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Dental and Allied Dental Students' Cultural Climate-related Experiences and Perceptions: How Does Ethnicity/Race Matter?

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ABSTRACT

Objectives: The cultural climate of an academic institution affects students' academic performance and well-being. The objectives were to investigate the culture-related experiences and perceptions of dental and allied dental students in the United States (U.S.) and Canada who self-identified in response to a survey question as American Indian/First Nation-Indigenous/Hawaiian Native (AI), Black/ African American/Canadian American/African (Black), Hispanic/Latinx (HL), Middle Eastern (ME), East Asian/Southeast Asian/South Asian (AA), White/European (White) or multiracial (M). The comparisons focused specifically on experiences of biases/inequities related to systemic factors (policies/practices) and personal discrimination/harassment, and on perceptions of the cultural climate and climate-related consequences, having a sense of belonging and culture-related clinical competence. Relationships between these constructs of interest were explored.

Methods: Descriptive and inferential statistics such as univariate analyses of variance and chi-square tests were used to analyze the data from 10,281 students who participated in the 2022 American Dental Education Association climate study.

Results: AI and Black students reported the highest mean numbers of experienced biases/inequities related to policies/practices, while White students experienced the lowest mean (Range of sum scores: 0-16: AI:5.06/Black:4.38/ME:4.11/M:3.96/HL:3.54/AA:3.47/White:3.06; $p<0.001$). The mean sum score of having witnessed and experienced harassment and discrimination was highest for Black and lowest for HL students (Range: 0-4: Black:0.82/M:0.73 /ME:0.66/AA:0.6 /White:0.46/AI:0.40/HL:0.36; $p<0.001$). Significant differences in mean responses were also found for general climate perceptions (5-point answer scale with 5=most positive: ME:3.58/Black:3.59/M:3.59/AA:3.66/ White:3.73/AI:3.77/HL:3.87; $p<0.001$), personal climate-related consequences (ME:3.70/BM:3.72/Black:3.73/AA:3.75/AI:3.83/White:3.85/

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HL:3.96; p<0.001), having a sense of community (ME:3.84;Black:3.87/AI:3.88/BM:3.93/ AA:3.95/HL:4.09/White:4.11; p<0.001) and the "Culturally competent clinical care" Index (AA:4.30/M:4.32/AI:4.34/Black:4.37/E:4.40/White:4.43/HL:4.54; p<0.001). The higher the witnessed/experienced harassment/discrimination was, the less positive the students perceived the general climate (r=-0.52; p<0.001), their own situation (r=-0.51;<0.001), their sense of belonging (r=-0.43;p<0.001) and cultural competence when providing clinical care (r=-0.24;p<0.001).

Conclusions: Students' ethnic/racial background matters. It affects their perceptions of the school/program climate, their experiences of biases/inequities related to policies/practices and the degree to which they experience and witness harassment and discrimination. These findings should be a wakeup call for faculty and administrators to progress on fulfilling the CODA requirements to create a humanistic environment for all students.

MeSH Keywords: Education, Dental; Students, Dental; Culture; Humanism; Diversity, Equity, Inclusion; Cultural Competency; Ethnic and Racial Minorities

Author selected keywords:

Climate Study; Harassment; Discrimination; Inclusive Culture

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INTRODUCTION

Significant sociodemographic population changes both in the United States (U.S.)[1] and Canada[2,3] are well documented. Specifically, major shifts are expected in the ethnic/racial composition of the U.S. population, resulting in the prediction that the U.S. will become "minority white" by 2045.[4] While a comparison of U.S. and Canadian demographic data showed clear differences,[5] sociodemographic changes in the ethnic/racial background of the population also occur in Canada.[5] These changes affect the ethnic/racial diversity of patient populations and require that the future dental workforce must be well prepared for providing culturally competent care to patients from all backgrounds.[1]

The Commission on Dental Accreditation (CODA)[6] in the U.S. is obviously aware of this fact when they postulate in the pre-doctoral Standard 2-17 that "Graduates must be competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment."[7] In order to achieve this academic goal, CODA states unequivocally that diversity is essential for achieving academic excellence and that dental schools must have policies to achieve appropriate levels of diversity among its students, faculty and staff. However, research showed that bringing students from diverse backgrounds into an environment in which they might not feel included can result in stress and lower satisfaction. [8] One way to prevent these negative consequences is to assure that the cultural climate of academic institutions is inclusive and allows all students to have a sense of belonging and to not experience biases and inequities related to policies nor experience or witness harassment, i.e., aggressive pressure or intimidation,[9] or discrimination, i.e., practices of treating persons or groups of people less fairly than others.[10] CODA's requirement that U.S. dental schools and allied dental programs must be committed to a humanistic culture and learning environment can contribute to assuring equity and inclusion for all students. Specifically, CODA Standard 1-3

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states that "The dental education program must have a stated commitment to a humanistic culture and learning environment that is regularly evaluated."[6] CODA describes "humanistic environment" in the following way: "Dental schools are societies of learners, where graduates are prepared to join a learned and a scholarly society of oral health professionals. A humanistic pedagogy inculcates respect, tolerance, understanding, and concern for others and is fostered by mentoring, advising and small group interaction. A dental school environment characterized by respectful professional relationships between and among faculty and students establishes a context for the development of interpersonal skills necessary for learning, for patient care, and for making meaningful contribution to the profession."[6]

Currently, the Commission of Dental Accreditation of Canada does not have a similar standard.[11] Yet, even despite this Standard in the U.S., research showed that students' cultural experiences in dental programs vary.[12] For example, students from historically underrepresented minority (HURM) backgrounds reported experiencing belittling, discrimination, and isolation.[13] Evidence that students from HURM backgrounds experience a less positive cultural climate in dental schools in the U.S. go back to the results of the first climate study in a U.S. dental school in 1997[14] and were replicated in a follow up study in 2017.[15]

Research clearly showed that climate-related student experiences vary dependent on the students' ethnic/racial backgrounds. For instance, students from HURM backgrounds reported experiencing discrimination and heightened vigilance compared to their non-Hispanic White counterparts, with Black students having the most negative experiences.[16] A national study with Black dentists found that these professionals had experienced more discrimination as students in dental schools compared to their Hispanic and American Indian/Alaska Native counterparts.[17] Research in the United Kingdom (U.K.) showed that HURM students experienced a range of discriminatory encounters at dental school, ranging

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from micro aggressions, i.e. actions, or incidents regarded as an instance of indirect, subtle, or unintentional discrimination or prejudice against members of a marginalized group such as a racial minority,[18] and from racial mocking to overt racist behaviors.[19]

Even if policies and practices are developed and implemented to support equity and inclusion, students might experience biases and inequities in the application of these policies as described in a study with medical students.[20] Experiencing these biases and inequities as well as personal experiences with micro aggressions, harassment and discrimination clearly result in experiencing and perceiving the academic environment differently than students without such experiences. Students with these negative experiences might perceive a lower sense of belonging which in turn could affect their ability to deliver culturally competent care to diverse patients.

The 2022 American Dental Education Association (ADEA) Climate Study[21] offers an opportunity to assess the cultural climate-related experiences of students from different ethnic/racial backgrounds and their perceptions of their academic institution. Investigating their experiences and perceptions is crucial because ensuring that there is a diverse and competent oral health workforce to support diverse populations now and even more so in the future remains a key health equity challenge.[1,22,23]

The objectives of this study therefore were to investigate the culture-related experiences and perceptions of dental and allied dental students in the United States (U.S.) and Canada who self-identified as American Indian/First Nation-Indigenous/Hawaiian Native (AI), Black/African American/Canadian American/African (Black), Hispanic/Latinx (HL), Middle Eastern (ME), East Asian/Southeast Asian/South Asian (AA), White/European (White) or multiracial (M). The comparisons focused specifically on experiences of biases/inequities related to systemic factors (policies/practices) and personal experiences of discrimination/harassment, on perceptions of the cultural climate and climate-related

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consequences, having a sense of belonging and culture-related clinical competence. Relationships between these constructs of interest were explored.

METHODS

The survey of the American Dental Education Association (ADEA) Climate Study Survey was administered from January to April 2022 to students, staff, faculty, administrators and administrators with faculty positions at participating U.S. and Canadian dental schools and allied dental education programs. An independent ethical review/institutional review board (IRB), Adverra, Inc. (Pro00057545), reviewed the inclusion and exclusion criteria for the ADEA Climate Survey and granted IRB approval to ADEA. Data collected from U.S. and Canadian dental schools and allied dental education programs were encrypted and password protected by ADEA and a third-party contractor. ADEA shared only data of participating students with the authors of this study. A general overview of the background of the ADEA Climate Survey and the overall methodology used is provided by Inglehart et al.[24]

Respondents: For the here presented analyses, ADEA provided anonymous data from 10,281 students, with 6,045 students attending dental schools and 4,236 allied dental education programs. However, for the purpose of this study only data from the 7,464 students who had self0identified their ethnicity/race were included in the ethnicity/race related analyses. Data from 2,817 students who had not self-identified their race/ethnicity were excluded in the ethnicity/race related analyses. Participation in this research study was voluntary. All participating students consented and were not compensated for their participation.

Materials: The survey started with seven educational background questions such as which type of program the student respondents attended and where the program was located.

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Questions 8 to 98 focused on assessing different aspects of the climate in their institution and the final eight questions focused on the respondents' demographic background.

The only demographic responses considered in the analyses were the answers to the question "Select the term(s) that best align(s) with your race, ethnicity or population group. Select one or more." The eleven answer categories provided were (a) American Indian, Alaska Native, Native American or Indigenous (U.S.); (b) First Nations, Indigenous (Canada); (c) Middle Eastern, Arab or North African (Cypriot, Lebanese, Syrian, Iraqi, Iranian, Israeli, Jordanian, Saudi Arabian, Kuwaiti, Qatari, Bahraini, United Arab Emirati, Omani, Yemeni); (d) Black, African American; (e) Black, African Canadian; (f) African; (g) Hispanic, Latino, Latinx (Cuban, Mexican, Puerto Rican, South or Central American, and additional Spanish descent); (h) Native Hawaiian or Pacific Islander (Hawaiian, Guamanian/Chamorro, Samoan, and additional Pacific Islanders); (i) East Asian, Southeast Asian (Chinese, Korean, Japanese, Taiwanese, Filipino, Vietnamese, Cambodian, Thai, Indonesian, and additional East/Southeast Asian descent); (j) South Asian (Afghan, Bangladeshi, Bhutani, Indian, Nepali, Pakistani, Sri Lankan and Maldivian); (k) White, European (defined in this study as White) plus an answer category "Prefer to self-describe (please specify)". Due to the low number of responses for some of these answer categories, some subgroups were combined such as groups a, b and h, groups d, e and f, and groups i and j. Respondents who self-identified with more than one of these groups were categorized as multiracial. Table 1 provides an overview of the percentages of respondents in each of these resulting categories.

Answers to questions assessing six culture-related topics were included and analyzed (see Figure 1 for an overview). The first topic, concerned with institutional policies and practices, prompted students to respond to the statement, "Please indicate if you have experienced bias or inequities in relation to the following policies or practices at your dental

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school/allied dental education program." Items a to p in Table 2 provide the wording of these 16 policies. Topic 2 focused on students having experienced and/or witnessed harassment and discrimination (see items q to w in Table 2 for the wording of these questions). Topic 3 centered on students' general climate perceptions with seven Likert-type questions (see items a to g in Table 3 for the wording of these questions) and Topic 4 complemented these responses with answers to 12 Likert-type items that focused on the students' personal climate-related experiences and consequences of these experiences (see items a to l in Table 4 for the wording of these questions). Table 5 provides the wording of four Likert-type questions a to d concerning the students' sense of community (Topic 5) and the wording of the four questions e to h concerning the degree to which the students felt comfortable to provide culturally competent care (Topic 6).

Statistical analyses: After receiving a CVS file from ADEA with the data and a codebook, the data were imported into SPSS (Version 29: Released 2023. IBM Corp., Armonk, NY) for analyses. Descriptive statistics such as percentages, means and standard deviations (SD) were computed to provide an overview of the responses. A sum score of the responses concerning experienced biases and inequities related to 16 policies and practices was computed by adding one point for each "Yes" response. A "Harassment/discrimination" sum score was computed by adding one point for each "Yes" response to four items. Responses to seven items were used to create a "general climate perception" Index, responses to 12 items to create a "Personal climate-related consequences" Index, responses to four items for the creation of a "Sense of belonging" Index and answers to four items to create a "Cultural competent clinical care" Index. These indices were created by averaging the responses to the items used for assessing each topic after confirming that these sets of items had at least an inter-item consistency of Cronbach alpha >0.70.[25]

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Inferential statistics, specifically chi-square tests for the analyses of the "Yes / No" responses and univariate analyses of variance for the analyses of differences in mean responses were used to test for the significance of differences between the seven different ethnic/racial groups. Pearson correlation coefficients were computed to test whether there were significant relationships between the sum scores and indices of interest. Because of the high number of significance tests conducted, a Bonferroni correction was used and the significance level was set to $p<0.001$.[26]

RESULTS

Table 1 provides an overview of the students' background and educational characteristics. About half of the students (50.2%) had self-reported to belong to the answer category "European American (White)" and are referred to as "White" in the description of the results; 17.9% had checked the answer categories "East Asian/Southeast Asian" and "South Asian" and are referred to as "AA"; 13.8% self-identified as "Hispanic/Latinx" ("HL"). Respondents who had reported to be "Black, African American", "Black, African Canadian" or "African" are referred to as "Black" (6.3%); students who had self-identified as "Middle Eastern / North African" are referred to as "ME" (5.2%). If respondents had checked more than one answer category, they were referred to as multiracial ("M") (5.2%); if they had indicated that they were "American Indian", "First Nation / Indigenous" or "Native Hawaiian /Pacific Islander" (AI) (1.3%) (Table 1). Historically and contemporary minoritized students—Hispanic/Latinx, Black, American Indian/First Nation-Indigenous or Native Hawaiian/Pacific Islander—accounted for 21.4% of the student respondents. Women were about three times as likely as men to participate in this survey (74.2% vs. 24.9%), with 0.9% of the respondents reporting their gender as "Other". Most students attended dental schools (58.8%) as pre-doctoral dental students (56.6%).

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The results related to experienced biases and inequities related to 16 academic policies showed that for all but one policy ("Student scholarship, grant programs"), the seven different ethnic/ racial groups differed significantly in the percentages of "Yes" responses (Table 2). For 15 of the 16 differences respectively, White students reported the lowest level of experiencing these biases/inequities and American Indian/ students reported the highest level of these biases/inequities, followed by Black students in 12 of the 16 categories. A comparison of the mean "Sum of biases or inequities experienced" scores showed that while American Indian/First Nation-Indigenous or Native Hawaiian/Pacific Islander respondents had on average a mean sum score of 5.06 "Yes" responses, Black students 4.38 and Middle Eastern students had 4.11 "Yes" responses. In contrast, White students had an average of 3.06, followed by Asian American students with 3.47 and Hispanic/Latinx with 3.54 "Yes" responses. Multi-racial students were in the middle of this distribution of means with 3.96 "Yes" responses.

When asked if the students had witnessed or experienced harassment or discrimination because of race or ethnicity, Black students were most likely to have witnessed discrimination (32.8%) and experienced discrimination (24.4%) because of their race or ethnicity and multiracial students were most likely to have witnessed harassment (21.0%) or experienced harassment (12.7%) ($p<0.001$) (Table 2). Hispanic/Latinx students had the lowest percentages of experienced discrimination (8.3%), witnessed harassment (9.2%) and experienced harassment (6.9%). The "Harassment/discrimination" sum score of the number of "Yes" responses to these four questions confirmed these findings: Black students had the highest mean sum score (Mean = 0.82), followed by multiracial students (Mean = 0.73), with Hispanic/Latinx students having the lowest mean sum score (Mean = 0.36) followed by White students (Mean = 0.46; $p<0.001$).

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For the responses to the statements concerning the students' general climate perceptions, mean responses to six of the seven items were in the range from "neither disagree nor agree" to "agree" (Table 3). In addition, all mean "General climate perception" Indices for all seven groups ranged between 3.58 for Middle Eastern students to 3.87 for Hispanic/Latinx students ($p<0.001$).

This same pattern of responses was also found in the answers to the questions concerning personal climate related responses/consequences (Table 4). Nearly all mean "Personal climate-related consequences" Index responses were below the positive response of "4" = "agree". Hispanic/ Latinx students had the most positive mean response to these 12 items (Mean = 3.96), followed by White students (Mean = 3.85) and American Indian students (Mean = 3.83), with Middle Eastern students having the least positive mean response (Mean = 3.70), followed closely by multiracial students (Mean = 3.72) and Black students (Mean = 3.73; $p<0.001$).

This pattern is also repeated in the mean responses to the four items measuring the degree to which students have a positive sense of belonging (Table 5). Middle Eastern students had the least positive mean "Sense of belonging" Index response, followed by Black and American Indian students (Means: 3.84 vs. 3.87 vs. 3.88), while White students had the most positive mean response, followed by Hispanic/Latinx and Asian American students (Means: 4.11 vs. 4.09 vs. 3.95; $p<0.001$).

The mean responses to the items assessing the degree to which students perceived themselves as being able to provide culturally competent clinical care were quite positive, with all means for all groups ranging between "4" = "agree" and "5" = "agree strongly" (Table 5). However, the overall "Culturally competent clinical care" Index differed again significantly: Hispanic/Latinx students had the most positive mean response followed by White students (Means: 4.54 vs. 4.43), with Asian American students having the least

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positive response, closely followed by multiracial students, American Indian students and Black students (Mean: 4.30 vs. 4.32 vs. 4.34 and 4.37; $p<0.001$).

Table 6 provides an overview of the relationships between the sum scores and indices. The higher the "Sum of biases and inequities experienced" score and the "Harassment/ discrimination" score, the more negative were the "General climate perceptions" and "Personal climate-related consequences" and the lower was the students' "Sense of belonging" and self-reported ability to provide "Culturally competent clinical care".

DISCUSSION

Before discussing the findings, it is important to note that the overall response rate of 29.2% in the 2022 American Dental Education Association Climate Study was higher than what can be expected from research concerning surveys with dentists[27] and in general.[28] In addition, the majority of the 17,705 submitted surveys (N=10,281; 58.1%) were from students. However, not all students answered all questions. For example, only 71.3% of the students answered all harassment and discrimination related questions. One of the reasons could be that when the number or respondents from a minority background in a specific academic setting is particularly low, these persons might be concerned that responding to a survey might "out" them and therefore do not respond to the questions.[29] In addition, responding to a survey that addresses discrimination can result in re-traumatization when individuals are asked about their experiences of biases, inequities and lack of support. The results should therefore be interpreted with this information in mind.

In addition, the data in this study were not analyzed for respondent subgroups such as for students from the U.S. or Canada, by type of dental institution nor were social identity characteristics such as self-reported gender or sexual orientation considered. It is important to note that other contributions to this special issue of the Journal of Dental Education focused

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specifically on these subgroup analyses such as analyzing the responses of students from the U.S.[30] or from Canada,[31] as well as on results concerning students from different gender[32] and sexual orientation[33] backgrounds. This fact is important because it has to be clear that the purpose of this study was to focus on "painting an overall picture" of the experiences and perceptions of students from different ethnic/racial backgrounds. However, it is possible and even likely that students from Canada differ substantially in their responses from students in the U.S. and that self-identified male students from HURM backgrounds differ from self-identified female students from HURM backgrounds. These considerations are important when interpreting the data

The results from this study for each of the objectives are interesting and should be a wakeup call for faculty and administrators to realize that students' ethnic/racial background clearly affected their culture-related experiences and perceptions. The first objective focused on experiences of biases and discrimination. The comparisons of the degree to which students from different ethnic/racial backgrounds experienced systemic biases and inequities specifically in relation to policies and practices showed that White students had the lowest mean experiences while students from AI backgrounds, Black students, and Middle Eastern/North African and multiracial students experienced substantially higher biases/inequities and Hispanic/Latinx and Asian American students higher degrees of these biases.

Students' experiences with micro aggressions, harassment and discrimination also differed significantly by their ethnic/racial background. When asked if they had witnessed/ experienced micro aggressions because of race or ethnicity, nearly half of the Black students and about a third of Asian American, multiracial and Middle Eastern/North African students had either witnessed or experienced or witnessed/experienced such micro aggressions. These groups were also more likely to experience and witness harassment and discrimination than

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the other groups. While these findings concerning Black and multiracial students are consistent with previous research,[16-18] it is important to note that Asian American and Middle Eastern/North African students also reported higher percentages of such experiences and perceptions. Research showed that dental residents had increased stress and significantly lower satisfaction the more they experienced and witnessed harassment and discrimination based on their own social identity.[34] These findings would suggest that Black, multiracial, Asian American and Middle Eastern/North African students might experience increased levels of stress in their already stressful academic environments.[35] In this situation it is very important to also note that while significant percentages of students responded that they had reported harassment or discrimination, only between 1.1 to 3.4% had received support from their institution in response to their report.

Given these results concerning experiences and perceptions of micro aggressions, harassment and discrimination and the lack of support from institutions for reported discrimination and harassment, it is not surprising that the same four student groups also rated their academic institutions' cultural climate and the consequences of this climate least positively. The fact that overall, each of the seven groups did not even agree on average that their climate was positive and that the consequences of the climate were positive is important to note and requires serious considerations from faculty and administrators alike.

Concerning the objective to compare the degree to which students from these different ethnic/racial backgrounds experience a "Sense of belonging", the data showed that White and Hispanic/Latinx students had the most positive sense of belonging, with students especially from HURM backgrounds having the poorest sense of belonging. These findings are consistent with results in other studies.[36,37] A sense of belonging has been shown to affect students' intentions to persist in dental school[36] and ultimately their performance.

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One essential part of students' performance evaluations is their assessment of the degree to which they are competent to deliver culturally competent clinical care. The data in this study showed that on average students in all seven groups agreed to agreed strongly that they were able to deliver culturally competent care, with Hispanic/Latinx students having the most positive mean responses. This finding is crucial given the CODA Standard 2-17 that "Graduates must be competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment."[7] Given that these students ranged from first year to graduating students, such positive scores are especially impressive.

The final objective was to analyze the relationships between the constructs of interest. Figure 1 provides an overview of the relationships expected. Specifically, it shows that experienced and perceived systemic biases and inequities and personal harassment and discrimination were predicted to result in less positive evaluations of the institutions' cultural climate, culture related consequences, sense of belonging and assessment of one's cultural competence when providing clinical care. The findings strongly supported these predictions and are supportive of a call for change.

One pathway to improving conditions for students from HURM backgrounds and by extension all students was provided by the National Association of Diversity Officers in Higher Education has a framework for advancing anti-racism strategies.[38] This framework offers a comprehensive approach for change by prioritizing institutional structure, policies and procedures along with climate and culture and can thus offer a productive approach to change for dental schools and dental allied programs.

A second framework for improving institution's climate was developed by Hurtado et al.[39-42] This approach invites institutions to explore the historical legacy of inclusion or exclusion (e.g., mission, resistance to desegregation), the compositional diversity (e.g.,

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diverse student enrollment, diverse faculty and staff hires); psychological dimension (e.g., perceptions of racial/ethnic tension, perceptions of discrimination); behavioral dimensions (e.g., pedagogical approaches; classroom diversity); and organizational/structural dimension (e.g., diversity of curriculum, tenure policies, organizational decision-making policies).

In summary, having access to these data and being able to assess how students from different ethnic/racial backgrounds experience and perceived the cultural climate of their institution shows the great benefits of climate studies. While these analyses focused on a bird's eye view of this topic, individual institutions would be well advised to critically assess their own data from this study and to determine whether they have a climate that truly discourages biases and inequities, micro aggressions, discrimination, and harassment, and if they provide support for students that report such experiences.[43]

This research had several limitations. The first limitation is related to the fact that the results are limited by the nonresponse bias associated with survey data and the question whether the data are representative.[44,45] However, overall, the value of these results cannot be underestimated. Validating these findings with other methodological approaches such as conducting focus groups can be helpful. For example, the here presented results are consistent with the findings from student focus groups which can be considered as a validation of the results.[46]

A second limitation is the fact that the purpose of this study was to focus only on the role of students' ethnic/racial background and that results related to the effects of the intersectionality of characteristics cannot be presented here. However, other authors analyzed other aspects of the data and can therefore contribute to describe a finer grained picture of these findings.

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Additional studies are needed to determine over time whether the lessons learned from this 2022 ADEA Climate Study and the recommendations made result in changes and a more positive climate in the future.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, it can be concluded that students' ethnic/racial background matters for the degree to which they experience biases/inequities related to policies and practices. Specifically, it is important to note that American Indian/First Nation-Indigenous/Hawaiian Native and Black/ African American/Canadian American/African experience the highest degree of biases/inequities, followed by Multiracial, Asian American and Middle Eastern/North African students, with White/European students experiencing the lowest degree.

Recommendation 1: It is therefore recommended that students, staff, faculty and administrators are involved in discussions of policies, the application of policies and policy changes. Ensuring that all policies are written in easy to understand and inclusive language and are accessible for all members of the dental schools/allied dental education programs is important. Engaging all community members in the creation of policies should become a best practice at all schools/programs. It is also recommended to inform all incoming students, staff, faculty and administrators about policies and practices in orientation and onboarding sessions and then have annual training sessions. These training sessions should assure that all school members are aware which policies and practices exist and how they are applied. Assuring all policies and practices are applied without biases and inequities for certain groups of community members is of utmost importance and annual calibration sessions for persons applying policies could assure that they are applied without biases and inequities.

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Students' ethnic/racial background also affected the degree to which they experienced harassment and discrimination and witnessed harassment and discrimination of other members of their community.

Recommendation 2: Experiencing harassment and discrimination because of one's social identity and witnessing how others are harassed and discriminated against requires quick and determined responses. During students' orientation sessions and during onboarding / orientation sessions for staff, faculty and administrators, clear information about grievance procedures need to be shared. Each school/program should have this information easily available on their website to ensure that all members of their community are informed about the ways in which grievances can be reported and are handled in their academic institution. Electing group specific grievance officers should be considered and access to experts in the wider university setting should be provided.

Students' ethnic/racial backgrounds also affected the way they perceived the overall cultural climate of their school/program.

Recommendation 3: Gaining a better understanding of the degree of and reasons why students from historically underrepresented minority (HURM) backgrounds experience cultural climate of an institution less positively than other students is important. Having a Diversity, Equity and Inclusion Office headed up by an administrator with a dean position can contribute to increase the understanding of these challenges. Conducting focus groups with community members from HURM backgrounds can lead to concrete recommendations related to ensuring that all community members feel included and appreciated.

The consequences of the cultural climate for students' academic progress, their sense of belonging and the degree to which they can progress academically and develop their professional aspirations are also affected by their ethnic /racial background.

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Recommendation 4: It is recommended to develop student - faculty mentoring programs. In the first year of the programs, these mentoring relationships could contribute to positive integration of all students into the community. During the transition to clinical care, the mentoring programs could become crucial by providing positive role models and mentors who can provide crucial information needed when students encounter challenges. These relationships could also support students in developing clearer career aspirations. Having mentoring groups consisting of students at different stages of their education and a faculty member could also be explored.

The findings also draw attention to the degree to which students perceive they are able to provide culturally competent care as for example required in the Commission on Dental Accreditation pre-doctoral Standard 2-17 which states "Graduates must be competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment." Students' ethnic/racial background affects their perceptions of how prepared they are to work with marginalized, socioeconomically disadvantaged and other culturally diverse patients.

Recommendation 5: It is recommended to assure clinical experiences for all students in community-based settings, in hospital dentistry and clinics specialized in treating patients with diverse abilities. These findings should be a wakeup call for faculty and administrators to progress on fulfilling the CODA requirements to create a humanistic environment for all students that prepares them for their professional lives in increasingly more diverse countries.

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Figure 1: Overview of the objectives

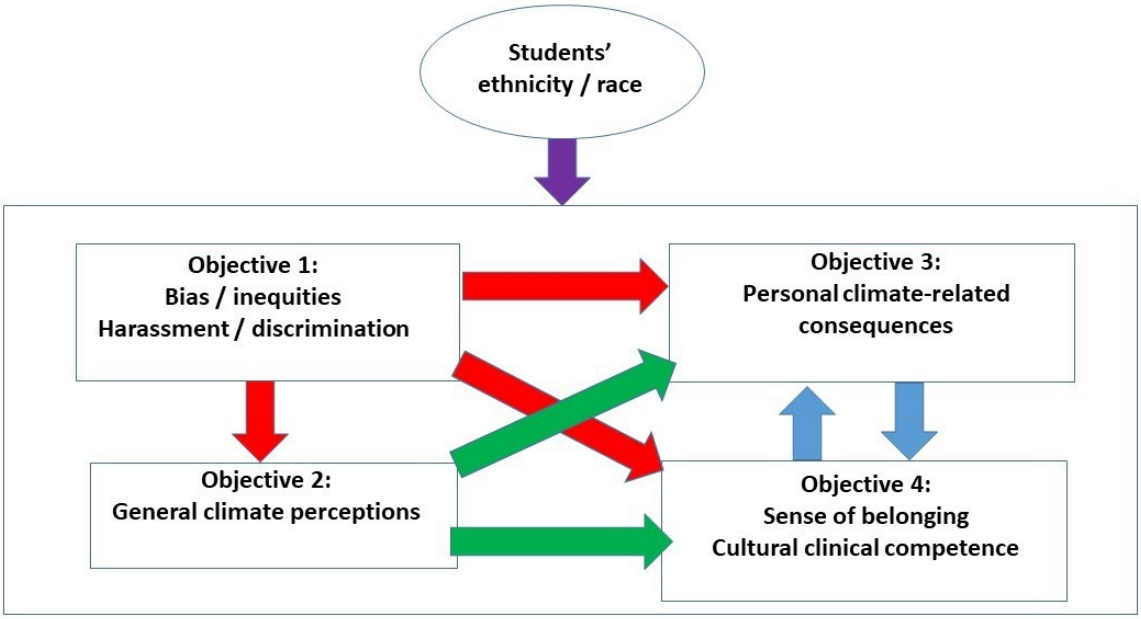

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Table 1: Overview of the students' background and educational characteristics

Background characteristics	**Frequencies N = 10,281[1]**	**Percentages**
Ethnic/racial background:		
- American Indian / First Nation -Indigenous / Hawaiian Native (AI)	95	1.3%
- Black / African American / Canadian American / African (Black)	472	6.3%
- Hispanic / Latinx (HL)	1,029	13.8%
- Middle Eastern (ME)	388	5.2%
- East Asian / Southeast Asian / South Asian (AA)	1,332	17.9%
- European American (White)	3,737	50.2%
- Multiracial (M)	391	5.2%
Self-reported gender identity:		
- Man	1,899	24.9%
- Woman	5,649	74.2%
- Other	67	0.9%
Educational characteristics	**Frequencies N = 10,281[1]**	**Percentages**
Type of program:		
- Dental school	6,045	58.8%
- Dental allied program	4,236	41.2%
Type of student:		
- Pre-doctoral	5,701	56.6%
- Resident / PhD	214	2.2%
- Dental hygiene	3,522	34.9%
- Dental assisting	582	5.8%
- Dental technician	56	0.6%
- Dental therapy	4	0.0%
Degree:		
- Associate	2,335	23.4%
- Baccalaureate	1,339	13.4%
- Certificate	533	5.3%
- Doctorate	5,556	55.7%
- Diploma	113	1.1%
- Masters	92	0.9%

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Table 2: Responses concerning biases/inequities, harassment and discrimination by students from different ethnic/racial backgrounds

Experienced bias or inequities in relation to policies or practices:	**AI[1] % Yes**	**Black % Yes**	**HL % Yes**	**ME % Yes**	**AA % Yes**	**White % Yes**	**M % Yes**
a. Code of conduct or discipline policy	35.8%	32.2%	25.1%	25.5%	24.6%	22.5%	29.4% ***
b. Whistleblower, anti-retaliation policy	26.3%	24.5%	18.4%	21.2%	19.0%	16.1%	19.4% ***
c. Anti-harassment/ Anti-bullying policy	28.4%	26.1%	21.3%	25.2%	21.2%	19.0%	23.9% ***
d. Discrimination policy /equal opportunity policy	32.6%	32.0%	22.0%	27.8%	24.9%	19.2%	27.4% ***
e. Dress code, personal appearance and attire policies	34.7%	33.5%	25.0%	26.4%	23.6%	23.8%	29.5% ***
f. Result of reactions or responses to contemporary societal events	27.4%	29.1%	20.6%	23.2%	20.8%	18.1%	25.1% ***
g. Student recruitment	24.2%	23.9%	19.4%	24.1%	19.2%	15.3%	23.5% ***
h. Student admissions application	32.6%	26.3%	21.5%	26.4%	21.3%	19.1%	25.3% ***
i. Student admissions process	33.7%	28.6%	22.5%	26.0%	22.7%	20.0%	26.3% ***
j. Attendance	35.8%	31.1%	24.5%	29.0%	24.5%	23.9%	29.4% ***
k. Campus safety	30.5%	26.1%	21.9%	22.8%	20.8%	18.2%	22.3% ***
l. Student academic policy	33.7%	31.1%	23.7%	26.2%	24.5%	21.5%	26.9% ***
m. Student scholarship, grant programs	26.6%	27.5%	24.6%	30.4%	23.7%	22.4%	25.6% **
n. Student honor award	30.5%	24.3%	19.6%	24.4%	19.3%	15.7%	20.9% ***
o. Student mentorship	31.9%	26.8%	20.0%	25.2%	20.6%	16.6%	23.3% ***
p. Selection for a student leadership position	32.6%	26.6%	23.3%	24.7%	22.2%	18.3%	22.3% ***
Sum of biases or inequities experienced[2]: Mean / Standard deviation	***5.06 6.685***	***4.38 6.036***	***3.54 5.795***	***4.11 5.947***	***3.47 5.755***	***3.06 5.366***	***3.96 *** 5.856***

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Table 2 continued:

Harassment and discrimination	**AI[1] % Yes**	**Black % Yes**	**HL % Yes**	**ME % Yes**	**AA % Yes**	**White % Yes**	**M % Yes**
q. I witnessed/experienced a micro aggression because of you **race or ethnicity**.							***
- No	80.9%	55.3%	79.4%	70.2%	65.6%	79.7%	66.1%
- Witnessed	6.4%	11.8%	11.7%	15.1%	12.9%	17.3%	14.4%
- Experienced	7.4%	10.0%	3.6%	7.3%	9.2%	1.4%	5.7%
- Both	5.3%	22.9%	5.2%	7.3%	12.4%	1.6%	13.9%
r. I have witnessed discrimination …	15.3%	32.8%	15.8%	24.4%	26.3%	19.0%	27.5% ***
s. I have experienced discrimination …	11.6%	24.4%	8.3%	17.9%	15.3%	8.4%	15.8% ***
t. I have witnessed harassment …	9.4%	16.4%	9.2%	16.2%	16.4%	14.0%	21.0% ***
u. I have experienced harassment …	6.0%	10.4%	6.9%	10.4%	9.4%	7.5%	12.7% ***
"Harassment/discrimination sum" score[3]	***0.40 1.001***	***0.82 1.254***	***0.36 0.853***	***0.66 1.186***	***0.63 1.150***	***0.46 0.951***	***0.73** 1.206***
v. Did you report the harassment or discrimination that you experienced?	40.0%	35.7%	25.2%	30.6%	23.4%	29.5%	33.8% ns
w. If you reported it, do you feel that you received support from your institution?	1.1%	3.4%	1.1%	1.3%	1.4%	1.3%	1.8% ***

Legend: Note: ns = not significant; ** = p<0.01; *** = p<0.001

1 The following abbreviations were used for the ethnic/racial background:
AI = American Indian/First Nation - Indigenous /Hawaiian Native
Black = Black / African American / Canadian American / African
HL = Hispanic/Latinx
ME = Middle Eastern
AA = East Asian/Southeast Asian/South Asian
White = White/European
M = Multiracial

2 The "Sum of biases or inequities experienced" was created by adding one point for each "Yes" response to the 16 items a to p.

3 The "Harassment/discrimination sum" score was created by adding one point for each "Yes" response to the items r to u.

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Table 3: General climate perceptions of students from different ethnic/racial backgrounds

General climate perceptions	AI[1] % Mean SD	Black % Mean SD	HL % Mean SD	ME % Mean SD	AA % Mean SD	White % Mean SD	M % Mean SD
a. Students' health and well-being are a priority at my school / program.	3.62[2] 1.265	3.44 1.216	3.72 1.196	3.33 1.341	3.43 1.206	3.49 1.251	3.38 *** 1.303
b. The climate in my school / program encourages free and open discussion about students' health and well-being.	3.59 1.224	3.57 1.092	3.79 1.080	3.49 1.218	3.57 1.086	3.58 1.162	3.46 *** 1.210
c. At my dental school / program, we are a community where we look out for each other.	3.86 1.135	3.79 1.004	3.95 0.987	3.64 1.155	3.81 0.979	3.89 1.011	3.73 *** 1.062
d. My school / program fosters a sense of community.	3.84 0.926	3.75 0.987	3.95 0.920	3.69 1.079	3.77 0.972	3.86 0.982	3.73 *** 1.073
e. My school / program has a strong sense of social cohesion.	3.86 0.963	3.57 1.061	3.86 0.983	3.61 1.095	3.64 1.017	3.75 1.026	3.54 *** 1.127
f. My school / program values students' opinions.	3.55 1.201	3.33 1.182	3.65 1.174	3.30 1.344	3.39 1.208	3.40 1.265	3.32 *** 1.278
g. My school / program is supportive of students, faculty and staff who are racially and ethnically diverse.	3.97 0.831	3.67 1.159	4.14 0.921	4.02 0.989	3.96 0.944	4.13 0.862	3.95 *** 1.018
"General climate perception" Index[3] (Cronbach alpha = 0.922)	***3.77 0.902***	***3.59 0.894***	***3.87 0.867***	***3.58 1.012***	***3.66 0.881***	***3.73 0.892***	***3.59 *** 0.955***

Legend: Note: *** = p<0.001

1 The following abbreviations were used for the ethnic/racial background:
AI = American Indian / First Nation -Indigenous / Hawaiian Native
Black = Black / African American / Canadian American / African
HL = Hispanic / Latinx
ME = Middle Eastern
AA = East Asian / Southeast Asian / South Asian
White = White/European
M = Multiracial

2 Answers ranged from 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree to 5 = Strongly Agree.

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3 The "General climate perception" Index was computed by averaging the responses to items a to g.

Table 4: Personal climate-related experiences of students from different ethnic/racial backgrounds

Personal climate-related consequences	AI[1] % Mean SD	Black % Mean SD	HL % Mean SD	ME % Mean SD	AA % Mean SD	White % Mean SD	M % Mean SD
a. I am satisfied with the overall climate of my institution.	3.68[2] 1.026	3.47 1.093	3.85 1.044	3.59 1.184	3.63 1.045	3.70 1.104	3.49 *** 1.180
b. I feel a sense of belonging to my institution.	3.73 1.100	3.66 1.074	3.90 1.029	3.68 1.156	3.77 1.001	3.85 1.044	3.69 *** 1.120
c. I feel like I am a member of my dental school/allied dental education community.	3.85 1.048	3.76 1.026	4.00 0.944	3.72 1.104	3.83 0.955	3.93 0.960	3.82 *** 1.052
d. I feel comfortable at my institution.	3.92 1.030	3.80 .985	4.00 0.978	3.76 1.088	3.85 0.958	3.97 0.975	3.80 *** 1.082
e. I would choose my institution over again.	3.76 1.208	3.73 1.110	3.95 1.118	3.62 1.271	3.68 1.096	3.81 1.172	3.66 *** 1.210
f. My institution is supportive of me.	3.85 1.026	3.80 0.967	4.01 0.961	3.65 1.208	3.76 1.015	3.88 1.038	3.77 *** 1.096
g. I am comfortable being my authentic self at my institution.	3.85 1.077	3.60 1.159	3.97 0.991	3.71 1.091	3.79 0.977	3.88 1.012	3.70 *** 1.103
h I am respected within the dental school/allied dental education culture.	3.91 0.935	3.86 0.899	4.06 0.901	3.88 1.047	3.86 0.898	3.94 0.933	3.81 *** 1.045
i. I have not experienced intimidation at my institution.	3.51 1.233	3.34 1.266	3.56 1.276	3.40 1.306	3.44 1.212	3.39 1.308	3.29 *** 1.294
j. I am on track for progressing toward my academic and professional goals at my institution	4.26 0.761	4.18 0.811	4.30 0.724	4.03 0.928	4.08 0.820	4.27 0.800	4.15 *** 0.864
k. My professional aspirations have increased since coming to my institution.	4.00 1.005	3.96 0.962	4.15 0.922	3.87 1.059	3.84 0.970	3.96 1.030	3.94 *** 1.020

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l. After I graduate, I plan to be an active/supportive alum of my institution.	3.73 1.049	3.59 1.143	3.82 1.047	3.51 1.263	3.58 1.126	3.58 1.183	3.57 *** 1.210
"Personal climate-related consequences" Index[3] (Cronbach alpha = 0.950)	***3.83 0.833***	***3.73 0.815***	***3.96 0.802***	***3.70 0.961***	***3.75 0.822***	***3.85 0.841***	***3.72 *** 0.897***

Table 4 continued:

Legend: Note: *** = p<0.001

1 The following abbreviations were used for the ethnic/racial background:
AI = American Indian / First Nation -Indigenous / Hawaiian Native
Black = Black / African American / Canadian American / African
HL = Hispanic / Latinx
ME = Middle Eastern
AA = East Asian / Southeast Asian / South Asian
White = White/European
M = Multiracial

2 Answers ranged from 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree to 5 = Strongly Agree.

3 The "Personal climate-related consequences" Index was computed by averaging the responses to the items a to l.

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Table 5: Responses concerning experiencing a sense of belonging and being culturally competent when delivering clinical care of students from different ethnic/racial backgrounds

Students' sense of belonging	**AI[1] % Mean SD**	**Black % Mean SD**	**HL % Mean SD**	**ME % Mean SD**	**AA % Mean SD**	**White % Mean SD**	**M % Mean SD**
a. The climate of my institution is welcoming to individuals from diverse backgrounds and experiences.	3.95[2] 1.062	3.82 1.034	4.18 0.899	3.94 1.002	3.98 0.947	4.15 0.843	3.92 *** 1.022
b. I enjoy spending time with members of my community.	3.91 0.991	3.95 0.909	4.17 0.832	3.89 0.983	3.98 0.844	4.17 0.822	4.01 *** 0.956
c. Members of my community come together to celebrate good times and share difficult times.	3.82 1.048	3.82 0.996	3.98 0.944	3.73 1.076	3.89 0.930	4.02 0.909	3.90 *** 0.987
d. Members of my community care about each other.	4.00 0.938	3.88 0.928	4.05 0.910	3.75 1.097	3.92 0.882	4.09 0.868	3.89 *** 0.994
"Sense of community" Index[3] (Cronbach alpha = 0.870)	***3.88 0.987***	***3.87 0.820***	***4.09 0.789***	***3.84 0.916***	***3.95 0.793***	***4.11 0.739***	***3.93 *** 0.896***
Culturally competent clinical care	**AI[1] % Mean SD**	**Black % Mean SD**	**HL % Mean SD**	**ME % Mean SD**	**AA % Mean SD**	**White % Mean SD**	**M % Mean SD**
e. I am comfortable working with patients from diverse backgrounds, values, beliefs and cultures.	4.44 0.840	4.63 0.606	4.67 0.618	4.60 0.681	4.50 0.725	4.60 0.625	4.56 *** 0.739
f. I am comfortable working with the families of patients / clients from cultural back-grounds different from my own.	4.49 0.816	4.65 0.601	4.70 0.589	4.57 0.715	4.50 0.704	4.60 0.621	4.56 *** 0.725
g. I believe I am adequately prepared to work with marginalized, socioeconomic-cally, racial/ethnically and other culturally diverse persons and patients.	4.31 0.859	4.43 0.808	4.55 0.695	4.36 0.812	4.23 0.857	4.37 0.783	4.30 *** 0.902

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Table 5 continued:

Culturally competent clinical care	AI[1] % Mean SD	Black % Mean SD	HL % Mean SD	ME % Mean SD	AA % Mean SD	White % Mean SD	M % Mean SD
h. The faculty model behaviors that support and promote diversity, equity and inclusion.	4.10 0.933	3.78 1.112	4.23 0.928	4.06 0.955	3.97 1.017	4.15 0.936	3.87 *** 1.099
"Culturally competence care" Index[4] (Cronbach alpha = 0.815)	***4.34 0.716***	***4.37 0.606***	***4.54 0.568***	***4.40 0.657***	***4.30 0.675***	***4.43 0.605***	***4.32 *** 0.699***

Legend: Note: *** = p<0.001

1 The following abbreviations were used for the ethnic/racial background:
AI = American Indian / First Nation -Indigenous / Hawaiian Native
Black = Black / African American / Canadian American / African
HL = Hispanic / Latinx
ME = Middle Eastern
AA = East Asian / Southeast Asian / South Asian
White = White/European
M = Multiracial

2 Answers ranged from 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree to 5 = Strongly Agree.

3 The "Sense of community" Index was computed by averaging the responses to the items a to d.

4 The "Culturally competent care" Index was computed by averaging the responses to the items e to h.

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Table 6: Correlations between the climate study related sum scores and indices

Culturally relevant sum scores and indices	**A "Sum of biases / inequi-ties ex-peri-enced"[1]**	**B "Harass-ment/ discrimi-nation sum" score[1]**	**C "General climate percepti on" Index[2]**	**D "Perso-nal climate-related conse-quence" Index[3]**	**E "Sense of commu-nity" Index[4]**	**F "Cultur ally compe-tent care" Index[4]**
A = "Sum of biases or inequities experienced"[1]	1	0.14 ***	-0.07 ***	-0.08 ***	-0.11 ***	-0.07 ***
B = "Harassment/ discrimination sum" score[1]	0.14 ***	1	-0.52 ***	-0.51 ***	-0.43 ***	-0.24 ***
C = "General climate perception" Index[2]	-0.07 ***	-0.52 ***	1	0.91 ***	0.73 ***	0.44 ***
D = "Personal climate-related consequences" Index[3]	-0.08 ***	-0.51 ***	0.91 ***	1	0.74 ***	0.45 ***
E = "Sense of community" Index[4]	-.011 ***	-0.43 ***	0.73 ***	0.74 ***	1	0.45 ***
F = "Culturally competent care" Index[4]	-0.07 ***	-0.24 ***	0.44 ***	0.45 ***	0.45 ***	1

Legend: Note: *** = p<0.001

1 For the creation of the "Sum of biases or inequities experienced" and the "Harassment/ discrimination sum" score see Table 2!

2 For the creation of the "General climate perception" Index see Table 3!

3 For the creation of the "Personal climate-related consequences" Index see Table 4!

4 For the creation of the "Sense of community" Index and the "Culturally competent care" Index see Table 5!

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