

How are Mentees' Goals and Demographic Characteristics Associated with their Mentoring Experiences, Preferences and Perceived Benefits?

By

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ABSTRACT

Mentoring typically happens in a dyadic form where a senior mentor advises a mentee who is not as experienced. Recent review of the literature suggests that other forms of mentoring could be beneficial to mentees. Group mentoring is where a mentor or multiple mentors work with a mentee or several mentees; it can take on many forms such as mentoring triads, collective mentoring with more than three individuals in the mentoring relationship, and a mentoring network with different information, resources, and people to help guide a mentee.

Mentoring can also be either formal, where a designated mentor (s) is assigned to a mentee (s), or informal, where the mentoring relationship evolves spontaneously between mentor(s) and mentee (s). Career (sponsoring, coaching, increasing the mentees exposure or visibility, etc.) and psychosocial (role modeling, counseling, offering friendship, etc.) goals are two major goals that have been documented for mentoring relationships. It is possible that the type of mentoring, as well as demographic factors, may influence one's access to mentors and the likelihood of fulfilling one's goals for the mentoring relationship.

This study seeks to investigate how medical students' mentoring goals and demographic characteristics (race/ethnicity, gender identity, household income, or parental highest level of education) may have influenced their prior mentoring experiences. I focus on medical students because their insight on their mentoring experiences would be beneficial for students interested in pursuing a career in medicine. I surveyed 87 medical students from three different institutions (East Carolina University's Brody School of Medicine (SOM), Wake Forest SOM and UNC Chapel Hill SOM) and holding one-on-one interviews with ten of the survey respondents. The goals of the study were to provide a deeper understanding of the factors that may impact mentoring and to advance ongoing research about effective mentoring in higher education.

Findings show that medical students from all populations had previously participated in both formal and informal mentoring, and Asian students had significantly more informal mentors than white and UR students. Medical students generally had university faculty or medical professionals as mentors, and there was a significant association between the gender identity of the mentee and that of their first mentor (i.e., they shared the same gender identity). Additionally, students reported having both career and psychosocial goals for mentoring, and there was a positive association between the strength of the mentees' goals for mentoring and the number of formal mentors the mentees had. Most respondents preferred having one mentor in a dyadic relationship, but only around a quarter of the survey respondents had experienced group mentoring. Further research into the functions and benefits of group mentoring will be critical to better anticipate under what conditions it may be preferable over dyadic mentoring. Mentoring programs for aspiring medical students may benefit from focusing on both career and psychosocial functions, as well as offering access to dyadic and group mentoring, to maximize the benefits of mentoring for students from diverse backgrounds.

How are Mentees' Goals and Demographic Characteristics Associated with their Mentoring
Experiences, Preferences and Perceived Benefits?

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CHAPTER 1: Introduction

Mentoring is complex, and the debate for a universal definition for the role and function of a mentor is ongoing. In 1991, Jacobi identified 15 different definitions across disciplines, and between 1990 and 2007 over 50 different definitions were created to define mentoring (Crisp & Cruz, 2009). For example, Ramanan et. al (2002) defined a mentor as “an active partner in an ongoing relationship who helps a mentee maximize potential and reach personal and professional goals.” McLean (2004) suggested that academic mentors “should seek to assist students’ socialization into the academic culture and optimize their learning experience by providing emotional and moral support.” Healy et al. (1990) considered mentoring to be “a dynamic, reciprocal relationship between an advanced career incumbent (mentor) and a beginner (protégé) aimed at promoting the career development of both.” The consensus in the literature is that mentorship should be beneficial for the personal and career growth of both the mentor and the mentee (Pololi et. al, 2002, Healy et al., 1990). In addition, mentoring relationships are now seen as collective processes in which mentees and mentors take part in dynamic activities such as planning, reflecting, questioning, and problem solving (McGee, 2016).

Both career support (career guidance, networking, sponsorship) and psychosocial support (emotional support, confidence boosting, role modeling) are necessary for an effective mentoring relationship (Haggard et. al., 2011, Jacobi, 1991, Kram 1985a, Packard, 2016). The mentee can have both career and psychosocial goals when entering a mentoring relationship; career goals prepare them for career advancement opportunities while psychosocial goals can provide them with a sense of confidence and competence (Kram, 1983). Successful mentoring relationships allow mentees to clearly define their career goals, the skills they need to achieve those goals, and take the steps needed to make progress towards those goals (NASSEM, 2019). As a result, an

effective mentor would support the mentee's development by helping them gain the confidence and knowledge they need to reach their educational and career goals.

These benefits are expected to extend beyond individuals to the broader STEM (Science, Technology, Engineering, Mathematics, and Medicine) community by developing a more diverse talent pool and increasing access, equity, and inclusion (NASEM 2019). Studies researching positive outcomes of mentorship have shown that undergraduate mentored research experiences in STEM are particularly beneficial for underrepresented (UR) students (Estrada et al., 2018; Thiry and Laursen, 2011). Additionally, undergraduate mentored research for UR students may promote a sense of fit for with the scientific community (Estrada et al., 2011; Hurtado et al., 2009).

Personal development, career support, academic success and networking are some of the many benefits of effective mentoring; however, mentoring is often denied the attention it deserves. Over the past two decades, effective mentoring has been identified as a skill that can be taught, practiced, and mastered. Unfortunately, in academia other aspects of professional development such as teaching and research receive much more attention, evaluation, and recognition than mentoring (NASEM, 2019). Academic institutions have mostly formalized the education of STEM professionals while mentoring often happens informally. Less than 50 percent of undergraduate faculty had mentoring considered during promotion review, and only seven percent reported being formally trained to be a mentor (Stolzenberg et al., 2019). Unlike teaching practices, which are often evidence-based, mentoring has usually been based on the mentor's individualized practices, which are not research-based (NASEM, 2019).

Participation in Mentoring Relationships

A wide range of students participate in mentoring relationships, including undergraduate, graduate, and medical students. Undergraduate students' participation in mentored research experiences have been linked to greater retention in STEMM, and mentees' perception of mentoring effectiveness is a good prediction of enrollment in science-related doctoral programs. Graduate students who have positive mentoring relationships are more likely to persist in their academic programs and are more likely to publish their research than their counterparts who have not been mentored (NASEM, 2019).

Despite the positive effects of mentorship, access to mentoring has been shown to disproportionately favor some demographic and socioeconomic groups over others. For example, studies have reported that students from UR groups in STEMM degree programs typically receive less mentorship than their well-represented peers (Gayles & Ampaw, 2011; Helm et al., 2000; King et al., 2018; Thomas, 2001; Thomas & Hollenshead, 2001). Milkman et. al (2015) propose that negative stereotypes may affect women and minorities receiving mentorship during their academic journey by limiting their access to mentoring and impacting the student's experience during mentoring. Common negative stereotypes have been shown to impact Black students (Cuddy et. al., 2007), Hispanic students (Weyant, 2005), Asian students (Kim & Yeh, 2002), Indian students (Lee & Fiske, 2006), and females (Nosek et al., 2007). Thus, these groups may not have access to the same level of career and psychosocial support that students from well-represented groups have.

Types of Mentoring Relationships

Mentoring can be either formal or informal. Formal mentorship is where a designated mentor and mentee are assigned to one another, usually with organizational assistance or intervention (Ragins et al., 1999). In contrast, informal mentorship develops spontaneously based

on the mentor's and the mentee's mutual interest and interpersonal comfort (Zachary, 2011). Research on formal and informal mentoring relationships indicate that both forms of mentoring can be beneficial to the mentor and the mentee. A case study by Griffin et al. (2018) showed that graduate students benefit from the support from formal relationships with advisors and dissertation committee members, as well as from informal relationships with peers and relatives. Members of UR groups, however, often have less access to the benefits of informal mentoring mentorships (NASEM, 2019). Both formal and informal mentorship can happen through a variety of configurations including dyads, triads, collective or group mentorship, and mentorship networks (Aikens et al., 2016; Joshi et al., 2019).

Mentoring is usually defined as a dyadic relationship, an interaction where a more advanced mentor is paired with one less advanced mentee. In this model, a novice learns by working with an expert to develop expertise in the field of study and prepare for a career (Lave & Wenger, 1991; Wenger, 1999). Traditional dyadic mentoring is effective when the relationship between the mentor and the mentee is dynamic, in which the skills of the mentees grow as well as the skills of the mentor. Dyadic mentoring is often assumed to be a mutually positive experience for the mentor and the mentee (Hansman, 2003). However, the mentors and mentees may hold different values, goals, level of commitment, or expectations for mentoring. One negative impact that can arise is that mentees can turn into "clones" of their mentors without having the opportunity to develop their own professional identity. Other common problems with dyadic mentoring are finding time for mentoring and the potential for the mentoring relationship to feel forced and artificial. Effective mentoring requires "a certain chemistry" between the mentor and the mentee (Jackson et al., 2003) and a single mentor might not have all the skills, knowledge, abilities, or connections needed by their mentees (DeCastro et al., 2013, Halvorson

et al., 2015, Yun et al., 2016). Therefore, other mentorship structures beyond a dyadic model could be beneficial for mentees' success (NASEM, 2019). Most research on mentorship in STEMM examines mentorship at the dyadic level, but researchers are beginning to examine other structures for mentorship (Huizing, 2012, Kroll, 2016, Mullen, 2016, Nicholson et al., 2017).

Group mentoring can take on many configurations including a mentorship triad with one mentor and two mentees or two mentors and a mentee. A survey of about 800 participants in undergraduate life science research found that the undergraduate researchers experienced a range of triadic mentorship structures (Aikens et al., 2016). In a bigger collective setting, a group of mentees can work together with one or more mentors as a small network. In mentoring networks, information and advice can be passed from mentors to mentees as well as from one mentee to another. Mentorship groups can help expose students to different levels of expertise and cross disciplines (Dodson et al., 2009; Horner-Devine et al., 2018; Reeves et al., 2019; Thomas et al., 2014). Finally, mentorship networks allow a mentee to be exposed to a variety of resources and different people for their mentorship experience.

Non-dyadic structures (group mentoring) can be affinity based, where the group comes together based on a common identity, such as African American women in STEMM. Affinity based mentorship groups can potentially provide additional support for individuals in minority groups (Comer et al., 2017; Martinez et al., 2015; Smith et al., 2014; Tuitt, 2010). For example, group mentorship among women scholars has been shown to help participants build skills, self-efficacy, and career satisfaction (Martinez et al., 2015; Varkey et al., 2012). Among African American male students, it has been shown to help build skills, improve academic success and persistence in research, and value the communal goals of the group (Dodson et al., 2009). Peer

support and socialization are opportunities that would be absent in a strictly dyadic mentoring relationship (Majocho et al., 2018).

Research Aims

In this research study, I investigate the mentoring preferences of medical students, as well as how they perceive their prior mentoring experiences and whether those perceptions differ based on their mentoring goals, demographic characteristics, or mentoring configurations (dyadic or group mentoring). Specifically, I ask five research questions. 1) How much exposure to mentoring (formal, informal, group) have the students had, and does that vary with student demographics? The hypothesis was that students from groups less represented in medical fields (i.e., students whose parents have less formal education, those with lower household incomes, and black or Hispanic students) would have had fewer mentors than students in groups that are not underrepresented in medical fields. 2) What types of mentors did the students have? The hypothesis was male and female mentees would be mentored more frequently by mentors with the same gender identities as them. 3) What goals did students have for mentoring and what benefits did they perceive from it? The third hypothesis was that the students would have both psychosocial and career-related goals for mentoring and that they would perceive both career and psychosocial benefits from mentoring. 4) Was there a correlation between the strength of the goals the students had when entering mentoring and the benefits they perceived from it or the number of mentors they had? The fourth hypothesis was that there would be an association between the mentees' mentoring goals and their perceived benefits. An additional hypothesis was that students with stronger mentoring goals would have had more prior mentors than students with fewer mentoring goals. 5) What mentoring configuration did students prefer? The

hypothesis was that students would prefer group mentoring as it provides a larger number of individuals (mentors, fellow mentees) from which to benefit.

This study will advance the research on effective mentoring in higher education, specifically for populations interested in medicine. Medical students are the study population because their insights about mentoring relationships may be beneficial for students interested in entering medical school. Vast numbers of students enter their undergraduate degrees with the goal of attending medical school after graduation, yet only a small percentage will be successful. Thus, understanding the mentoring experiences of those successful few students could be instructive for programs designed to assist students with medical school ambitions.

CHAPTER 2: Methods

This study was conducted using a mixed methods approach, collecting both quantitative and qualitative data to investigate medical students' prior mentoring experiences. The quantitative data were collected through a survey and the qualitative data was collected through interviews. The goal of the survey was to investigate the association between students' demographic characteristics (race/ethnicity, gender identity, household income, parental highest level of education) and preferred mentoring model (one-on-one mentoring or group mentoring), as well as their mentoring goals, mentoring experiences, and perceived benefits (psychosocial guidance or career guidance) of these experiences. The interviews provided context to the survey results.

Study Population

Medical students from three institutions (East Carolina University (ECU)'s Brody School of Medicine, Wake Forest School of Medicine and University of North Carolina (UNC) at Chapel Hill School of Medicine) participated in this research. ECU's Brody School of Medicine's acceptance rate is 12.40%. The school has a total enrollment of 343 students (currently 165 males and 178 females) with 87 first-year students. Wake Forest School of Medicine's acceptance rate is 2.81%. The school has a total enrollment of 570 students (currently 277 males and 293 females) with 137 first-year students. UNC at Chapel Hill School of Medicine's acceptance rate is 3.78%. The school has a total enrollment of 865 students (currently 402 males and 463 females) with 189 first-year students.

Survey Creation

The survey was created for use in this study and contains demographic questions as well as questions about students' formal and informal mentoring experiences (Appendix A). The original questions contained a variety of formats such as multiple choice, fill in the blank, and five-point Likert scale. Check point items such as "click yes if you are paying attention" and "select strongly disagree for this question" were added throughout the survey to ensure the validity of students' answers. In addition to the original questions written for this study, the survey included 16 validated items (items not included in Appendix A but available in the Tepper et al. 1996 citation) from Tepper et al. (1996) to determine the mentees' goals and perceived benefits. The items from Tepper et al. (1996) are on a 5-point Likert scale from "strongly agree" to "strongly disagree" and four questions were reverse-coded. The items represented four different subscales (psychosocial and career perceived benefits, and psychosocial and career mentoring goals). These 16 items were validated previously through confirmatory factor analysis in which all the factor loadings were statistically significant ($p < 0.01$), meaning that the items are significantly related with career and psychosocial mentoring functions (Tepper et al., 1996). An exploratory factor analysis test confirmed the validity of these four subscales in our data. The psychosocial benefits subscale consisted of 8 items ($\alpha = .79$), the career benefits subscale consisted of 8 items ($\alpha = .88$), The psychosocial mentoring goals subscale consisted of 8 items ($\alpha = .73$) and the career mentoring goals subscale consisted of 8 items ($\alpha = .88$). The group mentoring perceived benefits subscale consisted of 6 items ($\alpha = .64$) and was based on Rogerian principles, which describes the characteristics of an effective mentor in a group setting (Rogers, 1969). The original and previously published items were combined into a single survey (Appendix A) in Qualtrics (Provo, UT). After completion of the survey, five

upper-level undergraduate students pilot tested the survey and provided feedback on the flow and clarity of the questions. Three faculty members familiar with the study and item construction examined the survey to establish that the survey questions were appropriate for the purpose of the study (face validity). The survey was revised by clarifying the definition of formal and informal mentoring relationships with an example for both types of mentoring.

Survey Distribution

The Qualtrics survey was distributed to students at ECU's Brody School of Medicine, Wake Forest School of Medicine, and the University of North Carolina at Chapel Hill School of Medicine via email between September and December 2020. Participation in the survey was voluntary but incentivized with a \$20 gift card given to a random subset of approximately 10% of survey respondents. Survey respondents had the option to include their e-mail address to be eligible for the gift card drawing and could indicate their willingness to be contacted for a follow-up interview.

Survey Data Manipulation

After data collection, I exported the survey data from Qualtrics into SPSS (IBM, Armonk, NY). I cleaned the data by removing any response that did not meet the 51% or more inclusion criteria (i.e., respondents completing 50% of the survey items or less were removed). I also removed duplicate responses from the same individual, respondents who did not answer the check point questions correctly, and students who consistently gave the same answer (e.g., strongly agree or strongly disagree). Finally, I also checked for any responses that were not consistent between the regular and reverse coded questions. I reverse coded the relevant Likert scale items (denoted with a * in Appendix A). One survey respondent who identified as nonbinary checked "other" as gender identity. Because of the small sample size, I removed this

respondent in the gender identity count, but the respondent's answers were included in the analysis for the other questions. I coded each item about the perceived benefits of mentoring based on the categorization from Tepper et. al (1996) as either a perceived psychosocial benefit (8 items) or perceived career benefit (8 items). Each mentoring goal item also was categorized as either a psychosocial mentoring goal (8 items) or a career mentoring goal (8 items). Due to low sample size, I recoded the mentees' household income into three levels: "high" (incomes over \$75,001), "intermediate" (incomes between \$25,001 and \$75,000) and "low" (incomes below \$25,000). Because of limited sample sizes, I also recoded the mentees' race and ethnicity into three categories: White, Asian, and Underrepresented (UR). If the mentees selected more than one option ("Black" or "Hispanic" + anything else) their response was coded as "UR" and "Asian" + "White" was coded as "Asian." Finally, the ideal configuration answer choices that included more than one mentor and one mentee were recoded into "group mentoring" as opposed to one-on-one (dyadic) mentoring.

Survey Analysis

The quantitative data was analyzed using SPSS (IBM, Armonk, NY) and R Software (R Core Team, Vienna, Austria). To address the first research question, I used descriptive statistics to determine the number of formal and informal mentors the students had, along with a count of the number of students who had experienced group mentoring. I performed separate analysis of variance (ANOVA) tests for each demographic factor to address the first hypothesis that students from groups less represented in medical fields (students whose parents have less formal education, those with lower household incomes, and those from an underrepresented race or ethnicity), are likely to have had fewer mentors than students from groups that are not underrepresented in medical fields.

To address the second research question, I used descriptive statistics to determine the most common profession and the gender identity of the mentors. I determined whether the gender identity of the student and the mentor was the same. In addition, I used a chi-square test to evaluate the hypothesis that male and female mentees would be mentored by mentors who shared their same gender identity.

For the third research question, I calculated the strength of the psychosocial and career goals students reported having for the mentoring by calculating the mean of the eight items that measured psychosocial goals and then the mean of the eight survey items that measured career goals (Tepper et al., 1996). We repeated these steps for the perceived career and psychosocial benefits of mentoring, using those respective survey items. To address the fourth question, I performed a Pearson correlation test between the mentees' psychosocial mentoring goals (and then their career-related mentoring goals) and their perceived psychosocial benefits (and then their career-related benefits) of mentoring. In addition, I performed two separate linear regressions to address the hypothesis that students with stronger mentoring goals would have more prior mentors than students with fewer mentoring goals. Finally, to address the fifth research question, I used descriptive statistics to calculate the percent of students indicating they preferred dyadic mentoring and those preferring any version of group mentoring.

Interview Requests

In December 2020, I emailed a random subset of 30 survey respondents who provided their contact information to request that they participate in a follow-up interview. The goal of the interview was to further investigate the survey responses and gain a deeper understanding of the responses received from the survey. A total of 11 students agreed to be interviewed via Cisco WebEx during the first two weeks of January 2021. One interviewee was later removed because

they did not fit the target study population (i.e., students in medical school). Each interview was recorded with the interviewee's consent. The semi-structured interviews were guided by 17 original questions and followed up with clarifying or probing questions, as needed (Appendix B). The interviews lasted 20-30 minutes each. Each participant received a \$20 gift card for completing the interview, in addition to being eligible for the gift card raffle associated with completing the survey.

Interview Analysis

The interview videos were transcribed by a commercial service (Rev.com). I created a list of 13 initial codes: "career choices", "choice of mentor", "emotional support", "gender identity impact", "ideal configuration", "mentor availability", "mentor quality", "mentor dislikes", "career guidance", "mentoring likes", "mentoring dislikes", "race/ethnicity impact", "role model", and "socioeconomic impact"; the interview transcripts were then coded iteratively using Nvivo (QSR International, Burlington, MA). Two individuals (the author and one other) coded two interview transcripts, and interrater reliability between these two coders was calculated using kappa coefficient. Any differences in coding were discussed and the code book was revised. This process was repeated until high interrater reliability was achieved (e.g., kappa coefficient of 0.87) with a final codebook of seven codes (Appendix C). The remaining transcripts were coded by the author and synthesized to identify broad themes.

To analyze the interviews, I labeled the attributes of each of the ten interviewees in Nvivo. These attributes (collected on the survey) included gender identity, race/ethnicity, household income, the number of formal and informal mentors each interviewee reported, and whether they had received group mentoring or not. I also examined the percentage of words in an interviewee's transcript assigned to a specific code. I looked for patterns in coded answers (e.g.,

mentoring likes and dislikes; career guidance and emotional support; mentor availability and mentoring dislikes; gender identity, race/ethnicity, and socioeconomic impact on choice of mentor) based on mentees' demographic characteristics and attributes (e.g., number of formal and informal mentors and whether they had participated in group mentoring).

CHAPTER 3: Results

Survey Results

There were 130 surveys completed. After removing some responses because they did not meet the inclusion criteria, 87 responses were retained for analysis. Most of the respondents were female (Table 1), white (Table 2), had a low or intermediate household income (Table 3), and had at least one parent/guardian with education beyond a bachelor's degree (Table 4).

Research Question 1: We found that students had considerable exposure to both formal and informal mentoring (86% and 92% of the respondents, respectively), but not group mentoring. On average, respondents reported having 2.36 formal mentors ($SD = 1.92$) and 2.99 informal mentors ($SD = 2.29$). In the prior five years, only 26% of survey respondents had been mentored in a group setting. ANOVA tests revealed no significant difference in the number of formal and informal mentors as a function of household income, parental highest level of education, or student gender identity. However, further analyses showed that there was a significant difference in the number of informal mentors, but not formal mentors, based on race/ethnicity ($F(2,77) = 4.36, p = 0.016$), in which Asian students had significantly more formal mentors than white students ($p = 0.017$) and UR students ($p = 0.056$; Figure 1). Thus, there was support for the hypothesis that students from racial/ethnic groups less represented in medical fields would have had fewer mentors than students in racial/ethnic groups that are not underrepresented in medical fields. There was no support for the hypothesis that students from other underrepresented groups in medicine had fewer mentors.

Research Question 2: The mentors were generally medical professionals or university faculty members, with mentors of female and male gender identities well represented.

Respondents' first formal mentor was either a medical professional (48%) or university faculty member (45%), where 57% of the mentors were reported to be male and 42% female. Most respondents who had second formal mentor reported having a female mentor (58%) and a medical professional (56%). Respondents' third formal mentors were generally medical professionals with 40% male mentors and 56% female mentors. Similarly, students' informal mentors were generally medical professionals (51% first informal mentor, 58% second informal mentor, 65% third informal mentor) with a fairly even split of female and male mentors (54% of first informal mentors were female, 47% of second informal mentors were female, and 57% of third informal mentors were female). There was a significant association between the gender identity of the mentee and the gender identity of their first formal mentor ($\chi^2(2, N = 66) = 10.00, p = 0.007$) and their first informal mentor ($\chi^2(2, N = 70) = 10.75, p = 0.005$). Male respondents shared the same gender identity as their first formal and informal mentors more often than would be expected under the null hypothesis of no association between gender identity of the mentee and chosen mentor (Figure 2a). Female respondents only shared the same gender identity as their first informal mentors more often than would be expected under the null hypothesis (Figure 2b). Thus, there was support for the hypothesis that male and female mentees would be mentored more frequently by mentors who share their same gender identity.

Research Question 3: As a group, substantial numbers of respondents reported having psychosocial *goals* ($M = 5.7, SD = 0.511$; 7-point Likert scale) and career *goals* ($M = 5.6, SD = 0.893$) when entering these mentoring relationships. Respondents reported perceiving (on a 5-point Likert scale) psychosocial *benefits* ($M = 4.2, SD = 0.498$) and career *benefits* ($M = 3.6, SD = 0.795$) from their mentoring. The hypothesis that students would have both psychosocial and

career-related goals for mentoring and that they would perceive both psychosocial and career benefits was supported.

Research Question 4: A correlation test revealed a significant positive correlation between the strength of mentees' goals going into mentoring and their perceived benefits of mentoring (career benefits $r = 0.57, p = 0.000$; psychosocial benefits $r = 0.52, p = 0.000$). Thus, the fourth hypothesis was supported. In addition, there was a significant, positive association between the strength of a student's career goals for mentoring and their number of formal mentors ($r(73) = .24, p = .048$; Figure 3a), but not for informal mentors. Similarly, there was a significant positive association between the strength of a student's psychosocial goals for mentoring and their number of formal mentors ($r(73) = 0.31, p = 0.011$; Figure 3b), but not informal mentors. There was support for the hypothesis that students with stronger mentoring goals would have had more formal mentors than students with fewer mentoring goals, but this hypothesis was not supported for informal mentors.

Research Question 5: Those respondents who had experienced group mentoring indicated that they agreed that they had benefitted from the experience, but not strongly ($M = 4.02$ on a 5-point Likert scale, $SD = 0.459$). Most respondents preferred having one mentor (71%) in a dyadic relationship over group mentoring. The hypothesis that medical students would prefer group mentoring was not supported.

Interview Results

The demographics of the interviewees were similar to the survey respondents except Asian students were more heavily represented (Tables 5-9). The final codebook had seven codes: career guidance, emotional support, mentoring availability, mentoring likes, mentoring dislikes,

choice of mentor and ideal configuration (Table 10). Three main themes arose from the seven codes: choice of mentor, mentoring functions, and mentor preferences.

The first theme, choice of mentor, included information about choice of mentor and mentor availability. The first hypothesis stating that students from groups underrepresented in medical fields would have had fewer mentors than students from groups that are not underrepresented was partially supported in the interviews. Most mentees reported that socioeconomic status was one of the biggest factors affecting mentoring accessibility. For example, because of limited access to medical professional mentors, students in lower income households and underrepresented groups mentioned seeking mentors who are not medical professionals (e.g., faculty members) to help advance their ambition to pursue medicine. The second hypothesis stating that male and female mentees would be mentored more frequently by mentors that share their same gender identity was partially supported by the interviews, as interviewees reported that gender identity and race/ethnicity played a role in some mentees' access to mentors and ability to choose a mentor.

The second theme, mentoring functions, included ideas from the career guidance and emotional support codes. In the interviews, there was support for the third hypothesis that students had both psychosocial and career-related goals for mentoring and that they perceived both psychosocial and career benefits from mentoring. Interviewees particularly discussed how they appreciated receiving recommendations and research opportunities from their mentors, as well as encouragement. They looked up to their mentors as role models and felt that they received any necessary emotional support. Additionally, many female mentees reported receiving emotional support related to gender identity and identity as a scientist from female mentors.

The third theme, mentor preferences, included ideas about what the mentees liked and disliked about their mentoring relationships, as well as their ideal mentoring configuration. Mentees liked when their mentors had knowledge about the medical admission process, were available and approachable, gave them constructive criticism, were encouraging, and were good listeners. Mentees did not like the amount of planning that mentoring required because both the mentor and mentee were busy. When asked about their preferred mentoring configuration based on prior mentoring experience, most interviewees reported preferring one-on-one (dyadic) mentoring, which refuted the hypothesis that students would prefer group mentoring. Students preferred dyadic mentoring because they felt it was a more comfortable mentoring relationship. They explained that connecting with just one mentor takes a lot of energy, so they would not want to spend that much energy connecting with multiple mentors.

CHAPTER 4: Discussion

This study addressed how mentees who are now medical students perceived their mentoring experiences and preferences and how these factors are influenced by demographic factors. I found that Asian students had significantly more informal mentors than their white and UR counterparts. This finding partially matches the NASEM (2019) report, which states that members of UR groups in STEMM have difficulty accessing informal mentoring relationships. The fact that the UR students did not have fewer informal mentors than white students could be due to my study population being highly motivated and successful medical students whereas the NASEM (2019) report encompasses results from different groups including undergraduate, graduate, and medical students. The number of formal or informal mentors a student had did not differ based on mentees' gender identities, household income or level of parental education. Thus, for these students, personal motivation may have driven participation in mentoring more than demographic factors.

Over ninety percent of the medical student respondents had at least one parent with a bachelor's or higher degree. This shows that these respondents reflect a small subset of the U.S. population whose family has unusually high levels of education. According to the American Council on Education (A.C.E), in 2017, only 34.2% of adults ages 25 and older obtained a bachelor's degree or higher. There was no difference in exposure to mentoring, however, in respondents from differing levels of parental education. Thus, respondents from families with low parental education who are enrolled in medical school may not be representative of the larger population of students applying to medical schools (but who are ultimately unsuccessful) from families with lower levels of parental education. Higher levels of mentoring among these first-generation students than the average first-generation student may have helped these students

be more successful in their medical school admissions. Although first-generation students account for one third of students in postsecondary education and almost half of all students enrolled at minority-serving institutions (Harmon, 2012), they are much less represented in medical school admissions. In addition, first-generation students are less likely than continuing-generation students to begin their studies in four-year colleges and more likely than continuing-generation peers to attend less selective colleges, including two-year and for-profit institutions (Cataldi et al., 2018). Admission in medical school requires at least a bachelor's degree, which means that first-generation students may need mentoring at a higher rate than their continuing-generation counterparts to address issues of equity and inclusion.

Students had experienced both formal and informal mentoring with one, two, or three mentors, but only roughly a quarter of the respondents had experienced group mentoring. They usually selected medical professionals or university faculty as mentors. They preferred medical professionals as mentors but students with lower household incomes had less access to potential medical professional mentors. Thus, aspiring medical students may benefit from programs that help connect them with medical professionals willing to serve as mentors and provide guidance on creating goals for the mentoring and sustaining the mentoring relationship.

There was an association between the gender identity of the student and that of their first formal, and first informal, mentor. Specifically, males shared the same gender identity as their mentors more frequently than would be expected by random chance. Women were no more likely to have a female than a male as a formal mentor but were more likely to have a female mentor as an informal mentor. During interviews, students expressed that they did not seek out mentors of a particular gender identity, but it is possible that unconscious biases influenced their choice of mentor, or the mentor had conscious or unconscious biases in their selection of

mentees. Alternatively, students' social networks may be skewed to individuals of the same gender identity and that may influence their likelihood of selecting a mentor with a particular gender identity. Female interviewees reported not intentionally seeking female mentors, but a mentoring relationship with a female mentor happened spontaneously.

Moreover, mentees' perception of career and psychosocial support may also depend on the gender identity of the mentor. Research on gender bias in mentorship has shown that female mentees with male mentors had difficulty seeing their mentors as suitable role models (Kram, 1985a) and women in same-gender mentoring relationships have reported significantly greater role modeling from their mentors (Ragins & McFarlin, 1990). Other studies have shown that both male and female mentees perceive female mentors as offering more psychosocial support, including role modeling, and male mentors as offering more career support, which is consistent with common gender identity roles (Sosik & Godshalk, 2000).

Students were motivated to enter these mentoring relationships due to a desire for psychosocial and career guidance, and the more goals they had for mentoring the more formal (but not informal) mentors they tended to have. This finding suggests that mentees may have more specific goals when entering formal mentoring relationships as opposed to informal mentoring relationships which tend to be spontaneous and are often developed without clear expectations (Kram, 1985a; Ragins & Cotton, 1999; Zachary, 2011). In their interview responses, mentees reported having clear expectations for the mentoring relationship as one of the most important determinants of the success of a mentoring experience. Interviewees felt that formal mentoring provided better connections because of the set expectations for the mentor(s) and the mentee(s), whereas they felt it was harder to cultivate relationships with informal mentors because they never officially asked them to be their mentor. Mentees also reported

wishing they had mentors earlier in their career and specifically for the medical field, instead of just research mentors. Therefore, mentees should establish clear expectations with their mentors for both informal and formal mentoring relationships to maximize their mentoring experiences, and they should actively seek out mentors in the medical field to guide them in their medical career goals.

Students generally preferred having one mentor in a dyadic relationship, compared to group mentoring. It is possible that the strong preference for dyadic mentoring is because it is the more familiar model to students, as only a quarter of the respondents had participated in group mentoring. Conversely, students who had participated in both types may have had a better experience with one-on-one mentoring than group mentoring. Respondents who had participated in group mentoring overall agreed that they benefitted from mentoring in groups but were not asked to compare the quality of their prior dyadic versus group mentoring experiences. Thus, it is possible that mentees who have not been exposed to group mentoring may also benefit from it, if they tried it. Dyadic and group mentoring may serve slightly different purposes. Dyadic mentoring offers opportunities for career development and role modeling for the mentee; group mentoring has been reported to promote collaboration, provide mentees with psychosocial and career support, and increase dedication to a STEMM major (NASEM, 2019). For example, during the interviews some people commented on how there are certain topics they felt comfortable discussing with a trusted mentor but not in front of their peers. In other situations, though, a network that includes another peer may add an additional level of comfort and connection for the mentees because of the different perspectives from different mentors. Students expressed concerns about mentoring configurations with more than two mentees due to the fear it

would divide the mentor's attention from each mentee.

Limitations

As with all research, there are limitations to this study. These data on students' mentoring goals and perceived benefits are self-reported; no direct measures of how the mentoring experiences impacted the students' success have been included. Additionally, the study could have benefitted from a bigger sample size and representation from additional medical schools to increase our confidence in the results and enhance our ability to generalize the findings. I requested permission to distribute the survey to many additional medical schools in the region but only these three institutions agreed. In addition, I used medical students from all years in medical school to increase my sample size; while most students talked about their mentoring experience prior to entering medical school, some upperclassmen may have talked about mentoring experiences during medical school. Thus, the survey would have benefitted from an item that specified the student's year in medical school. Finally, we were unable to fully validate the survey using confirmatory factor analysis as our sample size was insufficient. Piloting the survey with a comparable student population and then interviewing the students about their interpretation of each item, along with soliciting input from experts allowed us to revise the survey items, however, and provide some validation.

Future Directions

Further research should investigate the impact that gender bias may have in the quality of the mentoring relationship. In addition, the potential barriers and challenges that may hinder students from different backgrounds from gaining the full benefits of mentoring need to be better understood. Research into the functions and benefits of group mentoring will be critical to better anticipate under what condition group mentoring may be preferable over dyadic mentoring.

CHAPTER 5: Conclusion

This study highlights the importance of both psychosocial support and career guidance for the successful career development of mentees and the role that demographic factors play in mentoring relationships. Both the survey results and interviews indicate that there may be gender bias in selection of mentors. In addition, student race or ethnicity may impact students' access to mentoring, especially informal mentoring, and household income may impact student selection of mentors as well as their goals and perceptions of mentoring. Most students reported a preference for one-one-one mentoring, but only a small subset of the survey respondents reported having experienced group mentoring. Students who participated in group mentoring reported having benefitted from the experience. Mentoring programs for aspiring medical students may benefit from focusing on both career and psychosocial functions, as well as offering access to dyadic and group mentoring, to maximize the benefits of mentoring for students from diverse backgrounds.

TABLES AND FIGURES

Table 1. Number and percentage of individuals of each gender identity responding to the survey.

Gender identity	Frequency	Percentage
Male	16	18%
Female	70	80%

Table 2. Number and percentage of survey respondents of each aggregated race or ethnicity. UR indicates those from a race or ethnicity that is underrepresented in medical school (e.g., Hispanic, black, mixed races identifying with Hispanic or black race).

Race/ethnicity	Frequency	Percentage
Asian	21	24%
UR	15	17%
White	51	59%

Table 3. Number and percentage of survey respondents from each aggregated level of household income, as an indicator of the respondent’s household income (high > \$75,001, intermediate between \$25,001 and \$75,000, and low < \$25,000).

Household Income	Frequency	Percentage
Low	32	37%
Intermediate	23	26%
High	14	16%
Prefer not to answer	18	21%

Table 4. Number and percentage of survey respondents based on the highest level of their parent’s education.

Parent’s level of education	Frequency	Percentage
No Bachelor’s degree	8	9%
Bachelor’s degree	30	35%
Post Bachelor’s degree	49	56%

Table 5. Percentage of interviewees from each gender identity.

Gender Identity	
Male	Female
10%	90%

Table 6. Percentage of interviewees from each level of reported annual household income (high > \$75,001, intermediate between \$25,001 and \$75,000, and low < \$25,000).

Household Income		
High	Intermediate	Low
25%	25%	50%

Table 7. Percentage of interviewees of each aggregated race/ethnicity. UR indicates those from a race or ethnicity that is underrepresented in medical school.

Race/Ethnicity		
Asian	White	UR
50%	40%	10%

Table 8. Percentage of interviewees who had participated in group mentoring previously.

Group Mentoring	
Yes	No
30%	70%

Table 9. Percentage of interviewees from each medical school.

Institution		
Brody	UNC	Wake Forest
70%	10%	20%

Table 10. Mean percent and standard deviation of interview transcript text matching each code for each interviewee.

Code	Mean (%)	Standard Deviation (%)
Choice of mentor	12.55	6.55
Emotional support	10.96	6.09
Career guidance	10.44	7.14
Mentoring likes	7.60	2.64
Ideal configuration	3.77	3.29
Mentoring dislikes	3.74	1.53
Mentor availability	3.34	1.71
Total	52.4	28.95

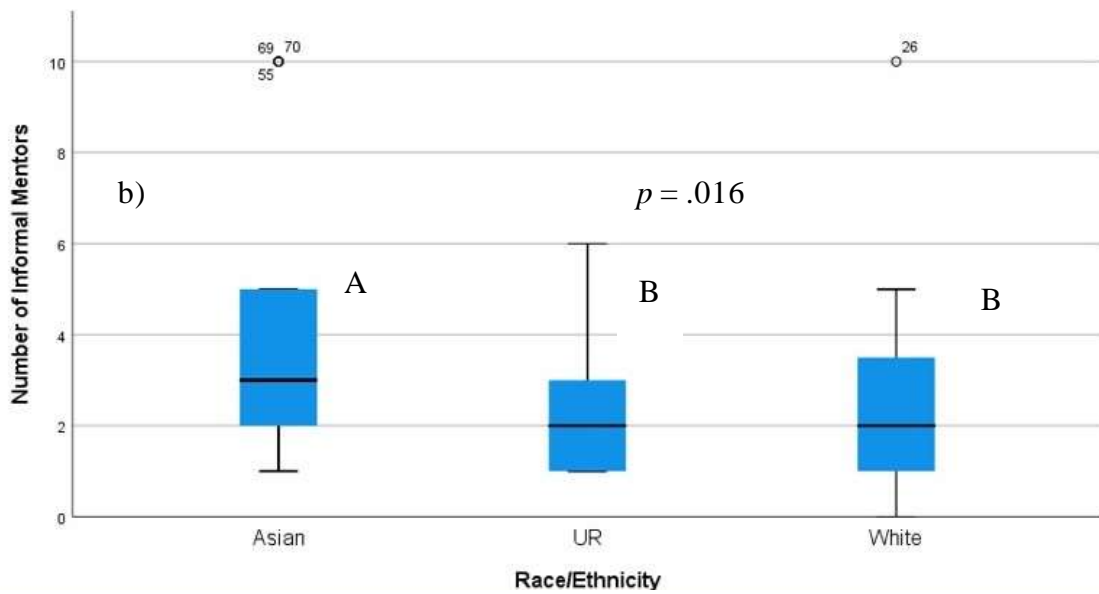
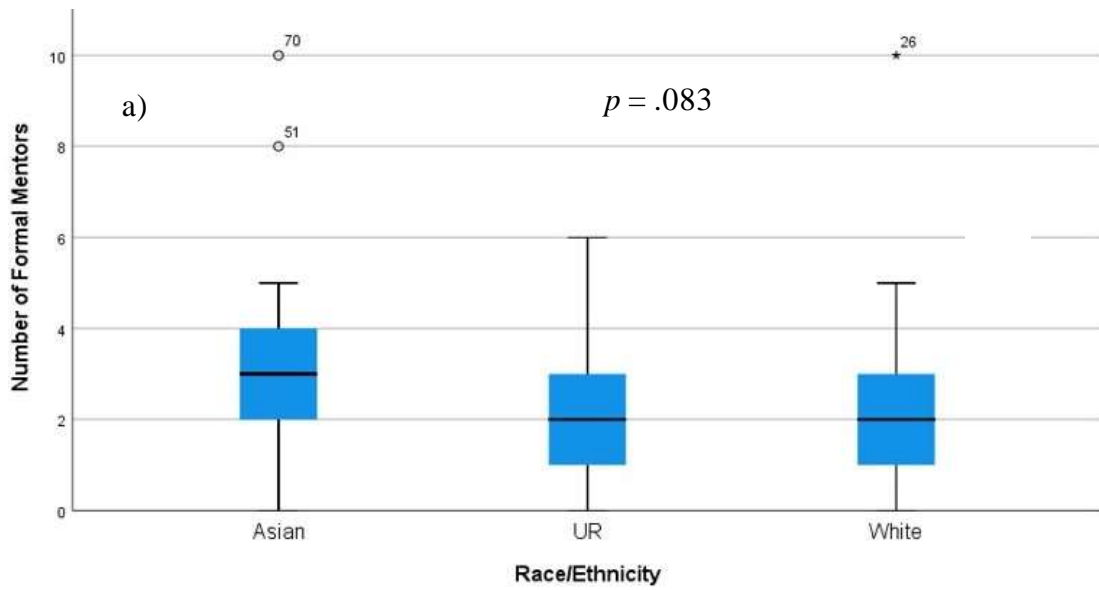


Figure 1. The mean number of formal mentors (a) that a survey respondent had did not differ with respondent race or ethnicity, but Asian survey respondents had significantly more informal mentors (b), than underrepresented (UR) or white respondents.

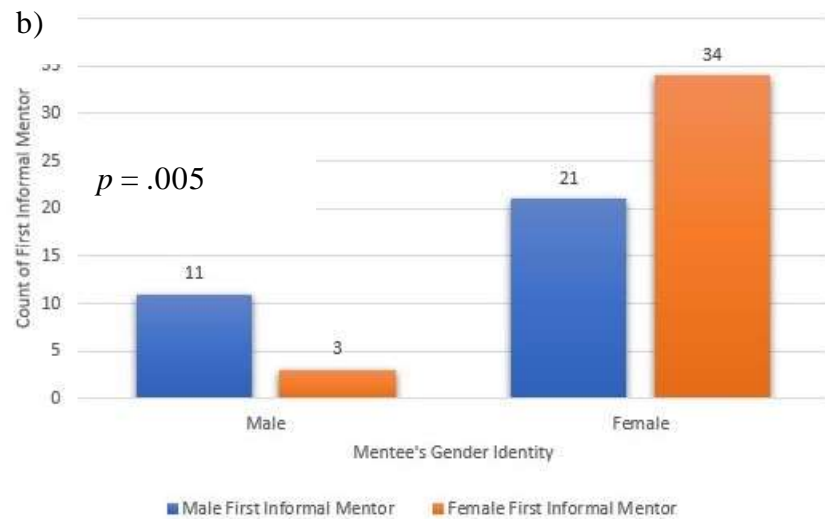
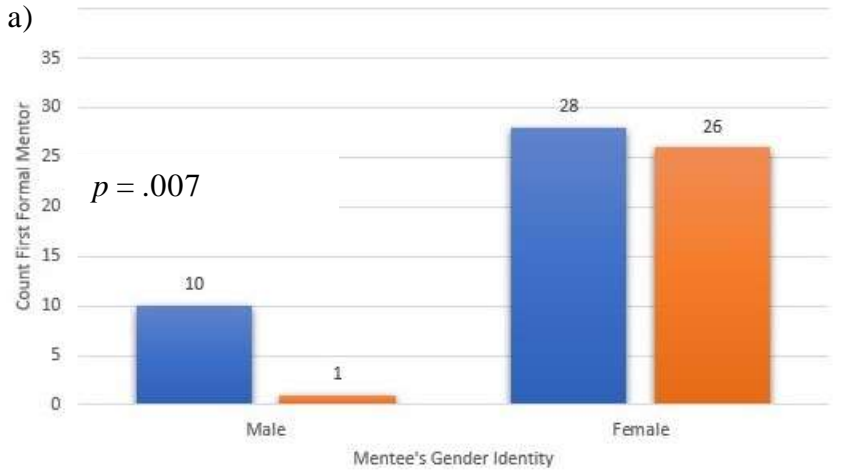


Figure 2. Male respondents shared the same gender identity as their first formal (a) and informal mentors (b) more often than would be predicted at random; female respondents only shared the same gender identity as their first informal mentors (b) more often than would be predicted at random.

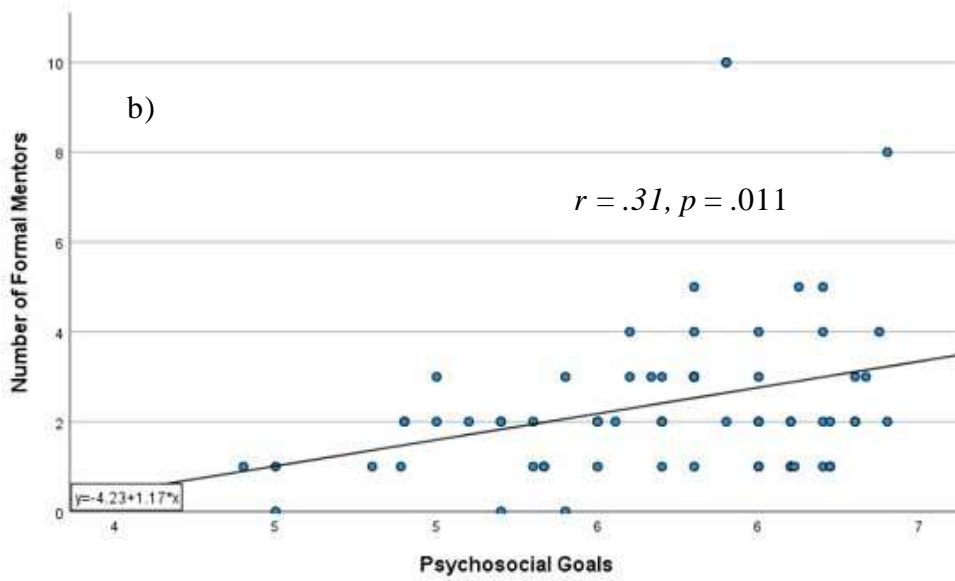
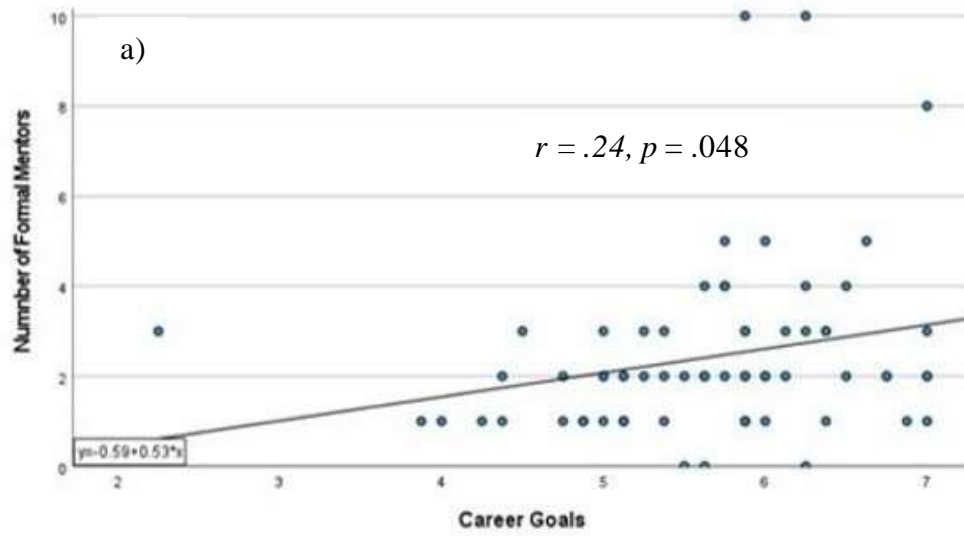


Figure 3. The more career goals (a) or psychosocial goals (b) a survey respondent had for mentoring, the greater the number of formal mentors they generally had.

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APPENDIX A: Survey Items

Demographic Questions

1. What is your gender identity?

- Male
- Female
- Another gender identity, please specify: _____
- I prefer not to respond.

2. What is your age? (Leave blank, if prefer not to answer).

3. What is your racial or ethnic identification? (Select all that apply.)

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White
- Other, please specify: _____
- I prefer not to respond.

4. What is the highest level of education completed by either of your parents (or those who raised you)?

- Did not finish high school
- High school diploma or G.E.D.
- Attended college but did not complete degree

- Associate degree (A.A., A.S., etc.)
- Bachelor's degree (B.A., B.S., etc.)
- Master's degree (M.A., M.S., etc.)
- Doctoral or professional degree (Ph.D., J.D., M.D., etc.)
- I prefer not to answer.

5. Which of these describes your personal income last year?

- \$0
- \$1 to \$9 999
- \$10 000 to \$24 999
- \$25 000 to 49 999
- \$50 000 to 74 999
- \$75 000 to 99 999
- \$100 000 to 149 999
- \$150 000 and greater
- I prefer not to answer.

6. Including yourself, how many people live in your household? (Leave blank, if prefer not to answer).

- 1
- 2
- 3
- 4
- 5
- More than 5 people

7. What is your total household income?

- Less than \$25,000
- \$25,001 to \$50,000
- \$50,001 to \$75,000
- \$75,001 to \$100,000
- \$100,001 to \$125,000
- \$125,001 to \$150,000
- \$150,001 to \$175,000
- \$175,001 to \$200,000
- \$200,000 or more
- I prefer not to answer.

Questions about prior mentoring exposure

Please answer the following questions about your prior mentoring relationships (collaborative process in which you and your mentor(s) took part in reciprocal and dynamic activities such as planning, acting, reflecting, questioning, and problem solving). These relationships may have been formal or informal. Unless otherwise specified, “mentor” refers to both a formal and informal mentor.

Formal mentoring: a mentoring relationship in which a designated mentor(s) and mentee(s) are assigned as part of an organizationally supported program. *Example:* A person who is assigned to help you succeed such as a research mentor or an advisor.

Informal mentoring: mentoring relationship (s) that developed spontaneously based on mutual interest and interpersonal comfort. *Example:* A person who is not assigned to you, but

you sought guidance from for professional development such as a professor or a doctor.

8. In the last five years, how many people can you identify as mentor(s)?

- Formal mentor (s) _____
- Informal mentor (s) _____

9. In the last five years, how many voluntary and/or required mentoring experience(s) have you had?

- Required _____
- Voluntary _____

10. In the last five years, have you been mentored by a peer (or peers) (someone with related rank or age as you). If yes, how many peer(s)?

- Yes (_____)
- No

11. In the last five years, have you been mentored in a group setting? If yes, including yourself, how many mentors and mentees were a part of the group (e.g., one mentor with two mentees, two mentors with one mentee, one mentor with three mentees, etc.)

- Yes (_____)
- No

12. In the last five years, which mentoring configurations have you experienced? (Select all that apply)

- Pairing of one mentor and one mentee
- Two or more mentees with a mentor
- Two or more mentors with one mentee

- Two mentors and three mentees
- Mentorship network for one mentee with formal mentor(s) and informal mentor (s)
- Another mentoring configuration _____

13. Based on your prior mentoring experiences, which mentoring configurations would be *ideal* for you?

- Pairing of one mentor and one mentee
- Two or more mentees with a mentor
- Two or more mentors with one mentee
- Two mentors and three mentees
- Mentorship network for one mentee with formal mentor(s) and informal mentor (s)
- Another mentoring configuration _____

Questions about mentoring goals and perceived benefits

Please indicate, on average, the perceived benefits you have received from your mentoring experiences. - (These items are not listed here but are available in Tepper et al. 1996.)

Note: Only for students who have indicated prior dyadic mentoring experiences.

Please indicate, on average, the perceived benefits you received from group mentoring. (These items are not listed here but are available in Rogers 1969). *Note:* Only for students who have indicated prior group mentoring experiences.

Please indicate your goals for mentoring when entering mentoring relationships. (These items are not listed here but are available in Tepper et al. 1996.)

Optional Contact Information

Please enter your e-mail address if you would like to be entered into a drawing for one of the \$20 gift cards. Approximately 10% of individuals including contact information will receive a gift card.

APPENDIX B: Interview Questions

1. Have you had people you identified as mentors?
2. Have you ever heard of “facilitated peer mentoring?” Please choose of the following responses:
 - 1 = No, not at all.
 - 2 = Not really, although I had heard the term.
 - 3 = Yes, but only a little.
 - 4 = Yes, I have been mentored in a facilitated peer mentoring setting.
 - 5 = Yes, and I am participating in a facilitated peer mentoring setting.
3. How hard was it for you to find a mentor (s) (if applicable)?
4. What qualities were you looking for in a mentor?
5. What do you remember about your prior mentoring experiences? How have your prior mentor (s) affected your career choices?
6. What did you like about your mentoring experiences?
7. What did you dislike about your mentoring experiences?
8. What did you want to get out of mentoring at the time of mentoring? Did you mainly seek out career guidance or psychosocial guidance (role modeling) from your mentor (s)?
9. How did your mentoring experiences affect your decision to attend medical school?
10. How would you describe the emotional support that you received from your mentor (s)?
11. Was/were your mentor (s) a role model (s) to you? Please expand.
12. How do you think your gender identity and/or race and/or ethnicity and/or socioeconomic class may have impacted your ability to find a mentor?

13. How do you think your gender identity and/or race and/or ethnicity and/or socioeconomic class may have impacted your choice of mentor?

14. How do you think your gender identity and/or race and/or ethnicity and/or socioeconomic class may have impacted your goals for mentoring (whether you were seeking career guidance or emotional support/role modeling)?

15. How have your mentoring goals impacted your mentoring experiences?

16. Based on your prior mentoring experiences, which mentoring configurations would be ideal for you?

- Pairing of one mentor and one mentee
- Two or more mentees with a mentor
- Two or more mentors with one mentee
- Two mentors and three mentees
- Mentorship network for one mentee with formal mentor(s) and informal mentor (s)
- Another mentoring configuration _____

17. Is there anything else you would like to add?

APPENDIX C: Codebook

Code	Description	Example
Choice of Mentor	This code describes how demographic characteristics (including but not limited to race, gender, and household income) impact explicit choice of mentor	“A lot of those people were women in leadership. And so, I definitely identified them as mentors over other people, because um, and I think they were also more likely to want to mentor me, because they were like "Oh, another woman who is interested in following like similar footsteps that I have done.”
Emotional Support	This code describes the emotional support mentees received from their mentors or mentions of psychological guidance	“I think it was just I'd always sort of had it in the back of my mind that I would try it, but just sorta giving me the confidence to be, like, well, it may not work out, but also it might, and then you would get what you wanted. So, you (laughing) should at least try and see if it does.”
Ideal Configuration	This code describes the mentoring configurations would prefer after their mentoring experiences	“I guess I would say having as many mentors for one person possible, as many as you can have is probably a good idea. I would say that having meaningful mentorships would be more important than just having a number of mentorships. So I would say having five mentors or less, but within, you know, maybe different aspects of medicine or if you like, you know, wanna own

		your own private practice, having a mentor within business so you can understand how that works and how having a business might run.”
Mentor Availability	This code explains how hard it was for mentees to find a mentor prior to entering medical school	“I would say for the formal experience, it wasn't that hard. Um, I think it helped living in Raleigh and having like the university nearby and being a student and everything. It was pretty easy to, to find an opportunity where they were looking for students to do lab work and stuff like that, so, that was pretty easy. Finding the mentors to do like shadowing with was a lot harder.”
Mentoring Dislikes	This code describes what mentees disliked about their mentoring experiences	“When mentorships have not worked out, communication has usually then the biggest um, issue. Uh, whether it's my not communicating with them or them not communicating with me or um, or differing expectations.”
Career Guidance	This code corresponds to ideas of mentors helping in various ways with advancement in career (example: reading applications)	“They really were honest with me of what they knew about medicine, um, they work with a lot of medical professionals so they have an idea of what that looks like, and I think they were very clear to me of what my expectations should be out of my own career.”

Mentoring Likes	This code describes what mentees liked about their mentoring experiences	“She was very like compassionate but also like willing to um, to talk at any point. She had to make difficult decisions and also like priority- prioritized everyone at the clinic while also like prioritizing herself. Like doing both.”
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APPENDIX D: IRB Approval



EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
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600 Moye Boulevard · Greenville, NC 27834
Office 252-744-2914 · Fax 252-744-2284
rede.ecu.edu/umcirb/

Notification of Amendment Approval

From: Social/Behavioral IRB
To: [Heather Vance Chalcraft](#)
CC:
Date: 2/4/2021
Re: [Ame4_UMCIRB 20-001704](#)
[UMCIRB 20-001704](#)
How are Mentoring Experiences, Preferences and Perceived Benefits Influenced by Mentoring Goals and Demographic Characteristics?

Your Amendment has been reviewed and approved using expedited review on 2/4/2021. It was the determination of the UMCIRB Chairperson (or designee) that this revision does not impact the overall risk/benefit ratio of the study and is appropriate for the population and procedures proposed.

Please note that any further changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must adhere to all reporting requirements for this study.

If applicable, approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Document	Description
There are no items to display	

For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

