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The Effects of Stereotype Threat on State Levels of Stigma Consciousness and Overall Performance on a Stereotype-Relevant Task

Gwenith Blount-Nuss

THE EFFECTS OF STEREOTYPE THREAT ON STATE LEVELS OF STIGMA

CONSCIOUSNESS AND OVERALL PERFORMANCE ON A STEREOTYPE-RELEVANT

TASK

by

GWENITH BLOUNT-NUSS

(Under the direction of Amy A. Hackney)

ABSTRACT

Situational anxiety surrounding performance has been shown to adversely impact task performance by members of negatively stereotyped groups, creating a stereotype threat effect. This study tested the hypothesis that the anticipation of being stereotyped, known as stigma consciousness, is one of many contributing factors to the expression of stereotype threat effects. One area in which stereotype threat has been shown to exist is in the domain of mathematics, with females being negatively stereotyped in the subject and often underperforming relative to males. In this study, male and female participants were presented with a stereotype prime manipulation and then asked to complete a mathematical assessment and the Stigma Consciousness questionnaire. Results failed to replicate past research or lend support to the primary hypothesis. Limitations of the study as well as future directions are discussed.

INDEX WORDS: Stereotype, Stereotype threat, Stigma consciousness, Math performance

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GWENITH BLOUNT-NUSS

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Major Professor: Amy A. Hackney

Committee: Kent Bodily

                    Janice N. Steirn

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TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

"The whole idea of a stereotype is to simplify. Instead of going through the problem of all this great diversity - that it's this or maybe that - you have just one large statement; it is this."

-Chinua Achebe

Targets of stigma face a particular dilemma: because of their "tainted" identity, they are forced to contend with not only any self-doubt they may personally have, but also the collective doubt that society holds of them as a consequence of that identity. The essence of stigmatization extends into achievement, such that any failure is seen by the stigmatizer as an inevitability while any success is regarded merely as an exception to the rule. This incongruity between what a stereotype says a person is capable of achieving and what the person knows he or she is actually capable of achieving creates a conflict within the individual; the stereotyped person may then feel a desire to overcome the particular disadvantage the stereotype suggests that he or she owns. Unfortunately, performing at an optimal level can be difficult to do when there is the added pressure of attempting to disconfirm a negative stereotype.

Logel and her colleagues (Logel, Iserman, Davies, Quinn, & Spencer, 2009) likened this conundrum to the double-consciousness which W.E.B. DuBois discusses in his book, *The Souls of Black Folk* (1903). DuBois posited that a Black man in early 1900's America "ever feels his two-ness [...] two warring ideals in one dark body." While DuBois was writing specifically about struggling to unify the seemingly incongruent identities of being an American while also being Black, an examination of psychological literature on the nature of stereotypes reveals that difficulty in reconciling two seemingly conflicting aspects of self is a theme which repeats itself

time and again. Perhaps this is nowhere more evident than in the research of stereotype threat; this was, in fact, to what Logel was referring when she drew the parallel.

An Introduction to Stereotype Threat

What causes underachievement? Stereotype threat research demonstrates that situational cues about anticipated performance explain a significant amount of the underachievement in members of stereotyped groups. According to Steele (1997, p. 614):

> *"It is the social-psychological threat that arises when one is in a situation or doing something for which a negative stereotype about one's group applies. This predicament threatens one with being judged or treated stereotypically, or with the prospect of conforming to the stereotype."*

Steele's intention was to clarify that threat effects are not born of the stereotyped individual as much as they are dependent upon cues in the environment which signify lowered expectations for performance. It is a provoked fear of being evaluated as a member of a group and not as an individual, a fear of being stereotyped and subsequently confirming a stereotype, which leads to the situation as being self-threatening. If a self-threatening situation leads to assessment, underachievement on the assessment becomes increasingly likely as a result of the heightened pressure to perform well.

Stereotype threat effects have been researched and produced in several different demographics and arenas, including: Black and White athletes who anticipated competing on tasks which were framed to hold a negative stereotype for their respective ethnicity (Stone, Lynch, Sjomeling, & Darley, 1999); threatened men who were tested on social sensitivity (Koenig & Eagly, 2005); interest in leadership positions and ideal career choices for women who had been primed with television ads that contained traditional gender stereotypes (Davies, Spencer, Quinn, & Gerhardstein, 2002; Davies, Spencer, & Steele, 2005); subconscious displays

of anxiety in threatened homosexual males who were interacting with young children (Bosson, Haymovitz, & Pinel, 2004); performance by female chess players who were told they were competing against a male (Maass, D'Ettole, & Cadinu, 2008); and memory recall of elderly participants who had been primed with a negative stereotype about the elderly (Levy, 1996).

Intellectual Performance under Stereotype Threat

The majority of stereotype threat research, however, is focused in academics, a place where assessment is already commonplace. Researchers have intensely studied stereotype threat's effects on academic achievement in college students, a population which places value in education and academic success. In the classic study of stereotype threat, Steele and Aronson (1995) proposed that myths about the innate inferior intelligence of Blacks compared to Whites, and the subsequent expected lower academic performance resultant of those myths, creates an increased pressure among Black students to disconfirm the negative stereotype commonly held of their ethnic group that they are intellectually deficient. Steele and Aronson further proposed that this pressure would have the unfortunate side-effect of suppressing intellectual performance as a result of increases in anxiety and doubt.

In their study, Steele and Aronson found that Black participants scored lower than White participants on a verbal test when the assessment was framed as predictive of intellectual ability, a domain in which non-Asian ethnic minorities are stereotyped to be inferior to Whites. However, Black participants in a non-stereotype-threat condition, who were told the assessment would be used to evaluate problem solving strategies and was not diagnostic of intelligence, did not show the same decrease in performance; Black participants in this latter condition produced scores statistically equivalent to the scores of their White peers. Additionally, Study 3 confirmed

that inclusion in the threat condition increased motivation to disprove other relevant stereotypes about the primed identity. Specifically, threatened Black participants avoided self-reported associations with stereotypically "Black" music (such as rap), sports (basketball), and personality traits (laziness and aggression) more than did their non-threatened Black peers. This was a clear indication of the Black participants' attempts to disconfirm all the presented ethnic stereotypes, both cultural and intellectual.

There have been studies on the effects of stereotype threat on the academic performance of several disadvantaged groups, such as families from low SES homes (Croizet & Claire, 1998) and students from underrepresented high schools at a prestigious institution (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010). However, the bulk of research on stereotype threat and intellectual performance has focused on two populations in particular: Blacks in general academic settings and women in high-level mathematical domains.

The landmark stereotype threat study on women's underachievement on upper-level quantitative assessments was conducted by Spencer, Steele, and Quinn (1999). In a series of studies, they demonstrated that women underperformed on mathematics tests compared to men but only on difficult math tests that stretched towards the edge of the participants' abilities; on easier tests, women who believed their scores were to be compared to male scores (the threatened condition) performed just as well as female participants in the non-threat condition and all male participants. Additionally, characterizing the more difficult test as gender-fair (that is, having been shown in the past to be free of gender bias) was enough to eliminate this gap in performance between the sexes. Several other studies have demonstrated this same result: nullifying the expectation that women are expected to underperform on a particular test before

the assessment is administered consistently improves the overall performance of female test-takers (Brown & Pinel, 2003; Smith & White, 2002; Spencer et al., 1999).

A stereotype threat can also be nullified by implicitly priming an advantageous personal identity. In one study, groups of Asian-American women were brought into a lab and primed with either their ethnic or gender identity, then given a mathematical assessment (Shih, Pittinsky, & Ambady, 1999). The researchers hypothesized that those primed with their ethnic identity would outperform those primed with their gender identity by virtue of the stereotypes that Asians are good at math and women are not good at math. This is precisely what results indicated: women primed with their gender identity significantly underperformed on the assessment compared to women primed with their ethnic identity. Women in a control condition, who were not primed with an identity, performed in between the two.

Expectation's Role in Stereotype Threat

Studies which demonstrate that female students perform at a higher level on quantitative tasks when the stereotype that women are not good at math is situationally nullified are important studies. Such studies illustrate the pervasive nature of the stereotype and its harmful effects. While some researchers have suggested that the persistent trend of underperformance of women in quantitative domains is due to innate differences in natural mathematical ability between men and women (Benbow & Stanley, 1983; Geary, 1996), studies which nullify the expectation of lower female performance provide evidence that such underperformance is more likely a situationally-induced phenomenon than a matter of biological sex differences. Were it an issue simply of inherent ability, the gender performance gap would remain even after a stereotype was experimentally nullified; instead, when an assertion is made that the particular

test the female participants are taking has shown no gender differences in the past, the gender performance gap disappears. The stereotype is contextually invalidated and as a result, the unspoken negative performance expectation which the stereotype holds is no longer relevant to the female test-takers. Subsequently, female performance is adequately elevated so that gender no longer predicts assessment outcome.

In a prime example of the powerful impact that expectational information has on performance, Cadinu, Maass, Frigerio, Impagliazzo, and Latinotti (2003, Study 1) generated differences in women's performance on a math assessment by manipulating explicit expectancy among conditions. Women in the positive expectancy condition were told they could expect to outperform men on a specific mathematical-logic test. Women in the negative expectancy condition were told that men outperformed women on the assessment. Women in the control condition were told they could expect to perform roughly the same as males on the assessment. As predicted, women in the positive expectancy condition produced the highest scores, women in the negative expectancy condition produced the lowest scores, and women in the control group produced scores in between the two.

Consistent with those results, Good, Aronson, and Harder (2008) found that when male and female students in highly selective, upper-level college math courses received information that negated gender stereotypic expectancy prior to assessment, it resulted in a gender gap where women actually significantly *outperformed* their male classmates. Those female students who were told that the assessment being administered had previously been tested many times and never shown a gender-bias predictably produced better scores than their female classmates who were not given the stereotype-nullifying information. More importantly, though, females in the

threat-nullified condition also produced higher scores on the assessment than males in both the control and nullified-threat conditions.

Among these high-achieving, math-oriented students, females had been producing coursework scores equivalent to their male peers' on a daily basis; when the negative stereotypic expectancy was experimentally removed, the females outscored their male counterparts. These results suggested to the researchers that although males outnumbered females in the upper-division class by a ratio approaching 2 to 1, the females in the class were a more select group of students than were the males in the class. The females represented a more gifted and devoted sample simply because it would more likely be that type of student that could maintain the motivation necessary for continued success in mathematics despite persistent stereotype threat. Those female students who were not as motivated to excel in mathematics, on the other hand, were more likely to have discontinued their studies in the field before taking a high-level course such as the one examined in the study. This explanation addressed both the threat-nullified condition gender gap (in which females outperformed males) and the higher male to female ratio within the classes.

The researchers' assumption that the female subjects of study were not expected to produce as high caliber of work as their male counterparts was supported by additional survey data. The sampled calculus students indicated that although both genders believed that *other people* thought males had more natural mathematical ability than females, only men reported *personally* believing that males had superior ability to females. The women in the course, meanwhile, reported that they personally did not believe in a gender gap in innate ability. The conclusion was that the expectation that women were intellectually inferior to males in quantitative domains had become so inherent and wide-spread that it was having an adverse and

persistent effect on the work of even the most talented and motivated female mathematicians. When the threat was situationally removed, it allowed the female students to perform at their optimal level.

Cadinu et al.'s (2003) and Good et al.'s (2008) research shows that individuals with a chronic stigmatization will demonstrate a decrease in cognitive performance regardless of whether a negative expectancy is made explicitly available. Just as women who are blatantly reminded of the long-held stereotype that women are not good at math underperform, so too do women who are given no indication of sex differences in math performance prior to testing (Dar-Nimrod & Heine, 2006; Good et al., 2008; Spencer et al., 1999). In these cases, the negative expectation is carried by information contained in the stereotype itself, so that anyone with knowledge of the stereotype is aware of its implications. As such, for chronically stereotyped groups, an overt declaration of what is expected is not a necessary precursor to stereotype threat effects. Instead, the threat is internalized and ever-present, a constant reminder that others have doubt in one's ability.

Contextual Cues' Effects on Non-Stigmatized Individuals

Although non-declared performance expectations only affect members of a disadvantaged group with a stigmatized identity, even members of an advantaged group can be negatively impacted when there are explicit declarations of low performance expectations. Leyens and colleagues (Leyens, Desert, Croizet, & Darcis, 2000), for instance, demonstrated that in a control condition, males and females performed equally well on a lexical decision-making task which required identification of affective words. However, when participants were primed with the stereotype that women are better at recognizing affective cues than are men, males made

significantly more errors than women in the same condition and more errors than non-threatened participants of both genders.

In another example of how situational cues can disrupt the performance of non-stigmatized individuals, strongly math-identified White male students performed worse on a math assessment when reminded of the widening gap in math achievement between Whites and Asians (Aronson, Lustina, Good, & Keough, 1999). Their White peers in a control condition, in which no mention of ethnicity was made, did not have impaired performance. Though there is nothing in the examined stereotype to suggest that White males are not good at math, and so nothing to suggest that these participants anticipated poor performance, the White males in the stereotype threat condition produced stereotype threat effects similar to what one would expect were this test administered to a minority/disadvantaged group. The conclusion reached by the researchers was that the expectation of being compared to a "superior" group by the White participants in the threatened condition was enough to disrupt performance, even though overtly negative expectancy information was not present.

Another intriguing example of diminished performance in non-stigmatized individuals was the effect that Cadinu et al. (2003, Study 2) found of expectancy on the performance of a primed identity. American soldiers, stationed on a NATO base in Italy, were recruited to take a verbal assessment. Researchers were assessing verbal task performance by participants randomly assigned to different expectancy conditions. Though both Black and White American soldiers participated in the study, the target demographic of the study was the Black American soldiers. Half the participants were primed with their American identity, which in the context of the military base was a dominant identity. The other half were primed with their ethnic identity, which for the Black experimental targets was a subordinate identity. Within each identity

condition, half of the participants read positive expectancy information regarding their primed identity's likely performance on the task (told the test favored Americans/Blacks). The other half received negative expectancy information on their primed identity's anticipated performance (told the test favored Italians/Whites). As predicted, participants who received the positive expectancy information outperformed those who received the negative expectancy information, regardless of the socio-cultural status of their primed identity.

Some of the most telling research on the impact environmental cues can have on males in mathematics in particular, however, are those studies which demonstrate the absence of stereotype lift among male participants who are informed that a test is gender-fair. Stereotype lift is the increase in the performance of a group that experiences a perceived advantage in a given situation. For males, then, there is a perceived advantage on math assessments because they are able to make a downward comparison to females. This availability of a group to which a downward comparison can be made has been shown to elevate scores in the advantaged demographic; in the case of a pervasive stereotype, no explicit utterance of positive stereotypic expectation needs to be made to induce an increase in performance (Walton & Cohen, 2003).

When considering male and female performance on mathematics assessments, males, the perceived advantaged group, are negatively (though only slightly) impacted by information which negates their perceived gender advantage. These studies suggest that by framing the assessment as non-gender-biased, male participants become aware that they do not have the inherent benefit that their gender delivers in other math-testing situations. As a result, there are consistent, small decrements in their performance that do not appear in control conditions which are given no information about gender-relevant expectations (Brown & Pinel, 2003; Good et al., 2008; Spencer et al., 1999; Steele & Aronson, 1995).

It appears, then, that stereotype threat effects have been observed in both advantaged and disadvantaged groups. When environmental cues cause an individual to fear that inadequate performance will lead to confirmation of a stereotype, even an experimentally manufactured one, the individual feels increased pressure to perform. Likewise, when a perceived advantage is taken away, as it is when the stereotype is made irrelevant in a certain circumstance, there is an extra burden on the individual to overcome the unanticipated obstacle. In turn, these situations often have the consequence of underperformance.

Studies that demonstrate that situational cues can impact the performance of all groups, dominant and subordinate alike, have added to the mounting literature that supports Steele's (1997) assertion that stereotype threat is foremost a situational phenomenon. By demonstrating that stereotype threat effects can be induced in even high-status populations, it affirms that negative consequences linked to distinct demographics are not dependent solely upon the target's possession of a subordinate or stigmatized socio-cultural identity; in fact, even those who possess a high-status identity can be adversely affected by negative information which targets their group. Further, awareness of information which negates a perceived advantage impairs performance, indicating that members of advantaged groups are also sensitive to external cues of lowered performance expectations.

In summary of the work reviewed, stereotype threat occurs as a result of cues regarding expectation, whether those cues be internally (Shih et al., 1999; Spencer et al., 1999; Steele, 1997; Steele & Aronson, 1995) or externally (Cadinu et al., 2003; Leyens et al., 2000) activated. Additionally, members of dominant groups are impacted by cues of expectation, even in situations in which there are no negative socio-cultural expectations of them (Aronson et al., 1999; Cadinu et al., 2003). Finally, both advantaged and disadvantaged groups can be

simultaneously, though oppositely, affected by identical expectancy information, as when females produce higher scores on a math assessment when the stereotype threat is nullified but males experience a slight hindrance in performance when presented with the same information (Brown & Pinel, 2003; Good et al., 2008; Spencer et al., 1999; Steele & Aronson, 1995; Walton & Cohen, 2003).

Because of this evidence that even those with a societal advantage are not oblivious to environmental factors which may influence their group's performance, it leaves open the question of just how vulnerable the advantaged group is to these external cues. Many studies have demonstrated that stereotype threat effects can be produced in advantaged populations on relatively gender-neutral (Leyens et al., 2000) and ethnicity-neutral (Aronson et al., 1999; Cadinu et al., 2003, Study 2) tasks. To this author's knowledge, however, research has not tested whether overt negative performance expectations can completely overcome a perceived advantage. That is, are environmental cues which suggest that a stereotyped-advantaged identity is in fact a detriment within a specific situation sufficiently strong to produce stereotype threat effects? The exploration of this possibility was the goal of a preliminary pilot study.

The pilot study contained three conditions: a male threat condition, a female threat condition, and a neutral threat condition. Participants in the female threat condition read that men tended to outperform women on the test they were about to take, a ten-item math assessment. Participants in the male threat condition read that women tended to outperform men. Participants in the neutral threat condition read only that the questions had shown a gender bias in the past, but the direction of bias was not specified. The sample was composed of 56 undergraduate students, 26 males and 30 females. Though none of the statistical tests reached significance, the means suggested that males in the male threat condition were impacted by negative performance

expectancy information; there was an interaction effect that may have reached conventional levels of statistical significance had the study not been underpowered due to small sample size.

Summary

When the threat is a well-known stereotype, the implications of the threat are inescapable; the stereotyped cannot affect the content of the stereotype any more than they can affect its cultural persistence. However, even if test-takers do not approach the situation with the burden of a negative stereotype or of an internalized sense of an in-group weakness which such a stereotype might suggest, they are still not immune from suffering the ill-effects of anticipating impaired performance. For each person, stigmatized or not, it is the situation which is the primary determinant of outcome, regardless of the means in which that outcome came into being.

The results of the pilot study suggest that even those who should expect high performance under normal circumstances are vulnerable to environmental cues which hint that they are at a context-specific disadvantage. Because performance can be influenced by both implicit (Spencer et al., 1999; Steele & Aronson, 1995) and explicit (Aronson et al., 1999; Cadinu et al., 2003; Good et al., 2008) performance expectations, it follows that the primary observable difference between stereotype threat and context-specific threat is the extent to which the performance expectation is widely acknowledged and implicitly available, in the form of a socio-cultural stereotype. That assumption is strongly supported, based on research that examined the effects that anticipation of diminished performance can have on performance (Cadinu et al., 2003; Leyens et al., 2000). The pilot study provided additional support for this assumption. However, a similarity in external symptoms does not necessarily indicate a similarity in internal processes. That is, though the surface, observable effects (i.e., impaired

performance) are consistent across advantaged and disadvantaged groups alike, there is no empirical evidence to support a supposition that it is the same underlying cause which is producing the detriments.

In fact, Cadinu et al. (2003, Study 2) found that although the expectancy condition mediated the relationship between stereotype threat and performance for the threatened minority condition participants (when Blacks were negatively compared to Whites), it was not a significant mediator for the threatened majority identity participants (when Americans were negatively compared to Italians). This result led the researchers to propose that although the outward expression of stereotype threat appears to be the same for both threatened dominant groups and threatened subordinate groups, there is almost certainly a different underlying mechanism for the observed effects between the two groups. They further speculated that "in the case of majority group members [decreased performance is] simply the result of a temporary situational pressure, whereas for minority members a history of stigmatization leads these individuals to lower their level of expectation which in turn causes the performance decrement" (p. 282).

While research on stereotype threat has been abundant, the search for its source is yet to yield one unifying mechanism which can explain the experience of all those who demonstrate its effects. Research has found evidence for the mediating effects of anxiety (Osborne, 2007; Spencer et al., 1999; Steele, 1997; Steele & Aronson, 1995), implicit stereotype activation (Davies et al., 2002; Keller, 2002; Kiefer & Sekaquaptewa, 2007; Nguyen & Ryan, 2008), decreases in working memory capacity (Schmader & Johns, 2003), and negative performance expectancies (Cadinu et al., 2003; Keller & Bless, 2005) in threatened research participants. I

propose that another explanation, state levels of stigma consciousness, might help to illuminate the roots of stereotype threat deficiencies.

Stigma Consciousness and its Impact on Expectations

It is important to realize that not all stigmatized individuals experience their stigmatized status in the same way. The construct of stigma consciousness (Pinel, 1999) yields some insight into how different people interpret their stigma. It is a measure of individual differences that targets the stigmatized person's level of self-consciousness regarding their own stigma; more specifically, it is a reflection of the extent to which a stereotyped person believes that his or her stigmatized identity affects daily interactions with members of the outgroup.

Stigma consciousness levels are assessed with a ten-item questionnaire. Items can be re-worded for different demographics in order to address the identity which is to be examined. For example, the Stigma Consciousness Questionnaire for Women contains statements such as "When interacting with men, I feel like they interpret all my behaviors in terms of the fact that I am a woman." The item can be tailored to assess stigma consciousness levels in any group by swapping the ingroup and outgroup for the appropriate targets. Participants taking the questionnaire answer each item based on a 7-point scale ranging from "strongly disagree" to "strongly agree," with several reverse scored items.

While stigma consciousness bears resemblance to several other constructs, it has been validated as a separate construct, distinct from group identity, group consciousness, stigma schematicity, and stereotype threat (Pinel, 1999). With regards to stereotype threat, it is closely related in that as stereotype threat represents a fear of confirming a stereotype through

performance, high levels of stigma consciousness indicate an expectation that one will be stereotyped by others regardless of the quality of performance that is exhibited.

Studies on stigma consciousness and stereotype threat have demonstrated their inter-relatedness. For example, in one study, stigma consciousness predicted academic performance in academically stereotyped ethnic groups, specifically latino/as and Blacks (Brown & Lee, 2005). Those non-Asian ethnic minorities who reported lower levels of stigma consciousness had GPAs similar to their non-stigmatized White and Asian-American peers. However, those members of the negatively stereotyped groups who had higher levels of stigma consciousness had significantly lower overall GPAs than the non-stigmatized and low stigma conscious students.

Another study (Pinel, Warner, & Chua, 2005) on stigma consciousness' effect on academic performance in ethnic minorities found similar results to Brown and Lee's (2005) study, but furthered the research by examining its impact on academic disengagement and self-esteem. Results showed a gender difference such that increased levels of stigma consciousness in stigmatized males predicted lower GPAs and a greater disengagement from school. For females, stigma consciousness was negatively correlated with self-esteem but had no predictive ability for academic performance; the sample of ethnic-minority females demonstrated low GPAs compared to their White female counterparts across different stigma consciousness levels. Female levels of stigma consciousness, interestingly, were correlated to academic disengagement such that those who were high in stigma consciousness displayed decreased levels of disengagement.

In a related study, Brown and Pinel (2003) reported a relationship between high stigma conscious female participants and suboptimal performance on a mathematical assessment. In their study, Brown and Pinel recruited female participants who had at a previous research session

indicated that math was important to them and who scored either high or low in women's stigma consciousness. During the study, the participants were assigned to a low-threat or a high-threat condition before taking a mathematical assessment. Those in the low-threat condition were told that the math assessment was being used to examine factors which predicted math performance and had been proven to be free of any gender-bias. Those in the high-threat condition were told that the purpose of the study was to examine gender differences on standardized math tests. The high-threat manipulation did not overtly state a lowered expectation for women's performance compared to men's, but it was assumed by the researchers that the stereotype that women are not good at math is pervasive enough to incite stereotype threat among the female participants.

As Brown and Pinel predicted, in the high-threat condition, women high in stigma consciousness significantly underperformed women low in stigma consciousness. Also as predicted, when the threat was nullified, as it was in the low-threat condition, high stigma conscious women produced test scores equivalent to low stigma conscious women. The conclusion of the study was that stigma consciousness moderates the relationship between contextual performance expectations and actual performance.

Not only does stigma consciousness vary between individuals, it also has the added dimension that individual levels of stigma consciousness can fluctuate depending on the situation (Pinel, 1999; Pinel, 2004). Thus, while everyone has a trait level of stigma consciousness which remains relatively stable over time, changes in the environment can cause a temporarily heightened or decreased level of state stigma consciousness. There is some evidence that the consequences of temporarily elevated state levels of stigma consciousness are just as severe as are the consequences of high trait stigma consciousness. Pinel (2004) found that women high in trait stigma consciousness were more likely than women low in trait stigma consciousness to

attribute negative performance feedback from a male evaluator to sexual discrimination. However, the study also showed that when women low in trait stigma consciousness had experimentally elevated levels of state stigma consciousness, they were just as likely as trait high stigma conscious women to perceive the negative feedback as discriminatory.

Because within given situations state stigma consciousness appears to be as powerful a force as trait stigma consciousness (Pinel, 2004), we would gain additional insight into the underlying causes of stereotype threat by observing how overt expectations and stereotypic information can impact state levels of stigma consciousness. As it has been shown that stereotype threat is primarily a contextual occurrence (Shih et al., 1999; Spencer et al., 1999; Steele, 1997), task performance has been shown to be influenced by situational cues (Cadinu et al., 2003; Leyens et al., 2000), and situational cues have also been shown to impact state stigma consciousness (Pinel, 2004), manipulating anticipated test performance expectations in a student population should have an effect not only on assessment score but also on state levels of stigma consciousness. The examination of this possibility is the primary goal of the proposed study. This study also seeks to replicate stereotype threat effects in a female student population, to demonstrate contextual threat effects in a male student population, and to find experimental evidence for the influence of state stigma consciousness on math test performance.

Thus, the goals of the new study are as follows: (1) to find out whether an expectancy manipulation is sufficient to elevate or lower state stigma consciousness levels; (2) to replicate stereotype threat effects in females taking a math test such as has been demonstrated in past studies; (3) to demonstrate a contextual threat effect in a male student population taking a math test, a stereotyped-advantage task; and (4) to look for evidence that state stigma consciousness level is a mediating factor of expectancy information on performance.

CHAPTER 2

METHOD

Participants

Participants were 91 males and 131 females from a southeastern university. Ages ranged from 18-60 years old with a Mean age of 21 years and SD of 3.8 years. Sixty-seven percent of participants identified themselves as "White," 20% as "Black," 5% as "two or more ethnicities," and less than 2% identified themselves as "Asian/Pacific Islander," "Hispanic," or "Other ethnicity"; additionally, 1% preferred not to answer. Students were offered the opportunity to participate in the study for course research credit, course extra credit, and/or as experience participating in psychological research.

Males and females were randomly assigned to one of 4 conditions: male threat, female threat, neutral threat, or nullified threat.

Materials

Participants received a packet which contained a cover sheet; an instructions sheet with the expectancy information manipulation; a math assessment similar to the one used in the preliminary study but with questions reordered, three questions substituted for three easier questions, and a demographics page at the end (Appendix A); and three previously validated scales.

The Gender Identification Scale (Luhtanen & Crocker, 1992) (Appendix B) was included to control for gender identification's moderating effects of stereotype threat on math test performance (Schmader, 2002). This scale contains items such as "Being a man/woman is an important part of my self-image" and exhibited good consistency in this sample: $\alpha = .737$ for women and $\alpha = .780$ for men.

The Math Identification Questionnaire (Brown & Josephs, 2000) (Appendix C) used in Schmader's (2002) and Brown and Pinel's (2003) studies identifies low math-identified students and contains items such as "My math abilities are very important to me." This scale also demonstrated good reliability within the sample: $\alpha = .747$ for women and $\alpha = .751$ for men.

The Stigma Consciousness Questionnaire (Pinel, 1999) (Appendix D) is a scale designed to assess the degree to which participants anticipate being stereotyped. For this study, it was prepared with males and females alternated as questionnaire ingroups and outgroups, containing items such as "I never worry that my behaviors will be viewed as stereotypically male/female." Prepared for females, the Stigma Consciousness Questionnaire has a Cronbach's alpha of .74. The consistency coefficient for this sample was also adequate: $\alpha = .771$ for women and $\alpha = .638$ for men.

Procedure

Depending upon which manipulation the participant received, participants in the male threat, female threat, and neutral threat conditions read that:

> *"There is some controversy regarding gender differences on standardized mathematical tests. This test is compiled of questions which have shown a gender bias in the past (such that men/women tend to outperform women/men). The purpose of this study is to further investigate these sex differences."*

Those participants in the female threat condition read that men tend to outperform women on this assessment. Those participants in the male threat condition read that women tend to outperform men. Those participants in the neutral threat condition read only that the questions have shown a gender bias in the past, but the direction of bias was not specified.

Participants who received packets with the nullified threat manipulation read that:

> *"There is some controversy regarding gender differences on standardized mathematical tests. This test is compiled of questions which have been shown in the past to be free of*

gender bias; men and women tend to perform equally on these items. The purpose of this study is to further investigate performance between genders on these items."

Packets were placed in separate stacks for males and females to ensure that participants received the gender-appropriate Gender Identity Scale and Stigma Consciousness Questionnaire. The cover sheet indicated each packet's target, male or female. Packets were also conditionally-randomized ahead of time. Distribution of the packets to participants was monitored by a researcher.

To simulate a real-world testing situation, research sessions were held in a mock classroom within the Psychology Department and in other classrooms around the campus. After participants signed in, they were asked to seat themselves in a desk and then received their gender-appropriate packet. Participants were given some brief instructions on the study procedure: they must complete section I (the Gender Identity Scale and the Math Identification Questionnaire, with scales counterbalanced to control for possible order effects) before proceeding to section II (the math assessment) before proceeding to section III (the Stigma Consciousness Questionnaire) without skipping around in the packet. Additionally, there was a 30 minute time-limit after which participants were asked to stop working on the assessment if they had not already finished and to proceed to section III.

Once everyone had completed and submitted their packets, participants were debriefed to the true intent of the experiment. As in the preliminary study, the debriefing was followed by an informational session on academic stereotypes, stereotype threat, and how to recognize and cope with self-threatening performance information.

Collected packets were labeled with the time, date, and location of testing session.

CHAPTER 3

HYPOTHESES

It was predicted that (a) in the female threat condition, females would greatly underperform on the math assessment compared to males; (b) in the male threat condition, males would greatly underperform compared to females; (c) in the neutral threat condition, males would slightly outperform females; and (d) in the nullified threat condition, there would be no significant difference in the mean test scores of males and females.

It was predicted that for female participants: (a) in the female threat condition, they would demonstrate the highest state stigma consciousness levels of all female participants; (b) in the neutral threat condition, they would demonstrate the second highest levels of state stigma consciousness of the female participants; (c) in the nullified threat and male threat conditions, they would demonstrate the lowest levels of state stigma consciousness of the female participants. It was predicted that for male participants: (d) in the male threat condition, they would demonstrate the highest levels of state stigma consciousness of the male participants; (e) in the neutral and nullified threat conditions, they would demonstrate the second highest levels of state stigma consciousness of the male participants; and (f) in the female threat condition, they would demonstrate the lowest levels of state stigma consciousness of the male participants. It was also hypothesized that: (g) overall, males would tend to demonstrate lower levels of state stigma consciousness than females.

It was further predicted that though trait stigma consciousness is a moderating variable of the relationship between expectancy information and test score (Brown & Pinel, 2003), state levels of stigma consciousness would be found to be a mediating variable. A possible mediating role of state stigma consciousness on the relationship between expectancy condition and test

score was to be examined using Baron and Kenny's (1986) method. Using this method, it would have first been assessed whether expectancy condition is related to test score. Were there a significant relationship, the proposed mediating variable (state stigma consciousness) would have been regressed on to the expectancy condition. Were that also significant, test score would have been regressed onto both expectancy condition and state stigma consciousness level. It was expected that results would indicate a partially mediating relationship, where both expectancy condition and state stigma consciousness predicted test score.

CHAPTER 4

RESULTS

Preliminary analyses were conducted to assess average levels of gender identity and math identification. A t-test revealed a statistically significant difference in math identity between genders such that males ($M = 5.79$, $SD = 1.56$) reported a higher math identity than did females ($M = 5.25$, $SD = 1.53$), $t(220) = -2.59$, $p < .05$. There was no difference between genders on reported gender identity: males reported a M of 3.89 with a SD of .74 while females reported a M of 4.02 with a SD of .75, $t(220) = -1.28$, $p > .05$.

It was hypothesized that both males and females would experience a cognitive deficit when given negative performance expectancy information for their gender; further, it was hypothesized that these deficits would be comparable in size between genders, indicating a vulnerability to contextual identity-threat effects. It was also hypothesized that state stigma consciousness level would fluctuate depending on the type of expectancy information received. Specifically, it was expected that within each gender condition, those receiving negative expectancy information would show a heightened level of state stigma consciousness while those given positive expectancy information would show lower levels of state stigma consciousness; also, participants receiving more neutral expectancy information would show state stigma consciousness scores in between those scores derived from the positive and negative expectancy information groups. Finally, it was hypothesized that state stigma consciousness would show a predictive quality toward assessment score; specifically, it was expected that state stigma consciousness would reveal itself to be a mediator of threat condition's effect on assessment performance.

To test hypotheses, 2 (male/female) X 4 (male threat, female threat, neutral threat, and nullified threat) ANOVAs were conducted on assessment scores and on stigma consciousness scores. Results showed a main effect for participant gender on math assessment scores, $F(1, 214)$ = 11.23, $p < .05$, such that the average math assessment score was significantly higher for men ($M = 6.03$ out of a possible score of 10, $SD = 2.05$) than for women ($M = 5.16$, $SD = 1.75$). Contrary to expectations, there was no main effect of threat condition on math assessment score, $F(3, 214) = 1.23$, $p > .05$. The interaction between gender and threat was also non-significant, $F(3, 214) = .71$, $p > .05$.

As expected, there was a significant main effect of participant gender on State Stigma Consciousness scores, $F(1, 214) = 8.20$, $p < .05$, such that the average Stigma Consciousness score was significantly higher for women ($M = 4.61$ on a scale of 1 to 7, $SD = .86$) than for men ($M = 4.28$, $SD = .75$). Contrary to expectations, there was no main effect of threat condition on State Stigma Consciousness scores, $F(3, 214) = .30$, $p > .05$. The interaction between gender and threat was also non-significant, $F(3, 214) = .84$, $p > .05$.

Next, a series of ANOVAs were conducted to examine how math identity and/or gender identity may have been related to math assessment scores. Participants were categorized as either low or high in math identity via a median split. Female and male participants were independently categorized as low or high in gender identity via median splits. Results showed that there was a significant main effect of math identity on assessment scores such that those reporting a higher math identity ($M = 5.77$, $SEM = .17$) outscored those reporting a lower math identity ($M = 5.25$, $SEM = .20$), $F(1, 220) = 3.84$, $p = .05$. Further, a 2 (math identity) X 2 (gender) ANOVA showed a main effect of gender such that men ($M = 5.90$, $SD = .20$) outscored women ($M = 5.16$, $SD = .16$), $F(1, 218) = 7.95$, $p < .05$; a main effect of math identity such that those with a high math

identity ($M = 5.80$, $SD = .17$) outscored those with a low math identity ($M = 5.26$, $SD = .20$), $F(1, 218) = 4.35$, $p < .05$; and a marginally significant interaction between level of math identity and gender, $F(1, 218) = 3.113$, $p = .08$.

Assessment scores did not differ between females in the lower 50% of gender identity scorers ($M = 5.28$, $SEM = 1.69$) and those in the upper 50% ($M = 5.09$, $SEM = 1.80$), $F(1, 130) = .38$, $p > .05$. Assessment scores did not differ between males in the lower 50% of gender identity scorers ($M = 6.24$, $SEM = 2.22$) and those in the upper 50% ($M = 5.86$, $SEM = 1.90$), $F(1, 90) = .78$, $p > .05$.

The main effect of gender identity on stigma consciousness was also assessed. It was found that participants in the upper 50% of gender identity scores reported higher stigma consciousness ($M = 4.54$, $SEM = .08$) than did participants with lower gender identity scores ($M = 4.30$, $SEM = .09$), $F(1, 110) = 4.55$, $p < .05$.

Further, gender identity was shown to have some predictive value for state stigma consciousness levels between conditions. A linear regression showed that a higher gender identity for women predicted a higher level of state stigma consciousness in the neutral threat condition, $\beta = .39$, $t(31) = 2.13$; gender identity also explained a significant proportion of variance in stigma consciousness scores, $R^2 = .128$, $F(1, 31) = 4.55$, $p < .05$. Additionally, a higher gender identity for men predicted a higher level of state stigma consciousness in the nullified threat condition, $\beta = .41$, $t(22) = 2.09$; gender identity also explained a significant proportion of variance in stigma consciousness scores, $R^2 = .166$, $F(1, 22) = 4.38$, $p < .05$.

CHAPTER 5

DISCUSSION

It was hypothesized that math assessment scores and state levels of stigma consciousness would fluctuate between threat conditions. No evidence for this was found. It was hypothesized that mean math assessment score between males and females would not significantly differ, but it was found that males outperformed females on the math assessment overall. It was also predicted females would display higher overall levels of state stigma consciousness than would males. This hypothesis was supported. Finally, it was hypothesized that state stigma consciousness would show a mediating influence on threat condition's effect on math assessment outcome. Because results indicated that State Stigma Consciousness and math assessment performance were not related to threat condition, subsequent examination of a possible mediating relationship of State Stigma Consciousness between threat condition and math assessment score was unnecessary.

It is likely that low math identity played a role in the study's lack of significant findings. The Math Identity Questionnaire (Brown & Josephs, 2000) is a 9-point scale with a true neutral score of 5. Both males and females reported only a moderate level of math identification. This indicates that overall, participants did not think math skills are important for future success nor were they concerned about their math abilities. Numerous studies have shown that students who place importance on high performance are most susceptible to stereotype threat while students unconcerned about performance are less affected by lowered expectations or otherwise self-threatening cues (Spencer et al., 1999; Steele, 1997; Steele & Aronson, 1995). Because so few students in the sample placed a high level of importance on mathematical skills, perhaps it

should not be surprising that the experimental manipulation had no effect on the math assessment outcome.

Similarly, it is well established that, at least for women, a highly feminine gender identity is related to the demonstration of diminished math performance as well as a lower attitude towards mathematical domains (Inzlicht & Ben-Zeev, 2000; Schmader, 2002: Steele & Ambady, 2006). This study may have failed to reproduce this trend because of a possible ceiling effect. The mean for both genders on the gender identity scale was quite high, meaning that both males and females regarded their gender as a central component of their identity.

Finally, it is possible that the female participants were threatened by the presentation of the Gender Identity Scale and the Math Identification Questionnaire even before being exposed to the threat manipulation. Females may have been primed with the negative stereotype about their gender's mathematical abilities as a result of being confronted with an assessment of gender identity and an assessment of math identity; this in turn could have led them all to feel a stereotype threat, even those in the conditions which later gave them the positive or nullified expectancy information. Similarly, men may have experienced a stereotype lift via the presentation of the scales in question which buffered them from the negative or the nullified threat information.

If this is the case, it could explain all the findings of this study: We did not replicate past stereotype threat research trends and females did significantly worse than men on the math assessment overall because women in all conditions were operating under stereotype threat while at the same time, men in all conditions were under stereotype lift. Women's gender identity was not related to math performance in this study because the highly gender-identified sample was very susceptible to stereotype threat effects as those high in gender identity have been shown to

be (Schamder, 2002). Finally, males reported higher levels of math identity than did females and females reported higher levels of stigma consciousness than did males regardless of the threat manipulation because women felt a threat while men did not.

Speculation can only take us so far, so we must be careful to not draw hasty conclusions. Nevertheless, it is a possibility that fits the results if a poor choice of the placement of the tools used to help control for extraneous variables, the Gender Identity Scale and the Math Identification Questionnaire, had uniformly threatened female participants while simultaneously lifting male participants.

Limitations

A primary limitation of the study was the low selectivity of the sample. Many studies on stereotype threat have selected participants from a pool of highly academically-identified individuals (Brown & Pinel, 2003; Good et al., 2008; Spencer et al., 1999; Steele & Aronson, 1995). However, because of time constraints, it was impossible to do so here. As a result, the collected sample reported only a moderate level of math identity and that undoubtedly contributed in part to the lack of significant findings.

Second, more consideration must be paid to the scales which were used in the study and how to effectively administer them. While it is important to control for gender identity and math identity in this line of stereotype threat research, it was a big oversight to discount the possibility that presenting the scales first may influence participants' performance on subsequently presented items.

Another limitation which must not be ignored is the discrepancy in group size in which testing took place. Though most testing sessions contained approximately 5-10 individuals at a time, the study was run with as few as 1 participant and as many as 85 per session.

Implications for Theory and Research

Despite having few significant findings in this study, it is worth discussing the predictive quality of gender identity on stigma consciousness level which emerged from the data. For women in the neutral threat condition, a higher gender identity predicted a higher stigma consciousness level; for men in the nullified threat condition, a higher gender identity predicted a higher stigma consciousness level. These results were not reproduced in any other threat conditions for either gender suggesting that it was indeed state levels of stigma consciousness, not trait levels, which were being assessed.

Past stereotype threat literature has shown that the nullified threat and neutral threat conditions are two conditions in which males and females are likely to underperform. It has been shown that men in a nullified threat condition have somewhat lower performance than male peers in a control condition because they lose the benefit of stereotype lift (Walton & Cohen, 2003). Further, some literature shows that women tend to demonstrate the highest performance deficits under conditions in which bias is ambiguous or subtle, like the neutral threat condition in the current study (Nguyen & Ryan, 2008; Spencer et al., 1999; Steele & Aronson, 1995). There is also, however, some literature which shows that while women still underperform when subjected to subtle bias, they perform worse when confronted with blatant bias (Keller, 2002) or similarly underperform between explicitly stated and implicitly activated bias conditions (Smith & White, 2002). Nevertheless, a neutral threat condition does consistently impair female math performance and is the experimental condition which most closely approximates a natural testing scenario.

In summary, because only those participants within these conditions and with a high gender identity were affected, this result provides some evidence that a neutral threat condition

for females and a nullified threat condition for males may lead to elevated levels of state stigma consciousness for those who consider their gender to be a central component of their identity. The link between gender identity and state levels of stigma consciousness should be explored precisely because these are conditions in which males and females produce sub-optimal performance in stereotype threat research; if the two factors are interrelated, it could help to provide insight into contributors to a susceptibility to stereotype threat, both in experimental and real-world settings. At the very least, it could present a new perspective for running and then interpreting future research in stereotype threat.

Establishing a link between state stigma consciousness and situational bias may also help to further distinguish stereotype threat effects from expectancy effects. The fact that in the current study, only females in the neutral threat condition and males in the nullified threat condition were more likely to show heightened state stigma consciousness is indicative of the power these types of situational cues have on those who are susceptible to those cues, in this case, those with a high gender identity. Had participant expectation played a role in the elevated stigma consciousness level, we would have expected to see elevated stigma consciousness in the female threat condition among female participants and in the male threat condition among male participants, as well. This was not observed, however, which suggests the correlation between gender identity and state stigma consciousness may be most strong in those situations when bias is on a more implicit level.

Future Directions

The idea that gender identity and state levels of stigma consciousness are related is consistent with research which shows that deemphasizing personal identities by focusing on similarities between ingroups and outgroups before completing a stereotype-relevant task

increases the performance of the negatively stereotyped group (Ambady, Paik, Steele, Owen-Smith, & Mitchell, 2004; Rosenthal & Crisp, 2008; Rosenthal, Crisp, & Suen, 2007). If a research participant's personal identity is deemphasized before completing a stereotype-relevant task, state stigma consciousness levels should drop in a co-occurrence with optimal task performance. Likewise, if research participants are aware they are participating in a task associated with a stereotype but also no longer feel that the stereotype applies to their highly-internalized group category more than it does to any other group, state stigma consciousness level should also decrease.

Future research would do well to examine the relationship between gender identity and stigma consciousness in general, but a particular emphasis on how gender identity affects state levels of stigma consciousness under conditions associated with stereotype threat is definitely warranted. The factors which contribute to impaired performance are so numerous and interact in such complex ways that previous findings can often be hard to reproduce. As a consequence, perhaps in this area of study more than some others, any possible new mechanisms which come to light through research should be pursued.

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APPENDIX A
MATHEMATICAL ASSESSMENT

Depending upon which manipulation the participant received, participants in the male

threat, female threat, and neutral threat conditions read that:

> "There is some controversy regarding gender differences on standardized mathematical tests. This test is compiled of questions which have shown a gender bias in the past (such that men/women tend to outperform women/men). The purpose of this study is to further investigate these sex differences."

Those participants in the female threat condition read that men tend to outperform

women on this assessment. Those participants in the male threat condition read that women tend

to outperform men. Those participants in the non-gender-specified threat condition read only

that the questions have shown a gender bias in the past, but the direction of bias was not

specified.

Participants who received packets with the nullified threat manipulation read that:

> "There is some controversy regarding gender differences on standardized mathematical tests. This test is compiled of questions which have been shown in the past to be free of gender bias; men and women tend to perform equally on these items. The purpose of this study is to further investigate performance between genders on these items."

All participants were asked:

What is your gender?

    ___ Male   ___ Female
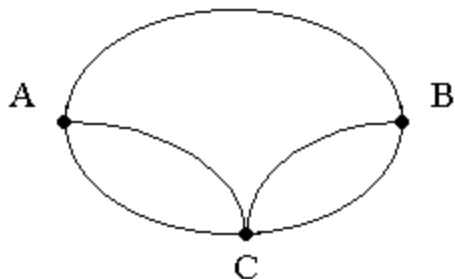
1. Stacy has to visit towns B and C in any order. The roads connecting these towns with her home are shown on the diagram. How many different routes can she take starting from A and returning to A, going through both B and C (but not more than once through each) and not travelling any road twice on the same trip?

A. 10
 B. 8
 C. 6
 D. 4
 E. 2

2. Compare two quantities, A and B. Given: $2x + 4 = 8$, $5y = 40$

A) y/x B) $16x/y$

A: A is greater than B
B: B is greater than A
C: A and B are equal
D: There is not enough information provided to determine the relationship between A and B.

3. There are fifteen marbles in a jar: 3 red, 7 blue, and 5 green. One marble is drawn at random.

Column A	Column B
1 in 3	The chance of selecting a green marble

A: The quantity in Column A is greater.
B: The quantity in Column B is greater.
C: The two quantities are equal.
D: The relationship cannot be determined from the information given.

4. Of the following, which is greater than ½ ?

A. 2/5
 B. 4/7
 C. 4/9
 D. 5/11
 E. 6/13

5. If $a > 0$, then $(8^a)(2^a)$

A: 16^a
B: 16^{2a}
C: 2^{2a}
D: 2^{3a}

6. If a = 2, then $3a + (a^3)^2 =$

A: 73
B: 70
C: 7
D: 12
E: 27

7. (√2 - √3)² =

A. 5 - 2√6
 B. 5 - √6
 C. 1 - 2√6
 D. 1 - √2
 E. 1
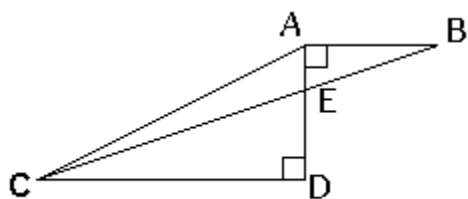
8. In the figure above AD = 4, AB = 3 and CD = 9. What is the area of triangle AEC ?

A. 18
 B. 13.5
 C. 9
 D. 4.5
 E. 3

9. Arnold has enough gas to last him for thirty days. If he starts using 50% more gas, how many days will the same supply last him?

A. 10
B. 12
C. 15
D. 20
E. 25

10. 60% of 3 is:

A.1 1/2
B. 1 4/5
C. 1 3/4
D. 1 5/8

Demographics Page

1.) What is your race/ethnicity?

__ White/Caucasian   __ Black/African-American   __ Hispanic/Latino/a

__ Asian/Pacific Islander   __Other ethnicity/race   __ 2 or more ethnicities/races

__ I prefer not to answer

2.) What is your age (in years)?   _____ years

3.) Please indicate your class standing as of this semester:

    ___ Freshman   ___ Sophomore   ___ Junior   ___ Senior

4.) What was the semester and year of your last high school or college-level math course?

    Semester/quarter:_____   Year: _____   Full-year course? Yes No

5.) Please indicate your overall G.P.A. as of the end of last semester:
    ___ Below 2.0   ___ 2.0 – 2.5   ___ 2.6 – 3.0

    ___ 3.1 – 3.5   ___ 3.6 – 4.0

APPENDIX B
GENDER IDENTIFICATION SCALE (Luhtanen & Crocker, 1992)

For the statements below, indicate the extent to which you agree or disagree with each statement.
Please **circle the number** of your response:

1.) Being a woman/man is an important part of my self-image

    1-----------2-----------3-----------4-----------5
  Strongly   Strongly
  Disagree   Agree

2.) Being a woman/man is unimportant to my sense of what kind of person I am   (R)

    1-----------2-----------3-----------4-----------5
  Strongly   Strongly
  Disagree   Agree

3.) Being a woman/man is an important reflection of who I am

    1-----------2-----------3-----------4-----------5
  Strongly   Strongly
  Disagree   Agree

4.) Being a woman/man has very little to do with how I feel about myself   (R)

    1-----------2-----------3-----------4-----------5
  Strongly   Strongly
  Disagree   Agree

APPENDIX C
MATH IDENTIFICATION QUESTIONNAIRE (Brown & Josephs, 2000)

For the statements below, indicate the extent to which you agree or disagree with each statement. Please **circle the number** of your response:

1. My math abilities are very important to me.
     1-------2-------3-------4-------5-------6-------7-------8-------9
     Strongly   Strongly
     Disagree   Agree

2. Math abilities are not important to my success in school.   (R)
     1-------2-------3-------4-------5-------6-------7-------8-------9
     Strongly   Strongly
     Disagree   Agree

3. If I took an IQ test of my math abilities (a test of my natural math abilities, on which studying really would not help) and I did poorly on this test, I would be very bothered.
     1-------2-------3-------4-------5-------6-------7-------8-------9
     Strongly   Strongly
     Disagree   Agree

4. I don't care at all if other people believe that I am good at math.   (R)
     1-------2-------3-------4-------5-------6-------7-------8-------9
     Strongly   Strongly
     Disagree   Agree

5. Math abilities will probably be very important to me in my future career.

     1-------2-------3-------4-------5-------6-------7-------8-------9
     Strongly   Strongly
     Disagree   Agree

APPENDIX D
STIGMA CONSCIOUSNESS QUESTIONNAIRE, edited for women (Pinel, 1999)

For the statements below, indicate the extent to which you agree or disagree with each statement. Please **circle the number** of your response:

1.) Stereotypes about women have not affected me personally (R)

   1-----------2-----------3-----------4-----------5-----------6-----------7
  Strongly   Strongly
  Disagree   Agree

2.) I never worry that my behaviors will be viewed as stereotypically female (R)

   1-----------2-----------3-----------4-----------5-----------6-----------7
  Strongly   Strongly
  Disagree   Agree

3.) When interacting with men, I feel like they interpret all my behaviors in terms of the fact that I am a woman

   1-----------2-----------3-----------4-----------5-----------6-----------7
  Strongly   Strongly
  Disagree   Agree

4.) Most men do not judge women on the basis of their gender (R)

   1-----------2-----------3-----------4-----------5-----------6-----------7
  Strongly   Strongly
  Disagree   Agree

5.) My being female does not influence how men act with me (R)

   1-----------2-----------3-----------4-----------5-----------6-----------7
  Strongly   Strongly
  Disagree   Agree

6.) I almost never think about the fact that I am female when I interact with men (R)

1----------2----------3----------4----------5----------6----------7
Strongly   Strongly
Disagree   Agree

7.) My being female does not influence how people act with me (R)

1----------2----------3----------4----------5----------6----------7
Strongly   Strongly
Disagree   Agree

8.) Most men have a lot more sexist thoughts than they actually express

1----------2----------3----------4----------5----------6----------7
Strongly   Strongly
Disagree   Agree

9.) I often think that men are unfairly accused of being sexist (R)

1----------2----------3----------4----------5----------6----------7
Strongly   Strongly
Disagree   Agree

10.) Most men have a problem viewing women as equals

1----------2----------3----------4----------5----------6----------7
Strongly   Strongly
Disagree   Agree