which is expressed in a higher bullying probability with increasing age. In this instance, the data provided differentiated results. In the middle age groups (30–44 and 45–59), only a small gender gap is evident, and the data here tend to support the null hypothesis. However, in the youngest and oldest age groups, the gender gap for the sample is more pronounced, but still not robust. The results suggest that young and older women in particular experience age-related discriminatory bullying.

With reference to the social identity theory, *H11* predicted that in the individual units of non-scientific personnel such as in Technology and IT, women classify themselves more frequently as bullied than men, whereas in the Administration and Other Service units, men would more frequently self-identify as being bullied. The hypotheses are partially supported as the conditional differences estimated for the sample suggest that women categorize themselves as bullied more frequently in all sections. This gender gap is particularly pronounced in Technology and IT.

Conclusion

This study aimed to examine the relevance of gender, age, and nationality for the individual bullying vulnerability of scientific and non-scientific employees in the academic field, taking the Max Planck Society as an example. Based on the state of research, it was assumed that individual demographic characteristics do not lead to experiences of discriminatory bullying across the board (Salin, 2021). This study sought to unpack the contextual conditions and intersectionality in which gender, age, and nationality influence the likelihood of self-categorization as affected by workplace bullying. The contextual factors considered for researchers were hierarchical position and their discipline (or scientific section in the Max Planck Society). In addition, the interaction of gender and nationality was examined. For non-scientific employees, the respective work unit was considered as a context factor and the interaction of gender and age was analyzed. The hypotheses underlying the study were mainly derived from the social role, social identity, and cultural distance theory as well as from role congruity and relative deprivation theory.

Theoretical Contributions

The results of the research conducted here support the hypothesis that women with scientific or non-scientific jobs in research organizations state bullying experiences more often than men (Keashly, 2021). However, it remains an open question whether this perceived gender gap is the result of differences in hierarchical gradients, conflicts in stereotypical role expectations or group identities, or the method of measurement used (Salin and Hoel, 2013). Similarly, conclusions about the main effects of age on non-scientific staff remain unclear as these may be a result of longer tenure, more frequent leadership responsibilities, or even a stronger claim to be treated with the respect due to age.

Regarding gender, the results support the social identity theory in particular. In organizational contexts in which women make up the minority of employees, they categorize themselves as bullied more often than their male colleagues. For researchers, this could be shown by comparing the sections of the Max Planck Society, and for non-scientific personnel by comparing the respective units. However, for men the reverse is not true: in the non-scientific units, where men are in the minority, women nevertheless more frequently state that they have been bullied. This result contradicts previous research findings (Eriksen and Einarsen, 2004). Within the framework of the current state of research, this imbalance could presumably be explained by the fact that women experience bullying from both genders, while men are more likely to experience bullying from other men (Gardner et al., 2020). A competing explanation is that the study conducted here differs from Eriksen and Einarsen's (2004) study which examined the nursing profession in terms of the gendered organizational setting. According to this view, research organizations are masculine, and women are in a minority even when they are the majority in a field of work (Hearn, 2020).

The results of this study contradict the role congruity theory according to which women experience more bullying than men as they advance in their (scientific) careers. The gender gap in the incidence of bullying is found exclusively at lower hierarchical levels and most prominently among doctoral candidates. One possible interpretation of this result is that female researchers might encounter a male-dominated culture in their institutes in which they may experience social role conflicts more frequently than their male colleagues (see also Striebing on work climate in this collection). Concrete, anecdotal examples of this elusive masculine culture are provided by the studies of Gewinner and of Pantelmann and Wälty in this collection.

Evidence for the social role theory can presumably above all be derived from the interaction of age group and gender. Accordingly, the assumption that gender roles in organizations lead to tangible inequalities in income or hierarchy with increasing age is supported by the fact that the age group 60 years and older shows a clear gender gap in bullying, whereas the age groups 30–44 years and 45–59 years do not. The fact that a gender gap in bullying was also found in the youngest age group suggests a biographical approach for future studies of bullying and gender discrimination in academia. Accordingly, it should be investigated how the distribution of the individual bullying items, for example, of the Negative

Acts Questionnaire or the Sexual Experience Questionnaire, varies between the individual age groups and to what extent young women experience different forms of bullying and discrimination than older women.

Concerning the general influence of nationality, the cultural distance theory is not supported by the data. According to this theory, a greater cultural distance would have led to a higher probability of self-categorization as bullied (Bergbom et al., 2015). However, no differences could be found here between affected persons from European and non-European countries. It can be speculated that different motivations and expectations between EU and non-EU researchers led to a convergence of the results: it is conceivable that non-EU researchers might generally be more tolerant of behavior at the workplace that appears inappropriate according to European norms since they already operate in a cultural context that they regard as foreign. In contrast, EU researchers might be more easily disappointed in the sense of the relative deprivation theory since they do not expect to be treated as "foreigners" within the European cultural area. Alternatively, it can be speculated that researchers from abroad are united in a sense of social uprootedness, regardless of the factual physical and cultural distance between Germany and their country of origin.

Similarly, EU and non-EU researchers alike were found to have an increased vulnerability to self-categorization as being bullied in the HSS. In the social sciences and humanities section, language and institutions defined by language (such as the legal system) play a prominent role, whereas scientific standardization in the form of formulas and quantitative methodology is more specific to CPTS and BMS. An obvious conjecture is that this salient role of language and cultural contextuality more frequently leads to experiences of exclusion among EU and non-EU researchers alike, and thus to a greater vulnerability to bullying.

The cultural distance theory is supported by the interaction of gender and nationality: female researchers from a non-EU country state bullying experiences considerably more often than their male colleagues from a non-EU country. However, the results concerning nationality and hierarchy are differentiated. Among EU researchers, especially doctoral candidates and postdocs show a higher tendency than Germans to categorize themselves as bullied, which again could be explained within the framework of the relative deprivation theory as a disappointment rather than an incomprehensible unequal treatment on the part of EU researchers. In the case of non-EU researchers, on the other hand, the role congruency theory seems more plausible, according to which leaders from a non-EU country have to struggle more with recognition problems and early career researchers have lower expectations of their social integration in the workplace.

Practical Implications

From a management perspective, the study conducted has relevant implications for the development of target group-oriented prevention programs against bullying or programs to promote professional behavior in the workplace. In principle, it should be noted that anyone can be affected by bullying. However, organizational resources can be used more efficiently and effectively if they are applied

according to need. In the scientific field of the Max Planck Society, the need for anti-bullying measures in research organizations is greatest among female and male non-EU doctoral candidates in the humanities and social sciences (calculated based on the parameter estimates in the Appendix) as every fourth person in this group describes themselves as having been bullied.[15] In contrast, among male German or non-EU doctoral candidates and postdocs in chemistry, physics, and technology the demand for support measures is lowest.[16] Among non-scientific employees, the prevalence of bullying experiences is generally higher among female employees, but peaks with men in Other services.[17] Men between the ages of 15 and 29 in the field of Technology and IT are the least likely to report having been bullied.[18]

The exemplary presentation of the minimum and maximum values of the model estimation illustrates that the target groups of anti-bullying measures can easily be over-simplified as neither are women more affected by bullying than men nor are foreigners more affected than Germans. The study also points to the special role of contextual conditions in the workplace and suggests that a sociodemographic group is more vulnerable to bullying when it is in a minority position in the workplace and when the conditions in the workplace, which are shaped by the majority, are exclusionary in their character.

Furthermore, from a practical perspective, the study can be used to legitimize awareness-raising measures through training, workshops, or online courses. The results of Kmec et al. (in this collection) indicate that there sometimes is a variance not only in awareness but even in the ability of managers to recognize misconduct in the workplace. The present study provides complementary evidence of the "uneven distribution" of managers' own experiences with social misconduct in the workplace. This finding, which is not new, is once again supported here with concrete data. Depending on the contextual conditions, there are "dominant" socio-demographic groups that experience their workplace as a "safe space" without perhaps ever questioning this, and there are other groups that are dependent on the empathy of this dominant group due to the hierarchical relationships at the workplace.

Limitations

The data set used, and the study design enabled unprecedented quantitative analyses of the interactions of demographic characteristics with contextual factors of the (academic) workplace – but also have relevant limitations. The results obtained in the binary logistic regressions conducted for researchers

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[15]$P_{\text{Female}} = 0.26$, 95% CI: 0.15/0.41, SE = 0.067; $P_{\text{Male}} = 0.28$, 95% CI: 0.16/0.45, SE = 0.076.

[16]$P_{\text{German PhDs}} = 0.03$, 95% CI: 0.02/0.04, SE = 0.007; $P_{\text{non-EU PhDs}} = 0.03$, 95% CI: 0.01/0.07, SE = 0.013; $P_{\text{German Postdocs}} = 0.03$, 95% CI: 0.01/0.05, SE = 0.008; $P_{\text{non-EU Postdocs}} = 0.03$, 95% CI: 0.01/0.06, SE = 0.012.

[17]$P = 0.17$, 95% CI: 0.12/0.24, SE = 0.030.

[18]$P = 0.04$, 95% CI: 0.02/.09, SE = 0.017.

and non-scientific staff were for the most part not robust according to conventional standards. The significance values of the t-tests performed were – in most cases – higher than the significance threshold corrected according to Bonferroni and the confidence intervals of the conditional differences in the estimated marginal means also included the null hypothesis in most cases. Thus, the results can only be applied with great caution to research organizations that are considered comparable to the Max Planck Society. In this context, as has been shown, the Max Planck Society represents a very specific case within Germany, if not worldwide, due to its pure research orientation in combination with strong excellence and hierarchy orientation. The data set used here is treated as a full survey, which means that it provides definitive data for the case of the Max Planck Society in terms of the specific time of the survey and the specific response rate.

Another limitation lies in the exclusive measurement of bullying based on the self-attribution of those affected. To be able to consider more complex constellations of the predictors in detail, a more limited validity of the outcome was accepted. It was presented that the respective operationalizations of bullying have a substantial impact on the identified associations with demographic characteristics (Salin and Hoel, 2013). There is still a research gap concerning whether women tend to more frequently ascribe to self-attributions of bullying because they are more sensitive than men, it is more acceptable for them to be vulnerable, or whether a structural power imbalance is expressed here since men hold leadership positions more often than women.

Research Opportunities

This work has opened new psychological and sociological research perspectives that are sensitive to the academic contextual conditions within which gendered, ethnicized, and age-specific interactions take place. Particularly exciting seem to be the puzzles that have been raised regarding the interaction of gender and nationality, and nationality and hierarchy: Why do women researchers with non-EU nationality seem to feel significantly less comfortable in their German research workplace than non-EU men? Why does the likelihood of bullying decrease for researchers from other EU countries compared to their German colleagues as they move up the hierarchy, while it increases for researchers from non-EU countries in leading positions?

Finally, this study points to the explanatory potential of relative deprivation theory to better understand bullying conflicts in general and those with discriminatory character in particular. In life and work, we draw self-esteem from a wide variety of aspects of our identity. As we age, we sometimes expect more respect from those around us, which we also do as we gain leadership responsibility, as we gain work experience, and possibly because of our gender. In organizations, such expectations can subtly clash, for example, in disputes between older and more experienced non-scientific employees and early career researchers. Such status conflicts can form structural starting points for bullying conflicts.

Acknowledgments

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Appendix A

1. Test of Model Effects and Parameter Estimates of Regression for Scientific Staff

Table A1.　Test of Model Effects for Non-scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No).

Source	Type III		
	Wald Chi-square	**df**	**Sig.**
(Intercept)	599.187	1	0.000
Gender	7.399	1	0.007
Nationality	5.419	2	0.067
Section	13.413	2	0.001
Position	2.608	3	0.456
Gender * Nationality	4.426	2	0.109
Gender * Position	1.372	3	0.712
Nationality * Position	13.452	6	0.036
Gender * Section	8.614	2	0.013
Nationality * Section	1.585	4	0.811

Table A2. Parameter Estimates With Robust Estimators for Scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No).

Parameter	B	SE	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-square	df	Sig.
Intercept	−3.619	0.2733	−4.155	−3.084	175.397	1	0.000
Gender (Female)	1.127	0.3334	0.474	1.781	11.434	1	0.001
Gender (Male)	Reference						
Nationality (EU)	1.405	0.3563	0.706	2.103	15.544	1	0.000
Nationality (Non-EU)	0.158	0.4606	−0.745	1.060	0.117	1	0.732
Nationality (German)	Reference						
Section (BMS)	0.828	0.2585	0.321	1.334	10.250	1	0.001
Section (HSS)	1.019	0.3054	0.420	1.617	11.126	1	0.001
Section (CPTS)	Reference						
Position (Postdocs)	−0.006	0.3247	−0.642	0.631	0.000	1	0.986
Position (Other research associates)	0.508	0.2942	−0.069	1.084	2.977	1	0.084
Position (Directors and research group leaders)	0.328	0.3926	−0.442	1.097	0.697	1	0.404
Position (Doctoral candidate)	Reference						
Gender (Female) * Nationality (EU)	−0.353	0.3365	−1.012	0.307	1.100	1	0.294
Gender (Female) * Nationality (Non-EU)	0.492	0.3690	−0.231	1.215	1.778	1	0.182

Gender (Female) * Position (Postdocs)	−0.169	0.3405	−0.837	0.498	0.247	1	0.619
Gender (Female) * Position (Other research associates)	−0.054	0.3661	−0.772	0.664	0.022	1	0.883
Gender (Female) * Position (Directors and research group leaders)	−0.522	0.4648	−1.433	0.389	1.262	1	0.261
Nationality (EU) * Position (Postdocs)	−0.574	0.3828	−1.324	0.176	2.247	1	0.134
Nationality (EU) * Position (Other research associates)	−1.671	0.6716	−2.987	−0.354	6.188	1	0.013
Nationality (EU) * Position (Directors and research group leaders)	−1.283	0.6292	−2.516	−0.049	4.156	1	0.041
Nationality (Non-EU) * Position (Postdocs)	0.009	0.4546	−0.882	0.901	0.000	1	0.983
Nationality (Non-EU) * Position (Other research associates)	−0.249	0.4898	−1.209	0.711	0.258	1	0.611
Nationality (Non-EU) * Position (Directors and research group leaders)	0.552	0.5429	−0.512	1.616	1.033	1	0.309
Gender (Female) * Section (BMS)	−0.768	0.3037	−1.364	−0.173	6.402	1	0.011
Gender (Female) * Section (HSS)	−0.880	0.3585	−1.583	−0.178	6.030	1	0.014
Nationality (EU) * Section (BMS)	−0.069	0.3445	−0.744	0.606	0.040	1	0.842
Nationality (EU) * Section (HSS)	0.261	0.4249	−0.572	1.094	0.377	1	0.539
Nationality (Non-EU) * Section (BMS)	−0.375	0.4080	−1.175	0.424	0.846	1	0.358
Nationality (Non-EU) * Section (HSS)	0.042	0.4446	−0.829	0.914	0.009	1	0.924
(Scale)	1						

2. Test of Model Effects and Parameter Estimates of Regression for Non-Scientific Staff

Table A3. Test of Model Effects for Non-scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No).

Source	Type III		
	Wald Chi-Square	**df**	**Sig.**
(Intercept)	492.691	1	0.000
Age	10.536	3	0.015
Gender	2.930	1	0.087
Unit	2.856	2	0.240
Age * Gender	3.453	3	0.327
Gender * Unit	2.947	2	0.229

Table A4.　Parameter Estimates With Robust Estimators for Non-scientific Staff's Self-ascription to Occasional or More Frequent Bullying (Yes/No).

Parameter	B	SE	95% Wald Confidence Interval		Upper	Hypothesis Test		
			Lower			Wald Chi-Square	df	Sig.
Intercept	−1.725	0.2075	−2.131	−1.318		69.118	1	0.000
Age (15–29)	−1.221	0.4759	−2.153	−0.288		6.580	1	0.010
Age (30–44)	−0.226	0.1950	−0.609	0.156		1.346	1	0.246
Age (60 and older)	−0.617	0.3692	−1.340	0.107		2.790	1	0.095
Age (45–59)	Reference							
Gender (Female)	−0.286	0.2436	−0.763	0.192		1.376	1	0.241
Gender (Male)	Reference							
Unit (Technology & IT)	−0.320	0.2242	−0.759	0.119		2.038	1	0.153
Unit (Other Services)	0.141	0.2688	−0.386	0.668		0.274	1	0.600
Unit (Administration)	Reference							
Age (15–29) * Gender (Female)	0.700	0.5663	−0.410	1.810		1.528	1	0.216
Age (30–44) * Gender (Female)	0.134	0.2511	−0.358	0.627		0.286	1	0.593
Age (60 and older) * Gender (Female)	0.693	0.4611	−0.211	1.597		2.258	1	0.133
Gender (Female) * Unit (Technology & IT)	0.557	0.3316	−0.093	1.207		2.825	1	0.093
Gender (Female) * Unit (Other services)	0.143	0.3095	−0.464	0.749		0.212	1	0.645
(Scale)	1							