Stereotype Threat: A Real Threat For Underrepresented Minorities In Medical School?

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Abstract

Stereotype threat was measured in 167 racial/ethnic minority and majority pre-medical students from all four undergraduate years at Georgetown University, using a modified survey by Henry (2006). Three main scales were created to assess perceived threats for pre-medical students concerning gender discrimination, racial/ethnic discrimination, and non-racial/ethnic discrimination. Analyses revealed significant interactions between gender, race, and year in university regarding gender discrimination and racial/ethnic discrimination. Overall, females expected significantly more gender–related barriers than males in their future medical careers. Similarly, all minorities, including Asian Americans, who are not considered to be underrepresented in U.S. medical schools, reported perceiving significantly more race-related barriers than their European American counterparts. Further, European American male Juniors reported expecting more race-related threats than European American male Freshmen. Analyses revealed no significant results regarding the stereotype threat condition. Results are discussed with reference to the literature on stereotype threat and medical-related education in the U.S.
Stereotype Threat: A Real Threat For Underrepresented Minorities In Medical School?

According to the Association of American Medical Colleges (AAMC), in 2007, 59.9% of medical school matriculants were White while 14.1% were underrepresented minorities, including Hispanic or Latino, Black or African American, American Indian and Alaska Native, and Native Hawaiian and Other Pacific Islander (Castillo, 2008). In contrast, in this same year, Asians constituted 19.9% of medical school students in the United States (Castillo, 2008). More generally, in 2007, underrepresented minorities (Black, Hispanic, and Native American) were reported to make up 6% of the physician workforce and 14% of total medical school graduates (Rumala & Cason 2007). These percentages are startlingly low considering that the percentage of these underrepresented minorities in the general population of the United States in 2007 was approximately 30% (Rumala & Cason 2007).

Many different factors have been examined to identify why these minority segments of society are not equally represented in the medical field. One important factor found to be correlated with medical education is socioeconomic status. As described by the AAMC, there is “a possible skewing in the medical student population toward children of upper-income families” (Grbic, Garrison & Jolly, 2010). Considering the high costs of U.S. medical schools, it is very possible that many people in a low-income family do not even contemplate the possibility of attending medical school. For the academic year of 2010-2011, the average cost of one year in a public medical school for a state resident was estimated to be $27,005 and $48,710 for a non-resident; the average cost of a private medical school for a resident is $44,591 and for a non-resident, $45,893 (AAMC, 2011). Thus, the possibility of being deeply indebted after medical school is extremely high and many members of underrepresented minority groups cannot afford
to carry such a large debt. With medical education costing so much, only a very small percentage of the population can aspire to become a physician, causing significant racial disparities in the field.

Another factor associated with low socioeconomic status and related difficulties faced by underrepresented minority groups attending medical school is parental education. According to the AAMC, there is a significant difference in parental education between students who attend medical school and those who do not. “Most medical students are children of parents with high levels of education. For example, roughly one-half of medical students’ fathers have a graduate degree compared with 12 percent of the weighted sample of men in the U.S. population. Similarly, roughly one-third of medical students’ mothers have a graduate degree compared with roughly 10 percent of U.S. women” (Grbic, Garrison & Jolly, 2010). Overall, parents of medical students are much more likely to have higher levels of education, including graduate education, than are the parents of non-medical students. Similarly, there are great disparities between the parental educational profiles of various racial and ethnic groups in the United States. For example, levels of education of the parents of African American and Latino medical students are significantly lower than those of Asians or Whites (Grbic, Garrison & Jolly, 2010). Since “social scientists have long agreed that socioeconomic status background comprises three main elements – parental income, education, and occupation” (Grbic, Garrison & Jolly, 2010) it can be implied that many of the underrepresented minority students who attend medical school and whose parents have high levels of education do not represent a low economic sector of society. Thus, these data suggest that even though there are a certain number of underrepresented minority students attending medical schools, it is likely that they come from families of higher socioeconomic backgrounds. Hence, there is still a very large segment of the population,
underrepresented minorities of low socioeconomic backgrounds, that has extremely limited access to medical education.

Because members of these groups have a relatively low chance of entering medical school, there is a general lack of knowledge about medical education amongst underrepresented minorities. Medical schools are not entirely responsible for increasing the percentages of underrepresented minority matriculants since students first have to select the institutions in order to be considered (Carlisle, Gardner & Liu, 1998). Thus, it is imperative that students from underrepresented racial and ethnic groups hold the belief that attending medical school is a feasible option for them. Taking this into consideration, one of the goals of the University of Toledo College of Medicine (UTCOM) along with the Student National Medical Association (SNMA) was to recruit more underrepresented minorities according to the stipulations mandated by the AAMC in 2006, wherein all medical schools had to increase their class size by 30%, including an increase in minority matriculants (Rumala & Cason, 2007). The UTCOM focused on recruiting minorities by means of formally involving minority medical student organization such as the SNMA in the recruitment process. The role of this organization at the UTCOM was centered on contacting students from underrepresented minority groups and having them participate in activities targeted specifically for minority students at the medical school. According to the members of UTCOM that were involved in this initiative, the students who were recruited greatly valued the presence of other minority students and faculty on campus (Rumala & Cason, 2007). Nevertheless, these numbers are also significantly low across the United States as the percentage of minority faculty members in medical schools is 7.5% (Castillo, 2008). Thus, it follows that a larger minority presence across medical schools, including both students and faculty members, would greatly improve the recruitment of
underrepresented minorities. This initiative also suggests that to have a greater number of underrepresented minority members matriculated in medical schools, it is of great importance to begin recruiting efforts before students start the process of applying to medical school. Not only do a small percentage of minorities actually enroll in medical school, but also, a small percentage of the applicants are minorities. According to AAMC, in 2007, 15.2% of applicants were underrepresented minority students, 19.8% were Asian, and 57% were White (Castillo, 2008). Thus, the problem does not lie solely in the fact that members of underrepresented minorities have on average lower GPA’s and lower MCAT scores and are thus accepted into medical programs at a lower rate than that of majority students, but also, that there is a lower percentage of these minorities applying to medical school in the first place (Johnson, 1998).

Taking all of the above into consideration, the purpose of the present study was to investigate some of the possible causes of the low number of minority students applying to and enrolling in medical schools. One factor that might dissuade many members of underrepresented minorities from attempting to apply to medical school, or might influence their underperformance before and during their medical education, is stereotype threat. Claude Steele defines stereotype threat in the following paragraph:

“The theory assumes that sustained school success requires identification with school and its subdomains; that societal pressures on these groups (e.g., economic disadvantage, gender roles) can frustrate this identification; and that in school domains where these groups are negatively stereotyped, those who have become domain identified face the further barrier of stereotype threat, the threat that others' judgments or their own actions will negatively stereotype them in the domain” (Steele, 1997).
Since Steele’s original research on stereotype threat, many studies have examined this phenomenon to further understand its components and find ways to eliminate it. For example, Schmader (2010) has pointed out that people who encounter stereotype threat have a sense of uncertainty about their abilities in the domain that they are interested in and because of their wishes to excel in this domain they expend extra energy trying to avoid confirming these stereotypes. When completing tasks related to their field of interest “this increased vigilance and control hijacks the same central executive processor (i.e., working memory) needed to excel on complex cognitive tasks, producing the very result—poorer performance—that they are trying to avoid” (Schmader, 2010). Thus, heightened anxiety levels for these groups of people who wish to overcome negative stereotypes hinder their performance as their working memory is compromised. Impoverished results are more likely to ensue as the person’s full capacities are diverted from the task at hand. Interestingly enough, as Schmader (2010) indicates, “it is ironic that the individuals most susceptible to stereotype threat are those who are most invested in doing well in that domain”; those that invest the most energy in trying to prove the negative stereotypes wrong are the ones that are more likely to experience an impoverished performance and feelings of inferiority when comparing themselves to stereotypically superior groups (Schmader, 2010). This finding has been supported by Schmader’s studies in which the minority students who had been identified as those with the most interest in succeeding in a specific field had higher error-related negativity (ERN) amplitudes when told their intelligence was being assessed. ERN “is thought to index activation of the anterior cingulate cortex, a region of the brain involved in detecting when one’s behavior conflicts with goals” (Schmader, 2010). Physiological evidence of this sort confirms that when the most susceptible individuals are exposed to stereotype threat their performance skills are compromised as a result of these
cognitive processes. In the medical field stereotype threat would apply to underrepresented minority students who identify with the profession yet fear to confirm negative stereotypes about their racial/ethnic groups.

Thus, it is possible that because of the existing prejudices surrounding the medical field, many minority students feel threatened and in fact do not think they can perform as well as the dominant, majority group. According to Beagan (2003), racism is still very present in both medical schools and later on amongst medical professionals in North America. In her study, Beagan (2003) found that the greatest form of racism present in medical institutions is that of “everyday racism.” As defined by Essed (1991), this form of racism consists of “practices that infiltrate everyday life and become part of what is seen as ‘normal’ by the dominant group.” In the case of the Canadian medical school where Beagan’s (2003) study was conducted, these subtle forms of racism consisted of denying the importance of race, marginalization and lack of support for the underrepresented minority students, as well as a general tolerance for racist incidents. Clearly, although some underrepresented minorities do attend medical schools, the environment is not inviting for many of them as there is a very marked stereotype of “what patients expect to see” with regards to their doctor (Beagan, 2003). Moreover, many European American students do not realize the advantage they have over minority students as “their whiteness grants them a kind of automatic status while other students have to earn the status of doctor” (Beagan, 2003). Thus, in consideration of all these factors, the present study attempts to identify the role of stereotype threat among undergraduate students who are following a pre-medical path. This represents one of the few examinations of the role of stereotype threat in the early stages of minority students’ medical education.
The present investigation explored several potential barriers for students in a pre-medical setting who are interested in going to medical school. The main aspects of potential discrimination were racial/ethnic background and gender. Nevertheless, the instrument used in this study measured other possible barriers that were not directly associated with either of these categorizations. Additional potential barriers included low socioeconomic status, lack of social or academic support, and academic difficulties, amongst others. It was anticipated that underrepresented minority premedical students in a highly competitive setting such as Georgetown University would be affected by stereotype threat as they are expected to be highly identified with the medical field and the stereotypes that are associated with it. Thus, if stereotype threat is a deterrent to applying to medical school or a possible contributor to underperformance in these students, it is likely that it could be measured in this selected group.

More specifically, it was hypothesized that: 1) Underrepresented minority students exposed to stereotype threat would expect more barriers in their future medical careers than their minority counterparts, not exposed to such threat. 2) Underrepresented minority students would expect more barriers in their future medical careers than their majority counterparts, especially regarding issues related to racial/ethnic discrimination. If these students had preconceived notions of their racial/ethnic group not being able to perform as well as those of the majority group, it was expected that underrepresented minorities would anticipate more barriers that would interfere with their success as well. 3) Similarly, it was expected that Asian American students, being overrepresented in medical school, would expect an equal amount of racial/ethnic barriers in their future medical careers as their majority peers. 4) Considering that both genders are fairly equally represented in medical schools, it was hypothesized that males and females
would not expect significant differences in barriers to their future medical careers (Rumala & Cason, 2007).

Method

Participants

Participants for this study, both minority and majority students, were recruited from the total number of undergraduate pre-medical students at Georgetown University. The study consisted of a total of 167 students. The majority of the participants were female, 118, (70.7%) while 49 were male (29.3%). The mean age was 19.40 years. The study was intended to have roughly the same number of underrepresented minority students as majority students. However, because of the disparity in representation of these two groups in the university, there were significantly less underrepresented minority than majority students who participated in the study. As expected, the majority of the students who participated were European American (66.5%). Additionally, there were 12 African American students (7.2%), 9 Latino students (5.4%), 15 Asian American students (9%), and 20 students who classified themselves as “Other” (12%). There were no Native American or Pacific Islander students who participated in the study. Regarding country of origin, 147 participants responded that they were born in the United States while 20 said they were born elsewhere. Out of the four undergraduate classes, there were 72 Freshmen (43.1%), 40 Sophomores (24.0%), 25 Juniors (15.0%), and 30 Seniors (18.0%) who participated.

When measuring levels of parental education there was a significant skew in the results. On a scale from 1-5 (1=Some high school, 2=Graduated high school, 3=Some college, 4=Graduated college, 5=Graduate degree) most parents, both fathers and mothers, had high levels of education. For the participants’ father’s highest level of education, the mean was 4.34;
105 fathers (62.87%) had obtained a graduate degree, 32 (19.16%) had graduated college, 16 (9.58%) had some college education, 10 (5.99%) had graduated high school, and 4 (2.40%) had some high school education. Similarly, for the participants’ mother’s highest level of education, the average was slightly lower, 4.19; 79 mothers (47.31%) had a graduate degree, 54 (32.34%) had graduated college, 22 (13.17%) had some college education, 11 (6.59%) graduated high school, and 1 (.59%) had some high school education.

When comparing parental education, there were significant differences amongst some of the ethnic/racial groups. A Scheffe post-hoc test determined that the father’s highest level of education differed significantly between European American and African American student groups. The mean level of education of European American students’ fathers was 4.47 while that for African American students was 3.25. All other groups, Latino (3.89), Asian American (4.00), and Other (4.75) were not statistically different from each other or from the European American group.

On the other hand, Mother’s highest level of education did not differ significantly amongst racial/ethnic groups. The mean level of maternal education for European American students was 4.21, for African American students 4.08, for Latino 4.00, for Asian American 3.80, and for Other, 4.55.

Materials

The demographic survey consisted of basic questions asking the participants’ racial/ethnic background, gender, age, year in college, parental education, an indirect indicator of socioeconomic background, number of physicians in family, and years of interest in the medical career. (see Table 1).
The main survey that was used in this study was a modified version of an instrument constructed by Henry (2006) in his investigation of educational and career barriers in the medical field for underrepresented minorities. The original purpose of the instrument was to measure the different challenges that could pose a threat to undergraduate pre-medical students applying to medical school. The items were measured on a numerical scale of 0-2 (possible answers: No/Not Sure/Yes). Some of the possible challenges measured in the survey related to socioeconomic status, gender, lack of ability, and lack of acceptability or social support, amongst others. The main purpose of the modified survey used in this study nevertheless was to try to find the effects of racial/ethnic threats for underrepresented minorities. The full survey is presented in Table 2.

Procedure

By means of Henry’s (2006) modified survey it was possible to measure the perceived barriers students felt existed for them in their medical careers. To further identify the role played by stereotype threat on undergraduate students’ perceptions of the barriers to medical success, an experimental and a control group of participants were created. At the beginning of the survey the experimental group was given the following informational paragraphs which were modified from data obtained from The National Center for Fair and Open Testing (2007) and the Association of American Medical Colleges (2010):

“Substantial score differences between Whites and students of color lead to an underrepresentation of minorities in medical school when GPA and MCAT scores play a large role in admissions. In states where affirmative action programs have been eliminated, the numbers of students from historically underrepresented groups in medical school have plunged dramatically. In 1997 the number of African Americans, Latinos, and Native Americans accepted to publicly-supported medical schools in California,
Texas, Mississippi, and Louisiana (all states that eliminated affirmative action for the first time that year) dropped by 27%.

In 2010, the underrepresentation of minority groups due to substantially lower GPA’s and MCAT scores of minority students was further confirmed as 8.25% of matriculants were Hispanic or Latino, 6.29% were Black or African American, 0.27% were American Indian or Alaskan Native, and 0.13% were Native Hawaiian or Other Pacific Islander. In contrast to such low numbers, due to significantly higher MCAT scores and GPA’s, 20.42% of matriculants were Asian, and 57.14% were White.”

The purpose of this information was to present a tangible reminder of common stereotypes about the difficulties in achieving success in the medical career for ethnic minorities. Since minority students are underrepresented in medical schools and also tend to have lower MCAT scores and GPA’s, stereotype threat should become more salient for members of this group. Thus, it was expected that underrepresented minority students who were vulnerable to stereotype threat should have an increased awareness of the barriers to their success in the medical field when exposed to this information.

After obtaining a complete list of all premedical students, participants were divided into two groups according to their year in the university. This was done primarily to create a balance in the age of the participants since “through long exposure to negative stereotypes about their group, members of prejudiced-against groups often internalize the stereotypes, and the resulting sense of inadequacy becomes part of their personality” (Steele, 1997). Sophomores and Seniors received the stereotype informational paragraphs, thus forming the experimental group; Freshmen and Juniors only received the survey without the stereotype threat paragraphs, thus forming the control group. The latter group of participants was thus responding to the survey
according to their own pre-established beliefs regarding their academic success and competency in applying to medical school. There were 69 students in the experimental group and 98 students in the control group. This disparity in group sizes was due primarily to the larger number of Freshmen who participated in the survey.

Once they were divided into the two groups, participants were contacted via their university email by the Pre-Med Program Coordinator to ensure participant confidentiality. The email included general information about the study and one of the two links for each survey (control vs. experimental). The links led to the surveys on surveymonkey.com, which included the informed consent form, the main questionnaire, and general demographic questions. Participation in the study was completely voluntary so completion of the online survey after reading the informed consent form was taken to indicate the participant’s agreement to participate.

Selection was controlled for by randomly recruiting as many pre-medical students as possible. Also, to control for demand characteristics, several questions on the survey addressed unrelated threats to medical education/career success, such as gender and political connections. Also, to further ensure participant blindness to the purpose of the study, the demographics survey was included last. Finally, to guarantee the participants’ privacy, all information was kept confidential so that student responses could in no way be traced back to the participants.

Results

Stereotype Threat Condition

There were no significant differences between the experimental and the control groups in terms of their responses to the survey. Thus there was no significant main effect of the stereotype threat condition.
Racial/Ethnic Background Variables

Two racial/ethnic background variables were created to measure the effects of stereotype threat on the different groups. For the first variable, Ethminvmj, students were divided into underrepresented minorities (African American, Latino, Other) and majority students (European American and Asian American). For the second variable, Allminvwhite, Asian American students were included as a racial/ethnic minority and only European American students were considered to be the majority. This differentiation was made to study perceptions of stereotype threat between underrepresented minorities in medical school and minority students in general when compared to the stereotypical European American majority.

Gender Barriers

In principal axis factor analysis with a varimax rotation (Kaiser normalization) on the 21 items of the survey, the three questions that addressed gender barriers clustered onto 1 factor with item loadings equal to or above .30. This scale had a Cronbach’s alpha for the entire sample of .81. This scale was labeled as Sexdiscrim (See Table 3). A univariate ANOVA was conducted with Sexdiscrim as the dependent variable and gender as the independent variable. The analysis yielded a significant between-subjects main effect of gender on the Sexdiscrim variable, $F(1,166)=73.48, p<.001$. Females ($M=1.12, SD=.66$) were more likely than males ($M=.25, SD=.42$) to perceive gender discrimination.

Racial Barriers

To assess racial discrimination, a principal axis factor analysis was performed with a varimax rotation (Kaiser normalization) on 18 items of the survey. Six questions that addressed racial/ethnic-related barriers clustered onto 1 factor with item loadings equal to or above .30. This scale had a Cronbach’s alpha for the entire sample of .79. (See Table 3)
After conducting a univariate ANOVA with the racial discrimination scale as the dependent variable and race and gender as the independent variables, several significant between-subject effects emerged. There was a main effect of race, as measured by the variable Ethminvmj, which distinguished underrepresented minority students (African American, Latino, Other) from majority students (European American and Asian American); \( F(1,166)=5.20, p<.05 \).

There was also a main effect of gender, \( F(1,166)=8.31, p<.005 \). Additionally, results showed a two-way interaction between gender and Ethminvmj, \( F(1,166)=14.09, p<.001 \). Follow-up analyses revealed that female minority students (\( M = .94, SD = .58 \)) were more likely to expect to be discriminated against in medical school than were their majority peers (\( M = .36, SD = .43 \)), \( F(1,117)=34.97, p<.001 \). (See Figure 2)

Regarding the other race-related variable that was created in which all minorities, including Asian Americans, were grouped together and contrasted to the European American majority, a univariate ANOVA was conducted with this new racial discrimination scale as the dependent variable and race and gender as the independent variables. A significant main effect of ethnicity emerged, \( F(1,166)=8.54, p<.005 \). There was also a two-way interaction between gender and Allminvwhite, \( F(1,166)=21.96, p<.001 \), and a three-way interaction between gender, Allminvwhite, and year in college when considering the Racediscim variable, \( F(1,166)=3.88, p<.05 \). (See Figure 3). Detailed analysis of the latter interaction showed that, among European American males, there was a significant difference between Freshmen and Juniors on perceived racial/ethnic barriers \( F(3,34)=3.42, p<.05 \). Specifically, European American male Freshmen (\( M = .24, SD = .26 \)) expected to be less discriminated against because of their race than European American male Juniors (\( M = .93, SD = .86 \)).
In terms of individual races/ethnicities, there were also significant differences in perceived racial barriers as measured by $Racediscrim$, $F(4,162)=3.17, p<.001$. The means in the $Racediscrim$ scale for each race were: European American .30 ($SD=.37$), African American 1.06 ($SD=.73$), Latino .91 ($SD=.47$), Asian American .96 ($SD=.53$), and Other .53 ($SD=.60$). (See Figure 1). Sheffe post-hoc tests revealed that there were significant differences in perceptions of racial discrimination between the European American students and the African American students ($p<.001$), between the European American students and the Latino students ($p<.01$), between European American students and Asian American students ($p<.001$), and between African American students and “Other” students ($p<.05$).

**Non-Racial Barriers**

To measure non-racial barriers another scale, $Nonracebarrier$, was formed. In principal axis factor analysis with a varimax rotation (Kaiser normalization) on 18 items of the survey, seven questions that addressed non-racial/ethnic-related barriers clustered onto 1 factor with item loadings equal to or above .30. This scale had a Cronbach’s alpha for the entire sample of .64. (See Table 3). A univariate ANOVA with the non-racial discrimination scale as the dependent variable and race and gender as the independent variables revealed no significant main effects or interactions.

**Discussion**

The main finding of this study was that, as hypothesized, minority students, including Latino, African American, Asian American, and “Other”, were more likely to expect future racial/ethnic discrimination in their medical-related education and professional work than were their majority European American counterparts. At first, students were divided into two groups, underrepresented minorities (African American, Latino, Other) and majority students (European
American and Asian American) because it was assumed that students whose race is underrepresented in medical schools would be more likely to experience stereotype threat. Even though Asian Americans are a minority, they are not underrepresented in medical schools (Castillo, 2008). Nevertheless, when analyzing the data it was found that, in partial support of hypotheses, there was also a significant difference in the means regarding expectations of race-related barriers in medical school between the European American students and all the minority students, including Asian Americans. Contrary to hypotheses, when the Asian American students were contrasted to only the European American students via a post-hoc test, there were also significant results. This implies that although Asian American students are not underrepresented in medical schools, they still expect more ethnic/racial barriers in their future medical career than do European American students.

These results are consistent with past studies indicating that even though some minorities do attend medical school, they still must face the preconceived notion that the prototypical physician is a White male (Beagan, 2003). As Beagan (2003) notes in her discussion of White physicians, “their whiteness grants them a kind of automatic status while other students have to earn the status of doctor” (Beagan, 2003). Thus, even though percentages of Asian Americans in medical schools, 19.9% in 2007, (Rumala & Cason, 2007) are higher than those of Asian Americans in the general United States population, 4.6% in 2009, (Census, 2010) it seems that members of this minority still believe they will encounter future racial/ethnic barriers in their professional careers as physicians.

As expected, the only group that averaged significantly low scores on expectations of racial/ethnic barriers and thus did not perceive significant stereotype threats were the European American students. Since the current stereotype of what a doctor should be in the United States
is that of a White individual (Beagan, 2003), this study has confirmed that European Americans are less likely to anticipate feelings of discrimination based on their racial/ethnic background in the course of their medical careers.

A three-way interaction between gender, racial/ethnic background, and year in university was also found. One possible explanation for such results is that, with the increasing numbers of underrepresented minority students being accepted to medical schools due to affirmative action, European American male students may in fact feel a perceived threat because of their race. Consistent with previous research about stereotype threat, the longer a group is exposed to a particular stereotype, the more affected its members become over time (Steele, 1997). Thus, it may be that European American male Juniors perceive racial/ethnic barriers in a more salient way than European American male Freshmen because they have been exposed to medical education for a longer period of time and are thus more familiar with its stereotypes. Nevertheless, this relationship between gender, race, and age should be further examined in future research.

Although not a central focus of the present study, analyses revealed a significant main effect of gender on the Sexdiscrim scale. More specifically, females perceived significantly more gender discrimination than males. This result suggests that, even though percentages of male and female medical students are roughly equal, females still seem to feel a stereotype threat regarding gender (Rumala & Cason, 2007). According to the AAMC, “In 2007, of the 16,142 medical school graduates, women comprised nearly 50% of the pool. Over time, women have steadily increased their numbers among medical school graduates. The number of women medical school graduates more than doubled from 3,524 in 1980 to 7,923 in 2007” (Rumala & Cason, 2007). Despite the apparently increasing numbers of women attending and graduating
from medical schools, it seems that the stereotypical image of the White male physician remains predominant (Beagan, 2003).

In analyzing responses regarding racial discrimination, an unexpected interaction was found between gender and ethnic/racial group membership. In particular, underrepresented minority females perceived more threats concerning their race than did majority females (including Asian Americans); there were no significant differences in perceptions of racial discrimination between underrepresented minority and majority males. Similarly, when considering all minority students (including Asian Americans) as compared with European American students, there was also an interaction between gender and race. Similar to the finding discussed above, female minorities perceived more threats concerning their ethnic/racial background than did European American females. Such results indicate that minority females feel particularly vulnerable to stereotype threat due both to their gender as well as their racial/ethnic background.

Considering the differences in perceived stereotype threat between the different races it is important to note that the racial/ethnic group with the highest perceived threat was the African American group. Interestingly, a relationship can be drawn between parental level of education and perceived stereotype threat as African Americans also had the lowest level of paternal education. Even though the level of parental education of the overall sample was high in comparison to national samples, in the present study, the group that perceived the most racial/ethnic threat was the same that had the lowest level of paternal education. Since parental level of education is commonly used as an indicator of socioeconomic status, it is possible that the students whose parents had lower levels of education were in fact from a lower socioeconomic status and would thus encounter more barriers in their future as medical students.
and physicians. Economic difficulties present even more obstacles to students from a lower socioeconomic status as the staggering costs of medical schools seem too high to withstand. As described by the AAMC, “Consistent with previous findings for parental income, our research demonstrates that parents of medical students are more likely to have graduate levels of education and less likely to have no college education” (Grbic, Garrison & Jolly, 2010). Thus, if the fathers of African American students had the lowest levels of education it is more probable that these students will perceive themselves as less likely to be able to attend medical school.

Although there were no significant differences between the control group and the experimental group on stereotype threat, results of this study nevertheless suggest that minority students did have preconceived notions of the possible threats they might encounter in their medical careers, given their racial/ethnic backgrounds. Even though the informative paragraphs presented to the experimental group did not seem to make stereotype threat more salient for these students, based on the results that significantly differentiate minority students from European American students on perceived racial/ethnic threats, there seem to be pre-established stereotypes that differentiate the groups. Thus, even though the paragraph prompt did not appear to be effective in triggering differences in stereotype threat between the experimental and control groups, minority students certainly did perceive significantly more threats to success in their future medical education and careers because of their racial/ethnic backgrounds than did European American students.

Future researchers on this subject should conduct pilot studies that can identify an effective instrument for the introduction of stereotype threat to an experimental group. In this way, a more accurate distinction can be made between the experimental and the control groups. Future research would also greatly benefit from a larger sample. With subgroups of equal or
similar sizes, the study would gain greater statistical power and more valid results could be obtained.

Finally, future studies should also address a number of the issues that have been raised by the significant findings of the present investigation. As discussed by Schmader, “stereotype threat can be undermined fairly readily by changing one’s frame of reference… By teaching students about the theory, we might effectively inoculate them against its effects” (Schmader, 2010). Thus, by informing students about the nature of stereotype threat it might be possible to lessen its negative consequences on those who feel disadvantaged in their future medical careers. Further investigations may lead to concrete and effective ways in which awareness of stereotype threat can be raised so that students of all genders and racial/ethnic backgrounds perceive themselves to be on equal footing when embarking upon their education in the field of medicine.
References


Table 1
Demographic Descriptive Statistics and Means by Ethnic/Racial Background and Year in College

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Father’s Education</th>
<th>Mother’s Education</th>
<th>Physicians in Family</th>
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Table 2

Modified Stereotype Threat Survey (Henry, 2006)

MAIN SURVEY:

In my future job as a physician I will probably experience discrimination because of my ethnic/racial background
Yes_______  No_______  Not Sure_______

If I don’t go to Medical School, it will be because I have money problems
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably experience negative comments about my sex (insults, rude jokes)
Yes_______  No_______  Not Sure_______

If I do go to Medical School I will probably experience pressure to perform academically
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably be treated differently because of my ethnic/racial background
Yes_______  No_______  Not Sure_______

If I don’t go to Medical School, it will be because I don’t fit in
Yes_______  No_______  Not Sure_______

In general, I think that I will be able to overcome any barriers that stand in the way of achieving my career goals.
Yes_______  No_______  Not Sure_______

If I do go to Medical School I will probably experience a lack of social support
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably be treated differently because of my sex
Yes_______  No_______  Not Sure_______

If I don’t go to Medical School, it will be because my GPA is not high enough
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably have a harder time getting hired
Yes_______  No_______  Not Sure_______
If I don’t go to Medical School, it will be because a lack of academic support
Yes_______  No_______  Not Sure_______

In general, I think that there are many barriers that will make it difficult for me to achieve my career goals.
Yes_______  No_______  Not Sure_______

If I do go to Medical School I will probably experience lack of acceptance by some classmates
Yes_______  No_______  Not Sure_______

If I don’t go to medical school, it will be because my MCAT scores are not high enough
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably experience discrimination because of my sex
Yes_______  No_______  Not Sure_______

If I do go to Medical School I will probably experience academic difficulty
Yes_______  No_______  Not Sure_______

If I don’t go to Medical School, it will be because of a lack of knowledge about the medical profession
Yes_______  No_______  Not Sure_______

In my future job as a physician I will probably experience negative comments about my ethnic/racial background.
Yes_______  No_______  Not Sure_______

If I don’t go to Medical School, it will be because of a lack of political connections
Yes_______  No_______  Not Sure_______

If I do go to Medical School I will probably experience pressure to overcome negative stereotypes
Yes_______  No_______  Not Sure_______
DEMOGRAPHICS

Gender: F_______ M ______

Age: ______

Race/Ethnicity:

- European American/White ______
- Hispanic/Latino ______
- African American/Black ______
- Native American ______
- Asian/Asian American ______
- Other ______, If so, which: ______________

Were you born in the United States? Yes ______ No ______

If no, where?________________

Year in College:

- Freshman ______
- Sophomore ______
- Junior ______
- Senior ______
- Post-Baccalaureate: ______

Father’s highest level of education

- Some high school ______
- Graduated high school ______
- Some college ______
- Graduated college ______
- Graduate degree ______
Mother’s highest level of education

- Some high school ______
- Graduated high school ______
- Some college ______
- Graduated college ______
- Graduate degree ______

How many people in family are physicians? ______

How old were you when you decided you wanted to be a physician? ______
Table 3

Scales (*Sexdiscrim*, *Racediscrim*, *Nonracebarrier*)

**Sexdiscrim**

In my future job as a physician I will probably be treated differently because of my sex.

In my future job as a physician I will probably experience negative comments about my sex (insults, rude jokes).

In my future job as a physician I will probably experience discrimination because of my sex.

**Racediscrim**

In my future job as a physician I will probably be treated differently because of my ethnic/racial background

If I do go to Medical School I will probably experience a lack of social support

In my future job as a physician I will probably experience discrimination because of my ethnic/racial background

If I do go to Medical school I will probably experience lack of acceptance by some classmates

In my future job as a physician I will probably experience negative comments about my ethnic/racial background

If I do go to Medical School I will probably experience pressure to overcome negative stereotypes

**Nonracebarrier**

If I don’t go to Medical School, it will be because of a lack of academic support
In my future job as a physician I will probably have a harder time getting hired.

If I don’t go to Medical School, it will be because my GPA is not high enough.

If I don’t go to Medical School, it will be because of a lack of political connections.

In general, I think that I will be able to overcome any barriers that stand in the way of achieving my career goals.

If I don’t go to Medical School, it will be because I don’t fit in.

If I don’t go to Medical School, it will be because of a lack of knowledge about the medical profession.
Figure 1. Main Effect of Racial/Ethnic Background on \textit{Racediscrim}

Figure 2. \textit{Racediscrim} Two-Way Interaction (Gender x Racial/Ethnic Background)
Figure 3. *Racediscrim* Three-Way Interaction (Gender x Racial/Ethnic Background x Year in College)