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INSTRUCTION TYPE AND STEREOTYPE THREAT
IN ANALYTICAL REASONING:
CAN CREATIVITY HELP?

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Psychology:
General Experimental Psychology

by
Erica Rachel Mitchell
September 2008

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September 2008

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ABSTRACT

Stereotype threat is a situational threat that affects a specific social group in which there are certain negative stereotypes. Certain conditions must exist in order for stereotype threat to be present; it is likely to be relevant whenever there is a negative stereotype about a particular group. Women and mathematical reasoning is an example of a stereotype threat condition; there exists a negative stereotype about women's abilities in math. The purpose of this study was to look at the effect of instruction and emphasis on female performance on an analytical reasoning task. This task was framed as a creative task, an analytical reasoning task, or there was no framing present. Included in the instructions were also two different statements about gender differences. Participants were either told that gender differences have been found on this task, or that there had been no gender difference on this task. This study found that performance did differ as a result of instruction type, with creative instructions yielding higher scores. Varying instruction type performance can improve performance on an analytical reasoning task.

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TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
CHAPTER ONE: LITERATURE REVIEW	
Introduction	1
Sex Differences in Cognition	4
Stereotype Threat and Women	6
How Instructions can Alleviate Stereotype Threat	10
Framing and Priming	13
Summary and Hypothesis	16
CHAPTER TWO: METHOD	
Participants	20
Instruments	22
Procedure	23
CHAPTER THREE: RESULTS	
Presentation of Findings	26
CHAPTER FOUR: DISCUSSION	
Implication of Findings	31
Limitations	36
Future Research	38
APPENDIX A: TABLES	40
APPENDIX B: FIGURES	45
APPENDIX C: INSTRUCTIONS	48

APPENDIX D: LAW SCHOOL ADMISSION TEST QUESTIONS	53
APPENDIX E: DEMOGRAPHICS	70
APPENDIX F: REMOTE ASSOCIATION TEST.	73
REFERENCES	79

CHAPTER ONE
LITERATURE REVIEW

Introduction

Stereotype threat is a situational threat that refers to the stigmatized individual's concern with conforming to, confirming, or being evaluated in terms of a negative group stereotype (Steele, 1997; Steele, Spencer, & Aronson, 2002). When targets of stereotypes are reminded of the possibility of confirming these stereotypes, or inadequacy in a relevant domain, stereotype threat will occur (Ben Zeev, Fein, & Inzlicht, 2005). For example, African Americans taking a standardized test may be aware that their group tends to do poorly in that situation and thus feel a threat, or fear of conforming to the stereotype threat (Aronson, Quinn, & Spencer, 1998; Steele, & Aronson, 1995; Steele, 1997). This threat creates stress, which in turn can impair performance. Steele and Aronson (1995) showed that inducing stereotype threat caused African Americans' performance on an intellectual task to decrease.

There are certain conditions that must exist in order for stereotype threat to be present. There needs to be a situation in which there is a negative group stereotype

concerning their performance in a domain. There also needs to be an awareness of the negative stereotype of that group, as well as a personal belief that the task that one is doing truly reveals their ability in that domain (Smith & White 2001; Steele, 1997). Some examples of stereotyped groups in their threatened domains are woman in math and African Americans, Latinos, and students of low socioeconomic status in a number of academic domains (Ben Zeev, et. al., 2005).

Stereotype threat is likely to be relevant to any group for whom negative group stereotypes exist. However, Steele (1997) proposes that stereotype threat should only have a detrimental impact in individuals who are in some way identified with the domain that is being stereotyped. Stereotype threat will produce poor performance by the stigmatized group in a threatening condition (Smith & White, 2001). Threatening conditions can be merely suggestive. If it were suggested that one ethnic group outperformed another on a task, then stereotype threat would be implied. Other threatening conditions can include people feeling like they are being judged, or that they are the objects in an environment that prime the negative stereotypes and expectations (Oswald & Harvey, 2000).

Although the specific processes through which stereotypes impact performance are not known, it is theorized that stereotype threat causes ineffective task processing (Steele & Aronson, 1995). The mechanisms that cause stereotype threat are still being researched. There have been a number of potential mediators that have been explored, such as anxiety, arousal, attentional distraction, low self-efficacy, and evaluation apprehension (Ben Zeev, et. al., 2005).

Working memory capacity has been shown to decrease as an effect of stereotype threat. Schmader and Johns (2003) tested the hypothesis that stereotype threat reduces an individual's working memory. Their results for the first two experiments showed that priming self-relevant stereotypes for both women and Latinos reduced working memory capacity. In the third experiment, Schmader and Johns showed that a reduction in working memory capacity actually mediates the effect of stereotype threat on women's math performance. This study suggests that the reason a stigmatized group performs poorly on a cognitive task when they have had a stereotype primed may be because it interferes with their attentional resources.

There has also been research done to examine ways to prevent stereotype threat from occurring. Spencer et. al. (1999) found that when females were told that gender differences on a math task occurred, females scored worse than those who were told there were no gender differences. Previous research has shown that when people from stereotyped groups are able to misattribute their arousal when doing achievement based tests they do much better on these tests than those from the same group who are not able to misattribute their arousal (Ben Zeev, et, al., 2005).

Sex Differences in Cognition

Current research on sex differences in cognition shows the main areas that males and females differ is in the area verbal and (Hegarty, Montello, & Richardson, 2006) and math (Ryan & Ryan, 2005). In math, males and females differ on the types of problems that are easier for them as well as how they perform through out school (De Wolf, 1981; Quinn & Spencer 2001; Robinson, Abbott, Berringer, & Busse 1996; Willingham & Cole, 1997).

De Wolf (1981) tested a sample of high school juniors and found that males took significantly more coursework in three of four math sub-areas (algebra, geometry, and

advanced math), significantly more physics courses, and scored higher than females on 6 subtests (four quantitative, one spatial ability and one mechanical reasoning). Despite these findings, females had significantly higher GPAs. Robinson, et al., (1996) studied gender differences in young children who were advanced in mathematical reasoning and found that boys scored higher than girls on 8 out of 11 quantitative measures.

In general, females tend to have higher math grades than males in childhood and adolescents. However, by age 17, males tend to outperform females on tests of mathematics and reasoning (Willingham & Cole, 1997). These differences manifest themselves on most standardized math tests (Ethington & Wolfle, 1986; Gallagher & Kaufman, 2005). Trends in standardized math test scores suggest that females score lower than males on particular types of math tests, particularly mathematical reasoning (Geary, Saults, Liu, & Hoard, 2000; Willingham & Cole, 1997). Quinn and Spencer (2001) showed that stereotype threat interfered with females' ability to formulate problem-solving strategies. Stereotype threat is one reason that females might not do so well in math.

Stereotype Threat and Women

Spencer, Steele, and Quinn (1999) hypothesized that the stress that stereotype threat produces might disrupt women's math performance. Women risk being judged by the negative stereotype that they have weaker math ability. The more difficult the test is, the worse women score. It is argued that this is due to the fact that the harder the test, the easier it is for women to confirm the negative stereotype about gender and math. Women were found to do equally well as men on easier tests, because the threat is reduced (Spencer, et al., 1999).

Not only can the level of a test's difficulty cause a stronger sense of threat, so too can the method of presentation. If a test is presented in the manner in which there are no gender differences on the test, then the stereotype threat of women's math inability become irrelevant. When participants are told there is no link between gender and test performance, women do better. (Schmader, 2002; Inzlicht & Ben Zeev, 2000). This research provides strong evidence that women's underperformance on difficult math tests results from stereotype threat, rather than hypothesized sex-linked ability differences (e.g.,

Fausto-Sterling, 1997). When stereotype threat is decreased, women's math performance improves (Spencer, et. al., 1999).

Keller (2002) tested the hypothesis that a heightened salience of stereotype threat is related to self-handicapping tendencies. He thought that participants targeted by blatant stereotype threat express stronger tendencies to search for external explanations for a possible weak performance on test than do participants in the control group. As expected, female participants in the condition of heightened salience of negative stereotypic expectations underperformed in comparison to their control group counterparts. The effect of blatant stereotype threat resulted in increased self-handicapping tendencies in women, which led to significantly impaired math performance.

Inzlicht and Ben-Zeev (2000) examined whether placing females in an environment where males outnumber them is adequate enough to cause a threatening intellectual environment that will then cause discrepancies in their performance. Results showed that when females were placed in the threatening environment of being outnumbered by males, their mathematical performance was significantly less than females who were in a non-threatening environment. Even without explicitly mentioning the threat (i.e., "Males have

been found to do better on this task"), differences between the groups were still present. This study implies that merely being around males can induce stereotype threat in females.

Schmader, Johns, and Barquissau (2004) examined the consequences of stereotype endorsement for women's self-perceptions, career intentions, and susceptibility to stereotype threat in the math domain. They surveyed women majoring in mathematics. They found that women who believe the status differences between the sexes are legitimate were more likely to endorse gender stereotypes about women's math abilities. They also found that women who tended to endorse gender stereotypes were found to be more susceptible to the negative effects of stereotype threat on their math test performance.

Schmader (2002) tested group identification as a moderator of stereotype threat effects when social identity was implicated by one's performance at a stereotype relevant task. He found that individual differences in gender identification moderated the effects of gender identity relevance on women's math performance. When their gender was linked to their performance on a math test, women with higher levels of gender identification performed worse than

men. When gender identity was not linked to test performance, women performed equally to men regardless of the importance they placed on gender identity, showing that the more prevalent the females gender is the worse their performance was.

Shih, Pittinsky, and Ambady (1999) found that when the salience of stereotyped social identity is manipulated, performance is affected. Shih et al. looked at the influence of gender salience versus ethnicity salience in a sample of Asian American women. Their results showed that the participants in the gender-salient condition performed worse on a math test than did the control group and the ethnicity primed group. Results indicate that when gender is clearly more salient, women are then more susceptible to the threat of the negative stereotype.

McGlone and Aronson (2006) primed different social identities prior to administering a standardized test of spatial reasoning (the Vandenberg Mental Rotation Test, VMRT). They found that males generally received higher scores than females, and that females in the gender primed condition achieved lower scores than those in the task-irrelevant prime (control) condition. The females for whom gender identity was made salient were at a significant

disadvantage in the VMRT performance relative to those whose identity as a college student was primed.

Lesko and Corpus (2006) found that when women who were highly identified with math were faced with a stereotype, they discounted the validity of the test more than did less identified women. However, their performance was also negatively affected in the stereotype threat condition, they performed worse when given the instructions containing stereotype threat.

How Instructions can Alleviate Stereotype Threat

Research has provided many different techniques that can be used to help alleviate stereotype threat. Some of these methods include minimizing the importance of the task, reducing the salience of stereotype, providing excuses for poor performance, allowing arousal to be attributed to other things, and changing the way in which material is presented (McIntyre, Lord, Gresky, Ten Eytck, Frye, & Bond, 2005). Examples of this are listed below, Shih et al. (1999) found that when participants were primed as Asian rather than being primed as a female, their performance on a

standardized math task increased, thereby demonstrating that when gender is made less prominent, females will do better.

Blascovich, Spencer, Quinn, and Steele (2001) conducted a study where they looked at the type of person giving instructions to participants as well as the information presented regarding racial differences in performance. African Americans performed better when they were instructed by a African American professor and when the instructions made it clear the task had no racial differences on previous performance. Not only did the instructor help to alleviate stereotype threat, but also the instructions where it was clearly stated that the task had no racial difference improved performance. Spencer (1999) also discovered that explicitly making a statement about gender differences on a given task induced stereotype threat.

In order to combat stereotype threat, instructions have proven to be useful, Good, Aronson, and Inzlicht (2003) found that if seventh grade girls were encouraged to view intelligence as malleable or to attribute academic difficulties to the educational setting, then their math performance on a standardized test increased. Johns, Schmader, and Martens (2005) tested whether informing women

about stereotype threat is a useful intervention to improve their performance in a threatening testing situation. Results demonstrated that women performed worse than men when the problems were described as a math test, but did not differ from men in the problem solving condition or in the condition in which they learned about stereotype threat.

Johns et al. (2005) designed an experiment to test ways in which to battle stereotype threat. They looked at three different conditions. In the first test condition, participants were given problems to solve that were framed as non-diagnostic problem-solving exercises. In the second test condition, they were called a measure of mathematical aptitude, and participants were told that their performance would be used to make gender comparisons. The third test condition was identical to the second, but participants were also given a description of stereotype threat. In addition, participants were also asked to rate their perception of whether gender stereotypes contributed to any of the anxiety that they felt. Results indicated that participants in the teaching-intervention condition and math-test condition were equally likely to report that gender stereotype contributed to their anxiety, and these ratings were significantly

higher than those participants in the problem-solving condition (Johns, et al., 2005).

Rosenthal and Crisp (2006) attempted to blur inter group boundaries in order to reduce stereotype threat. They found that participants who thought about overlapping characteristics answered more math questions correctly compared to both a baseline and to participants who thought about differences between genders. Thinking about other positive characteristics that one poses helps in not focusing on the task and its threat. Characteristics that have shown not to have gender differences, such as creativity, are a good to think about. It overlaps over the genders.

Framing and Priming

Decision-making can be influenced by the way options are presented. Stone, Lynch, Sjomeling, and Darley (1999) demonstrated that framing an athletic task as being cognitively-based hurt African American performance. In their study they framed a golf task as diagnostic of sports intelligence; African American participants performed significantly worse than when the task was framed as diagnostic of athletic ability; they also performed worse

when race was primed. The opposite effect took place for White participants who did better when race was primed and when they were told that the task was framed as diagnostic of sports intelligence.

When framing is used in decision making, the decisions that people make are prone to how choices are presented. The way in which information is presented can influence how participants respond to questions. Participants tend to find what is important in a set of directions, and use that to complete the task (Nutt, 1998).

Simon, Fagley, and Halleran (2004) showed that participants who had strong math skills were less influenced by framing options. It was the participants with low math skills that showed the largest framing effects; demonstrating that having strong math skills help in being able to resist reframing.

Although participants can be primed to perform poorly on a given task, self relevance is still needed (Marx & Stapel, 2006). Williams (2006) found that negatively stereotyped men outscored all other groups in their study; they argue that males in their study were not highly identified with psychology to suffer the negative effects of stereotype threat.

Framing a task can influence how participants perform. Studies in creativity have found both gender differences and no gender differences. (e.g., Baer, in press; Baer & Kaufman, 2005, in press; Kaufman & Baer, 2005; Kaufman, Baer, & Gentile, 2003; Runco & Albert, 1986). The studies that have found differences show that females tend to outperform males, particularly on verbal measures of divergent thinking or tests of remote associations (Baer, in press; Baer & Kaufman, 2005, in press; Richardson, 1985). Framing a task as a creative should therefore not cause the anxiety that other math tasks cause women. Harrington (1975) found differences in male participants' divergent thinking scores on a task when the instructions were changed. One group was encouraged to be creative with their answers and the other group was not, the group that was encouraged to be more creative had more creative alternate endings used. Katz and Poag (1979) extended Harrington's study to include females and found that when males and females were presented with one test of divergent thinking and one test of non-divergent thinking and were given instructions to be creative both males and females had an increase in creative responses. These findings can be interpreted to assume that

when participants are told to do some creatively in general they do.

Summary and Hypothesis

Stereotype threat is the fear that a person's behavior or performance will confirm an existing stereotype of a group with which that person identifies (Steele, 1997). Prior studies have shown how varying instructions to emphasize areas of weakness can induce stereotype threat and cause females to under perform (e.g., Inzlicht & Ben Zeev, 2001; Quinn & Spencer, 2001). Because studies on gender differences have not shown that there are specific gender differences in creativity we chose to use creativity as one of the instructions. Participants were given instructions to be creative, analytical, or no instructions at all, when performance was compared under these instructions, participants performed better when the instructions they received were more specific as to the type of task they were completing.

The current study will focus on participant performance on the analytical section of the Law School Admissions Test (LSAT). This task has been selected because it is ambiguous enough to be framed in different ways. In this thesis, the

task will be framed as either an analytical reasoning task, a creative reasoning task, or will be presented with no explicit instructions. In addition, participants will either be told that there have been gender differences found in the particular task (making the threat salient) or that no gender differences have been found. Also, participants were asked to rank how much they like math on a one to ten scale, in order to determine which participants identified with math. A creativity measure was also used to determine a person's creativity level.

Given the literature on stereotype threat one must identify with or like math in order for stereotype threat to take place. The first hypothesis is that there will be differences in female performance depending on if they identify with or like math. It is expected that participants that are more identified with math will fall susceptible to the threat. It is also predicted that performance will vary depending on the way in which the task is presented or framed, i.e., analytical task, creative task, or nothing is mentioned. Specifically, females are hypothesized to perform better when they are told the task is a creativity task than when it is framed as an analytic task or when it is given with no instructions. This pattern should be found

because of the lack of stereotypes about creative performance and the general improvement in creative performance in females upon explicit instruction.

The second hypothesis is that there will be differences in female performance depending on the salience of the threat. Specifically, females are hypothesized to perform better when there are told there are no gender differences compared to when they are told there are gender differences. There should also be a difference in performance for those who are more identified with math than those who are not. Females who are more identified with math should perform worse in the threatening condition, as they will be more anxious.

The second analysis will look at if being a creative person helps in reducing stereotype threat. Participants will be broken up into 2 groups those with high creative scores and low creative scores in order to see if there is also a difference in that. Threat and math identification will also be included. It is expected that participants with higher creativity scores will perform better on the task. It is also expected that participants in the no threat condition will perform better than those in the threat

condition. There should also be differences in performance depending on the participants identification with math.

CHAPTER TWO

METHOD

Participants

This study tested undergraduate students taking a psychology course from California State University at San Bernardino and visitors of the online website Dopox.com. Students that attended California State University at San Bernardino received extra credit for their Psychology course.

There were a total of 421 participants, all female, that completed this experiment. 281 of those participants completed the task online and 140 participants completed the task at California State University, San Bernardino. The mean age of the participants was 24 years old. The ethnic background of the participants was 66 African Americans, 26 Asian Americans/Pacific Islanders, 6 Indians or Middle Eastern, 115 Latinos or Hispanics, 170 White or Caucasians, 22 Native American/American Indian, 18 participants who reported other, and 2 who did not reply to this question.

Design

A 3 (type of instruction: creativity versus analytical versus no emphasis) X 2 (threat versus no threat) X 2 (like

math versus do not like math) between subject factorial design was utilized in this analysis. The first independent variable was the type of instruction; participants were either told that the task was designed to look at their analytical reasoning skills or creative reasoning skills. The second independent variable was the threat condition, some participants were told that gender differences have been found on this task, where as the other groups were told there are no gender differences. The third independent variable was whether or not the participant liked math.

Another 2 (threat versus no threat) X 2 (high creativity versus low creativity) X 2 (like math versus do not like math) between subject factorial design was also utilized in the analysis. The independent variable was threat; participants were either given instructions mentioning gender differences that were found on the task, or that no gender differences had been found on the specific task, causing either a threat or no threat. The second independent variable was the participants' creativity group and the third independent variable was whether or not the participant liked math.

Instruments

Students were given a demographic questionnaire, 24 LSAT analytic reasoning problems, and a measure of creativity (the Remote Associates Test). A computer controlled all experimental progression. It was used to administer questionnaires and directions, randomize the presentation of the stimuli, and record all the data from participants.

Demographics

A questionnaire was developed to ascertain a variety of demographic information: participant's age, gender, ethnicity, attitude towards math, previous experience with any graduate exams, i.e., GRE, LSAT, etc. The survey program generated a subject identification number that was used instead of the participant's name to ensure anonymity.

Remote Associates Test (RAT)

Participants were given 15 triads of words, in which they had to choose one word that relates them all together. Items were taken from the original form of the RAT devised by Mednick (1962; Mednick & Mednick, 1967). The RAT was designed to measure verbal fluency and the ability to make associations between different concepts; both of these characteristics are related to creativity (Mednick, 1962)

LSAT Analytical Reasoning Problems

These items were taken from Official LSAT Prep tests. They were used as the test stimuli in this project. These items are designed to measure the ability to understand a structure of relationships and to draw logical conclusions about the structure.

Procedure

On Campus

Participants arrived in the laboratory and filled out there informed consents. They were then seated in front of a computer and awaited instruction. Once everyone was seated, the participants logged onto the computer where they filled out an informed consent and then the instructions appeared for the task.

For the "analytical reasoning" condition, participants were told, "These are a series of problems that require analytical reasoning and problem solving."

For the "creative reasoning" condition, participants were told, "These are a series of problems that require creative reasoning and creative problem solving."

For the "no instructions" condition, participants were told, "These are a series of problems for you to solve."

For the "gender differences" condition, participants were then told, "Past studies have found gender differences on these problems, with males consistently scoring better than females."

For the "no gender differences" condition, participants were instead told, "There is no evidence that any one gender does better or worse than the other."

Participants used a computer to complete the tasks. All participants began working at the same time moving through the tasks at their own pace. After receiving randomly assigned instructions (either creative instructions, analytic instructions, and no instructions, and then either gender differences or no gender differences), participants began the tasks. The first exercise will be the LSAT analytical reasoning task, the RAT and then a demographic questionnaire. When participants were done, they closed the computer screen and picked up a debriefing statement and exited the room.

On-Line

For participants completing the task from the website dopox.com, all the same materials were given. They began the task by reading an informed consent and choosing yes to move on to the task. The task was given in exactly the same

manner, as above. The only difference between the participants completing the task on campus at California State University at San Bernardino versus online was the setting in which the task was taken. An analysis was conducted to determine that there were no differences in performance between participants completing the task at school versus those taking it online.

CHAPTER THREE

RESULTS

Presentation of Findings

A total of 421 participants completed the task on the computer, either online (281) or on campus in a classroom (140). The total N for each cell is presented in Table 1.

Because the participants took the test both in class and online, a between subjects analysis of variance (ANOVA) was conducted to determine if there was a significant difference in performance between the two different groups. There was no significant difference in performance based on setting where test was taken, type of instruction, threat or gender $F(1, 421) = .1.028, p = .428, n.s.$ Therefore, for the purpose of this study, it is safe to assume that taking the test in a different setting did not change performance.

The first analysis that was conducted was a 2 (threat versus no threat) X 3 (instruction type: analytical, creative, no instruction) X 2 (do not like math versus like math) between subjects ANOVA was performed to look at the differences in participants performance.

Key assumptions were checked before the ANOVA was run. There was evidence in support of the assumptions of

normality homogeneity of variance covariance matrices, linearity, and multicollinearity. There were no within cell univariate outliers detected. The variable score, which was participants' score on the LSAT, had a slight negative kurtosis.

In the demographics there was a question regarding how much the participants liked math. Participants scored on a 1 to 10 scale how much they like math. A median Split was performed and two groups were created, participants who do not like math and participants who liked math. This variable was then used in the analysis.

In order to test the hypothesis that performance will change as result of instruction type an ANOVA was conducted using instruction type, threat, and feeling toward math. There were no significant main effects for threat $F(1, 409) = .057$, $p = .811$, $\eta^2 = .000$, type of instructions $F(2, 409) = 1.341$, $p = .263$, $\eta^2 = .007$, and feelings about math $F(1, 409) = .847$, $p = .358$, $\eta^2 = .002$. The ANOVA showed that there was a significant two-way interaction between instruction type and liking math, $F(2, 409) = 3.107$, $p < .05$, $\eta^2 = .015$. Means are reported in table three. Threat by type of instruction was not significant, $F(2, 409) = .104$, $\eta^2 = .001$ and neither was threat by feelings about math $F(1, 409) = 2.46$, $p = .118$, $\eta^2 =$

.006. The three way interaction of threat by type of instruction by feelings about math was also not significant, $F(2,409) = .884$, $p=.414$, $\eta^2=.004$. All means are reported in Table 1.

Participants scored significantly different as a result of instruction type, depending on if they liked math or not. Those participants that did not like math scored 4.98 for analytical, 4.98 for creative and 5.18 for no instruction. This result was different for participants that liked math; in the analytical instruction they scored a 5.34, in the creative instruction they scored a 5.71, and in the no instruction they scored a 4.69.

After the between subjects ANOVA was analyzed the simple main effects were looked at. We split up the data for those that do not like math and for those that like math. For participants that did not like math threat did not have a significant effect on their performance, $F(1,232)=1.165$, $p=.282$, $\eta^2=.005$, nor did type of instruction $F(2,232)=.329$, $p=.720$, $\eta^2=.003$ The interaction between threat and type of instruction was also not significant $F(2,232)=.914$, $p=.403$, $\eta^2=.008$

For participants who did like math threat did not have a significant effect on performance $F(1,177)=1.24$, $p=.267$,

$\eta^2=.007$. However type of instruction did significantly predict performance $F(2, 177)=3.130, p= .046, \eta^2=.034$. There was no significant interaction between threat and type of instruction $F(2,177)=.210, p=.811, \eta^2= .002$.

Participants were scored on their performance on the RAT. A median split was conducted on their RAT scores and two groups were created high creativity and low creativity. This variable was used in the next analysis.

In order to test the hypothesis that performance will differ as a result of threat, a persons' creativity, and how much they like math, an ANOVA was conducted using the threat variable, creativity variable and the liking math variable. There were no significant main effects, threat $F(1,413)=.063, p=.802, \eta^2= .000$, like math $F(1,413)=.295, p=.587, \eta^2= .001$, and creativity $F(1,413)=1.015, p=.314, \eta^2= .002$ or significant interactions, threat and like math $F(1,413)=.439, p=.508, \eta^2= .001$, threat and creativity $F(1, 413)= .190, p=.663, \eta^2= .000$, feelings about math and creativity $F(1, 413)= .738, p=.391, \eta^2= .000$, threat and feelings about math and creativity $F(1, 413)=2.128, p=.145, \eta^2 =.005$ in this analysis. All means are reported in Table 2.

The simple main effects were also analyzed, the data was split into two groups those with low creativity score and those with a high creativity score. For those with high creativity performance did not significantly differ as a result of feelings about math $F(1, 125)=.034, p=.854, \eta^2=.000$, nor did it differ as a result of threat $F(1,125)=.162, p=.688, \eta^2=.001$. There were no significant interactions between feelings about math and threat $F(1,125)=.218, p=.642, \eta^2=.002$.

For those with low creativity, there were no significant mean differences as a result of feelings about math $F(1,288)=1.636, p=.202, \eta^2=.005$, or as a result of threat $F(1,238)=.029, p=.866, \eta^2=.000$. There was however a significant interaction between feelings about math and threat $F(1, 288)=3.742, p=.054, \eta^2=.013$, means are reported in Table 4. Because this interaction was significant, it shows that those with lower creativity scores are show the same effects of stereotype threat as the above studies, whereas those with high creativity did not follow this pattern.

CHAPTER FOUR

DISCUSSION

Implication of Findings

Prior research has shown that there are different ways of reducing stereotype threat and improving performance. The aim of this study was to see if giving different instructions - specifically, instructions that emphasize creativity - would change performance on a given task. We found that performance did indeed differ depending on the type of instruction received and a participant's positive or negative experience with math. This experiment demonstrated that simply by varying instructions, performance on a math task can be improved for those who like math. The highest level of performance was found for participants who like math, when they were told that they were taking a creative reasoning task.

This study shows the importance of framing. All participants took the exact same analytical reasoning test, yet they scored differently depending on how the instructions were framed. When participants were highly identified with math, they performed best in with the creativity instructions, then the analytical instructions

and finally no instructions. This was very different for participants who were not identified with math, where participants scored the best in the no instructions group and then the same for both analytical and creative instructions.

Research in stereotype threat shows that for stereotype threat to take place a person needs to be identified with math (Steele, 1997). Therefore we did expect performance to differ as a result of how much a participant was identified with math. Our main interest is in the performance of participants that identified with math.

Although the expected results would have been a 3-way interaction between threat, instruction type and identifying with math, the threat did not have a significant effect on performance. The pattern we hoped for was there, though, see table one.

When participants were given instructions containing information as to the type of task that they were about to perform (i.e., analytical task versus creative task), they performed better than when given no information on the type of task. When participants were given the instructions containing the type of activity they might have felt less anxiety about the task they were about to complete.

Broadly speaking, the purpose of this study was to identify ways in which to alleviate stereotype threat. It is possible that the analytical and creative instructions may have prevented stereotype threat from happening in the first place, rather than reducing it after being activated. Indeed, Rosenthal and Crisp (2006) reduced inter group bias by having participants think of overlapping self characteristics before presenting an explicit threat, and found participants to be more successful in their performance.

This is true of the current study as well. Although all categories made reference to there being gender differences or there not being gender differences, they were not as salient in certain instructions as others. In the analytical and creative instructions it depicted the type of task first and this may have caused participants to not acknowledge the threat that was being given.

Another explanation for the findings would be the idea of framing, where decision-making can be influenced by the manner in which the options are presented (Tversky & Kahneman, 1981). Because the tasks were presented as an analytical reasoning task or a creative reasoning task, participants might have felt less anxious about taking the

test, framing the task in such a way that made participants at ease while completing it.

Schmader and Martens (2005) found that when the task was described as a problem solving task rather than a math task, women did not perform significantly different than men. This same sort of pattern could have taken place in the current study. Because the task was described as an analytical reasoning task and not a math task, there is reason to believe that the performance differences might not have occurred in the threat and no threat categories. Another possibility is that framing for stereotype threat using creative instructions may not get rid of stereotype threat but instead helps everyone improve; performance was best in this condition. Past research has shown when participants are asked to be creative, they often are (Harrington, 1975); having instructions that tell participants to complete a creative reasoning task might have induced students to think more creatively. This then caused them to perform better on the task than people who were given analytical or no instructions.

The current study shows that participants did not measurably feel threatened because there were no significant differences in the threat and no threat categories. This in

part might be due to the testing situation. Although participants were told in the instructions there were no gender differences, males were still in the testing room. This might be the reason that there were not any differences in the threat and no threat categories.

Moving forward in the area of research in which we are able to help students perform better is extremely important. It is important to have students be engaged in their work. Often times when students start performing bad they become disengaged from school and work. It is important to find ways even if only framing an assignment differently to keep them engaged in school. Conducting research in the area of stereotype threat reduction can give educators information that allows them to use in their classrooms, in their curriculum, and even in their standardized testing methods, to reduce stereotype threat.

Women are under represented in pursuing math degrees and jobs in math and math related fields (Dick & Rallis, 1991; Kiefer & Sekaquaptewa, 2007). One argument is that by continuously adding to the stereotype threat literature, there will eventually be an increase of women in these areas. In addition, if women are educated in the area of

stereotype threat and know what it is they are less likely to succumb to its effects.

Limitations

On average, the mean score on performance across all categories was 5.26 problems answered correctly, out of 24 problems total. One flaw of this study might have been that the measure used to assess performance was too difficult for this sample. The LSAT was chosen in the hope of using a test that required both reasoning and math skills. However, this test is typically given to college graduates who are preparing to advance to law school. Most participants in this study were undergraduate students and may have been academically unprepared to take problems from the LSAT.

Another limitation was that the task that participants were given did not contain typical math problems used in previous studies, which emphasized numbers. The task used in this study consisted of problems with both words and numbers in roughly equal proportion. If the task had looked more like a math test, then gender differences may have been more extreme.

Because the test itself was put on a website that students logged onto both in the classroom setting and at

home, there was the occasional problem of the network shutting down and being inaccessible. Some students reported that they would move on to the next task and then get a message saying that the website could not be found and therefore could not display the page. As a result, these students had to stop in the middle of the task and the data were thrown out.

When the research was conducted in person, a female administrator was present. Such a presence might have limited the threat felt by the females. Ideally, this study would have used administrators of both genders, either to eliminate such an influence or to study the effect of male vs. female administrators.

Another problem with the study is that even though in the no threat category participants received instructions that there were no gender differences found on the task, there were still males in the testing room. Beaton, Tougas, Rinfret, Huard, & Deliste (2007) demonstrated that women's performance is directly effected by the number of males in the room.

Future Research

As mentioned earlier, the task did not have typical math problems. In the future, it would be interesting to see what the results of this study would be with different stimuli. One such example might be a mathematical equation-writing task (e.g., Baer, 1993). Such a task might seem to be a better example of both creativity and mathematics, and therefore have higher face validity to participants in all conditions.

It would also be helpful in future studies to make sure that the instructions are clear. If there is intended to be a threat in the instructions, then such a threat should be emphasized. One possibility might be to put words such as "gender differences" or "no gender differences" in a bold font to better help the threat come across.

It would be nice to see this study conducted on with only females in the room when testing is conducted. Having only females in the testing room might allow the threat and no threat in the directions to have an effect on performance and one might find more differences in performance due to the instructions and threat.

The current research only looked at one type of stereotype threat (across gender). Kaufman (2006) examined

self reported differences in creativity by ethnicity and found that African Americans have a higher self perception of creativity across multiple domains than European Americans, Hispanic Americans, and Asian Americans. Future studies might focus on the creativity, stereotype threat, and ethnicity. Perhaps creative instructions or emphasis might help alleviate stereotype threat in African Americans that occurs in general ability tests.

APPENDIX A

TABLES

TABLE 1- Means, Standard Deviation, and N for Each Cell, for Analysis One

Threat Vs No Threat	Type of Instruction	Like Math	Mean	Std. Deviation	N
Threat	Analytical	No	5.33	2.13	46
		Yes	5.05	1.90	37
	creative	No	4.98	1.44	42
		Yes	5.67	2.63	30
	none	No	5.25	1.69	28
		Yes	4.42	2.55	19
no threat	Analytical	Yes	5.13	2.34	86
		No	4.57	1.63	37
		Yes	5.67	2.35	33
	Creative	No	5.00	2.45	43
		Yes	5.77	2.28	30
	None	No	5.14	2.18	42
		Yes	4.85	1.99	34

TABLE 2- Means, Standard Deviation, and N for Each Cell, for Analysis Two

Threat Vs No Threat Like Math		Creativity	Mean	Std. Deviation	N
Threat	no	Low	5.18	1.66	82
		High	5.18	2.10	34
	yes	Low	5.02	2.28	51
		High	5.29	2.46	35
no threat	no	Low	4.66	2.06	85
		High	5.51	2.21	37
	yes	Low	5.46	2.38	74
		High	5.26	1.66	23

TABLE 3- Means and Standard Deviations for the Significant Two Way Interaction

Instruction Type	Like Math	Mean	Standard Deviation
annalytical	no	4.99	1.95
	yes	5.34	2.13
Creative	no	4.99	2.00
	yes	5.72	2.44
None	no	5.19	1.99
	yes	4.70	2.19

TABLE 4- Means and Standard Deviations for Participants who have Low Creativity

	Like Math	Mean	Standard Deviaton
Threat	no	5.18	1.66
	yes	5.02	2.28
no threat	no	4.66	2.06
	yes	5.46	2.38

APPENDIX B

FIGURES

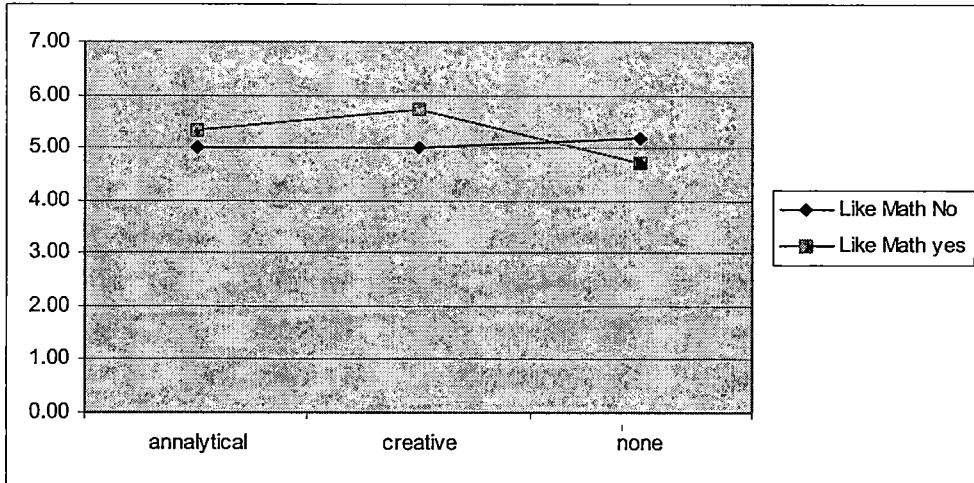


Figure 1. Performance in all Instructions for Math Identification

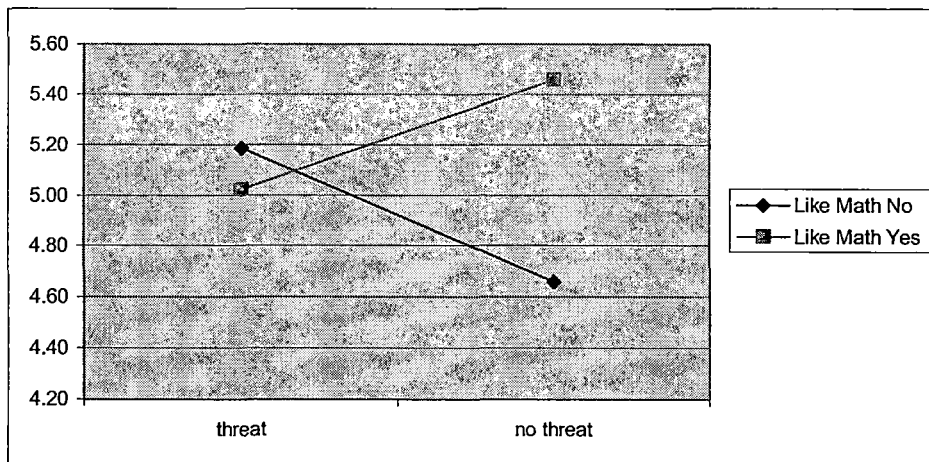


Figure 2. Participants with low creativity attitude towards math and threat

APPENDIX C
INSTRUCTIONS

Threat/Analytical

1. Because of the well-known stereotype that males usually outperform most females on logic orientated task, the first section of this study will involve helping to standardize the new items for the LSAT analytical reasoning section. Some research shows that there are gender differences in analytical reasoning tasks. These items are designed to measure your ability to understand a structure of relationships and to draw conclusions about the structure. Although the section has no mathematical equations on it per se, it does seem that those who intuitively understand spatial reasoning and variable-laden equations (if set A, not set B) do best here. Logic games are, at base, designed to measure your ability to quickly understand a system of relationships and to draw conclusions about those relationships.

No Threat/Analytical

2. The first section of this study will involve helping to standardize the new items for the LSAT analytical reasoning section. These items are designed to measure

your ability to understand a structure of relationships and to draw conclusions about the structure. Although the section has no mathematical equations on it per se, it does seem that those who intuitively understand spatial reasoning and variable-laden equations (if set A, not set B) do best here. Logic games are, at base, designed to measure your ability to quickly understand a system of relationships and to draw conclusions about those relationships.

Threat/Creative

Analytical

3. Because of the well-known stereotype that males usually outperform most females on logic orientated task, the first section of this study will involve helping to standardize the new items for a creativity reasoning task. Some research shows that there are gender differences in creative reasoning tasks. These items are designed to measure your ability to understand a structure of relationships and to draw conclusions about the structure. Although the section has no mathematical equations on it per se, it does seem that those who intuitively understand spatial reasoning and

variable-laden equations (if set A, not set B) do best here. Creative reasoning is, at base, designed to measure your ability to quickly understand a system of relationships and to draw conclusions about those relationships.

No Threat/Creative

4. The first section of this study will involve helping to standardize the new items for a creative analytical reasoning task. These items are designed to measure your ability to understand a structure of relationships and to draw conclusions about the structure. Although the section has no mathematical equations on it per se, it does seem that those who intuitively understand spatial reasoning and variable-laden equations (if set A, not set B) do best here. Creative reasoning is, at base, designed to measure your ability to quickly understand a system of relationships and to draw conclusions about those relationships.

Threat/Control

5. Because of the well-known stereotype that white males usually outperform most minorities and females on logic orientated task, the first section of this study will involve helping to standardize the new items for a new standardized test.

No Threat/Control

6. The first section of this study will involve helping to standardize the new items for a new standardized test.

APPENDIX D
LAW SCHOOL ADMISSION TEST QUESTIONS

Directions: Each group of questions in this section is based on a set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. Choose the response that most accurately and completely answers each question and blacken the corresponding space on your answer sheet.

Question 1-6

Each of five students—Hubert, Lou, Paul, Regina, and Sharon—will visit exactly one of three cities—Montreal, Toronto, or Vancouver—for the month of March, according to the following conditions:

Sharon visits a different city than Paul.

Hubert visits the same city as Regina.

Lori visits Montreal or else Toronto.

If Paul visits Vancouver, Hubert visits Vancouver with him.

Each student visits one of the cities with at least one of the other four students.

1. Which one of the following could be true for March?

(A) Hubert, Lori, and Paul visit Toronto, and Regina and

Sharon visit Vancouver.

- (B) Hubert, Lori, Paul, and Regina visit Montreal, and Sharon visits Vancouver.
- (C) Hubert, Paul, and Regina visit Toronto, and Lori and Sharon visit Montreal.
- (D) Hubert, Regina, and Sharon visit Montreal, and Lori and Paul visit Vancouver.
- (E) Lori, Paul, and Sharon visit Montreal, and Hubert and Regina visit Toronto.

2. If Hubert and Sharon visit a city together, which one of the following could be true in March?

- (A) Hubert visits the same city as Paul.
- (B) Lori visits the same city as Regina.
- (C) Paul visits the same city as Regina.
- (D) Paul visits Toronto.
- (F) Paul visits Vancouver.

3. If Sharon visits Vancouver. Which one of the following must be true for March?

- (A) Hubert visits Montreal.

- (B) Lori visits Montreal.
- (C) Paul visits Toronto.
- (D) Lori visits the same city as Paul.
- (E) Lori visits the same city as Regina.

4. Which one of the following could be false in March?

- (A) Sharon must visit Montreal if Paul visits Vancouver.
- (B) Regina must visit Vancouver if Paul visits Vancouver.
- (C) Regina visits a city with exactly two of the other four students.
- (D) Lori visits a city with exactly one of the other four students.
- (E) Lori visits a city with Paul or else with Sharon.

5. If Regina visits Toronto, which one of the following could be true in March?

- (A) Lori visits Toronto.
- (B) Lori visits Vancouver.
- (C) Paul visits Toronto.
- (D) Paul visits Vancouver.
- (E) Sharon visits Vancouver.

6. Which one of the following must be true for March?

- (A) If any of the students visits Montreal, Lori visits Montreal.
- (B) If any of the students visits Montreal, exactly two of them do.
- (C) If any of the students visits Toronto, exactly three of them do.
- (D) If any of the students visits Vancouver, Paul visits Vancouver.
- (F) If any of the students visits Vancouver, exactly three of them do.

Questions 7-13

A college offers one course in each of three subjects—mathematics, nutrition, and oceanography—in the fall and again in the spring. Students' book orders for these course offerings are kept in six folders, numbered I through 6, from which labels identifying the folders' contents are missing. The following is known:

Each folder contains only the orders for one of the six

course offerings.

Folder 1 contains orders for the same subject as folder 2 does.

The orders in folder 3 are for a different subject than are the orders in folder 4.

The fall mathematics orders are in folder 1 or else folder 4.

The spring oceanography orders are in folder 1 or else folder 4.

The spring nutrition orders are not in folder 5.

7. Which one of the following could be the list of the contents of the folders, in order from folder 1 to folder 6?

(A) Fall mathematics, spring mathematics, fall oceanography, fall nutrition, spring nutrition, spring oceanography

(B) Fall oceanography, spring nutrition, fall nutrition, fall mathematics, spring mathematics, spring oceanography

(C) spring mathematics, fall mathematics, spring nutrition, fall oceanography, fall

nutrition, spring oceanography

(D) spring oceanography, fall oceanography, fall

nutrition, fall mathematics, spring

mathematics, spring nutrition

(E) spring oceanography, fall oceanography, spring

mathematics, fall mathematics, fall nutrition, spring

nutrition

8. Which one of the following statements must be false?

(A) The spring mathematics orders are in folder 3.

(B) The fall nutrition orders are in folder 3.

(C) The spring oceanography orders are in folder 1.

(U) The spring nutrition orders are in folder 6.

(F) The fall oceanography orders are in folder 5.

9. If the fall oceanography orders are in folder 2, then which one of the following statements could be true?

(A) The spring mathematics orders are in folder

4.

- (B) The spring mathematics orders are in folder 6.
- (C) The fall nutrition orders are in folder 1.
- (D) The spring nutrition orders are in neither folder 3 nor folder 6.
- (E) Neither the spring nor the fall nutrition orders are in folder 3.

10. Which one of the following statements could be true?

- (A) The spring mathematics orders are in folder 6.
- (B) The fall oceanography orders are in folder 4.
- (C) The fall nutrition orders are in folder 4, and the fall oceanography orders are in folder 6.
- (D) The fall oceanography orders are in folder 2, and the spring oceanography orders are in folder 1.
- (E) The spring oceanography orders are in folder 1, and neither the spring nor the fall nutrition orders are in folder 3.

11. If the fall oceanography orders are in folder 2, then for exactly how many of the remaining five folders can it be

deduced which course offering's orders are in that folder?

- (A) one
- (B) two
- (C) three
- (D) four
- (E) five

12. Which one of the following lists a pair of folders that must together contain orders for two different subjects?

- (A) 3 and 5
- (B) 4 and 5
- (C) 3 and 6
- (D) 4 and 6
- (E) 5 and 6

13. Which one of the following could be true?

- (A) The fall mathematics and spring oceanography orders are in folders with consecutive

numbers.

(B) Folder 5 contains the orders for a spring course in a subject other than mathematics.

(C) Folder 6 contains the orders for a subject other than nutrition.

(D) The mathematics orders are in folders I and 4.

(E) The orders for the fall courses are in folders 1, 3, and 6.

Questions 14-19

Greenburg has exactly five subway lines: L1, L2, L3, L4, and L5. Along each of the lines, trains run in both directions, stopping at every station.

L1 runs in a loop connecting exactly seven stations, their order being Rincon-Tonka-French-SemPlain-Urstine-Quetzal-Park-Rincon in one direction of travel, and the reverse in the other direction.

L2 connects Tonka with Semplain.

L3 connects Rincon with Urstine, and with no other station.

L4 runs from Quetzal through exactly one other station,

Greece, to Rincon.

L5 connects Quetzal with Tonka, and with no other station.

14. How many different stations are there that a traveler starting at Rincon could reach by using the subway lines without making any intermediate stops?

- (A) two
- (B) three
- (C) four
- (D) five
- (E) six

15. In order to go from Greene to Semplain taking the fewest possible subway lines and making the fewest possible stops, a traveler must make a stop at

- (A) French
- (B) Park
- (C) Queztal
- (D) Rincon

(E) Tonka

16. If L3 is not running and a traveler goes by subway from Urstine to Rincon making the fewest possible stops, which one of the following lists all of the intermediate stations in sequence along one of the routes that the traveler could take?

(A) Quetzal, Tonka

(B) Semplain, French

(C) Semplain, Park

(D) Quetzal, Park, Greene

(E) Semplain, French, Tonka

17. In order to go by subway from French to Greene, the minimum number of intermediate stops a traveler must make is

(A) zero

(B) one

(C) two

(D) three

(E) four

18. If the tracks that directly connect Urstine and Quetzal are blocked in both directions, a traveler going from Semplain to Park and making the fewest possible intermediate stops must pass through

- (A) French or Tonka
- (B) Greene or Urstine
- (C) Quetzal or Tonka
- (D) Quetzal or Urstine or both
- (E) Rincon or Tonka or both

19. If a sixth subway line is to be constructed so that all of the stations would have two or more lines reaching them, the stations connected by the new subway line must include at least

- (A) French, Greene, and Park
- (B) French, Greene, and Quetzal
- (C) French, Greene, and Rincon
- (D) Park, Tonka, and Urstine
- (E) Park, Semplain, and Tonka

Questions 20–24

Prior to this year's annual promotion review, the staff of a law firm consisted of partners Harrison and Rafael, associate Olivos, and assistants Ganz, Johnson, Lowry, Stefano, Turner, and Wilford. During each annual review, each assistant and associate is considered for promotion to the next higher rank, and at least one person is promoted from each of the two lower ranks. An assistant is promoted to associate when a majority of higher-ranking staff votes for promotion. An associate is promoted to partner when a majority of partners vote for promotion. Everyone eligible votes on every promotion. No one joins or leaves the firm. Olivos never votes for promoting Ganz, Johnson or Turner. Rafael never votes for promoting Lowry or Stefano. Harrison never votes for promoting Johnson or Wilford.

20. Which one of the following could be the distribution of staff resulting from this year's review?

- | <u>Partner</u> | <u>Associates</u> | <u>Assistant</u> |
|--|-------------------|------------------|
| (A) Harrison, Olivos, Ganz, Johnson, Stefano, Turner, Rafael, Lowry, Wilford | | |
| (B) Harrison, Rafael, Lowry, Olivos, Ganz, Johnson, Stefano, Turner, Wilford | | |
| (C) Harrison, Olivos, Ganz, Lowry, Johnson, Rafael, Stefano, Turner, Wilford | | |
| (D) Harrison, Olivos, Ganz, Johnson, Rafael, Lowry, Stefano, Turner, Wilford | | |
| (E) Harrison, Olivos, Ganz, Lowry, Johnson, Wilford, Rafael, Stefano, Turner | | |

21. If Rafael votes for promoting only Ganz, Olivos, and Wilford. and if Harrison votes for promoting only Lowry, Olivos, and Stefano, then which one of the following could be the complete roster of associates resulting from this year's review?

- (A) Ganz, Lowry, Wilford
- (B) Johnson, Lowry, Stefano
- (C) Lowry, Stefano, Turner
- (D) Lowry, Stefano, Wilford
- (E) Olivos, Turner, Wilford

22. If Johnson is to be promoted to associate during next year's review, which one of the following is the smallest number of assistants who must be promoted during this year's review?

- (A) one
- (B) two
- (C) three
- (D) four
- (E) five

23. Which one of the following must be true after next year's review?

- (A) Lowry is an assistant.

- (B) Wilford is a partner.
- (C) There are no assistants.
- (D) There are at least two assistants.
- (E) There are no more than four assistants.

24. What is the smallest possible number of associates in the firm immediately after next year's review?

- (A) none
- (B) one
- (C) two
- (D) three
- (E) four

APPENDIX E
DEMOGRAPHICS

Demographic Questions: Please provide the following information. These questions will help us describe the population of people who participated in the study. Again, all information is anonymous.

1. Age: _____

2. Sex (circle): Male Female

3. Please indicate below the group membership with which you most strongly identify (check one):

- African American/Black
- Middle Eastern/Arab
- White/European American
- Latino/Hispanic/Chicano
- Native American/American Indian
- Asian American/Pacific Islander/Indian
- Multiethnic/Other ethnic background (Please indicate: -
_____)

4. On a scale of 1-10 how much do you identify with math, 1 being the least and 10 being the most: _____

5. Have you had any experience with any graduate exam?

Yes / No

APPENDIX F
REMOTE ASSOCIATION TEST

RAT

Triad	Solution	Difficulty	
		p (unsolved)	Normalized
Falling Actor Dust	STAR ³	0.15	-2.38
Broken Clear Eye	GLASS ²	0.2	-2.06
Skunk Kings Boiled	CABBAGE ¹	0.2	-2.06
Widow Bite Monkey	SPIDER ¹	0.25	-1.75
Bass Complex Sleep	DEEP ¹	0.3	-1.44
Coin Quick Spoon	SILVER ²	0.3	-1.44
Gold Stool Tender	BAR ²	0.3	-1.56
Time Hair Stretch	LONG ²	0.3	-1.44
Cracker Union Rabbit	JACK ²	0.35	-1.13
Bald Screech Emblem	EAGLE ¹	0.4	-0.81
Blood Music Cheese	BLUE ¹	0.4	-0.81

Manners Round Tennis	TABLE ²	0.4	-0.81
Off Trumpet Atomic	BLAST ²	0.4	-0.81
Playing Credit Report	CARD ²	0.4	-0.81
Rabbit Cloud House	WHITE ²	0.4	-0.81
Room Blood Salts	BATH ¹	0.4	-0.81
Salt Deep Foam	SEA ²	0.4	-0.81
Square Cardboard Open	BOX ²	0.4	-0.81
Water Tobacco Stove	PIPE ²	0.4	-0.81
Ache Hunter Cabbage	HEAD ²	0.45	-0.5
Chamber Staff Box	MUSIC ¹	0.45	-0.5
High Book Sour	NOTE ²	0.45	-0.5
Lick Sprinkle Mines	SALT ¹	0.45	-0.5
Pure Blue Fall	WATER ²	0.45	-0.5
Snack Line Birthday	PARTY ²	0.45	-0.5
Square Telephone Club	BOOK ²	0.45	-0.5

Surprise Wrap Care	GIFT ²	0.45	-0.5
Ticket Shop Broker	PAWN ²	0.45	-0.5
Barrel Root Belly	BEER ²	0.5	-0.19
Blade Witted Weary	DULL ²	0.5	-0.19
Cherry Time Smell	BLOSSOM ¹	0.5	-0.19
Notch Flight Spin	TOP ²	0.5	-0.19
Strap Pocket Time	WATCH ²	0.5	-0.19
Walker Main Sweeper	STREET ¹	0.5	-0.19
Wicked Bustle Slicker	CITY ¹	0.5	-0.19
Chocolate Fortune Tin	COOKIE ¹	0.55	0.13
Color Numbers Oil	PAINT ²	0.55	0.13
Mouse Sharp Blue	CHEESE ¹	0.55	0.13
Sandwich Golf Foot	CLUB ²	0.55	0.13
Silk Cream	SMOOTH ²	0.55	0.13

Even			
Speak Money Street	EASY ²	0.55	0.13
Big Leaf Shade	TREE ²	0.6	0.44
Envy Golf Beans	GREEN ¹	0.6	0.44
Hall Car Swimming	POOL ²	0.6	0.44
Ink Herring Neck	RED ²	0.6	0.44
Measure Desk Scotch	TAPE ²	0.6	0.44
Strike Same Tennis	MATCH ²	0.6	0.44
Athletes Web Rabbit	FOOT ¹	0.65	0.63
Board Magic Death	BLACK ¹	0.65	0.63
Lapse Vivid Elephant	MEMORY ¹	0.65	0.63
Puss Tart Spoiled	SOUR ¹	0.65	0.63
Rock Times Steel	HARD ³	0.65	0.63
Stop Petty Sneak	THIEF ¹	0.65	0.75
Thread Pine	NEEDLE ²	0.65	0.75

Pain			
Zone Still Noise	QUIET ²	0.65	0.63
Cloth Sad Out	SACK ²	0.7	1.06
Cotton Bathtub Tonic	GIN ²	0.7	1.06
Foot Collection Out	STAMP ²	0.7	1.06
Inch Deal Peg	SQUARE ¹	0.7	1.06
Jump Kill Bliss	JOY ¹	0.7	1.06
Magic Plush Floor	CARPET ²	0.7	1.06
Note Dive Chair	HIGH ¹	0.7	1.06
Stalk Trainer King	LION ¹	0.7	1.06
Bump Throat Sum	LUMP ²	0.75	1.34
Shopping Washer Picture	WINDOW ¹	0.75	1.34
Blank White Lines	PAPER ²	0.8	1.56
Stick Light Birthday	CANDLE ²	0.8	1.69
Sore Shoulder Sweat	COLD ¹	0.9	2.31

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