DO STRESSED FEMALE ROLE MODELS HINDER WOMEN'S INTEREST

IN MALE-DOMINATED DOMAINS?

AN ABSTRACT

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ABSTRACT

The current study is designed to test whether a stressed-out female role model in a male-dominated domain hinders women's career aspirations. Role models have been shown to increase women's career interest in fields where they are underrepresented. This study, however, sought to establish that role model stress in male-dominated domains is threatening to aspirant women's career achievement. Female pre-medical undergraduates read about either a stressed or non-stressed female physician (the role model) who works in either a male-dominated or gender-equal work environment. There were no significant changes on pre-med career interest over time. However, participants reported that their interest in a career in medicine decreased as a result of listening to an interview with a stressed role model. Unexpectedly, participants listening to a stressed role model performed better on an in-lab task. The male-dominated domain did not induce the same threat effects as it has in past studies, but this independent variable was not without consequence as participants in the gender-equal domain condition performed better on a creative thinking exercise. This study demonstrates that stressed-out role models do impact individuals looking up to them, but it may not be enough to deter new aspirants from their intended career paths.

Do Stressed Female Role Models Hinder Women's Interest in Male-Dominated Domains?

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I would like to thank my family for their love and enduring support throughout this process. I also wish to express my sincere gratitude towards my friends for their kind words, helpful advice, and unwavering encouragement.

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hinder women's interest in male-dominated domains?

Despite the fact that there are equal numbers of men and women in the United States, with slightly more women attending college, gender gaps favoring men still exist in salaries, political leadership roles, and top-ranking business positions (Brown, Graf, & Patten, 2019; Brown & Patten, 2017; Proctor, Semega, & Kollar, 2016; United States Department of Labor, 2017). Recent initiatives to close the gender pay gap have focused on encouraging women to enter professional roles historically occupied by men. These roles, where the gender composition skews heavily male, are considered masculine fields or masculine domains. Although many women have demonstrated the early ambition to enter male dominated fields, the desire to pursue and remain in masculine fields is lacking (Frome, Alfred, Eccles, & Barber, 2006; Good, Rattan, & Dweck, 2012; Xu, 2008). Psychological scientists have demonstrated that role models can bolster women's intentions to follow their ambitions in masculine domains (Stout, Dasgupta, Hunsinger, & McManus, 2011). Studies have determined, however, that there are many caveats to an efficacious role model, including the need for similarity, competency, and confidence (Marx & Ko, 2012; Marx, Monroe, Cole, & Gilbert, 2013; Marx & Roman, 2002; Morgenroth, Ryan, & Peters, 2015 for review).

An issue in the role model research that has yet to be explored is the importance of stress and the potential for role models to transmit their stress to others. Subsequently, this may cause disinterest in the career among those looking to the stressed role model for guidance. There is reason to believe that female role models in fields that contain relatively few women face compounded stress in dealing with the challenges of the job,

discrimination in the workforce, finding appropriate work/life balance, and the burden of being the sole, or "token" woman (Kanter, 1977). Stressed role models may exacerbate women's disinterest in entering or advancing in masculine fields. To address an unexamined cause of career disengagement, this study tests the impact of role model stress and gender representation of their field on the interest of college women considering a career in medicine.

Role Models

Role models have been a rich source of study for social psychology. In their most basic form, role models are individuals that someone may or may not know personally, who demonstrate behaviors for a protégé to copy. Even children copy behavior demonstrated by a role model (Bandura, 1965). In more recent literature, role models are often called upon to inspire career development and achievement (Morgenroth, et al., 2015). Although past research has sometimes conflated role models with mentors, a mentor is different than a role model; a mentor has a personal relationship with the aspirant (Gibson, 2004). Mentors often offer positive encouragement and personalized advice, whereas role models may not know the protégés looking up to them (Gibson, 2004).

Although the specific mechanism through which role models are effective has remained somewhat elusive, the motivational theory of role modeling suggests that role models directly influence aspirants' goals (Morgenroth, et al., 2015). By demonstrating successes, role models show protégés how to set goals and meet the milestones necessary to achieve their aspirations. Medical school students and residents will often look to role

models to guide their career, behavior, and moral foundation as doctors (Paice, Heard, & Moss, 2002).

There are lots of factors that affect whether role models are effective. For example, role models should demonstrate behaviors that are well matched to the attitude the protégé has towards goal attainment. Attitudes can range from promotional or preventative and should match the role models' attitude in order to maximize motivation (Lockwood, Jordan, Kunda, & Insko, 2002). An example of a promotional attitude is setting the goal of getting accepted to medical school. A preventative example is setting the goal to not fail the medical board exams. Both goals focus on career milestones, but one focuses on attainment and the other on avoidance.

Similar to the concept of having shared attitudes about goals, being like-minded is another pivotal aspect of the role model relationship. The shared perspective of the role model and protégé are an important factor in enhancing the feeling of belonging. Role models that demonstrate the importance of communal perspectives are more effective and appealing to individuals who value communal work, with the same holding true for role models that showcase the agentic perspective being better suited for agentic-valued individuals (Fuesting & Diekman, 2017).

Female college students, relative to male college students, report being more influenced by role models (Basow & Howe, 1980). Role models are particularly important for influencing young women's career choices. In a large-scale survey of female college students, having a role model was a significant predictor of deciding on a career (Quimby & DeSantis, 2006). Famous female role models were effective at boosting women's performance on a leadership task (Latu, Mast, Lammers, & Bombari,

2013). In Latu and colleagues (2013) leadership research, female and male participants saw a poster of a famous politician, either male or female, and then were asked to give a speech. Speeches given by female participants were better in the condition where participants saw a female politician, demonstrating that even subtle role model manipulations are effective.

Most relevantly, role models have been determined to positively impact the pre-med intentions of women, as well as their attitudes and beliefs regarding pre-med programs. Women exposed to successful female role models report having greater career interest, higher identity compatibility, and increased sense of belonging compared to those without a role model (Rosenthal, Levy, London, Lobel, & Bazile, 2013). This area of research demonstrated the phenomenon that successful role models could have positive effects for female physicians' careers.

Similarly, female role models in science, technology, engineering, and math (STEM) change aspirants' STEM attitudes, identification with STEM, and pursuit of STEM careers (Stout et al., 2011). A review of studies related to role model gender in STEM fields shows that having a female role model is important for retention, but may not be as important for recruitment (Drury, Siy, & Cheryan, 2011). Drury and colleagues (2011) argue that gender similarity matters for keeping women in STEM because they are more concerned with stereotype threat and negative stereotypes about being in a masculine field. A female role model can ease those concerns.

There are many caveats, however, in finding efficacious role models for women. Women, in particular, may need their role models to be female (Lockwood, 2006). Being similar to one's role model is believed to be the mechanism through which many such

relationships are formed. Gender matching of role model to protégé is one way that similarity can be activated. Role model similarity is important because it facilitates the imagining of future aspirations to be like that person (Morgenroth, et al., 2015). People find it hard to relate to role models who are extremely dissimilar; dissimilarities between role model and protégé makes it difficult for the protégé to imagine that she can be successful like the role model. This is especially true when personal group membership is heightened through tokenism (Kanter, 1977). In a group context, if one belongs to an underrepresented group, such as a woman in a predominantly male company, the group membership (of gender) and token status is made salient. In work assessing a corporation with group skew (where ethnic minorities and women were underrepresented), Thomas (1990) discovered that women sought out mentors earlier than men and that ethnic minorities sought out ethnic minorities in other departments for psychosocial support. It was argued that these underrepresented individuals may have suffered from the stress of tokenism and, as a result, sought guidance to ease that stress. This study demonstrates that protégés seek the support of someone who they believe is like them.

Although similarity is both a precursor and preserver of the role model/protégé relationship, it cannot stand alone--role models also need to be successful. In addition, successful role models should also be both relevant and their accomplishments must seem attainable (Lockwood & Kunda, 1997). For example, Hoyt and Simon (2011) found that women in elite leadership positions display unattainable accomplishments that are harmful to participant women's aspirations. Women who viewed high-level female leaders reported lower levels of leadership aspirations than participants in the mid-level leader condition, who presumably saw the role models' leadership accomplishments as

attainable. Women in the high-level female leader condition reported feeling less accomplished and experiencing more difficulty with a lab task, as well as greater feelings of inferiority compared to those viewing male high-level leaders and those in a control condition. In sum, role models are effective so long as they are the right fit.

Masculine Domains

Masculine fields (trades that are stereotyped as jobs for men or industries that have higher compositions of men) are perceived as having higher prestige and status than feminine fields (Glick, Wilk, & Perreault, 1995). This perception ultimately leads to careers in masculine domains paying higher salaries than those in feminine domains do. When jobs are seen as feminine, salary has shown to be lower than when they are seen as masculine (Alksnis, Desmarais, & Curtis, 2008). In addition to the perception that masculine equals greater prestige, there are data that show that as occupations become more feminine, pay decreases (Levanon, England, & Allison, 2009; Reskin & Roos, 1990). The higher value placed on "jobs for men" should make everyone flock to those jobs, careers, and trades. Women, however, sometimes struggle within masculine domains because of the worry that they will not perform well due to their gender. In the field of psychology, this is known as stereotype threat and is defined by Steele and Aronson (1995) as "being at risk of confirming, as self-characteristic, a negative stereotype about one's group." Women may feel especially threatened in masculine domains because 1) their gender is salient and 2) they are concerned with the negative stereotypes about their gender.

One experiment by Murphy, Steele, and Gross (2007) was able to show the stereotype threat effects by manipulating the gender concentration in a promotional video

for a supposed science conference, where participants either saw attendees as being mostly men or equal genders represented. Women reported a lower sense of belonging in science and less desire to attend the conference when viewing a high concentration of men at the conference. In addition, women experienced a physiological stress response in the male-dominated condition evinced by elevated heart rate and sweating (measured through skin conductance). They also displayed the stress response of hyper-vigilance by accurately remembering more details about the promotional video compared to those in the gender-balanced condition. This study demonstrates that gender segregation cues can elicit a threat response in women.

Role Models Within Masculine Domains

Role models can be especially useful to women pursuing careers in masculine domains because they buffer stereotype threat (Marx & Roman, 2002). STEM fields are considered masculine because of the numeric gender representation of being predominantly male as well as the stereotypes of these fields as being suited for men. Within STEM disciplines, female role models can improve women's academic success and persistence in courses where they are numerically underrepresented (Hermann, et al., 2016). STEM role models had positive effects for both STEM and non-STEM college students by challenging stereotypes, increasing STEM interest, and boosting belonging in STEM (Shin, Levy, & London, 2016). Even younger students are positively impacted by female STEM role models. Middle school girls showed increased science identification after writing about a female science workshop leader (O'Brien, et al., 2017). Role models in STEM that are the most efficacious at buffering stereotype threat are similar (Marx & Ko, 2012) and confident (Marx et al., 2013). Doubtful role models heighten and

emphasize aspirants' own doubts about their abilities. Presumably, if role models are not confident, they may be confirming negative stereotypes about women and about women's efficacy in a masculine domain.

Not only can role models deter adults from future career aspirations, but role models can also deter high school students from entering masculine STEM fields. In a study that sent ninth grade girls to interact with female STEM role models at their job, findings revealed negative outcomes on girls' perceptions of female scientists, self-efficacy in STEM, and desire to pursue a STEM career (Bamberger, 2014). These findings were opposite of the researchers' predictions, who hypothesized based on past research that female STEM role models should be effective at inspiring girls to pursue STEM careers. The discrepancy between role models in lab studies whose flaws can be carefully controlled or eliminated and real life role models may be that people convey the stress of being in their position and this stress may act as a deterrent for someone considering similar career aspirations. The research so far has demonstrated that effective role models for women in masculine domains should be confident, competent, similar, have achieved comparable goals, and take similar perspectives. There is plenty of research that lays the groundwork on the "dos and don'ts" of being a role model in a masculine domain. Even though countless studies have shown career stress is a real-life phenomenon, no known studies have examined the effects a stressed role model has on women with similar career aspirations.

Role Model Stress

Stress is known to impact both cognition and behavior (Lazarus & Folkman, 1984). Stress is defined as "negative emotional experience accompanied by biochemical,

physiological, and behavioral changes directed toward adaptation either by manipulating the situation to alter the stressor or by accommodating its effects" (Baum, 1990). Women, no matter what field they are in, tackle a variety of different stressors. Women in medicine may be particularly vulnerable to stress. Female doctors face occupational stress and work-life balance demands that can lead to burnout. A large-scale study of physicians revealed that women were over one and a half times more likely to experience burnout than men (McMurray et al., 2000). Since doctors in general face a great amount of stress (McMurray et al., 2000), it is not presumptuous to suppose that overtaxed doctors are either unavailable to serve as role models or serve as poor role models to medical students and newer doctors. Residents and new doctors feel that there are a lack of available role models (Paice et al., 2002). If people within the medical community are having a hard time finding role models, some of the only ones available to them may be stressed ones. The effects of the stressed role models are worth examining.

The stress of role models in high-level jobs has been shown to impact those in lower level positions. For example, senior-level female managers who are stressed and unable to balance career and family deter middle-level managers from aspiring to higher positions (Cross, Linehan, & Murphy, 2017). For middle-level managers, there was a lack of female role models in senior-level positions at all three of the companies surveyed. Of the female role models that were available, they embodied negative role modeling, highlighting that family life and career achievement were incompatible, which ultimately lead to stress. Most importantly, some middle-level managers reported that as a result of viewing negative female role models, they had turned down promotions or tempered their career aspirations. This is an example of people accurately spotting the

stress of role models and altering their behavior and career intentions as a result. This field study showed role model stress is harmful to the aspirants of the protégé. The study's qualitative nature, however, made it unable to rule out other possible confounds for the explanation as to why mid-level female managers were not inspired to rise in rank. The authors did not test whether the communicable stress was unique to environments where men make up the majority of high-level managers. Thus, the study was only able to speculate on what types of changes could be implemented to improve the outcomes of female employees. An experimental study that could isolate the variables of stress and gendered environment could shed light on whether these factors are leading to a dampening of career interest and ambition among women.

Not only is the stress of others easily identifiable, but it is also communicable. In a recent study, participants showed increase cortisol response when witnessing someone else's stress (Engert, Plessow, Miller, Kirschbaum, & Singer, 2014). Observers in this study had knowledge that their partner would undergo a stressful situation. Physiological responses were particularly strong when the observer and the person under stress were emotionally close. Another study showed that stress experienced by a mother was contagious to her infant who experienced similar physiological responses without directly experiencing the stressor (Waters, West, & Mendes, 2014). Extrapolating from the findings of these studies, there is reason to believe that the familiarity between an individual and their role model would be conducive to the reciprocal stress model.

Emerging work in physiology has shown that humans have strong empathetic reactions to witnessing others' stress (White & Buchanan, 2016 for review). Put simply, witnessing stress causes stress. From early models on stress and coping, we know that

one determines available options and resources for dealing with stress through the process known as secondary appraisal (Folkman, Lazarus, Gruen, & DeLongis, 1986). Those who are concerned about a role model's stressful behavior will use secondary appraisal options available to them. Some logical options would be to either disengage with the role model by making an attribution to the person rather than the situation or to avoid the career of the role model. If there are not enough role models available to allow for the selection of an alternative role model career disinterest should result.

Research Design & Overview

The present research attempts to understand why women might not be persevering in male dominated fields even when female role models are available. Specifically, this experiment investigated whether witnessing a stressed role model can have negative impacts on the career aspirations of women in male-dominated fields. Participants were exposed to a female doctor role model who was either non-stressed or stressed (see Appendix A & B for non-stressed and stressed manipulation) and occupied a male-dominated or gender-equal work environment (see Appendix C & D for male-dominated and gender-equal domain manipulation). Of precise concern was how participants would rate their pre-med career interest. Immediately following role model exposure, participants were instructed to build a DNA model (see Appendix E for an image of the DNA model) purportedly designed by the role model. In actuality, this was a measure of performance in either a gender-equal or masculine domain. Next the participants completed the 'Alternative Uses' brainstorming task (Guilford, 1967; see Appendix F for instructions), which was used to assess creativity. After building the DNA model and completing the Alternative Uses brainstorming task, participants answered survey

questions regarding their performance in the lab, their intended career interest in pre-med, and perceptions of the role model, among other related items.

It was predicted that the stress of the role model would negatively impact the pre-med career interest and the behavioral tasks of participants when the role model was in a male dominated setting (i.e., whereas model stress level should have nominal impact in a gender equal environment, high model stress should be detrimental in a masculine environment). As male dominated settings have fewer female role models overall, reading about a stressed role model should result in women participants shying away from a career in medicine due to both the stress of the role model and the perceived lack of alternative female role models for participants to look up to. When gender representation is more balanced (i.e., equal gender domain), the stress of the role model should have little effect on the participant's career interest or performance, as there are perceived alternative female role models.

Method

Participants

Tulane University students who identified as female and indicated an interest in the pre-medical professions track on a prescreening survey were recruited for a laboratory study resulting in 173 participants (77% White). Most participants were freshman (57.7%), followed by sophomores (17.7%), juniors (13.1%), seniors (8.6%), and finally 5th years and beyond (1.8%). Participants received either extra credit through their Psychology course or $10 cash. Using Erdfelder, Faul, and Buchner's (1996) G*Power analysis program, a power analysis demonstrated that for a 2 (gender representation) X 2 (role model stress) analysis of variance (ANOVA) with a numerator degrees of freedom

of one, four groups, an alpha of .05 and a desired power level of .90, a sample of 171 participants was needed to be able to detect an *f* effect size of at least 0.25. This is based on trying to achieve a medium effect size (Richard, Bond, & Stokes-Zoota, 2003). This same G*Power program indicated that 252 participants would have been needed to detect an effect size of at least 0.20 for the three-way mixed model with the repeated measure of time (so this 3-way analysis of variance should be interpreted with caution).

Self-Report Measures

Pre-Med Career Interest. Participants answered a measure of career interest that was a composite scale created from single items that originally appeared in the Rosenthal and colleagues (2013) study on the impact of role models on pre-med students (see Appendix G for all items). These questions appeared during the prescreening survey and during the in-lab survey. Career interest measured participants' interest in continuing the pre-med track, their feelings of excitement about a career as a physician, the pre-med track, and their compatibility with pre-med. These four items were on a seven-point scale ranging from 1 (Not at all) to 7 (Very). Although this was a new measure, the scale demonstrated strong internal consistency at both prescreen (α=.97) and in-lab (α=.96) sessions. [1]

DNA Task: Self-Assessment. Interest in the DNA task was assessed by asking participants to describe their level of difficulty and enjoyment of the task, as well as whether they believed the task was effective (see Appendix H for all details). These three

[1] An additional question, "How do you feel about a career as a physician," was used in lab but not at prescreening (since not all participants taking the survey were pre-med); this item was not included in the 4-item scale. There also was an error during pre-screening in which some items appeared on a scale from 1 to 10, so responses to this scale at both timepoints were standardized. Finally, the question using a Venn diagram response format was inadvertently asked twice during the in-lab study and so the two responses were averaged together.

items appeared on a 1 to 7 scale with the first item reverse scored. This was the first time this scale was used; it did not demonstrate high reliability (α=.49).

Alternative Uses: Self-Assessment. In order to gage whether participants found the Alternative Uses brainstorming task to be challenging or anxiety provoking, we used a modified version of Hoyt and Simon's (2011) *Task Performance* scale. The original scale ranges from -3 (*Strongly Disagree*) to 3 (*Strongly Agree*) but as can be seen in Appendix I, the scale in the current sample was changed to a 1-7 in order to be more consistent with the other scales used in the present study. In Hoyt and Simon (2011), the first two questions were treated separate from the other six items that assessed task engagement because they were framed positively, but in this study, all these items were combined and the first two items were reverse scored. This scale in the current study showed good reliability (α=.90). Using the last six items in the former study also would have given acceptable reliability (α=.95).

Role Model Identification. The questions assessing how much participants identified with the role model whom they read about were adapted from Dasgupta and Asgari (2004). The questions asked participants about the success of the role model, their admiration for her, whether they would be able to achieve her same level of success, and whether women in general would be capable of achieving this success. These four items were on a 1 (Not at All) to 11 (Very) scale (see Appendix J for details). In the present study, the items were combined into a composite scale (α=.47).

Role Model Perception. Participants responded to six questions assessing their perception of the role model on a 1 (Not at All) to 10 (Completely) scale (see Appendix K for details). These comprised items about how similar, inspiring, likable, relevant, and

competent the role model was, as well as whether the participant believed she could accomplish as much as the role model. These items were created for this study based on face validity and were averaged into a single scale (α=.72).

Role Model Impact on Pre-Med Career Interest. The role model's impact was assessed with two questions on a seven-point scale that were created based on face validity (Appendix L). These two items are distinct from the aforementioned scale assessing general pre-med career interest because they specifically ask how listening to the role model made the participant feel about her choice of a pre-med track and a career in medicine. The two questions were: "How did hearing Sarah Brookheart's interview make you feel about your pre-med track?" and "How did hearing Sarah Brookheart's interview make you feel about a potential career in medicine?" Participants responded on a 1 to 7 scale, with higher numbers indicating greater excitement and interest (α=.91).

Sense of Belonging in Pre-Med. This measure assessed the extent to which undergraduate students felt that they belonged in a pre-medical track (see Appendix M for details). This scale exactly replicates the one used in Rosenthal and colleagues (2013) to test for belonging in pre-med (α=.84). It has been used with underrepresented groups (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002) as well as being used frequently for women in STEM (London, Rosenthal, Levy, & Lobel, 2011.; Rosenthal, London, Levy, & Lobel, 2011). This scale contains eight statements on a 10-point scale, ranging from 1 (Disagree) to 10 (Completely Agree). Sample questions include such things as, "I feel like I fit in the pre-med track," and "I feel comfortable in the pre-med track." The current sample demonstrated good reliability (α=.81).

Procedure

Female students with an interest in the pre-med track were recruited to take part in the study based on their average score above the midpoint (5 or above) on the prescreening pre-med career interest measure (Appendix G). Students that agreed to participate were conducted individually through the study. After obtaining consent, an experimenter read a script that told the participants that the purpose of the study was to test whether a fun interactive task can boost creative thinking. The overview of the study first was explained by the experimenter, then Qualtrics also gave written instructions to participants as they progressed through the study. The study took participants approximately one hour to complete and utilized Qualtrics to randomize which article appeared and which interview was played so that experimenters could remain blind to condition. The experimenter only interacted with the participant at the beginning and end of the study. The experimenters were six White undergraduate Tulane University women dressed in neutral clothing (e.g. jeans and t-shirts).

Manipulations. Qualtrics randomly assigned participants to one of four conditions based on purported gender representation of the role model's workplace (mostly men vs. equal female/male representation) and the level of stress the role model expressed (stress vs. no-stress). In all conditions, the role model, Dr. Sarah Brookheart was depicted with a photo from the Chicago Face Database (Ma, Correll, & Wittenbrink, 2015, id=018) in order to ensure average ratings of age (M=33.87) and attractiveness (M=3.69). For the gender representation manipulation, participants either saw an article that featured a photographed image of the role model surrounded by mostly men at her practice (see Appendix C for male-dominated domain) or equal representation of men

and women (see Appendix D for gender-equal domain); the photo remained on the screen throughout the interview.

For the role model stress manipulation, participants heard an audio recording of the role model's responses to interview questions that were either manipulated to sound non-stressed or stressed. The non-stressed interview comprised a doctor discussing her accomplishments, reflecting on her medical school education, and offering positive advice to listeners who may be interested in a career in medicine (see Appendix A for full non-stressed transcript). The stressed interview was very similar but contained content about feeling overworked and stressed as well as intonations such as pauses and sighs to signal a stressed individual (see Appendix B for full stressed transcript). The interviews were similar in length (non-stressed: 743 words, 331 seconds; stressed: 824 words, 347 seconds. The interview was performed and recorded by two local actors (a man played the part of interviewer Justin Smith and a woman played the part of Dr. Sarah Brookheart). As participants listened to the interview, they viewed images from a corresponding article.

Computer Tasks. Participants sat at the computer and viewed the article with images of Dr. Sarah Brookheart in her work environment (see Appendices C & D) while listening to an interview with her (Appendices A & B). After the participant listened to the interview, the computer instructed them to build a DNA model, which was set up at a table in the center of the lab room (see Appendix E for an image of the DNA model). Persistence in the hands-on DNA task was measured by a timer in Qualtrics. These data were approximately normal without significant skew (.02) or kurtosis (.76). Once the

participants were finished completing the model, they returned to the computer to finish the survey on Qualtrics.

First, Qualtrics instructed them to complete a creative problem-solving brainstorming exercise known as 'Alternative Uses' (Guilford, 1967) as a follow-up to assembling the DNA model. The instructions were to come up with as many uses as they could possibly think of for a test tube (see Appendix F for instructions on the Alternative Uses task). Next, participants completed the self-report measures detailed earlier in the following order: Alternative Uses: self-assessment (Appendix H), DNA task: self-assessment (Appendix I), pre-med career interest (Appendix G), role model identification (Appendix J), role model perceptions (Appendix K), role model impact on pre-med career interest (Appendix L), and belonging in pre-med (Appendix M). Finally, they answered demographic questions about themselves (Appendix N).

Once participants finished the computer-administered survey, they were thoroughly debriefed by the experimenter. The true purpose of the study was revealed in detail with a written debriefing form that participants were required to sign. Participants were assured that the purpose of the task was invented, that the story of Sarah Brookheart was completely fabricated, and the study hypothesis was revealed. All participants indicated they understood the debriefing and released their data for analysis.

Post-Procedural Coding

DNA Task: Quality. Once participants left the lab, the experimenter took a photo of the completed DNA model. The photos were saved with participant identification numbers and after data collection was complete, research assistants were given coding assignments. Independent coders, blind to condition, later gave ratings to pictures of the

completed DNA model. Coders used a 1-4 scale to rate the level of completeness of the model. An example of a 1 would be an incomplete model with little attempt to build, a 2 is a somewhat complete model, a 3 is nearly perfect, and a 4 would represent a perfectly assembled model. The complete code book can be found in Appendix O. Two coders were used to establish reliability of this means of assessment. The first coder coded all the images of the complete model while the second coder only coded one-third. The intercoder correlation was $r(58)=.74$. Pearson's r was used because coders were using a roughly equal-interval scale to make judgements of the model. This analysis strategy better captures that coders are more similar when selecting 1 and 2 rather than a 1 and 4.

Alternative Uses: Quality. The Alternative Uses task was originally developed by J. P. Guilford (1967). It asks participants to brainstorm innovative uses for an everyday object. It has commonly been used as a test of creativity. Independent coders, blind to condition, rated the responses for the Alternative Uses task. Using the same instructions participants received, as laid out in Appendix M, coders rated the fluency (how many uses), originality (how uncommon), flexibility (how many areas/topics it covers), and elaboration (level of detail) of the responses. The primary coder was trained on a random subset of 10 participant responses. As the main investigator, I assessed whether I agreed with the primary coder's assessment. Afterward, the primary coder went on to code all responses. A secondary coder then was instructed by the first coder on how to code. She also trained on 10 random responses. The second coder then coded all the responses (N = 183) in order to achieve intercoder reliability between the two. Intercoder correlations were $r(181) = .85$ for fluency, $r(181) = .77$ for originality, $r(181) = .78$ for flexibility and $r(181) = .67$ for elaboration. Pearson's r was used because the coding

strategy involved counts or scales. For example, the category of fluency was meant to assess how many ideas the participant invented for a test tube. Coders who differ by 1 should have higher correlations than coders who differ by 4, but using kappas to assess this would treat these differences the same.

Results

Screening & Cleaning Strategy

The method for cleaning and screening data was based on suggestions outlined by Tabachnik and Fidell (2014). First, data were assessed to ensure that every participant was, in fact, 18 years old or older, as stated in the consent form and identified as female.

Missing data were assessed at the item level. For those missing an item, no changes or imputations were made. Some participants, however, were missing an entire scale. Three participants were missing the measure of pre-med career interest at time one. One person was missing pre-med career interest at time two. These missing values were replaced with the mean score of all participants in order to increase power. The decision to impute data for pre-med career interest was due to its' central role in hypothesis testing and its' requirement for greater power for the three-way interaction with time. Although the imputation of data is a commonly used strategy, the pre-med career interest results should be interpreted cautiously (i.e., because although this strategy has no effect on sums of squares for systematic variance terms, the denominator df are artificially inflated).

Many scales were used in this experiment and each scale was subject to several tests to determine if regression assumptions were violated. It was important to ensure that data points were within the expected range. Descriptive statistics were generated to

confirm that no entries were miscoded or outside the possible range. Reliability analysis was run on each scale to determine internal consistency. After alpha was calculated for each scale, the scale score was calculated using the mean.

In order to check for univariate outliers, means and standard deviations were calculated for all scales. The only measure that had outliers was the time it took to complete the DNA model. Six scores were identified as outliers because they fell below three standard deviations from the mean and were, therefore, winsorized. In order to check for multivariate outliers among the scales, Cook's D was calculated. No results exceeded the value of 1.00 indicating an extreme outlier. Normality of the data were assessed using histogram plots. Descriptive statistics were generated to test whether skew or kurtosis were impacting any of the results. All of the values were within the appropriate range.

Manipulation Check

To determine if the manipulation of stress was effective, an analysis of variance (ANOVA) was performed on the single item question, "How stressed does Dr. Sarah Brookheart seem?" on a 1-10 Likert-type scale. This ANOVA with stressed or non-stressed condition as the independent variable revealed a significant effect of condition, $F(1,170) = 107.15$, $p < .01$, $\eta_p^2 = .39$) with participants reporting that the stressed role model seemed more stressed ($M = 6.10$, $SD = 1.95$) than the non-stressed role model ($M = 3.10$, $SD = 1.84$). The gender domain condition was not assessed using a manipulation check since this manipulation strategy has been shown in past studies to be subtle enough that participants would not remember these cues, but would be impactful as indicated by differences in outcome variables by condition (see Murphy et al., 2007).

Analysis Strategy

One hypothesis of the study related to participants' reported pre-med career interest which utilized a 2 (role model stress; between subjects) x 2 (gender representation; between subjects) x 2 (Time; within) mixed-model ANOVA. The remaining dependent variables were measured one time in lab and therefore data were submitted to 2 (role model stress: stress vs non stress) x 2 (gender domain: male-dominated domain vs. equal represented domain) ANOVAs. Unless otherwise noted, this 2 (role model stress: stress vs. non-stress) X 2 (gender domain: male dominated domain vs. equal represented domain) was the main analysis strategy. It should also be noted that error term degrees of freedom change slightly depending on the dependent variable as a result of missing data.

Pre-Med Career Interest

Participants' reported career interest over time was examined using the 2 (role model stress; between subjects) x 2 (gender representation; between subjects) x 2 (Time; within) mixed model ANOVA referenced above. As is shown in past research (Stout et al., 2011; Drury et al., 2011; Herman, et al., 2016), exposure to a competent role model should increase career interest. However, when the stressed role model is in a male-dominated domain, career interest was predicted to decrease. There was no main effect of stress, $F(1, 166) = 0.20$, $p = .66$, and also no main effect of gendered domain, $F(1,166) = 0.54$, $p = .46$. There were also no interactions between the independent variables of stress and domain, $F(1,166) = 0.01$, $p = .91$. There was also not an effect of time, $F(1, 166) =$

0.24 p = .62. There were also no interactions with time and stress, $F(1,166) = 0.49$, p = .49, nor time and domain, $F(1, 166) = 1.84$, p = .18, nor time, stress, and domain, $F(1,166) = 0.26$, p = .61. As noted earlier, the sample size may not have been sufficient to detect the 3-way effect in this design.

DNA Model

Participants were asked to perform a number of behavioral tasks in the lab in order to assess their cognitive abilities after being exposed to either the stressed or non-stressed role model in a male-dominated or gender neutral environment. As a reminder, persistence in completing the DNA task was measured by how much time participants spent building the model. In the equal gender representation condition, time spent is expected to be roughly the same. However, a high-stress role model in the male-dominated domain condition should make participants spend less time and leave the DNA model less complete than participants in the low-stress feminine domain. As seen in row 1 of Table 1, there was no significant differences on time spent on the model as a function of stress, gender domain, nor an effect of the interaction.

Participants also reported on how much they enjoyed the DNA task as a means to measure task engagement. As a reminder, it was predicted that role model stress would negatively impact performance for those viewing the male-dominated domain condition. In the gender equal condition, the stress of the role model should have little impact on performance. Contrary to predictions, those in the stressed condition reported greater enjoyment of the task (*Stress M*=4.85, *SD*=.91; *Non-Stress M*=4.50, *SD*=.92*)*. The gender domain condition did not impact enjoyment of the task, nor was the interaction significant. The detailed results can be found in row 2 of Table 1.

An additional evaluation of the DNA task involved having a coder blind to conditions rate the level of completeness of the DNA model. As can be seen in row 3 of Table 1, those in the stress condition created better DNA models than those in the non-stress condition (*Stress M*=3.25, *SD*=1.04; *Non-Stress M*=2.67, *SD*=1.25*)*. Participants in the male-dominated condition performed equally as well as those in the gender-equal condition, and the interaction was not significant.

Alternative Uses

After constructing the DNA toy model, participants performed a brainstorming exercise known as 'Alternative Uses,' that purportedly sparked their creativity. Participants rated how much they enjoyed the 'Alternative Uses.' There were no significant findings (detailed results can be found in row 1 of Table 2).

Coders blind to condition rated the uses on fluency, flexibility, elaboration, and originality. There was a main effect of domain on fluency, such that participants in the equal gender domain condition came up with more uses for the test tubes than those in the male-dominated condition (*Gender-Equal M*=4.33, *SD*=2.45; *Male-Dominated M*=3.56 *SD*=2.42). There was also an effect of domain on flexibility, such that those in the gender equal condition were able to come up with uses that covered more areas than those in the male-dominated condition (*Gender-Equal M*=2.66, *SD*=.80; *Male-Dominated M*=2.37, *SD*=1.04). There were no significant findings for elaboration or originality. The full coding results on these four variables can be found on rows 2-3 in Table 2.

Role Model Identification

Role model identification was predicted to remain somewhat similar in the no-stress condition. However, when the role model is stressed but is surrounded by other

capable women in the gender-equal domain condition, participants in this condition conceivably would distance or de-identify with the role model because there appear to be other available options for role models. When participants in the male-dominated domain condition saw a stressed role model, they were predicted to have no other available role model options (so they would identify with the one presented). Contrary to these expectations, there were no significant effects of the study manipulations on role model identification (refer to row 1 of Table 3 for complete results).

Role Model Perceptions

Participants were asked about their perceptions of the role model (refer to row 2 of Table 3). There were no interaction effects for role model perception. There was a marginal main effect of the domain on the perceptions of the role model, with participants in the equal gender condition trending toward more positive perceptions of the role model than those in the male dominated condition (*Gender-Equal M*=7.00, *SD*=1.33; *Male-Dominated M*=6.62, *SD*=1.20). No other main effects emerged.

Role Model Impact on Pre-Med Career Interest

Although there was not a significant effect on the predicted variable of pre-med career interest over time, participants reported variations in excitement about the premed track and interest in a career in medicine as a direct result of the role model. As seen in row 3 of Table 3, there was a main effect of stress. Participants exposed to a stressed role model reported less excitement and less interest in the pre-med curricular track than participants exposed to a non-stressed role model (*Stressed M*=4.07, *SD*=1.34; *Non-Stressed M*=4.76, *SD*=1.21). Gender representation had no significant effect, nor was the interaction significant. For all effects, refer to row 3 of Table 3.

Sense of Belonging in Pre-Med

Sense of belonging in pre-med was predicted to be highest among participants witnessing the low-stress role model, but was predicted to be slightly higher for those in the male-dominated gender representation condition because of the boost women get from observing a female role model persist in a male-dominated domain.

Participants in the high-stress role model condition were predicted to have lower sense of belonging in pre-med than those in the low-stress role model condition. Among participants in the high-stress role model condition, those who saw equal gender representation were predicted to have higher pre-med identification than those in the male-dominated domain condition. Neither condition impacted participants' sense of belonging in pre-medicine (refer to row 4 of Table 3 for complete results).

Correlations Among Variables

All dependent variables were entered into a correlation. The complete matrix can be found in Table 4 along with means and standard deviations of all variables.

Exploratory Analysis

A moderated multiple regression analysis was performed with domain and stress level of the role model predicting pre-med career interest in the lab study, moderated by role model identification. Role model identification was centered around the mean prior to creation of interaction terms and analysis. The overall model was significant $F(7, 165)=7.52$, $p<.001$. When examining all the components of the model, there was a main effect of role model identification $b=.71$, $t(165) = 6.97$, $p < .001$, such that those who

were highly identified with the role model also had greater pre-med career interest after hearing her story. There was no main effect of gender, b=.03, $t(165) = .487$, p =.63, nor a main effect of stress, b=.03, $t(165) = .53$, $p = .59$. Finally, 2-way and 3-way interactions were not significant.

A second moderated multiple regression analysis was run with gendered domain and stress level of the role model predicting pre-med belonging, moderated by role model identification (centered). The overall model was significant $F(7, 164) = 7.55$, $p < .001$. There was a main effect of role model identification b=2.05, $t(164) = 6.86$, $p < .001$, as well as an interaction between stress and role model identification b=.64, $t(164) = 1.96$, $p = .05$ and a 3-way interaction between stress, domain, and role model identification b=.80, $t(164) = 2.47$, $p < .05$. When participants viewed the equal gender domain, belonging seemed unaffected by stress or the degree of role model identification. This is graphically depicted on the left-hand side of Figure 1. In the masculine domain condition, however, there was a positive relationship for role model identification and pre-med belonging for those viewing the stressed role model. The opposite pattern emerged among participants viewing the unstressed role model, such that there was a negative relationship between role model identification and pre-med belonging. This interaction is graphed on the right-hand side of Figure 1.

In order to further probe the three-way interaction on pre-med belonging, a simple slopes analysis was conducted between pre-med belonging and role model identification as the moderator. Using on online calculator (Preacher, Curran, & Bauer, 2003), I examined the slopes of lines that were the product of four different conditions: unstressed role model in the equal gender domain, stressed role model in the equal gender domain,

unstressed role model in the masculine domain, and stressed role model in the masculine domain. Each line creates a slope that goes from low to high role model identification (as depicted in Figure 1). The results for the simple slopes analysis revealed the following slopes to be significant: The unstressed equal-gender domain (p=.02), unstressed masculine domain (p=.04), and the stressed masculine domain (p<.01). This means that each of these slopes are significantly different than zero. The only slope that was not significant was the one for the stressed equal gender domain (p=.20). This means that as role model identification increases, there is no significant change for those in the stressed equal gender domain condition. These results should be interpreted cautiously since moderation requires a significant amount of power. As is previously mentioned, this experiment was especially not well-powered for three-way interactions.

Role model identification was not a good variable for testing mediation, insofar as it was not predicted by the independent variables of stress and gendered domain. Therefore, mediational analyses were not performed.

Discussion

The aim of this experiment was to understand why women might not be persevering in male dominated fields even when female role models are available. Specifically, this experiment investigated whether witnessing a stressed role model can have negative impacts on the career aspirations of women in male-dominated fields. Thus, two factors should matter: stress and gendered domain. Assuming women identify with a female role model who is a future version of themselves, they should be motivated by her success with respect to career interest and behavioral outcomes. If she is not stressed, the gendered domain should not matter. If the role model is stressed, a

masculine domain is especially threatening because there are no other available female role models to turn to. The results did not develop exactly as expected.

Contrary to predictions no interactions emerged (except for an exploratory analysis, discussed later). However, the results of this study indicated a number of interesting main effects. For example, participants performed better on the creative Alternative Uses task when they were in the equal gender condition. In addition, for the DNA task there was a main effect of stress such that participants in the high stress condition performed better on the DNA task according to their own assessment and the evaluations of a independent coder. Finally, although there were no main effects or significant changes related to pre-med interest over time participants who listened to the stressed-out role model felt that their pre-med career interest was negatively impacted. The following is a discussion of the significant results as well as thoughts on why certain hypotheses were not confirmed.

Gender Representation

The subtle gender representation manipulation meant that participants either saw the role model surrounded by all men (male-dominated domain) or by an equal number of men and women (equal gender condition). This strategy was borrowed from existing literature (Murphy et al., 2007). Although the gender representation did not interact with stress, gender representation did influence some behavioral outcomes. Participants in the gender equal condition performed better on the ‘Alternative Uses’ task than did participants in the male-dominated condition. The current study’s participants achieved greater fluidity and flexibility on a creative thinking task when exposed to multiple female role models. This finding is in line with the previously mentioned study in that

mere exposure to successful women can lead to better performance. Perhaps being exposed to many successful female doctors empowered undergraduates to feel more capable, and thus led participants to complete the assignment more successfully than those in the male dominated condition.

Indeed, similar studies have demonstrated analogous results. Participants who were shown famous female role models performed better on a subsequent task (Latu, Mast, Bombari, Lammers, & Hoyt, 2019). One possibility is that participants in both studies experiences a certain amount of threat when seeing the male-dominated domain. Research has indicated that women in male-dominated fields do, in fact, experience greater stereotype threat than women in female-dominated fields (Steele, James, & Barnett, 2002). Although the participants in the present study did not experience enough threat to deviate from their career path, it is possible that they experienced enough threat to decrease their effort in the 'Alternative Uses' task. This decrease in effort may explain the significantly lower achievement that participants in the male-dominated condition attained on this task compared to those in the equal gender condition. This finding is novel, however, because it suggests that mere exposure a group of successful role models can positively impact cognitive performance.

Although gender representation impacted performance on the creativity task, it had no effect on participants' career intentions, task achievement, or sense of belonging in the pre-med track. These null effects are surprising given that similar manipulations have been used in past studies to elicit the aforementioned outcomes (Murphy et al., 2007). For example, in one experiment, women who saw a conference full of men felt threatened, and subsequently showed a decreased desire to attend the conference and a

lowered sense of belonging in STEM (Murphy et al., 2007). The authors argue that participants' lowered sense of belonging may have resulted from an increase in stereotype threat. The manipulation likely worked in the context of STEM because undergraduate participants may not have prior knowledge about the gender makeup of certain industries such as engineering. Participants in the current study may believe the medical field to be more equal if they have interacted with female doctors as patients and may have seen the male-dominated condition as an anomaly rather than a true representation. Additionally, women make up over half of those obtaining biological science degrees (National Science Board, 2018). Since students in the pre-med track likely had roughly equal amounts of women and men in their class, they may not have the threatening experience of being outnumbered by men.

Not only does a greater concentration of men signal stereotype threat to women, it could also cue the greater possibility of gender discrimination. In addition to showing increased stereotype threat among women in male-dominated fields, research has also demonstrated that women in these fields experience greater gender discrimination than women in female-dominated fields (Steele et al., 2002). In fact, gender discrimination is also pervasive in the medical community with female surgeons experiencing sexism and gender discrimination at alarmingly high rates (Bruce, Battista, Plankey, Johnson, & Marshall, 2015). Although the gender pay gap is shrinking in most fields, a recent report revealed that female physicians' salaries are nearly 30% lower than their male counterparts (Kavalinz, 2018). Another study found that the US government was paying female doctors less than male doctors under Medicaid (Oaklander, 2016). It is unlikely that female undergraduate students in pre-med similarly experience discrimination in

their university courses, as pre-med classes tend to be gender-equal. It is also possible that the subjects (most of whom were underclassmen) in this study participated before they had witnessed any acts of gender discrimination. If participants had not yet experienced gender discrimination, then seeing a woman outnumbered by men would not have signaled threat and therefore, impacted their career intentions.

Role Models

If the masculine domain had signaled threat to the participants, in theory a female role model should buffer this threat as it has done in past studies. This experiment used role models to persuade participants in the same vein as other psychological studies have done in the past (Morgenroth et al., 2015, Stout et al., 2011). Role models, in this context, are individuals who a person admires and might hope to achieve some of the same accomplishments (Gibson, 2004). It is common practice for psychology researchers to use role models from the news and media (Asgari, Dasgupta, & Stout, 2012; Hoyt & Simon, 2011; Marx, Ko, & Friedman, 2009). In these instances, participants likely have never met but may have some prior knowledge about the role model(s). Other researchers often create "role models" that constitute short vignettes about a fictional person (Buunk, Peiró, & Griffioen, 2007; Hermann et al., 2016; Lockwood, 2006; Marx & Ko, 2012). The latter option was chosen for this study due to the specific nature of the role model's career and the importance of fostering similarity for role model identification.

It is also possible that these findings would have been different had mentors or heroes been the target in this experiment. Mentors are different than role models because they offer personalized feedback for the protégé and have a closer relationship (Gibson, 2004). Heroes are different than role models because they exemplify conduct related to

morals and justice (Allison & Goethals, 2016). Role models are often the subject of psychological study with less theoretical research on mentors or heroes. The current experiment operationalizes role models in the same way as other social psychologists so it is difficult to surmise about what findings might emerge if a mentor or hero were to replace the role model. Future research should explore how the stress of heroes and mentors may influence those looking up to them.

Role Model Stress

The stress of a role model should impact the protégé because they are in a position where they admire the role model and hope to become like them. Participants in this experiment reported that the stressed role model negatively impacted their pre-med career interest. This was in-line with predictions and demonstrated that witnessing another's stress can have negative repercussions for one's own career ambitions. This finding is consistent with research in the bio-behavioral sciences. Specifically, research in this field has demonstrated that amongst close partners, stress can be transmitted from one individual to another (Engert et al., 2014). Although participants did not have a close relationship with the role model presented, they may have had similar reactions to the role model's stress since they were told that she was an alumnus of the same University and was working in medicine (a career they desired). Although the stress levels of the participants in the present study were not measured, participants' reported disinterest from their intended career path indicates that the role model's stress did have a negative influence on participants. A future direction would be to examine participants' stress levels to more closely replicate studies in the bio-behavioral sciences and determine if stress mimicry is responsible for this finding.

Counter to expectations, the role model's stress did not impact how much participants identified with her. At first glance these results seem to suggest that participants did not identify with the role model and were therefore not impacted by her level of stress. Given that role model identification is an important component in the process of empathizing with and internalizing a role model's experience, one cannot expect a role model manipulation to work without this critical piece. Although low role model identification in theory would explain the null effects of role model stress on participants' pre-med intentions, role model identification in this sample actually was high (M = 8.20 on a 1-11 scale, *SD* = 1.33, RANGE=7.25). This suggests that participants managed to maintain their long-term goals despite their high identification with both the stressed and non-stressed role model.

Unexpectedly, participants exposed to the stressed role model did a better job completing the DNA model and rated the task as more enjoyable than did those exposed to the non-stressed role model. These findings may be explained in part by research demonstrating that a certain amount of stress is necessary in order to challenge and motivate individuals (LePine, LePine, & Jackson 2004). This concept of stress or arousal enacting motivation is also known as the Yerkes-Dodson Law (see Teigen, 1994 for a complete review). According to this law, arousal is optimal for performance up to a point. This law has also been applied to stress in performance and learning. Perhaps participants in this study did not feel undue stress and may have been able to successfully utilize the small amount of stress they felt as a motivator to engage with the task. Also possible is that participants in the stress condition simply used the DNA building exercise as a

means of distracting themselves to keep from ruminating about the stress of the role model.

In addition to the findings just discussed, this study provided another unexpected result. Specifically, counter to predictions, participants in both the stress and no-stress conditions reported equal intentions to continue in pre-med and performed equally on the creative thinking exercise. These findings are in line with research on positive illusions. Research has indicated that people who hold positive illusions feel especially resilient when faced with a stressor as they tend to have unrealistically optimistic outlooks about the future (Taylor & Armor, 1996). This explanation is further supported by research indicating that people believe themselves to be less vulnerable to misfortunes than others (Makridakis & Moleskis, 2015). Participants in the present study may have felt that their experiences in medicine would be more positive than those of the role model, and thus they may not have internalized her stress (Taylor & Gollwitzer, 1995).

Although there is an advantage to maintaining a positive illusion in that one remains steadfast in pursuit of their goals, there are also disadvantages. The demands of getting into medical school, completing medical school education, and becoming a physician are extremely arduous. Of all those students that apply to medical school, less than half are accepted (Association of American Medical Colleges, 2018, Table A-23). Maintaining any type of illusion about how grueling it will be to get in could lead to a lack of effort, and in turn, harm the chances of acceptance. Many pre-med students do eventually realize the heavy demands of this career path. There is a high rate of students switching out of the pre-med major before they even apply to medical school, with the attrition rate among women is even greater than their male peers despite high levels of

competence (Witherspoon, Vincent-Ruz, & Schunn, 2019). A comprehensive study from Stanford University discovered that underrepresented minority students and female students were the most likely to lose interest in pre-med (Barr, Gonzalez, & Wanet, 2008). Although most of the students in the Stanford study who gained a greater interest in pre-med referenced contact with a physician, 15% of students who lost interest also indicated that it was because of contact with a physician. This suggests that not all career role models influence aspirants to continue their career pursuit. It is possible that the 15% in the Stanford study saw the stress of the physician and decided that they did not want to pursue the career path of being a doctor. Positive illusions may have a breaking point, but perhaps this threshold was not reached in the current study.

An alternative explanation for the null effect of stress on interest-relevant measures is that stress has become normalized in our society: Individuals with demanding careers are expected to have high levels of stress. An exploratory analysis lends some support to this idea. An interaction revealed that as role model identification increased, pre-med belonging also increased for those experiencing the stressed role model in the masculine domain. The opposite trend occurred for participants in the non-stressed role model in the masculine domain condition; As role model identification increased, pre-med belonging decreases. At first blush, this finding is counter to what would have been predicted based on initial hypotheses, but the finding fits with the normalization of stress in our society. Perhaps participants expect this successful role model to be stressed in a masculine domain so when she confirms their assumptions, they feel more belonging in pre-med. When she violates the assumption of a stressed individual in a masculine domain, perhaps they feel less belonging in pre-med because the ease with which she has

achieved her success appears unattainable. Similar studies have demonstrated that highly successful female role models can be harmful to protégés because their achievements seem unattainable (Hoyt & Simon, 2011).

Limitations

Although one can speculate about the reason for the counter-intuitive findings in the exploratory analysis, the findings should be interpreted cautiously as this study was not adequately powered to be able to test this moderation. Although research has indicated that experiencing stress can be motivating, it has also demonstrated that individual differences in traits such as conscientiousness might explain why some people benefit from stress while others find it debilitating (LePine, et al., 2004). Including measures of personality traits may have helped explain null results in this study. Given that the participants in this study were all pre-med students at a selective private university, it is possible that they may have all been high in conscientiousness or felt invulnerable to stressed role models due to general past successes. If so, this could explain why participants' career pursuits were not deterred by the stressed role model. Specifically, participants may have experienced stress but used it as a motivator to engage more with the DNA model building task. Future research should examine participants' stress-relevant personality traits before exposing them to a stressed role model in order to determine which personality types are impacted by the stress of a role model.

Another possible limitation is overestimating the impact lab role models can have on participants. It is possible that the stress of a real-life role female model in a masculine domain would impact a woman looking up to her. The role models of psychology

experiments might function in a vastly different manner than a real-life role model. One difference is that a protégé divulges that they admire the role model rather than being assigned a role model in an experiment. It may be that reading about a role model once is less effective at impacting future-oriented long-term goals than real life role models. Other studies have assigned real life role models to participants in order to gauge their impact (O'Brien et al., 2017). A future direction could use a more correlational method to offer some evidence that the stress of real-life role models impacts their protégés. With the lack of experimental manipulation, however, it does come with the drawback of not pinpointing the causal effects. Although the current experiment did not find evidence for an interaction between role model stress and gendered domain, the possibility can not be completely ruled out.

Another downside of the current experiment was using a college-aged sample for research about a future career as a physician. Undergraduate students have not yet embarked on their careers; Therefore, these students may not understand the demands and stress of work-life balance that were presented by the stressed-out role model. Although the role model presented was specifically chosen to maintain a semblance of similarity to participants (she was a woman who had been a Tulane undergraduate in the pre-med track), her current life and position as a doctor may have been too distant an outcome for students to imagine. It is possible that using a med-school student as the role model may have been more relatable figure for undergraduates.

In addition to the possibility of an unrelatable role model, the masculine gender domain may not have primed the same threat as it has in other experiments. The threat is based on the idea that with a greater amount of men, women suddenly have their own

gender become salient and would be more likely to face gender discrimination. Research demonstrates that undergraduates grossly underestimate the rates of gender discrimination that actually occur in the workplace, and do not believe that their success will be impacted by their gender (Sipe, Johnson, & Fisher, 2009). Therefore, exposure to the male-dominated domain may not have cued the same threat that would be experienced by someone who has had to endure years of being the only woman in a room full of men. Future research should use this design to test this hypothesis among graduate students, medical school students, or early career individuals.

Conclusions

Pre-med career interest decreased as a result of exposure to the stressed-out role model, irrespective of the gender representation of the workplace. The negative repercussions associated with being exposed to a stressed-out role model should still be carefully considered. Female role models are often stressed, especially when they are in a masculine field (e.g., medicine). These women are often dealing with a tremendous amount of pressure to perform, and that their stress presumably is visible to others. Based on the results of the present study, women exposed to stressed female role models may show less interest in pursuing a career in medicine and less excitement about being pre-med. It is important to recognize that stressed role models in masculine fields can have deleterious effects on others. This concept should be considered when attempting to implement female role models as a solution to gender imbalance.

There were also some positive results that emerged from the study. Although the role model's stress led to some negative results regarding a future career in medicine, participants who heard the interview with the stressed role model did a better job

completing the DNA model. This suggests that just like experiencing some amount of stress may be necessary to motivate individuals in their goal attainment, witnessing someone else's stress can also motivate people on a relevant task.

Lastly, manipulating the gender domain of the role model did not function as expected. Whereas it was predicted that the male-dominated domain would interact with viewing the stressed role model to be threatening to the participant. Instead, the gender-equal domain functioned on its' own, boosting performance on the creative 'Alternative Uses' task. Perhaps participants felt empowered by seeing many successful women and were therefore more motivated when it came to this creative assignment. At present, many organizations and universities feature prominent men in halls, classrooms, and boardrooms. The results of the present study suggest that remodeling these spaces to feature successful women could boost production and creativity amongst female workers or students.

Table 1

ANOVA Tests for 2 (no stress, stress) X 2 (equal, male-dominated) Domains related to building the DNA model

	Domain						
	Equal		Male				
	Stress						
Dependent Variable	Low	High	Low	High	Stress	Domain	Stress x Domain
1. DNA time	1298.74	1420.30	1392.52	1287.25	$F(1, 169) = 0.01$, $p = .93$	$F(1, 169) = 0.06$, $p = .82$	$F(1, 169) = 1.96$, $p = .16$
	(529.24)	(533.48)	(534.64)	(543.46)	$\eta_p^2 = .01$	$\eta_p^2 < .01$	$\eta_p^2 < .01$
2. DNA Self-Assessment	4.41	4.60	4.59	4.99	$F(1, 169) = 8.43$, $p = .01$*	$F(1,169) = 2.84$, $p = .09$	$F(1,169) = 0.09$, $p = .77$
	(0.90)	(0.95)	(0.95)	(0.86)	$\eta_p^2 = .04$	$\eta_p^2 = .02$	$\eta_p^2 < .01$
3. DNA construction ratings	2.57	3.08	2.77	3.41	$F(1,154) = 9.95$, $p < .01$*	$F(1,154) = 2.08$, $p = .15$	$F(1,154) = 0.13$, $p = .72$

Note: *p<.05 Means appear in the left-hand side of the table with their standard deviations in parenthesis below.

Table 2

ANOVA Tests for 2(stress, no stress) X 2(equal, male-dominated) Domains related to 'Alternative Uses Task'

	Domain						
	Equal		Male				
	Stress						
Dependent Variable	Low	High	Low	High	Stress	Domain	Stress x Domain
1. Alternative Uses: Self-Assessment	4.08	3.81	4.08	3.92	$F(1, 169) = 1.29$, $p = .26$	$F(1, 169) = .08$, $p = .78$	$F(1, 169) = 0.08$, $p = .78$
	(1.30)	(1.31)	(1.10)	(1.25)	$\eta_p^2 < .01$	$\eta_p^2 < .01$	$\eta_p^2 < .01$
2. Fluency	4.23	4.43	3.79	3.33	$F(1, 164) = 0.11$, $p = .74$	$F(1, 164) = 4.14$, $p = .04$*	$F(1, 164) = 0.74$, $p = .39$
	(2.66)	(2.22)	(2.62)	(2.22)	$\eta_p^2 < .01$	$\eta_p^2 = .03$	$\eta_p^2 < .01$
3. Flexibility	2.59	2.73	2.43	2.31	$F(1, 164) < 0.01$, $p = .96$	$F(1, 164) = 4.05$, $p = .05$*	$F(1, 164) = 0.78$, $p = .38$
	(0.90)	(0.68)	(1.04)	(1.05)	$\eta_p^2 < .01$	$\eta_p^2 = .02$	$\eta_p^2 < .01$
4. Elaboration	1.45	1.63	1.66	1.40	$F(1, 163) = 0.11$, $p = .74$	$F(1, 163) < 0.01$, $p = .95$	$F(1, 164) = 2.95$, $p = .09$
	(0.73)	(0.74)	(0.88)	(0.83)	$\eta_p^2 < .01$	$\eta_p^2 < .01$	$\eta_p^2 = .02$
5. Originality	2.50	2.73	2.50	2.40	$F(1, 164) = 0.13$, $p = .72$	$F(1, 164) = 0.78$, $p = .38$	$F(1, 164) = 0.78$, $p = .38$
	(1.16)	(0.91)	(1.25)	(1.35)	$\eta_p^2 < .01$	$\eta_p^2 = .01$	$\eta_p^2 = .01$

Note: *p<.05 Means appear in the left-hand side of the table with their standard deviations in parenthesis below.

Table 3

ANOVA Test for 2(stress, no stress) X 2(equal, male-dominated) Domains related to Role Model and Belonging

	Domain						
	Equal		Male				
	Stress						
Dependent Variable	Low	High	Low	High	Stress	Domain	Stress x Domain
1. RM identification	0.07	0.13	-0.08	-0.12	$F(1, 169)=.04$, $p=.84$	$F(1, 169)=.02$, $p=.90$	$F(1, 169)=.29$, $p=.59$
	(0.74)	(0.65)	(0.57)	(0.68)	$\eta_p^2 < .01$	$\eta_p^2 < .01$	$\eta_p^2 < .01$
2. RM perception	6.95	7.05	6.66	6.59	$F(1, 168) < 0.01$, $p = .95$	$F(1, 168) = 3.74$, $p = .06$	$F(1, 168) = 0.20$, $p = .65$
	(1.41)	(1.25)	(1.09)	(1.32)	$\eta_p^2 < .01$	$\eta_p^2 = .02$	$\eta_p^2 < .01$
3. RM impact on pre-med career	4.80	4.11	4.72	4.03	$F(1, 168) = 12.33$, $p < .01$**	$F(1, 168) = 0.17$, $p = .68$	$F(1, 169) < 0.01$, $p = .99$
	(1.24)	(1.35)	(1.20)	(1.35)	$\eta_p^2 = .07$	$\eta_p^2 < .01$	$\eta_p^2 < .01$
4. Sense of belonging in pre-med	8.28	8.13	8.22	8.15	$F(1, 168) = 0.04$, $p = .83$	$F(1, 168) = 0.11$, $p = .74$	$F(1, 169) = 0.04$, $p = .84$
	(1.44)	(1.42)	(1.07)	(1.39)	$\eta_p^2 < .01$	$\eta_p^2 < .01$	$\eta_p^2 < .01$

Note: *p<.05, p<.01** Means appear in the left-hand side of the table with their standard deviations in parenthesis below.

Table 4

Summary of Correlations Among Dependent Variables

Measure	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1. Pre-Med Time 1	__													
2. Pre-Med Time 2	0.90**	__												
3. Time DNA Model	0.08	0.12	__											
4. DNA Task Self-Assessment	0.18*	0.17*	-0.20**	__										
5. DNA Coding	0.10	0.09	0.14	0.41**	__									
6. Alternative Uses: Self-Assessment	0.12	0.11	0.15*	-0.17*	-0.03	__								
7. Fluency	-0.10	-0.13	-0.00	0.01	0.12	-0.31**	__							
8. Flexibility	-0.11	-0.11	-0.10	0.04	0.14	-0.17*	0.68**	__						
9. Elaboration	0.07	0.06	-0.08	0.13	0.10	-0.23**	0.53**	0.67**	__					
10. Originality	-0.08	-0.11	-0.06	0.09	0.14	-0.21**	0.82**	0.82**	0.69**	__				
11. RM identification	0.54**	0.56**	-0.01	0.11	-0.03	-0.00	-0.11	-0.11	-0.06	-0.12	__			
12. RM Impact on Pre-Med Career	0.45**	0.52**	0.07	-0.02	-0.14	0.00	-0.09	-0.14	-0.15	-0.12	0.45**	__		
13. RM Perception	0.41**	0.45**	-0.00	0.12	-0.10	-0.12	-0.06	-0.08	-0.08	-0.12	0.66**	0.54**	__	
14. Belonging	0.63**	0.68**	0.18*	0.18*	0.11	-0.06	0.01	-0.06	0.12	-0.02	0.48**	0.45**	0.45**	__
Mean	-0.00	-0.00	1344.37	4.66	2.96	3.98	3.94	2.51	1.53	2.53	8.20	4.46	6.81	6.61
Standard Deviation	0.96	0.95	534.14	0.94	1.18	1.23	2.46	0.94	0.80	1.17	1.33	1.36	1.28	1.49

Note: *$p < .05$, **$p < .01$

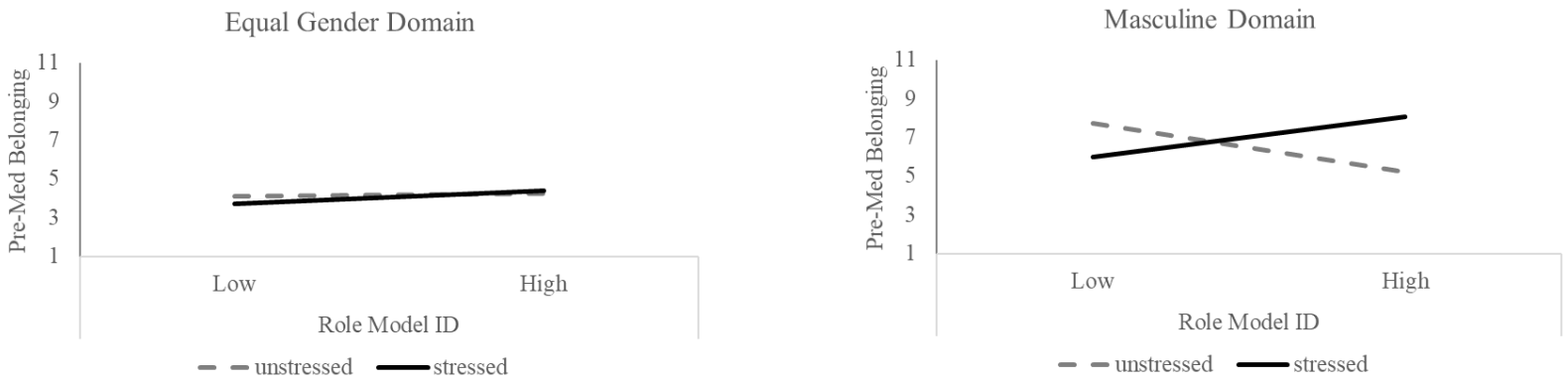

Figure 1.
Exploratory Moderated Multiple Regression: Pre-med belonging as a function of gendered domain, role model stress, and role model identification

Appendices

Appendix A- Transcript of non-stress interview
Appendix B- Transcript of stress interview
Appendix C- Article featuring male-dominated domain condition
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Appendix A
Transcript of Non-Stress Interview

Interviewer: Journalist Justin Smith for the Tulane Hullabaloo

Interviewee: Dr. Sarah Brookheart

Interview Setting: Lavin-Bernick Center for University Life, Room 212 Qatar Ballroom

Affiliation with Interviewee: Transcript from Tulane's series of interviews with distinguished alumni.

(Start of Interview)

Interviewer: When did you first decide to become a doctor? Why?

Dr. Brookheart: My mom mentioned that she had been admitted to medical school when she was younger, but she didn't go because of my dad's career. She was more focused on raising a family, so she became a teacher instead. I think, subliminally, that had inspired me. But more consciously, all my science teachers at Tulane were so inspirational.

Interviewer: How/why did you select the medical schools you applied to?

Dr. Brookheart: I considered GPA and MCAT score requirements.

Interviewer: What surprised you the most about your medical school studies?

Dr. Brookheart: The work is difficult, but I enjoy a challenge. Before exams, you certainly spend a lot time studying. And with rounds, I was always able to come up with an answer when called on by the attending physician: It keeps you sharp and on your toes. In terms of personal life, I always found time during the week to get a couple workouts in. It is important to have balance.

Interviewer: You just received an award from Tulane for innovation in the teaching of medicine. What sparked your desire to develop the Creative Brain Game?

Dr. Brookheart: There's a lot of textbook studying in med school. Since so much of being a doctor is hands-on, like examining patients and administering tests, I wanted to design an interactive activity that could be a practical activity to pair with medical textbook studying. The Creative Brain Game helps make those connections while studying.

Interviewer: Has being a physician met your expectations and what is your favorite thing about being a doctor?

(Non-Stress Transcript continued…)

Dr. Brookheart: I wanted a rewarding career, and I feel a strong sense of fulfillment as a physician. As a physician, there's both problem solving and instant gratification. Often, you can quickly identify whatever is wrong. For example, if a patient came in with appendicitis, you could come up with a diagnosis and decide what course of action needs to be taken in a matter of minutes.

Interviewer: What do you like least about being a physician?

Dr. Brookheart: It's never fun to communicate bad news to a patient, but I try not to let that get to me. Instead, I remember that on the whole, you are having a meaningful impact on the lives of others. The hours may seem like a lot, but they are very manageable. I enjoy my work.

Interviewer: What is it actually like working in a hospital?

Dr. Brookheart: I think people perceive hospitals to be a little bit of a hectic environment, because there are so many patients coming in and out of the hospital all the time. I've found that I thrive in environments where I feel useful, and because of the sheer number of patients I see in a day, I always feel valuable.

Interviewer: That sounds like a really busy schedule.

Dr. Brookheart: There's a lot of things that have to get done, but I always manage to do it.

Interviewer: People often regard doctors with a special kind of respect. Do you feel like that positively impacts your identity?

Dr. Brookheart: Yes, I do! I've always felt a sense of pride whenever I wear my lab coat. I think a lot of it is because they view you as a doer: You are going to solve their problem, assess their state, and fix whatever hurts. I like that I get to be a problem solver in helping patients come up with a plan of action to better their health.

Interviewer: Do you have any final words of advice for students interested in pursuing medicine as a career?

Dr. Brookheart: Make short-term and long-term goals so you are able to plan and achieve your aspirations. Understand these goals and how to achieve them. Make a plan to manage your time well. Ask advice from your colleagues, seniors, and mentors. I wish I had known what an average day or week in the life of a physician was like. Try to get some hands-on experience. This career will challenge you in a multitude of ways and all the hard work will pay off. A career in medicine is incredibly worthwhile and fulfilling.

Appendix B
Transcript of Stress Interview

Interviewer: Journalist Justin Smith for the Tulane Hullabaloo

Interviewee: Dr. Sarah Brookheart

Interview Setting: Lavin-Bernick Center for University Life, Room 212 Qatar Ballroom

Affiliation with Interviewee: Transcript from Tulane's series of interviews with distinguished alumni.

(Start of Interview)

Interviewer: When did you first decide to become a doctor? Why?

Dr. Brookheart: Well, my mom mentioned a couple times that she had been admitted to medical school when she was younger……..but she didn't end up going because it was just way too much to handle with my dad's career. She didn't think it would work with raising a family, so she became a teacher instead. So maybe subliminally, that had inspired me. But more consciously, all my science teachers at Tulane were so inspirational.

Interviewer: How/why did you select the medical schools you applied to?

Dr. Brookheart: Well, there are restrictions to consider. I had to make sure I met the GPA and MCAT score requirements.

Interviewer: What surprised you the most about your medical school studies?

Dr. Brookheart: The work is difficult, and it constantly feels stressful. Before exams, you certainly spend a lot time studying. And with rounds, although I always came up with an answer when called on by the attending physician, I felt like I was on pins and needles. In terms of personal life, I mostly was able to find time during the week to get a couple workouts in. Otherwise, the stress would kill you.

Interviewer: You just received an award from Tulane for innovation in the teaching of medicine. What sparked your desire to develop the Creative Brain Game?

Dr. Brookheart: During medical school, I was pretty frustrated with the sheer amount of studying and my time spent with my nose in a book when I knew that my career would be much more hands on. I wanted to design an interactive activity that could be a hands-on activity to pair with medical textbook studying. The Creative Brain Game helps make those connections while studying.

(Stress Interview Transcript continued…)

Interviewer: Has being a physician met your expectations and what is your favorite thing about being a doctor?

Dr. Brookheart: The job is all consuming, but I wanted a rewarding career, and I feel a strong sense of fulfillment as a physician. Sometimes I feel like there is not enough time in the day, but often, you can quickly identify whatever is wrong. For example, if a patient came in with appendicitis, you could come up with a diagnosis and decide what course of action needs to be taken in a matter of minutes.

Interviewer: What do you like least about being a physician?

Dr. Brookheart: The worst thing, as you might expect, is delivering bad news to a patient. I'm still not accustomed to doing it. I find it hard not to feel responsible so my mind is usually racing when I try to go to sleep at night. And of course, there's the hours [sigh]. Let's just say compared to other professions, you have relatively little free time. In other words, your time is never your own.

Interviewer: What is it actually like working in a hospital?

Dr. Brookheart: Yeaaaahh, [exhales], I do think that the hospital is a stressful environment, because there are so many patients coming in and out of the hospital all the time. But even when it's just you with a patient, there's a lot of pressure to assess them quickly in order to move on to the next case.

Interviewer: That sounds like a really busy schedule.

Dr. Brookheart: I am very busy. There's a lot of things that have to get done. Even though I always manage to get everything done, it can feel overwhelming.

Interviewer: People often regard doctors with a special kind of respect. Do you feel like that positively impacts your identity?

Dr. Brookheart: I've always felt a sense of pride whenever I wear my lab coat, but with that pride I also feel an immense amount of pressure. Patients come in and respect me because they think I can fix whatever is wrong. With that responsibility comes the big decisions that someone's health is relying on.

Interviewer: Do you have any final words of advice for students interested in pursuing medicine as a career?

(Stress Interview Transcript continued…)

Dr. Brookheart: I think I would tell myself to carefully evaluate my personal and professional goals and then prioritize accordingly. Make short-term and long-term goals so you don't get bogged down with details. I wish I had known what an average day or week in the life of a physician was like. Try to get some hands-on experience, and see how you would grapple with the time pressure and responsibility. Recognize what will be expected of you and make sure you are equipped to handle it. In other words, make sure you understand the sacrifices you have to make. If you are ok with them, then go for it.

Appendix C

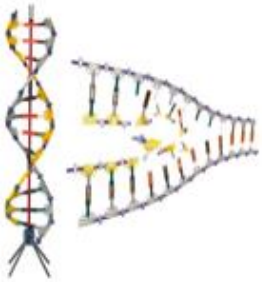
Article Featuring Male-Dominated Domain Condition

Dispatch Dr. Sarah Brookheart

WHERE Y'AT?

Dr. Sarah Brookheart receives alumni award for innovation in the teaching of medical science.

Dr. Brookheart with colleagues from the hospital.



Part of the Creative Brain Game® developed by Dr. Brookheart.

Interviewer: Journalist Justin Smith for the Tulane Hullabaloo

Interviewee: Dr. Sarah Brookheart

Interview Setting: Lavin-Bernick Center for University Life, Room 212 Qatar Ballroom

Affiliation with Interviewee: Transcript from Tulane's series of interviews with distinguished alumni.

Tulane University

Appendix D

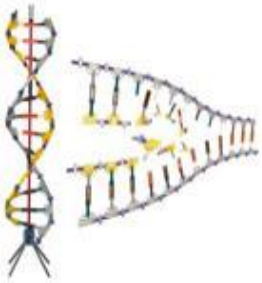
Article Featuring Equal-Gender Domain Condition

Dispatch Dr. Sarah Brookheart

WHERE Y'AT?

Dr. Sarah Brookheart receives alumni award for innovation in the teaching of medical science.

Dr. Brookheart with colleagues from the hospital.



Part of the Creative Brain Game® developed by Dr. Brookheart.

Interviewer: Journalist Justin Smith for the Tulane Hullabaloo

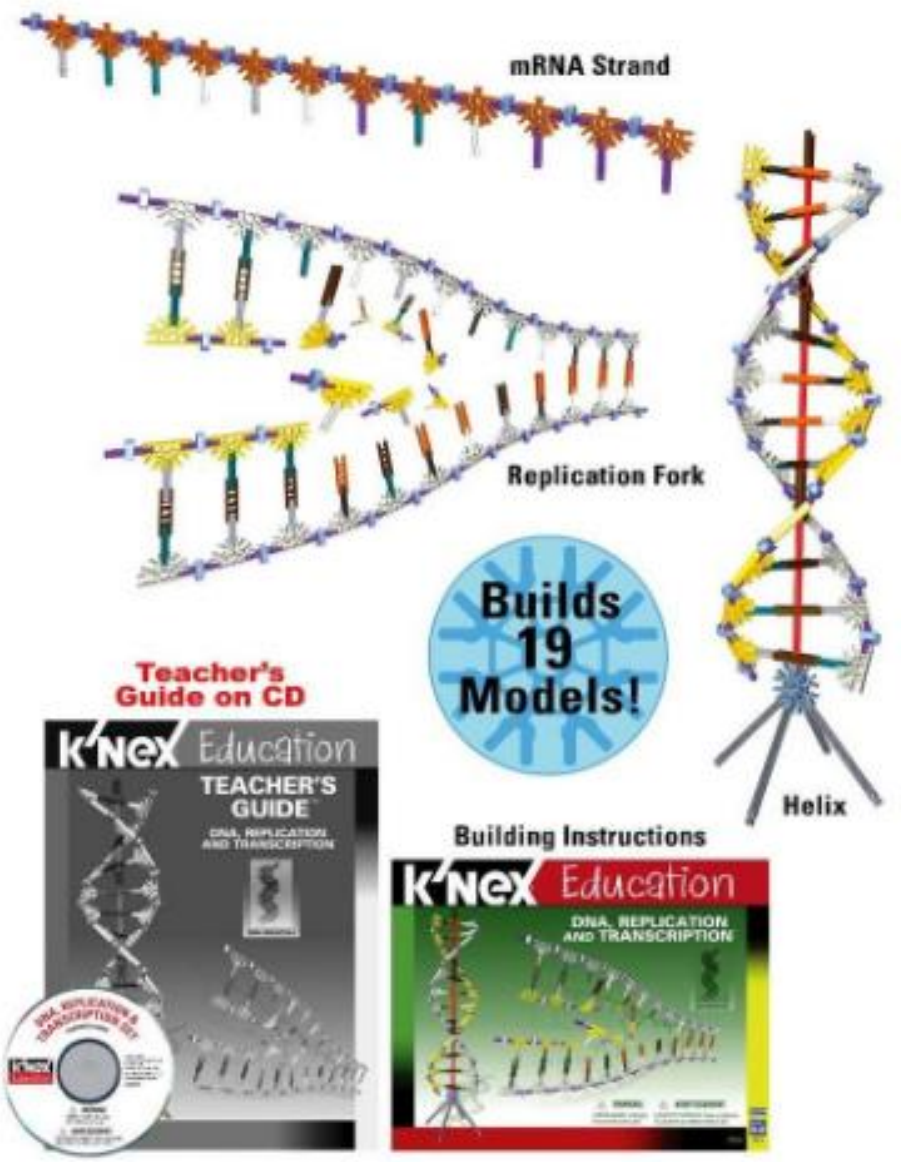
Interviewee: Dr. Sarah Brookheart

Interview Setting: Lavin-Bernick Center for University Life, Room 212 Qatar Ballroom

Affiliation with Interviewee: Transcript from Tulane's series of interviews with distinguished alumni.

Tulane University

Appendix E
DNA Model



Click Image to Zoom

Appendix F
Alternative Uses Instructions

1. Alternative Uses

Developed by J.P. Guilford in 1967, the Alternative Uses Test stretches your creativity by giving you two minutes to think of as many uses as possible for an everyday object like a chair, coffee mug, or brick. Here's a sample brainstorm for "paper clip" uses:

- Hold papers together
- Cufflinks
- Earrings
- Imitation mini-trombone
- Thing you use to push that emergency restart button on your router
- Keeping headphones from getting tangled up
- Bookmark

The test measures *divergent thinking* across four sub-categories:

- **Fluency** – how many uses you can come up with
- **Originality** – how uncommon those uses are (e.g. "router restarter" is more uncommon than "holding papers together")
- **Flexibility** – how many areas your answers cover (e.g. cufflinks and earrings are both accessories, aka one area)
- **Elaboration** – level of detail in responses; "keeping headphones from getting tangled up" would be worth more than "bookmark"

Try it yourself: How many uses can you think of for a test tube? You have two minutes… Go!

Appendix G
Pre-Med Career Interest

(items from Rosenthal et al., 2013)

The questions below used the following scale:

1	2	3	4	5	6	7
Not at all interested	Unintereste d	Slightly unintereste d	Neutra l	Slightly intereste d	Intereste d	Very intereste d

1. How interested are you in pursuing a career as a Physician?

2. How interested are you in continuing with the Pre-Med track?

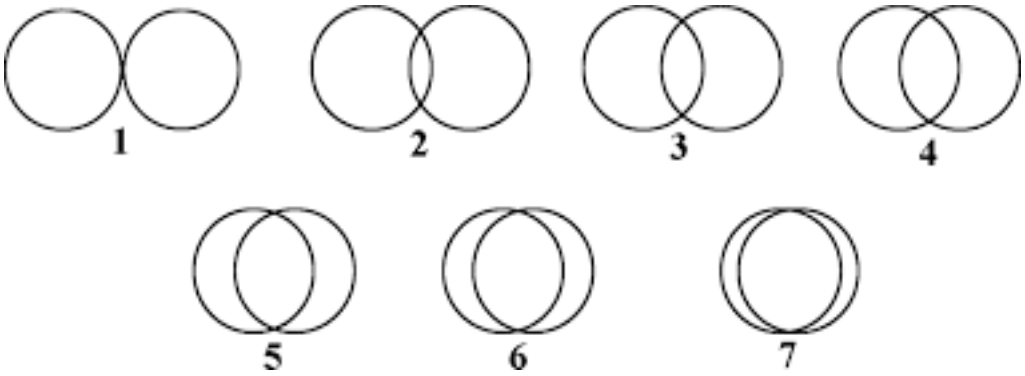
The questions below used the following scale:

1	2	3	4	5	6	7
Not at all excited	Unexcited	Slightly unexcited	Neutral	Slightly excited	Excited	Very excited

3. How do you feel about a career as a Physician?

4. How do you feel about Pre-Med?

5.Please select which picture below which best describes your compatibility with Pre-Med.



Appendix H
DNA Task: Self-Assessment

1. Which of these describes your experience with the hands-on DNA building activity?

1	2	3	4	5	6	7
Very easy	Easy	Somewhat easy	Neutral	Somewhat hard	Hard	Very hard

2. Which of these describes your experience with the hands-on DNA building activity?

1	2	3	4	5	6	7
Very boring	Boring	Somewhat boring	Neutral	Somewhat fun	Fun	Very fun

3. Do you believe that the hands-on DNA building activity was effective for its intended purpose?

1	2	3	4	5	6	7
Not at all effective	ineffective	Somewhat ineffective	Neutral	Somewhat effective	effective	Very effective

Appendix I
Alternative Uses: Self-Assessment

(Hoyt & Simon, 2011)

The questions below used the following scale:

1	2	3	4	5	6	7
Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

1. I performed well on the alternative uses creative thinking task I just completed.
2. I am content with how well I did the alternative uses creative thinking task.
3. This alternative uses creative thinking task was difficult.
4. I felt a lot of pressure during this alternative uses creative thinking task.
5. This alternative uses creative thinking task was hard.
6. I felt I was under a lot of pressure during this alternative uses creative thinking task.
7. This alternative uses creative thinking task game was very demanding.
8. I was anxious about completing this alternative uses creative thinking task.

Appendix J
Role Model Identification

(items from Dasgupta & Asgari, 2004)

The questions below used the following scale:

Not at All										Very
1	2	3	4	5	6	7	8	9	10	11

1. How successful do you consider Dr. Sarah Brookheart?
2. How much do you admire Dr. Sarah Brookheart?
3. Think about the success Dr. Sarah Brookheart has achieved. To what extent do you think that someday in the future, you might reach a similar level of success in medicine?
4. Do you think it is possible for most other women to be as successful as Dr. Sarah Brookheart?

Appendix K
Role Model Perceptions

The questions below used the following scale:

1	2	3	4	5	6	7	8	9	10
Not at all									Completely

1. How relevant did you find the article about Sarah Brookheart?
2. How similar do you think you are to Sarah Brookheart?
3. How inspiring is Sarah Brookheart?
4. How competent does Sarah Brookheart seem?
5. How likable is Sarah Brookheart?
6. How likely do you think you could accomplish what Sarah Brookheart has accomplished?

Appendix L

Role Model Impact on Pre-Med Career Interest

The questions below used the following scale:

1	2	3	4	5	6	7
A lot less	Less	Somewhat less	Neutral	Somewhat more	More	A lot more

1. How did hearing Sarah Brookheart's interview make you feel about your Pre-Med track?
2. How did hearing Sarah Brookheart's interview make you feel about a potential career in Medicine?

Appendix M
Sense of Belonging in Pre-Med

(Rosenthal et al., 2013)

The questions below used the following scale:

Completely Disagree									Completely Agree
1	2	3	4	5	6	7	8	9	10

1. I feel like I fit in the pre-med track.
2. I feel welcome in my major.
3. I feel comfortable in the pre-med track.
4. I feel thrilled to be in the pre-med track.

The questions below used the following scale:

Not At All									Very
1	2	3	4	5	6	7	8	9	10

5. How much do you like your professors?
6. How comfortable do you feel with your professors?
7. How much do you like your peers in your major?
8. How comfortable do you feel with your peers in your major?

Appendix N
Demographic Information

1. Age _____

2. Year in school :
   _____ 1st year/Freshman
   _____ 2nd year/Sophomore
   _____ 3rd year/Junior
   _____ 4th year/Senior
   _____ 5th year or beyond

1. Ethnicity (Check all that apply):
   _____ Asian American
   _____ Black/African American
   _____ Caucasian/European American
   _____ Hispanic/Latino(a)
   _____ Native American
   _____ Other
   If 'Other' please specify: _____

4. Major(s):_____
   Minor(s):_____

5. Do you plan to pursue the pre-med track?_____

6. Do you plan on going to graduate school:
   Yes/No/Unsure
   If yes, please list the areas you are considering studying in graduate school:
   _____
   _____
   _____

7. What is your gender? Male/Female/Other

Appendix O
Code Book for DNA Model

How complete is the puzzle?

1. Incomplete (e.g. little to no attempt is made to make the model or participant made model that does not twist at all)
2. Somewhat complete (e.g. only parts of the model are complete; model is missing parts; incorrectly twisted)
3. Nearly perfect (e.g. doesn't stand up but is correctly assembled)
4. Perfect

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