Title

“The Seeds Will Keep Growing” Stereotype Threat Among Orthodontic Residents and Their Experiences

Author

Okeke, Ifunanya

Publication Date

2024

Peer reviewed|Thesis/dissertation

“The Seeds Will Keep Growing”
Stereotype Threat Among Orthodontic Residents and their Experiences

by
Ifunanya Okeke

THESIS
Submitted in partial satisfaction of the requirements for degree of
MASTER OF SCIENCE

in

Oral and Craniofacial Sciences

in the

GRADUATE DIVISION
of the
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Approved:

DocuSigned by:
Elizabeth Mertz
2A1F68633954499...

Elizabeth Mertz
Chair

DocuSigned by:
Snehlata Oberoi

Snehlata Oberoi

DocuSigned by:
Christina Hong
CE6EAA6FBA31451...

Christina Hong

Committee Members

DEDICATION

This study is dedicated to all the students of color who have faced numerous challenges and continue to thrive and take on the world. *We are the seeds that continue to grow.*

ACKNOWLEDGMENTS

I would not be in the position today without the help of my family, friends, mentors, and individuals I have met once but left a lasting impression. I am thankful for you all believing in me.

I want to express my sincere gratitude to my thesis committee. Dr. Mertz, you are a true gem. Your confidence and honesty are the best combination I could have ever asked for in a PI. Thank you for taking on this project and always being there to answer any questions I have had since dental school. Dr. Oberoi, thank you for encouraging me to do this important work, even when I was scared to move forward. This milestone would not be possible without the help of both of you. Thank you, Dr. Eleanor Fleming and Dr. Christine Hong, for being cheerleaders as I hit roadblocks with my research.

To my incredible parents: I cannot thank you both enough for being the best role models. Your ENDLESS sacrifices have never gone unnoticed. You both have shown me that I can do anything I set my mind to and do it better than anyone else. Thank you for always believing in your favorite princess. To the two best baby sisters I could ever ask for, Tobechukwu and Chidera, thank you for always making me so proud to be your big sister. I know you both look to me for guidance and inspiration, but it is because of you both that I keep going every day. To my grandparents, two of whom I lost during residency, I will forever be a "SHINER."

To my line sisters who helped me get through college: Brittney, Ashley, Amanda, Morgan, Chanel, and Alysia, we have truly watched and supported each other as we grew into the amazing, powerful women we are today. I can never stop being proud of all our accomplishments. Our bond is un4saken.. To my forever mentor, Emeka Ikegwuonu, thank you for believing in the little ASU freshman who said she wanted to straighten teeth.

My time at UCSF started off rocky, but my “adopted family” truly allowed me to see the light in one of the darkest times in my life. I will forever cherish our SF adventures, coordinated outfits, and genuine laughs. Ivie (the true creator of this family), Prisca, Ziad, Jojo, and India, you are the doctors the world needs. To my favorite dentist, Dr. Hibret Benjamin, thank you for being the best role model for what it means to be a working doctor and mom, all while looking so fabulous! To the doctors of GBADS: Dr. Muhaimin, Dr. Alston, Dr. Carter, Dr. Sinclair, Dr. Hoskins, Dr. Stokes, and Dr. Sorrell, thank you for always striving to uplift the Black community. I am here because of all your sacrifices and continued support for the advancement of Black dentists.

Finally, James Johnson Jr., you have been my rock and my support throughout my academic journey. Thank you for making sure I ate, keeping our home clean, and spending late nights with me to prepare for all the various aspects of life. I could not have asked for a better partner to enjoy this life with.

“The Seeds Will Keep Growing”
Stereotype Threat Among Orthodontic Residents and their Experiences

Ifunanya Okeke

ABSTRACT

Underrepresented minorities (URM) often leave their residency programs with greater negative experiences than non-URM co-residents. It is critical for program leaders to understand the experiences of all their residents during the 2-3 year residency programs. This mixed-method study aims to assess whether race in an orthodontic academic setting leads to increased stereotype threat and to understand URM orthodontic dental residents' experiences and coping mechanisms. A total of 257 orthodontic residents completed a stereotype vulnerability scale, modified for dental residents, to assess the level of threat they face. The results revealed that 67.9% of URM residents were at high risk, in contrast to the 16.9% of non-URM residents who were at high risk. Additionally, ten high-threat and ten low-threat residents were interviewed using in-depth, semi-structured interviews. These interviews highlighted contrasts in race-based experiences based on threat levels, how stereotype threat can manifest (didactically, clinically, and socially), and the consequences and coping mechanisms of residents. Furthermore, five program leaders were interviewed to understand the current measures taken to create inclusive workplaces, how they perceive the experiences of their residents, and the effectiveness of the support systems implemented by program directors and chairs.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AA: African American

PWI: Predominantly White Institution

ST: Stereotype Threat

SVS: Stereotype Vulnerability Scale

URM: Underrepresented Minority (African American, Hispanic, and Native American)

WM: Working Memory

INTRODUCTION

The lack of diversity across all healthcare specialties is well-documented despite ongoing research and proposed strategies to address these disparities[1–3]. Within healthcare, the dental profession has faced significant challenges in increasing the representation of underrepresented minorities (URM)[4]. In 2005, Black dentists comprised 3.7% of the profession, and Hispanic dentists made up 4.2%[5]. Fifteen years later, these numbers have only slightly increased to 3.8% for Black dentists and 5.9% for Hispanic dentists [5]. This concern is also evident in the specialty of orthodontics, which continues to have a minimal number of URM residents, thereby affecting the overall number of URM orthodontists in the United States. According to the American Dental Association, the 2023/2024 academic year, comprised only 5% Black residents, and 6.7% were Hispanic orthodontic residents[6]. The need for URM orthodontists is critical, given their increased potential to treat the underserved orthodontic patient population[7,8]. Therefore, emphasis on the recruitment, retention, and continued support post-program completion of these residents is crucial for the specialty and the future of orthodontics.

Increasing the diversity of orthodontists begins with improving the residency experience and the ability to retain future educators. Creating safe learning environments for residents fosters positive experiences and enhances the likelihood of future alumni support [9,10]. Numerous studies have documented that the experiences of URM residents in residency are often marked by microaggressions [11], a lack of belonging [12], examiner bias [13], and stereotype threat [14]

Stereotype threat is a theory suggesting that high-performing individuals tend to underperform in environments where they believe negative stereotypes are applicable. Previous literature has provided insight into how stereotype threat can permeate various aspects of life,

including sports, the workplace, sexual identity, age, academia, and race. A study conducted in 2020 explored the dynamic nature of stereotypes in medical clerkships, demonstrating how previous triggers and microaggressions can lead to cognitive overload and potential disruption of learning.[15] However, the current literature does not address how stereotype threat affects dental residents.

Our study employed quantitative measures to assess stereotype threat in orthodontic residency and qualitative research methods to understand how URM residents differ from non-URM residents within the orthodontic residency. The profession of orthodontics has demonstrated an interest in increasing diversity, evidenced by the establishment of the Inclusion and Engagement Committee in 2022[16] and the offering of implicit bias training for its members in 2023[17]. This study aims to document the experiences of URM residents and provide insights into how program leaders can create safe and inclusive environments for all residents. The ultimate goal is to increase access to care and foster a positive upstream cycle of minority residents entering academia, thereby enhancing visibility in the specialty and attracting more minority orthodontists.

HYPOTHESIS

1. In orthodontic dental residency, URM residents experience greater stereotype threat than non-URM residents.
2. URM dental residents experience higher rates of stereotype threat, leading to negative experiences compared to non-URM residents.
3. The support systems created by orthodontic program directors and chairs vary from the needs of URM orthodontic residents regarding inclusive workplace environments.

RESEARCH AIMS

With the lack of information on the experiences of orthodontic residents in an ever-evolving society, this study will aim to:

1. Asses if race in an orthodontic academic setting leads to increased stereotype threat
2. Understand the experiences and coping mechanisms of URM orthodontic dental residents have while in residency
3. Understand the current measures program stakeholders have taken to create inclusive workplaces and how they perceive the experiences of their residents
4. Analyze the effectiveness of current support systems implemented by program directors and chairs

SIGNIFICANCE

This research will help to improve our knowledge of the current state of orthodontic residency programs by learning about orthodontic residents' experiences and the approaches residency programs are taking to foster safe and inclusive spaces for everyone. It will also help to narrow down a framework to provide to program leaders who want to address the needs of their residents. Moreover, this research will raise awareness among all dental residents and stimulate further studies within various dental specialties.

METHODS

Research Design

This study used a mixed-method approach, combining quantitative and qualitative methods to understand stereotype threat among residents in orthodontic programs comprehensively. The quantitative component involves administering a 5-question adapted Stereotype Vulnerability Scale (SVS) to assess the prevalence of stereotype vulnerability among residents. This scale measures residents' perceptions of stereotype threat. Following the quantitative phase, qualitative semi-structured interviews are conducted with selected residents and program stakeholders. These interviews looked deeper at residents' experiences with stereotype threat, exploring their perceptions, coping mechanisms, and suggestions for improvement within the program.

Setting and Participants

A modified stereotype vulnerability scale, adapted for dental residency, was distributed to orthodontic residents enrolled in the 2023/2024 accredited orthodontic specialty programs (n~1,146, based on enrollment figures from 2023/2024 from the Commission of Dental Education [6]. Orthodontic program leaders listed on the American Association of Orthodontics (AAO) website were contacted twice to forward the emails to their program residents. To increase engagement, personal calls, and texts were made to residents in orthodontic programs to encourage their co-residents to complete the survey.

The racial composition of participants in the 2023/2024 academic year was 54.3% White, 25.5% Asian, 6.7% Hispanic, 5% Black or African American, 6.5% Nonresident Alien,0.9% Unknown, 1 % Two or More races, and 0 % American Indian or Alaska Native. Gender distribution was 58 % Female and 42% Male. Participation in the survey and interview

was voluntary, and residents at any stage of their program were eligible to participate. Efforts were made to ensure the confidentiality and anonymity of participant responses. No incentives were offered for survey completion.

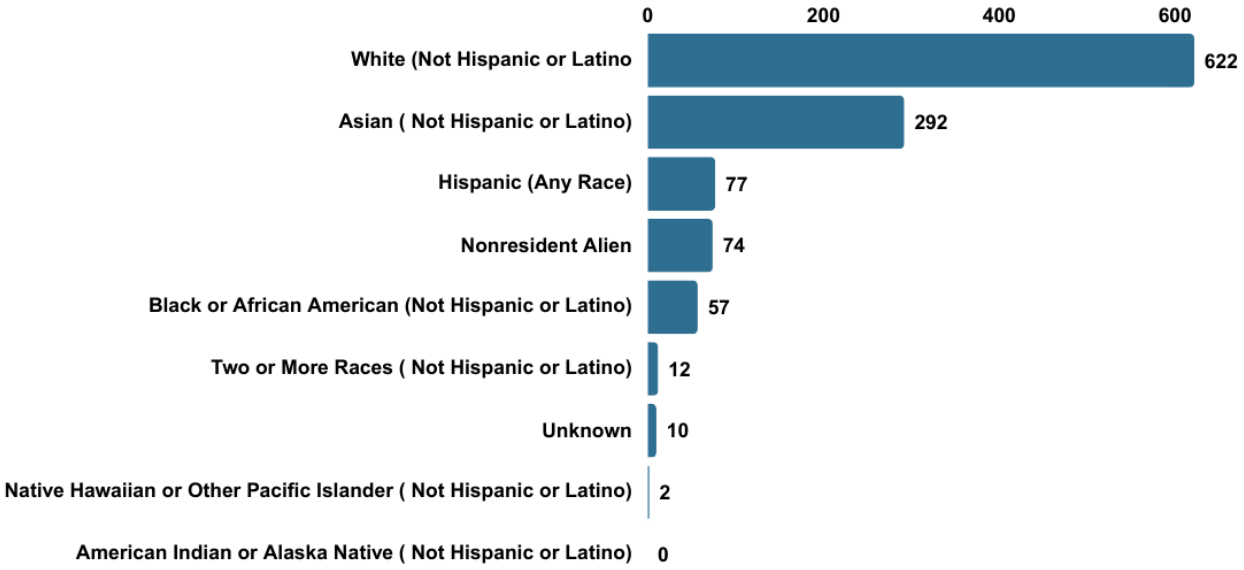

Figure 1: 2023/2024 Survey of Advanced Dental Education Race/Ethnicity Make-up

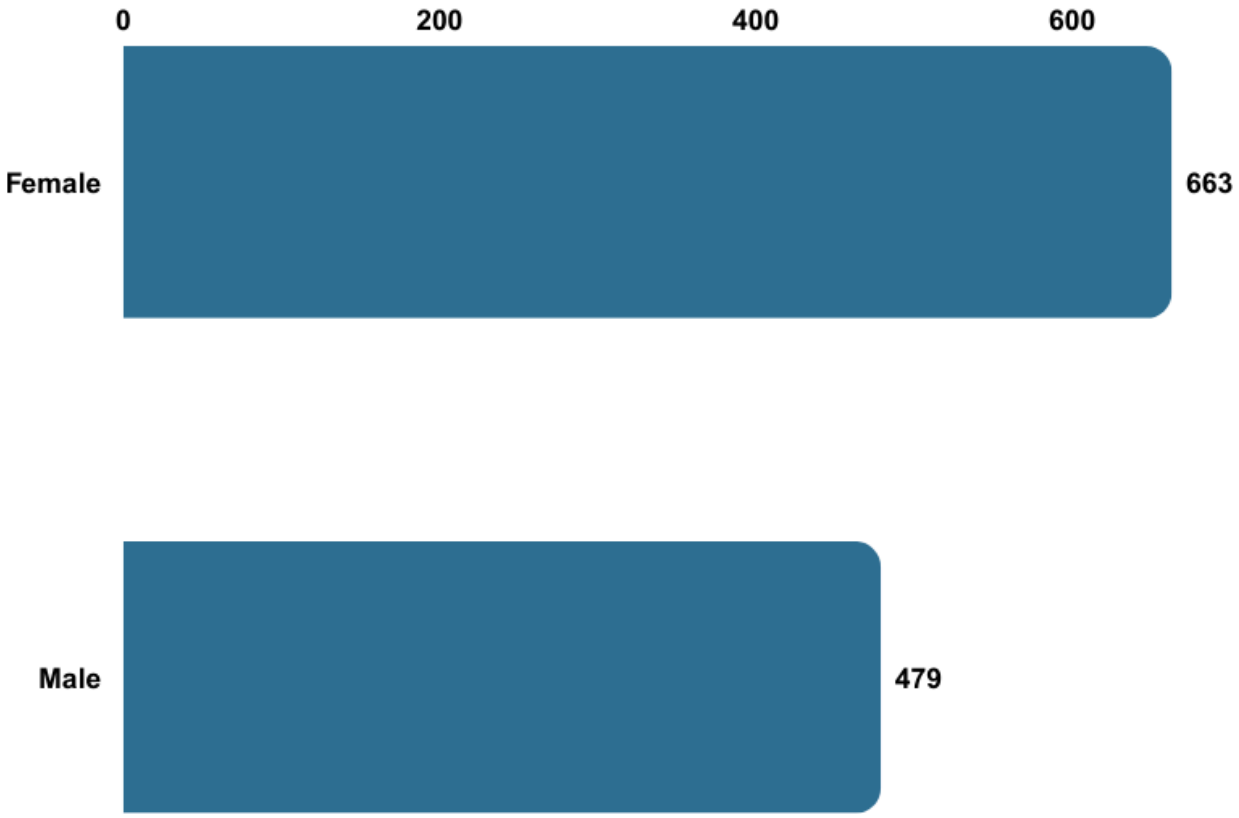

Figure 2: 2023/2024 Survey of Advanced Dental Education Gender Make-up

Phase 1: Modified Stereotype Vulnerability Scale (SVS)

The Stereotype Vulnerability Scale facilitated the assessment of stereotype prevalence based on race within accredited orthodontic residency programs in the United States. Originally consisting of 8 questions developed by Dr. Stephen Spencer at the University of Michigan, the SVS was adapted for use in medical clerkships by Bullock et al. in 2018[18]. This adaptation aimed to eliminate questions that could confuse students. To fit the context of orthodontic residency, the 5-question scale was further adapted to evaluate the prevalence of racial-ethnic stereotype threat among orthodontic dental residents.

A pilot test was conducted on five residents in their final year of residency at the University of California, San Francisco. The pilot was conducted to assess the survey's

completion time, clarity, and acceptability. Respondents completed the survey within 5 minutes and indicated that a 10-minute time frame would be sufficient if residents decided to provide additional details. Initially, the survey focused solely on experiences in clinical settings. However, recognizing dental residency programs' didactic nature, clinical and didactic sessions were incorporated into the survey. Additionally, considering the importance of networking and interprofessional activities in orthodontic residency, the survey was updated to include questions related to interprofessional interactions.

Table 1: Dental Residency Adapted Stereotype Vulnerability Scale

Dental Residency Adapted SVS
During my clinic/didactic sessions or interpersonal interactions, my faculty expected me to do poorly because of my race/ethnicity
Clinic/didactic sessions or interpersonal interactions may have been easier for people of my race/ ethnicity
Some people feel I have less clinical/didactic ability because of my race/ ethnicity
In clinic/didactic sessions or interpersonal interactions, people of my ethnicity often face biased evaluations from others
In residency, I often feel that others look down on me because of my race/ethnicity

The SVS was distributed using Qualtrics. It included five demographic questions to gather information on program location, year in the program, gender, race/ethnicity, and sexual orientation.

A 5-point Likert scale was utilized to assess stereotype threat. Questions 1, 3, 4, and 5 were rated on a scale where 1 indicated "strongly disagree," 3 represented "neither agree nor disagree," and 5 denoted "strongly agree." Due to the question's phrasing, question 2 was

measured inversely: 5 for "strongly disagree," 3 for "neither agree nor disagree," and 1 for "strongly agree." The total score ranged from 5 to 25 points.

Before completing the survey, residents were provided the space to include additional information on their experience and asked if they would like to participate in interviews to provide further insights. Residents were invited to leave their email or phone number for contact if they agreed.

Residents who received a score above 15 were categorized as experiencing "high threat." In contrast, those scoring below 15 were considered "low threat." Residents scoring below 10 or above 15 were invited to participate in interviews to gather insights and explore potential differences in the experiences of residents with low and high levels of stereotype threat.

Phase 2: Qualitative Interviews

The interviews were conducted to assess the varying experiences of those who experience high stereotype threats compared to those with low stereotype threats. This will allow us to understand what differs in their experiences and elucidate the challenges, coping mechanisms, and resiliency for those who experience high stereotype threats.

Orthodontic Residents

All orthodontic residents who completed the survey were invited to provide additional information on their residency experience. Forty-six residents said they would be willing to participate in an interview. Residents were contacted via text or email twice to be interviewed based on their preferred contact method.

Of the forty-six, twenty residents agreed to be interviewed. The racial breakdown of the resident's interviews included nine African American residents, two Middle Eastern, one Brazilian, two Asians, four whites, one Indian, and one Hispanic. The gender makeup was nine males and eleven females.

Interviews were conducted via Zoom, and each resident received a link for a 30-to-45-minute interview session. Verbal consent was obtained at the start of each interview, and recordings were made for transcription purposes. Semi-structured interviews facilitated in-depth conversations and the collection of experiences. Twenty residents (ten identified as experiencing high stereotype threat and ten as experiencing low stereotype threat) were asked the same questions. The recorded interviews were roughly transcribed using Zoom's transcription feature, and I.O. filled in any missing parts.

After transcription, the interview transcripts were uploaded to the coding software Dovetail for analysis. A mixed thematic analysis approach was employed to analyze the interviews. Thematic analysis, a method for identifying patterns and themes within textual data, was used to explore potential stereotype threats and the experiences of orthodontic residents.

Table 2 Priori Codes for Deductive Analysis

CONFORMATION OF STEREOTYPE THREAT	Impaired working memory, Avoidance, Hypervigilance, Minimization, Isolation, Assimilation, Uncertainty
EXPERIENCE OF RESIDENTS	Microaggressions, Anxiety, Self Doubt, Isolation, Lack of care, Relations, Belonging, Exclusion, Hardship
COPING MECHANISMS	Faith, Family, Different Programs, Exercise, Avoidance, Community Support, Ambition, Affirmation, Gratitude
DISCONNECT BETWEEN RESIDENTS AND PROGRAMS	Support, Mentorship, Prevention, Deferral Purpose, Advice, Empathy, Faculty Development, Superficial Diversity, Safety
IDEAL PROGRAM	Confrontation, Drawing a Line, Reassuring, Correcting, Misconceptions, Reflection

Initially, a deductive analysis was conducted, drawing upon previous research, the study aims, and existing literature on stereotype threats to develop a set of predefined codes. New themes emerged organically from the data as coding progressed, prompting an inductive approach to generating additional codes.

Program Leaders

The second request for orthodontic program leaders to resend the SVS survey to residents, also included in an invitation for a 30-minute interview to learn what each program is doing to enhance resident experiences.

Five program leaders responded with their availability, and interviews were conducted via Zoom. Each resident received a link for a 25-45 minute interview session. Verbal consent was obtained at the start of each interview, and recordings were made for transcription purposes.

RESULTS

Phase 1: Modified Stereotype Vulnerability Scale (SVS)

To analyze the level of stereotype threat, the Statistical Analysis System (SAS) was utilized. The FREQ Procedure was used to analyze race, gender post-graduate year, and regions designed by the American Association of Orthodontists. While the PROC LOGISTIC procedure to perform logistic regressions.

Overall, 307 residents attempted the survey. However, only responses with 100% completion were included in the analysis, resulting in a final sample of 257 residents.

Table 3: Demographic Data for Survey Respondents (n=257) and High/ Low Threat Risk for Orthodontic Residents at Accredited Residency Programs

Characteristic	Respondent Demographics	High Threat	Low Threat
Gender			
Female	143 (55.6%)	46 (32.17%)	97 (67.83%)
Male	111 (43.2%)	24 (21.62%)	87 (78.38%)
Other	3 (1.2%)	2 (66.67%)	1 (33.33%)
Post Graduate Year			
PGY-1	88 (34.2%)	20 (22.73%)	68 (77.27%)
PGY-2	88 (34.2%)	23 (26.14%)	65 (73.86%)
PGY-3	81 (31.5%)	29 (35.80%)	52 (64.20%
NON URM	201	34 (16.92%)	167 (83.08)%
URM	56	38 (67.86%)	18 (32.14%)
Race			
African American	33 (12.8%)	25 (75.76%)	8 (24.24%)
Asian	55 (21.4%)	9 (16.36%)	46 (83.64%)
Asian Indian	20 (7.8%)	11 (55%)	9 (45%)
Hispanic	20 (7.8%)	11 (55%)	9 (45%)
Middle Eastern	25 (9.7%)	12 (48%)	13 (52%)
White	104 (40.5%)	4 (3.85%)	100 (96.15%)
Region			
Pacific Coast	74 (28.8%)	21 (23.38%)	53 (71.62%)
North Eastern	42 (16.3)	6 (14.29%)	36 (85.71%)
Great Lakes	25 (9.7%)	4 (16%)	21 (84%)
Southern	56 (21.8%)	26 (46.23%)	30 (53.57%)
Middle Atlantic	21 (8.2%)	9 (42.86%)	12 (57.14%)
South Western	16 (6.2%)	2 (12.50%)	14 (87.50%)
Midwestern	23 (8.9%)	4 (17.39%)	19 (82.61%)

Demographic Analysis

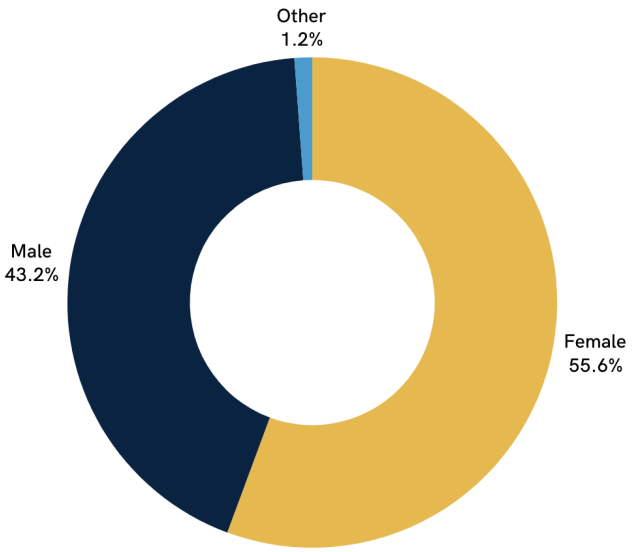

Figure 3: Gender Breakdown for Survey Respondents Post Graduate Year

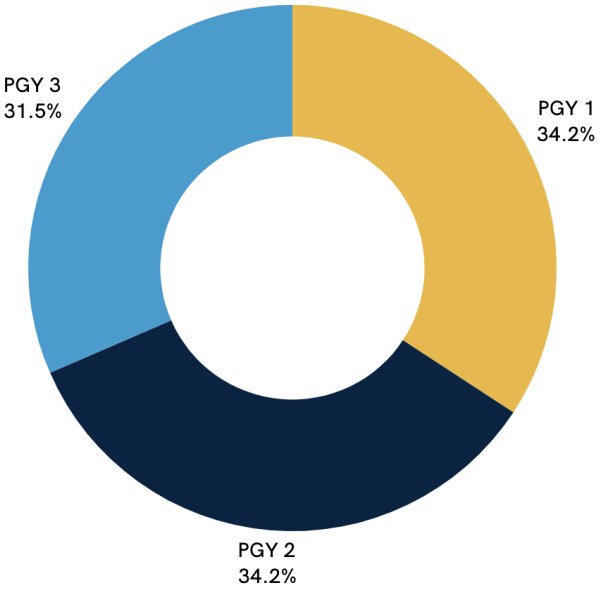

Figure 4: Post Graduate Year Breakdown for Survey Respondents

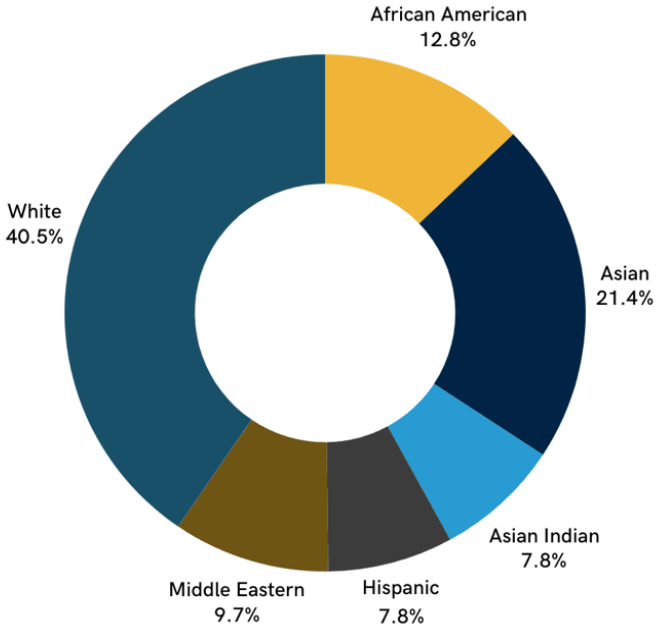

Figure 5: Race Breakdown for Survey Respondents

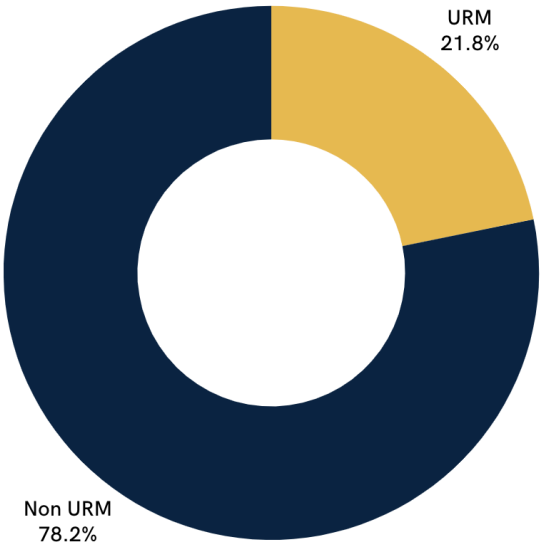

Figure 6:Non URM vs URM Breakdown for Survey Respondents

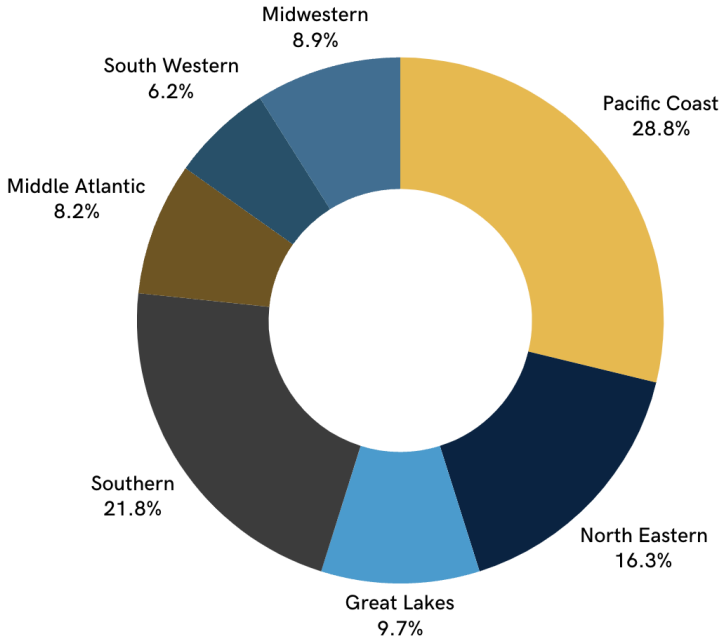

Figure 7: Region Breakdown for Survey Respondents

Analysis of Stereotype Threat

A logistic regression analysis was used to understand the factors impacting the high stereotype threat among residents.

The analysis data was based on a 100% survey completed by residents. The regression was conducted to predict the probability of high threat (>15) against low threat (</= 15). High threat was coded as 1, and low threat was coded as 0. Traditionally, the model with the lowest AIC is selected to determine the best fit. This did occur when comparing the models. However, the ultimate focus was on the models based on variables deemed important to be included.

83% of URM residents were classified as high threat, and 17% were classified as low threat. In comparison, 32% of non-URM residents were classified as high threat, and 68% were

classified as low threat, confirming that URM residents experience a higher level of stereotype threat compared to non-URM residents.

Table 4: Regression Coefficients and P-values for Different Racial Groups

	Coifficient	P-value
Intercept	-2.9304	<.0001
African American	4.4981	<.0001
Asian	1.6961	0.0121
Asian Indian	3.4611	<.0001
Hispanic	3.6831	<.0001
Middle Eastern	3.2402	<.0001
White	0	

White residents were used as a reference group. The intercept for the model was -2.9304 (baselines for white residents) and was clinically significant ($p < .0001$). Racial groups (African American, Asian, Asian Indian, Hispanic, Middle Eastern) all demonstrated higher log-odds of experiencing stereotype threats within their program. African American residents had the strongest probability of high threat (Coefficient: 4.4981, P-value: <.0001). Followed by Hispanic residents (Coefficient: 3.6831, P-value: <.0001), Asian Indians (Coefficient: 3.4611, P-value: <.0001), Asian (Coefficient: 1.6961, P-value: 0.0121). The increased coefficient shows the probability units to which the degree of stereotype threat can affect a resident and each race was statistically significant.

Odds Ratio

Table 5: Odds Ratios and P-values for Racial Group Comparisons

	Odds Ratio	P-value
African American vs White	89.850 (22.786 ,354.296)	<.0001
Asian vs White	5.453 (1.449 ,20.516)	0.0121
Asian Indian vs White	31.853 (7.784 ,130.356)	<.0001
Hispanic vs White	39.769 (9.571 ,165.245)	<.0001
Middle Eastern vs White	25.539 (6.462 ,100.930)	<.0001
African American vs Asian Indian	2.821 (0.814 ,9.776)	0.1020
African American vs Hispanic	2.259 (0.670 ,7.617)	0.1887
African American vs Middle Eastern	3.518 (1.112 ,11.135)	0.0324
Asian vs Asian Indian	0.171 (0.052 ,0.566)	0.0038
Asian vs Hispanic	0.137 (0.042 ,0.447)	0.0010
Asian vs Middle Eastern	0.214 (0.070 ,0.651)	0.0066
Asian Indian vs Hispanic	0.801 (0.222 ,2.889)	0.7346
Asian Indian vs Middel Eastern	1.247 (0.363 ,4.284)	0.7256
Hispanic vs Middle Eastern	1.557 (0.457 ,5.306)	0.4789

Comparison of Odds Ratios for Non-White Residents vs. White Residents.

Compared to white residents, African American residents were 89.9% more likely to experience stereotype threat. Hispanic residents were 39.8 % more likely, Asian Indians at 31.9%, Middle Eastern at 25.5%, and Asians at 5.5%.

Comparison of Odds Ratios Between Non-White Residents.

When comparing non-white racial groups to African Americans, African Americans are 3.5 times more likely to experience increased stereotype threat compared to Middle Eastern residents, 2.8 times more likely compared to Asian Indians, and 2.3 times more likely compared to Hispanics. These differences emphasize the heightened vulnerability of African Americans to stereotype threat in comparison to other non-white groups in orthodontic residency.

On the other hand, Asians were found to be less likely to experience stereotype threat compared to Asian Indians, Hispanics, and Middle Eastern residents. This may be attributed to

the increased representation of Asian Americans in orthodontic residency programs. Stereotype threat typically manifests when a population is in the minority. Asian residents (25.5%) are the second-largest racial group after white Americans (54.3%). The analysis grouped the entire Asian race, which may have diminished the differences if Filipino and Vietnamese groups were analyzed separately, as they are categorized as URM.

There were no significant differences when comparing Hispanic, Middle Eastern, and Asian Indian races together, indicating that these racial groups experience similar levels of stereotype threat. Hispanic Americans fall under the URM category, while Middle Eastern residents, especially those who immigrated to the U.S. after completing dental school in their home country, face documented challenges. As a result, they tend to experience increased stereotype threat due to their race.

Phase 2: Qualitative Interviews (Residents)

The thematic analysis explores the contrast between low-threat and high-threat residency experiences, how stereotype threat manifests for URM orthodontic residents, the consequences, and their coping mechanisms.

Experience Based On Race: Low-Threat

Low-threat residents describe their experiences when asked if race ever played a factor (good or bad) or if they have faced discrimination due to their race. Overall, these residents did not believe their race affected their experience negatively:

> I feel like I'm in a privileged position to say that I don't think it has affected me like with the learning aspects of my residency, perhaps in certain patient situations. [...] like my interactions with the faculty and with the other residents and the administration, no, but with my patients, yes. - White Male

The first year understands he is privileged not to have the burden of his race playing a factor. Privilege is the set of benefits one can gain based on what characteristic is deemed powerful. In this instance, the characteristic of benefit is being white [19]. The resident further elaborated on what he meant by he felt discrimination.

> We have a pretty diverse group of patients that come through our program, and it's pretty random who we get after patients are screened. I often wonder if our black patients may be more comfortable with our black providers. But I sometimes wonder if [my awesome black resident], [...],if my patient would feel more comfortable with her. But it's really only maybe in patient interactions, and I think it's, it's probably just coming from me and it's not anything may be real. - White Male

The resident believed race plays a significant role in comfort and trust in patient care. He brings to light the topic that more patients seek healthcare providers they can identify with as a source of comfort and trust[20]. Three AA residents described being a role model to patients and the joy it brought them.

Another resident expressed her thoughts on not being aware of her race during her residency, and she is uncertain if race had an impact.

> It's not something I've really noticed, which makes me think that it's been, like, neutral, kind of like a. Not a good or a bad thing. Like, honestly, I haven't, like, thought. Like, I haven't really thought about it or noticed it. So, um, I guess neutral. – Chinese Female

Similar to the resident above, a White female resident is not too aware of her race as she navigates her program.

> I don't know. It's hard to tell. I think it can be looked at both ways, in both facets, that it could be an asset, or it could sometimes in some instances, I don't know. We have a pretty diverse program, a lot of people from the Middle East, one black person. So, you know, like it's different when you can compare yourself and your experience to other people. But I don't really know if it has. – White Female

> I do think that it has… [in regards ot being a White male]. I think that there's an implicit increased level of not necessarily trust but like believability or maybe even authority at times. So I think that, yeah, it's probably in some ways been easier for me. I know one of my, I know one of my co-residents, who's a black female, has had issues with, certain staff. And part of it I think, is because, like, I don't know, I'm not sure, but I just get a

> little bit of a sense that it's at least because she's female, but maybe also, unfortunately, because of her race t that staff member seems to, I don't know, almost like respect her less. – White Male
>
> I don't think so. I feel like with Indian people, we get a lot of different types of discrimination, but I don't think, like, you know, like, I'm not really sure what the term is. It's like we almost get, a lot of positive discrimination, if that makes sense. Oh, they're hard workers, and they're really good at math. Like, that's what we're known for. – Indian Female

Nine out of the ten residents categorized as low threat did not believe their race led to any negative experiences during residency. These residents described not thinking about their race while in the program, how their race could generate unwarranted trust, and how their race is viewed positively in academic settings. The experiences of the low-threat residents differed significantly from those of the high-threat residents, whose race played a significant role.

Experience Based On Race: High-Threat

The interview excerpts below show the differences between the high-threat residents, who are also URM residents.

> I think it was tougher than, normal because of I think have the people here have subconscious bias and another half have blatant bias – AA female
>
> I [was] chief resident here. My term is over and the experience was really different from the previous chief resident, who wasn't black. I had a specific amount of tasks that I was supposed to fulfill while working with the director, but the director did not want to work with me at all. Instead, he actually chose to work with the [white] second-year [leadership position] instead of working with me.. He would refuse to meet me. And every time we did meet, I was disregarded. So as a chief resident, it was my duty to meet with the director alone, but I chose to have the [other resident leaders] with me to be effective. – AA male
>
> The most negative educational track I have been on. I have been at PWI's my entire life; being the only Hispanic sometimes is not new to me. However, during residency, I have never felt so out of place. I appreciate the education, but the people, staff, faculty, and even residents have made my life a living hell. I never felt comfortable being myself around them; I felt a lot of judgment for the bad and good things I did. - Hispanic Male
>
> It's been tough. So, on one hand, I am happy that I matched because I didn't match the first time, and I wanted to be an orthodontist for a while. So, I'm glad that I'm here, but

then sometimes I wish that I was in a more comfortable setting. I did experience microaggressions. I experienced that initially, and it just kind of made me withdraw…I didn't know who I could trust." – AA Female

This resident had a racial incident that occurred on campus and her program tried to belittle her feelings towards the incident.

It has been an interesting ride. I was looking for a community that I felt was supportive. I think I have that with the residents, sometimes, but I do not think I have that on the administrative/faculty side. – AA Male

Here, we can see how high-threat residents' race significantly impacted their residency time. Their experiences highlight instances of discrimination and the effects of overt and covert biases. Five residents described often feeling out of place in their program, experiencing alienation and mistrust. The lack of support while in leadership positions, coupled with the need to navigate biases and alter their behavior to assimilate, created additional burdens.

Source of Stereotype Threat in Orthodontic Resident Setting

In the literature, stereotype threat is defined as the fear of confirming negative stereotypes about one's social group, which can lead to decreased performance. A study on medical students during their clerkships revealed that in medical education settings, it is not merely the fear of stereotypes, but their prior experiences with race, microaggressions, and being the "only one" leading to significant energy (cognitive and emotional) being expended to navigate such events. This diversion of energy interrupted their learning potential during their clerkship. Similar experiences were seen among orthodontic residents in their programs[15].

Didactic. Dental school education does not provide the specialized training needed for orthodontics. As a result, programs include didactic sessions in the form of formal classes, case presentations, or seminars to ensure their residents are well-informed on the history of growth and development, biomechanics, and current trends in the specialty. This requires residents to engage in educational settings with their faculty and co-residents. Such environments carry a risk of stereotype threat. When asked during the interview, the residents provided insight into how they believed their race impacted them didactically:

> Oh man, my first two years, like my first year and half of my second year, I focused on not sounding dumb when asking a question, and I was so focused on it that it was affecting my learning because, I was afraid because every time I would say something they, would ding in more on me and almost try to make me look dumb. – AA Male

> The first year and a half, I would get nervous every time they would call me to answer the question, and I'd start stuttering. [If it was a non-black person] they would answer and have their hands held to the answer. Whereas for me, it was always like a rebuttal. Yeah. You know, but unbeknownst to them, that helped me more than having my handheld in the long run. – AA male

> I literally did not ask questions in class for clarification because when I would initially, the teacher would make [it seem like my] questions [were] dumb. When the other residents in my class were asking questions from the readings, she would just answer simply. – Hispanic Male

> I would stay up all night making my PowerPoints perfect because I knew if I messed something up it would be a huge thing. Yet my co residents literally barely tried and were never embarrassed for the half effort. I just know if it were me they would use it to make an example. - AA Female

The experiences expressed by the residents are similar to those of URM students in higher education. They feel pressured to perform perfectly, fear asking questions that might make them appear incompetent, and often experience extreme nervousness when answering questions, even when they know the correct answers. These feelings lead URM residents to overwork and focus excessively on how they are perceived as URM individuals, rather than being free to learn and make mistakes like their non-URM counterparts.

Clinical. Given the clinical nature of orthodontic residencies, residents were also asked to describe instances when they felt that stereotype threat might have been demonstrated in clinical settings.

> Let's say you have to bend a fixed lower retainer… And they might be like, you know what that is, right? It's like, of course I know what that is. Is it because you don't think I know what it is or because you're not sure if I would even know. But then it's hard to tell. Like, would you ask this to someone else? That's so basic. You think everyone will know what that is. And I'm just like, yeah, but then I just brush it off right after that. But if I think deeper, I'm like, why would you ask if I know what that is? You know? Like, if I don't, then I'll ask you… it could also be that implicit bias where it's just they don't realize it's happening." – AA male

> I don't know. It's tricky. [I had]an attendant come do [my] clincheck and it just seems like they have just a weird attitude towards you. Or they come over with, like, some type of sluggish, unwilling attitude, but I could see them five minutes later, go meet someone else…, they're happy or they're cool…start laughing. I'm like, dang I just asked for the same exact thing. – AA male

> If I do not follow the faculty around while they were explaining biomechanics to my co-residents, I would not have learned anything. If I asked the same question my co-residents asked, I would get a simple general dentist answer, while my co-residents would get an orthodontic answer. It is frustrating!" – AA Female

> I had a professor ask me if I knew what a serial extraction pattern was. After I told him yes, he proceeded to continue asking me and talking to me like I was a pre dental student. We learned about serial extractions in dental school, it was on boards which I passed. I am a 2nd year orthodontic resident who has performed them. It is not about him teaching me, but more that he continued to ignore me going over the pattern with him several times. – AA Female

> I will tell the faculty what I want to do in the clinic only to be ignored and then have my suggestions repeated back to me. I have watched to see if this faculty member does this with other residents, and he does not. He listens to them and praises them in front of the patient. – AA Female

Residents expressed experiencing differential treatment regarding clinical assistance and receiving less comprehensive knowledge to strengthen their skills as future clinicians. These experiences can lead to frustration and being undervalued by faculty members. It is important to note, low-threat residents did not report similar experiences at this level.

Social. The profession of orthodontics thrives off of social interactions and networking. Residents from URM backgrounds shed light on some encounters:

> I had a white faculty detail to me how much of an outcast he felt like when he went to [an event] with all black people. He went into detail of he just felt awkward and out of place. He looked at me as if I should been in shock for him. I just looked at him baffled as if he didn't realize I was the only black woman in my program and had to deal with this every day. What is worse is a [white] co-resident of mine who saw this was making me uncomfortable said nothing and left me to fend by myself. What is even crazier is that he brought this situation up again in front of my teenage patient. She had to ask me if I was okay after he left; imagine that. Being around this faculty member is triggering. - African American Female

This interaction demonstrates how the faculty member's lack of cultural awareness can lead to traumatic experiences for URM residents. A moment of support from the co-resident could have helped alleviate the resident's distress and served as a valuable teaching moment. Additionally, the resident's patient validated the faculty member's unprofessionalism by expressing concern for the resident, highlighting the inappropriate nature of readdressing the situation during a clinical setting. A Hispanic male also shared some sentiments he felt when interacting socially.

> Attendings talk about skiing, golfing, all these things ... I just can't relate to it, because I didn't grow up doing any of that. It would be okay if they wanted to also discuss things that pertain to my life, that just doesn't happen. - Hispanic male

Low threat residents were asked how they believed stereotype threat could present for their URM residents.

> I thought we would be over this at this point, but just coming into orthodontics, seeing that majority of people in power and those, for example, those who run successful orthodontic practices, are predominantly white males. They have a specific set of cultures. They play golf. They watch baseball. They have a specific set of interests and cultures that maybe people from other races and cities genders can't really relate to. And oftentimes that feels very alienating for people who may not necessarily connect with these lifestyles. So I definitely see a difference in how well we can relate to old orthodontists. And I can definitely see this play into job opportunities in the future, the

> ability to earn so, like, how much salary we're going to be earning in the future and etc. Etcetera. And I can't help but wonder, like, what could be done about this. I see a lot of my co residents showing interest in, for example, learning how to golf, and a lot of this is because a lot of older ones that honest golf, and that's one very good way to network with them. But I felt like I hate to see our interests and hobbies be whitewashed by the interests of people at a different subset that I personally just don't want to relate to, even though I feel like at some point I have to. – Taiwanese female

The resident highlights the cultural alienation experienced by those from diverse backgrounds in a homogeneous environment. As a result, energy is spent on whether to assimilate into the norms or risk further alienation by not participating. Residents like the Hispanic male emphasize how they try introducing activities that bring them joy but are met with resistance instead of appreciation.

Consequences

Pressure. URM residents describe feeling that their race added extra pressure to perform well to avoid reducing opportunities for future residents of similar backgrounds.

> I have to be a good example. If I do one thing wrong, it's gonna ruin it for all the other black residents. So whenever I'm presenting, I think alot about it. Where my other coresidents are like whatever, who cares? Who cares if you get in trouble? Yea, I dont have the luxury not to care, I have to always think about it. - AA Male

> I'm taking boards and some part of me want to pass boards and another part of me wants to pass board because I don't be that black kid that didn't pass board. It's like, why am I worried about other people? I don't even know them. But it's still, I just feel like if I were to not pass boards for some reason, and then another black person doesn't pass, it could be like maybe [black residents] dont pass boards , you know? – AA Male

> And then also felt the whole imposter syndrome because I just felt like if I don't perform this way or act this way, then they're not going to take anyone else as black. And then I felt like the first year that I was a resident didn't interview anybody that was black. And it took up until, like, the year that I'm leaving, there finally is another black resident coming in. And then a part of me was like, oh, am I responsible for that? – AA Female

Assimilation. In addition to increased pressures, residents describe the challenge of remaining true to themselves.

> If I am speak up, I get labeled as aggressive. If I take a step back, she is not involved. You honestly can not make them happy. So I am just unhappy to make it through. – AA Female

> There's also a stigma you either have to joke around or, or you're too aggressive so you have to pick one. There's no, you know, they have the opportunity to be whatever they want. You're basically labeled as the funny black guy or the aggressive one, you know. So when you defend yourself, everyone gets up in arms they're like, oh, I didn't mean it like that, you know, they get defensive. – AA Male

Disengagement. To reduce the negative experiences they encountered, residents expressed the need to remove themselves from certain situations for the sake of their mental health.

> I stopped talking to my co-residents. There was no point I was spending to much of my time trying to explain my feelings to them to not be understood. Even though I have to be nice in all situations when something upsets them. - AA Female

> To stop myself from crying every day I had to just remove myself from the things other than the requirements of my program. I went to clinic, class, and turned in all assignments. For my health, I did not go to socials or extra activities as it would lead to some kind of issue [microaggressions, rude remarks]. Yea, it isolated me, but I hung out with people who cared about me. – AA Female

Unheard. The frustration of being ignored by peers and leaders can lead to withdrawal from active participation in the program and lead to feelings of self-doubt.

> There was a time as a chief resident I did not feel respected by my peers or program director. I would suggest something, and it would go ignored, only to be brought up by someone else later as a good idea. I just wanted to stop talking because, honestly, what was the point? – AA Female

> Imagine telling a coresident something for them to ignore you, then for them to ask the same question and thank that person tremendously. If this happened once of twice, yeah brush it off. But it happens once a week. – Hispanic Male

Affected Performance. Due to the environment, residents describe being unable to put their best foot forward, which affected both their ability to benefit from the program and the positive contributions they could have made.

> I feel like I probably could have done a little bit better, but I can't worry about that. I feel like I did the best that I was able to do and I gave what I could give with how I was feeling because after what happened to me – AA Female

> But then I just kind of just didn't care, and I just didn't want to be there. And I feel like it might have affected my performance. I don't feel like I perform, like, to the best of my ability, if I'm being honest. Like, I'm. I don't feel like I'm, like, the perfect resident. – AA Female

Negative Feedback. Residents reflect on the impact of receiving false negative feedback. One non-URM resident also shares her feelings after witnessing a URM peer receive inappropriate feedback.

> In a batch of positive reviews, one faculty mentioned I was an "underachiever compared to her class". Even people who don't like me could never qualify me as such. I always go above and beyond, and to say this when there were residents in my class who did not nearly put in enough work was baffling to me. The thing is, I know I am not an underachiever, but the gull for that faculty to even write something like that just really showed no matter how hard I worked in his eyes I would never be enough. I try not to let it bother me but it will randomly come into my head and I just get a wave of depression. - AA Female

> There was a part time faculty member. I didn't have any cases to treatment plan with this particular individual. I also didn't have any patients in the clinic at the time. So I was spending the extra downtime that I had trying to work on a [a literature review]. So it's a big presentation. This [faculty] ended up calling my department chair after the clinic session was over and snitched on me. Essentially, they called and informed them that I wasn't busy enough in the clinic and that I was sitting there in my free time looking up food menus, even though my history showed that I wasn't doing that. So I was spoken to by my program director … The fact that this faculty felt the need to discuss me with my department chair after hours, which that I actually attributed to maybe this individual is like a little racist because that made no sense to me, especially because that wasn't even what I was doing… We are all adults…If they had an issue with what I was doing, they could just hold me instead of [telling on me] [...] . I wouldn't have dealt with this if I had been anyone else. - AA Female

> [Black male] had the most negative feedback. And my interactions with [black male], I think he's great. And I think he's great. He really tries. He's smart. He's a really great guy

> and a great resident. So some of the stuff he told me that, like, he got in the resident evals, I was just like, oh, that's kind of not fair. Like, it's. I don't know if that's really warranted. And maybe some, bias influence his negative feedback – Chinese Female

Reactions to stereotype threat vary among residents. Some may enter residency as the "only one" in their educational journey and develop coping strategies. Others may come from programs that have always been diverse and may not have encountered stereotype threats to the same degree. Nonetheless, these experiences illustrate the additional challenges URM residents face alongside their orthodontic training. Program leaders should take note of these consequences to mitigate their impact on URM residents in their program.

Coping Mechanisms/ Motivations: High Threat

> When I start something, I gotta finish, my main goal here was to work for my family. I have a very supportive family back home, my fiancé, my mom, my dad, my brother, my sister, and my community. I came here to accomplish a goal and that was that, whether they like me or not –AA Male

> I've been trying to just, like, do things that make me feel good. I've started going to therapy. I started, like, working out here, and they're not the best with that. Or sometimes, like, honestly, for me, coping is just, like, doing nothing. Yeah, just doing nothing and just watching tv, even when I know I have things to do. – AA Female

> You know, just be with people who aren't like that, and care about the people who, actually care about, you just care about what they think and not anything else. And that really helped me. This was a real time of introspection for me because I live by myself. So I use a lot of time to walk and spend time by myself and meditate and reflect on myself, you know, and that helped me um learn to not care and ignore these things. – AA Male

Coping Mechanisms/ Motivations: Low Threat

> I think knowing that my patients are real life people who are affected by what I do, and I can't just, like, leave them in the dust, and I can't just, like. Like, I literally have to do what's, like, try my best for my patients, otherwise their lives are affected. So I guess that keeps me motivated, like, just knowing that I'm, like, working with real people and then, um, wanting to learn a lot. - Chinese Female

> But I vent a lot. I used to like, like, work out like play tennis or something as a means to try and get any pent up energy off. –AA Female

> Definitely friends, I always have had good friends to um rely on and um doing a lot of fun stuff with them is uh like one day my free time. So that's good. I couldn't imagine like just focusing on school 24 /7. Family too. – White Male

> But I vent a lot. I used to like, like, work out like play tennis or something as a means to try and get any pent up energy off. –AA Female
> The fact that I do want to see more people that look like us having the opportunity, the exposure, to specialize. So it's important to fill the space so that they can understand that, hey, this is something that I may also be able to do by having the experience, I'm also able to enlighten not only those who are interested in following me, but also those that are in a position of power to be like, well, these are the things that you should probably change if this is something that you're actually passionate. – AA Female

Overall, the coping mechanisms of both the low and high residents were similar. They formed communities to lift them up, sought therapy, and released some pent-up energy with workouts or additional activities. The motivation for pushing through was for their families and overall patient experience.

Desires for Safe Environments

All residents were asked to describe how, as program leaders, they would create safe environments for all residents.

Administration Initiative to Learn.

> Yeah, it's like a circle thing. They won't know what they're saying is bad unless they learn about it, and they're not gonna. They're not gonna be better unless they learn about it. So it just, like, who goes? It's the snake chasing its tail. Everyone's busy and everyone's responsibilities. And so all of those responsibilities lend itself to just delivering trauma on a daily basis to people… They should pick up a book and read. – AA Male

> When I ask questions regarding to orthodontics faculty tell me to do a literature review. When I explain to them the struggles I have as a minority resident, they want me to relive my trauma for their satisfaction. If someone truly cares they will do the research into this themselves. – AA Female

Outside Confidential Mediums.

> I think that sometimes there can be a disconnect for certain people in academia. I am a firm believer that there is a reason why some people are in academia and that's because maybe they wouldn't be the best people out in private practice. So there might be a disconnect. Having someone that would be available to kind of break down, like, well, this is the experience that they're talking about and these are the ways in which it is affecting their ability to learn or you know, perform at their best in this environment. So that way, if they understand that there are true implications for that, they may be more motivated to make some changes to how the program operates in order to truly get the best out of the residents in their program. – AA Female

> I think a lot of times people make a lot of assumptions as to what the issue might be and just try and start, you know, offering up solutions that don't, you know, target what maybe the original issue was. So if you give people the opportunity to have a voice and shed light on whatever it is that's in, particularly bothering them, then you can be more tailored in your approach to fix it. So I think that that's something that I would do. - AA Female

Create Spaces for URMs (Bring in Orthodontist or Conferences).

> If the school give them enough [to cover the day of work they'll miss], help them as much as possible, give them more incentive to come. Even sometimes on Zoom, if they don't want to come in real life, that might still help. – AA Male

> The other thing would be being open to lunch online, bring in other people that also perhaps look like myself. Just reach out to more black orthodontists or black people doing great things and have them come speak. – AA Male

> Send me to more conferences with other black residents. Like GORP or AAO, any conference that would allow me to meet or see other black faculty and residents. Just give us that freedom. They could do it by maybe blocking our schedules, paying for our flight to go there, maybe even, like, you know, regular lunch, dinner, like regular stipend for regular expenses. And I think that will help. Some people need those weekends, occasional weekends to see other people that look like them, or to bounce ideas and feel rejuvenated.

Increasing Diversity and Outreach.

> I think outreach is really important. Like, having people from our programs that go reach out, to high schools and colleges and dental schools just to talk about our lives as residents and really show them, like, this is a career option for you. And here's the steps you can take if you're interested in pursuing this career. Just so, like, people from different schools, in different neighborhoods and communities are exposed to and hear about orthodontics as a profession. Yeah. So, like, going, like, doing some, like, outreach

> events in the community, I think would. Would help. And then making sure that people, the residents that go to the outreach events represent range of races, backgrounds, so we don't all look the same when we do these outreach events, so. – Chinese Female

> I think that, that just by having a variety of backgrounds, experience I think that makes a huge difference and also, you know, just making sure that they just relate to the residents from like, um, racial or gender backgrounds, but personal ones too where I, I think the connection you make with them help you to, to feel like you're connected program. I think that that would, I think that would help to make somebody feel comfortable.– White Male

All residency programs are structured differently, and what residents desire from their programs needs further exploration. However, 80% of the interviewees, both URM and non-URM residents, expressed the need for program leaders to take the initiative. By proactively learning about their residents' experiences, program leaders can help alleviate the burden on minority residents, who often have to explain their challenges. This approach can also foster stronger relationships within the program.

Residents did not expect their program leaders to have immediate solutions to all issues on campus, but they did mention that faculty being "blinded" to some concerns posed a significant problem. Bringing in outside confidential mediums can serve multiple purposes. These external entities can objectively gather and present opinions from both sides, and provide a voice for residents who feel uncomfortable expressing their true feelings directly to program leaders.

Increasing diversity and outreach was frequently mentioned to capture the next generation of healthcare providers as they decide on their career paths. Notably, bringing in a diverse group of residents is key to effectively representing the specialty of orthodontics. Similarly, working to ensure representation within the program is crucial. The residents acknowledge that recruiting minority faculty is challenging but suggest that inviting minority guest lecturers could be beneficial.

Phase 2: Qualitative Interviews (Program Leaders)

Support Systems for Residents and Open Communication

Program leaders were asked if their programs provided any support systems for their residents and if there were any specific programs for minority residents. The support systems mentioned are included below, though none were specific to URM residents:

- Quarterly meetings to gain insight into the program
- Chief Resident participation in bi-weekly division meetings, adding the resident's perspective
- Open door policy
- Frequent individual feedback requests from residents
- University-wide resources for assistance beyond what the program can support
- Wellness program in the hospital

All five program leaders mentioned that residents could talk to them anytime. However, during interviews, seventeen residents (ten URM and seven non-URM) stated they did not feel understood by their program leaders. Additionally, fourteen residents (eight URM and six non-URM) expressed that they felt uncomfortable speaking with their program leaders.

> I feel like sharing my experience with my program leader will shed a negative light on me. –AA Female

This sentiment among residents stemmed from the belief that their program leadership would not take action. A program leader provided a slightly different perspective on why this might be the case:

> In education, inherently, there's a hierarchy. There are certain ways that [studnets] would want to present to leadership or present to people who [they] respect highly. And you might not want to admit, especially since we tend to be in a profession of very high achievers, those tend to be the sort of people who don't want to let anybody who they perceive to be higher in the hierarchy understand or know that they're struggling or know that they're having an issue. And I think particularly in our profession, in our educational system, it's hard for people who are high performing to admit these problems. – Program Leader 3

Residents interviewed expressed that their programs' hierarchical nature and power dynamics caused significant strains. The need to be perceived favorably by the program director creates intense pressure on residents. Exploring how residents and program leaders can change these perceptions can positively affect residents' overall happiness and should be further studied. This program leader continues on to say:

> I'm sure that there are leadership faculty members who aren't approachable.I think one good thing in most residency programs. There are so many different faculty members, they might not be full time. Hopefully there is somebody who that resident feels comfortable speaking with. What can be done about it? I think it's hard because as a resident, it's very strange to hear from your leadership.Okay, just come and sit in my office and cry. You know, it can be very difficult for some people to do that, but keeping the lines of communication open. I also think it's important for leadership or faculty members to be close enough that maybe the resident doesn't have to be the one who reaches out. Sometimes it's been as simple as we have these one on ones asking, how are you doing? I noticed that this is going on in the world. – Program Leader 3

Given the inherent power dynamic, faculty and program leadership should take the initiative to cultivate vulnerability within academic settings. Proactive leadership is essential to dissolve communication barriers and build the supportive relationships that residents need. Some program leaders are working to take this approach:

> I think that's the key.. So they need to feel you as a friend. So they talk to you – Program Leader 1

Resident Evaluations

Five program leaders indicated that resident reviews are the primary method for evaluating residents. During the interviews, the interviewer, I.O, highlighted discrepancies that some residents might face in these evaluations. These included concerns about bias, lack of recognition of their talents, and insufficient constructive feedback. Below are the suggested methods to ensure that evaluations are fair for each resident:

> I try to tell [faculty], don't be too negative when you do critique. Try to do more constructive critique rather than negative critique. Otherwise you can get into much personal feeling and which is not fair to everybody" – Program Leader 1

> The feedback that's given is anonymous and that's done so that both parties can be comfortable saying everything that they want. But I sit down with each resident in person to give them the feedback. And that gives them an opportunity to either say, yes, this is something that I think is accurate, or no, I don't think it's accurate, and then we can have a conversation about it. I do also encourage the faculty members to have a direct conversation.But just as much as there are residents who don't feel comfortable reporting to certain faculty members, they feel intimidated, there are faculty members who don't feel comfortable taking on that role. – Program Leader 3

> I typically try to look at the data before I present it to the student [...] I encourage the faculty[…] to talk with me to the point that you raised. I also encourage them, if they haven't really engaged the student, not to evaluate it. I don't wanna overinflate their grade or to make it a negative or punitive thing. And so if they have comments about all the students, but they feel as though they haven't had enough engagement with any one particular student, they're always welcome just to provide me with that feedback. I'm meeting with the students, I could say, hey, some of the faculty think this about the whole group, and so this is just something to be mindful of. But again, I would be shocked if there wasn't at least one instance where they went through and they didnt said something. As I reflect back and I think of students who tended to struggle in the program. It's not always the minorities of underrepresented groups. I think my faculty has had a tendency maybe to be more proactive and vocal about those where they may be more accepting of [non minority residents] and state "They're a little more shy and like, I'll give them the benefit of the doubt". "They just had a bad day where with". – Program Leader 4

The same program leader describes how he advocates for residents during their evaluations. Understanding how biases can affect evaluations and, more importantly, how to address them with faculty is important.

> I can't undo biases that people have, but within our system, I could say, well, that's not a fair statement or that's not a fair assessment, or what about this person who you didn't mention, and they're performing the same. So at least if we're going to sit and try to hold someone to a standard or recommend a certain course of action, that it is ubiquitous, it's going to occur for everyone and not those students. – Program Leader 4

Program leaders surveyed were aware of the biases some residents face during standard evaluations. As a result, they have worked to counteract this by advising faculty not to be overly critical and by initially reviewing the evaluations for potentially biased findings. Unfortunately, more must be done to educate faculty completing resident evaluations. Program leaders

addressing remarks that may seem biased and out of place is a great way to start. Additionally, establishing a working group with program leaders to discuss potential improvements and gathering feedback from residents on effective measures for evaluations can also be helpful.

DISCUSSION

This study identified an increased presence of stereotype threat among URM orthodontic residents. 68% of URM residents were identified as experiencing high threats compared to 17% of non-URM residents. The reasons for the high threat levels were evident from residents' experiences of feeling unheard, disengaged, and under increased pressure. The information documented in this study aligns with findings on stereotype threat among URMs in healthcare settings, where sentiments of poor experiences are prevalent [15].

257 residents completed the survey, and a 22% response rate was achieved. Fifty additional residents attempted but only completed part of the survey. This could be due to a lack of motivation, concerns about anonymity related to questions on residency program and year, persistent questions about race having played a role in their program, or technical difficulties [21]. A pilot survey was conducted with third-year orthodontic residents from the University of California, San Francisco, to ensure clarity and to estimate the time needed to complete the survey (5-7 minutes). No incentive was provided to complete the survey. Offering a raffle entry or a monetary incentive might have increased the survey completion and overall response rate.

There were 1,146 orthodontic residents based on the 2023/2024 Survey of Advanced Dental Education[6]. Of these, 58% are women and 42% are men, which is representative of the 55.6% of women and 43.2% of men who completed this survey. The ADEA survey showed that 54.3% of residents are White, 25.5 % Asian, 6.7% Hispanic, and 5% African American. The distribution in this survey shows 50.2% White (including Middle Eastern), 29.2% Asian (including Asian Indian), 7.8% Hispanic, and 12.8% African American.

When compared, our survey is representative of all races except African Americans. This discrepancy is likely due to the lead researchers identifying as African American, making

African Americans the first point of contact to complete the survey and share it with their respective programs. Additionally, due to the nature of the study, African Americans may have been more inclined to complete the survey and share their experiences.

In addition to race, gender, sexual orientation, and the program's location were also observed to see if they contributed to a type of threat. Gender, sexual orientation, and location were not statistically significant. Nonetheless, the year in the program was statistically significant and showed that first-year and second-year residents had a higher chance of experiencing stereotype threat when compared to third-year residents. This decrease in threat could be due to the mindset change developed by residents during the program needed to survive as described by a third year African American male:

> It was making me depressed, trying to fit in and trying to be liked by everybody…I'm, I'm a 31-year-old, I have a great fiancé, I have a great family. Why do I have to fit in with them? This community is toxic, and I am a man of faith. The Lord has been good to me and everything I set out to accomplish; why do I care? They're gonna have their opinion on me anyway, no matter how hard I work or how well I do, they're still gonna have their opinion.

The threat is perceived, but URM residents have to find a way to develop strategies to mitigate the burdens they face to finish tasks without impairing their working memory. This trend could also be because eighteen orthodontic programs are only 24-27 months long. Therefore, fewer residents were in their third year to complete the survey.

URM residents did have an increased risk for high stereotype threat, but a similar threat could be seen in residents with children and those who immigrated after earning their initial dental degree abroad. The interviews with high-threat and low-threat residents provided insights into how stereotype threat manifests and leads to different experiences. When discussing the negative and positive aspects of their residency, residents from both groups cited similar issues related to administration, staffing, caseload, and power dynamics within the programs. However,

high-threat residents also reported additional negative experiences primarily related to race, which significantly impacted their time in the program.

Despite these challenges, some residents used these unfortunate situations as motivation to go the extra mile in their learning. Although it should not be the case, these residents utilized their coping mechanisms and motivations to persist through their programs. It was evident that these residents came in with the understanding that residency would be challenging but seek equitable treatment like their non-URM counterparts when it comes to how they were treated due to race.

Interestingly, most residents who identified as low-threat were not from underrepresented minority (URM) groups, but they did recognize the extra burdens carried by their URM peers. These low-threat residents often attempted to assist by acting as a sounding board and mentoring. The manifestation of stereotype threat among orthodontic residents significantly affected their perceptions. Stereotype threat was present throughout the residents' experiences, impacting their didactic, clinical, and social interactions within the residency. This pervasive presence of stereotype threat highlights the need for directed interventions to create a more equitable and supportive learning environment for all residents.

The sentiments regarding the strategies employed by program leaders to create more collaborative environments varied from what orthodontic residents stated they needed. Residents expressed that clear communication, alleviation of power dynamics, and increased diversity would significantly improve their experiences. This highlights the importance of program leaders' continued efforts to actively engage with residents to understand and address their needs and concerns to create safe envoiorments.

A discussion with a program leader led to the topic of why programs struggle to attract faculty. The leader attributed this issue to the financial differences between academia and private practice. Tough financial compensation is a major challenge. Poor experiences during residency can also lead to a loss of potential faculty.

> I think one of the things we don't often talk about is the importance of creating a good experience for residents. Your alumni network becomes strong ultimately who's gonna want to come back to teach even part-time for a program, who are the people who want to give back to the program? [Programs are not] gonna get that if [residents dont] feel like they have value,if they felt like they were just a means of producing cash flow work for the department or college, all of those kinds of things that devalue an experience and devalue thems an individual. Those make for a poor connection after residents graduate, which leads to a poor alumni. –White male

The sentiments of this resident are valid and were expressed to another program leader who stated that residents might forget the negative experiences and still return to teach. Although this may be accurate for some, programs are missing out on potential educators because many want to disassociate from their poor residency experiences. This is especially important for URM residents, who have documented negative experiences that could hinder their recruitment for much-needed URM faculty[10].

This study had limitations. A higher response rate would have provided a fuller representation of orthodontic residency programs. Additionally, 80% of the URM residents interviewed identified as African American, resulting in limited insights from other URM groups. The recall of residents who have undergone traumatic experiences also significantly impacted the information provided about their experiences.

Looking to see how the implementations presented by residents improved their experiences should be explored. In addition, looking to see how stereotype threat can affect orthodontic patients.

CONCLUSION

Stereotype threat is a multifaceted and prevalent phenomenon that impacts individuals with varying frequency. Efforts must be undertaken to alleviate its effects, particularly within the orthodontic residency setting, which strives to increase diversity. This study showed that URM residents experience higher levels of stereotype threat compared to non-URM residents. The experiences from interviews provided valuable insights, illustrating the differences in experience for residents regarding races and factors contributing to stereotype threats within orthodontic academia. The input and perspectives of program leaders can help bridge gaps and bring potential strategies for positive change across all residency programs. If program leaders do not take the time to understand the backgrounds of all their residents, they risk further perpetuating the negative experiences of their residents. To help mitigate stereotype threat, some recommendations are:

1. Reassess the standard methods for evaluating residents to remove biases and provide constructive feedback.
2. Actively listening to residents' needs is monumental. Initiatives to remove the hierarchy in leadership and create comfortable environments for all residents, especially URMs, are essential. Communicating with residents, developing an action plan without diminishing their concerns, and providing timely updates on the progress of their concerns are crucial.
3. Dive deeper by going beyond training sessions to educate on diversity and inclusion. Establish spaces led by trained professionals where faculty feel comfortable learning about varying experiences. Discussing topics such as stereotype threat, reduction of

biases, addressing microaggressions, and how to be a supportive ally will help create more inclusive environments.

4. Continue the efforts to increase minority representation in programs; this can be influenced by applicants seeing happy minority residents in the program. As recruitment ramps up, work on bringing in minority guest lecturers, either through compensated in-person sessions or via Zoom. Additionally, seek environments where URM residents do not need to be siloed, such as local and national conferences.

REFERENCES

(1) Flores, K.; Combs, G. Minority Representation in Healthcare: Increasing the Number of Professionals Through Focused Recruitment. *Hosp. Top.* **2013**, *91* (2), 25–36. https://doi.org/10.1080/00185868.2013.793556.

(2) Ko, M.; Henderson, M. C.; Fancher, T. L.; London, M. R.; Simon, M.; Hardeman, R. R. US Medical School Admissions Leaders' Experiences With Barriers to and Advancements in Diversity, Equity, and Inclusion. *JAMA Netw. Open* **2023**, *6* (2), e2254928. https://doi.org/10.1001/jamanetworkopen.2022.54928.

(3) Wilbur, K.; Snyder, C.; Essary, A. C.; Reddy, S.; Will, K. K.; Mary Saxon. Developing Workforce Diversity in the Health Professions: A Social Justice Perspective. *Health Prof. Educ.* **2020**, *6* (2), 222–229. https://doi.org/10.1016/j.hpe.2020.01.002.

(4) Mertz, E.; Calvo, J.; Wides, C.; Gates, P. The Black Dentist Workforce in the United States. *J. Public Health Dent.* **2017**, *77* (2), 136–147. https://doi.org/10.1111/jphd.12187.

(5) Frazier-Bowers, S. A.; Murdoch-Kinch, C. A.; Martinez-Mier, E. A. Racial Disparities in Oral Health Care. *J. Am. Dent. Assoc.* **2023**, *155* (2), 91–93. https://doi.org/10.1016/j.adaj.2023.12.001.

(6) CODA Survey of Dental Education. Dental Education Program Enrollment and Graduates Trends Report: 2023-24. https://www.ada.org/en/resources/research/health-policy-institute/dental-education.

(7) Allareddy, V.; Atsawasuwan, P.; Frazier-Bowers, S.; Hong, C.; Huja, S.; Katebi, N.; Lee, M. K.; Mehta, S. Y.; Padala, S.; Utreja, A.; Vaiid, N.; Venugopalan, S. R.; Wadhwa, S.; Yadav, S. Orthodontic Educational Landscape in the Contemporary Context: Insights from Educators. *Semin. Orthod.* **2024**, S1073874624000628.

https://doi.org/10.1053/j.sodo.2024.05.001.

(8) Brett R. Brown; Marita Rohr Inglehart. Orthodontic Care for Underserved Patients Professional Attitudes and Behavior of Orthodontic Residents and Orthodontists. *Angel Orthod.* **2011**, *81*, 1090–1096. https://doi.org/DOI: 10.2319/013111-64.1.

(9) Coe-Nesbitt, H. A.; Soleas, E. K.; Moucessian, A. M.; Arghash, N.; Kutsyuruba, B. Conceptualizing Thriving: An Exploration of Students' Perceptions of Positive Functioning Within Graduate Education. *Front. Educ.* **2021**, *6*, 704135. https://doi.org/10.3389/feduc.2021.704135.

(10) J.G, C., Lindsey; L., J.-A., Jennifer. Developing Alumni Begins with the Student Experience: A Thriving Model of a Long-Term Care Administration Program. *J. Health Adm. Educ.* **2023**, *40* (1), 39–50.

(11) Osseo-Asare, A.; Balasuriya, L.; Huot, S. J.; Keene, D.; Berg, D.; Nunez-Smith, M.; Genao, I.; Latimore, D.; Boatright, D. Minority Resident Physicians' Views on the Role of Race/Ethnicity in Their Training Experiences in the Workplace. *JAMA Netw. Open* **2018**, *1* (5), e182723. https://doi.org/10.1001/jamanetworkopen.2018.2723.

(12) Ulviye Isik; Anouk Wouters; Gerda Croiset; Rashmi A. Kusurkar. "What Kind of Support Do I Need to Be Successful as an Ethnic Minority Medical Student?" A Qualitative Study. *BMC Med. Educ.* **2021**, *21*.

(13) Ulviye Isik; Anouk Wouters. "As an Ethnic Minority, You Just Have to Work Twice as Hard." Experiences and Motivation of Ethnic Minority Students in Medical Education. *Perspect. Med. Educ.* **2021**. https://doi.org/10.1007/s40037-021-00679-4.

(14) Gomez, E.; Wright, J. G. A Simple Strategy to Reduce Stereotype Threat for Orthopedic Residents. *Can. J. Surg.* **2014**, *57* (2), E19–E24. https://doi.org/10.1503/cjs.020812.

(15) Bullock, J. L.; Lockspeiser, T.; del Pino-Jones, A.; Richards, R.; Teherani, A.; Hauer, K. E. They Don't See a Lot of People My Color: A Mixed Methods Study of Racial/Ethnic Stereotype Threat Among Medical Students on Core Clerkships. *Acad. Med.* **2020**, *95* (11S), S58–S66. https://doi.org/10.1097/ACM.0000000000003628.

(16) American Association of Orthodontics. *Help Lead DEI Efforts at AAO and Join the Inclusion and Engagement Committee*. https://www2.aaoinfo.org/join-the-inclusion-and-engagement-committee/.

(17) American Association of Orthodontics. *Implicit Bias Training Options for AAO Members*. https://www2.aaoinfo.org/implicit-bias-training-options-for-aao-members/.

(18) Bullock, J. L.; Lai, C. J.; Lockspeiser, T.; O'Sullivan, P. S.; Aronowitz, P.; Dellmore, D.; Fung, C.-C.; Knight, C.; Hauer, K. E. In Pursuit of Honors: A Multi-Institutional Study of Students' Perceptions of Clerkship Evaluation and Grading. *Acad. Med.* **2019**, *94* (11S), S48–S56. https://doi.org/10.1097/ACM.0000000000002905.

(19) Francis E. Kendall. UNDERSTANDING WHITE PRIVILEGE, 2002. https://www.american.edu/student-affairs/counseling/upload/understanding-white-privilege.pdf.

(20) Saha, S.; Taggart, S. H.; Komaromy, M.; Bindman, A. B. Do Patients Choose Physicians Of Their Own Race?: To Provide the Kind of Care Consumers Want, Medical Schools Might Be Able to Justify Using Race as an Admissions Criterion. *Health Aff. (Millwood)* **2000**, *19* (4), 76–83. https://doi.org/10.1377/hlthaff.19.4.76.

(21) Steinbrecher, M.; Roßmann, J.; Blumenstiel, J. E. Why Do Respondents Break Off Web Surveys and Does It Matter? Results From Four Follow-up Surveys. *Int. J. Public Opin. Res.* **2015**, *27* (2), 289–302. https://doi.org/10.1093/ijpor/edu025.

Publishing Agreement

It is the policy of the University to encourage open access and broad distribution of all theses, dissertations, and manuscripts. The Graduate Division will facilitate the distribution of UCSF theses, dissertations, and manuscripts to the UCSF Library for open access and distribution. UCSF will make such theses, dissertations, and manuscripts accessible to the public and will take reasonable steps to preserve these works in perpetuity.

I hereby grant the non-exclusive, perpetual right to The Regents of the University of California to reproduce, publicly display, distribute, preserve, and publish copies of my thesis, dissertation, or manuscript in any form or media, now existing or later derived, including access online for teaching, research, and public service purposes.

DocuSigned by:
Ifunanya Okeke
FAE378D3F11549C...
Author Signature

5/30/2024
Date