PREDICTING ACADEMIC SUCCESS AND FAILURE: IMPLICATIONS
FOR STEREOTYPE THREAT, MOTIVATION, INTEREST, AND
SELF-REGULATION

A Thesis
Presented
to the Faculty of
California State University, Chico

In Partial Fulfillment
of the Requirement for the Degree
Master of Arts
in
Psychology
Psychological Science Option

by
Kareema Najme Rahim Malmin
Fall 2009
PREDICTING ACADEMIC SUCCESS AND FAILURE: IMPLICATIONS
FOR STEREOTYPE THREAT, MOTIVATION, INTEREST, AND SELF-REGULATION

A Thesis

by

Kareema Najme Rahim Malmin

Fall 2009

APPROVED BY THE INTERIM DEAN OF THE SCHOOL OF GRADUATE, INTERNATIONAL, AND INTERDISCIPLINARY STUDIES:

_________________________________
Mark J. Morlock, Ph.D.

APPROVED BY THE GRADUATE ADVISORY COMMITTEE:

_________________________________
Linda M. Kline, Ph.D., Chair

_________________________________
Brian J. Oppy, Ph.D.
ACKNOWLEDGMENTS

I would like to thank my graduate advisory committee, Dr. Linda Kline and Dr. Brian Oppy for their wonderful support, guidance, and patience during this entire process. They have both been invaluable mentors throughout my graduate school experience.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgments</td>
<td>iii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>Abstract</td>
<td>vii</td>
</tr>
<tr>
<td>I. Introduction and Literature Review</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Literature Review</td>
<td>3</td>
</tr>
<tr>
<td>Summary</td>
<td>16</td>
</tr>
<tr>
<td>II. Method and Procedures</td>
<td>18</td>
</tr>
<tr>
<td>Participants</td>
<td>18</td>
</tr>
<tr>
<td>Design</td>
<td>18</td>
</tr>
<tr>
<td>Measures</td>
<td>20</td>
</tr>
<tr>
<td>Procedure</td>
<td>22</td>
</tr>
<tr>
<td>III. Findings and Results</td>
<td>24</td>
</tr>
<tr>
<td>Preliminary Results</td>
<td>24</td>
</tr>
<tr>
<td>Stereotype Threat, Test Performance and Career Interest</td>
<td>26</td>
</tr>
<tr>
<td>Academic Success</td>
<td>30</td>
</tr>
<tr>
<td>Manipulation Check</td>
<td>31</td>
</tr>
<tr>
<td>IV. Discussion</td>
<td>33</td>
</tr>
<tr>
<td>Summary and Discussion of Findings</td>
<td>33</td>
</tr>
<tr>
<td>Stereotype Threat, Test Performance and Career Interest</td>
<td>34</td>
</tr>
<tr>
<td>Academic Success</td>
<td>38</td>
</tr>
<tr>
<td>General Implications of Findings</td>
<td>39</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>General Limitations of Study</td>
<td>40</td>
</tr>
<tr>
<td>Future Directions</td>
<td>41</td>
</tr>
<tr>
<td>References</td>
<td>43</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
</tr>
<tr>
<td>A. Measures</td>
<td>50</td>
</tr>
<tr>
<td>B. Informed Consent and Debriefing</td>
<td>53</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Descriptive Statistics</td>
<td>25</td>
</tr>
<tr>
<td>2. Pearson r Correlations Among Variables</td>
<td>26</td>
</tr>
</tbody>
</table>
ABSTRACT

PREDICTING ACADEMIC SUCCESS AND FAILURE: IMPLICATIONS FOR STEREOTYPE THREAT, MOTIVATION, INTEREST, AND SELF-REGULATION

by

Kareema Najme Rahim Malmin

Master of Arts in Psychology
Psychological Science Option
California State University, Chico
Fall 2009

This study examines the relationships between academic success, stereotype threat, and motivational learning strategies. Current research shows how women in math and science are affected by stereotype threat. Less is known about the effects of stereotype threat on men in stereotypically female dominated domains. This study attempts to test stereotype threat effects on men and women under the same two conditions (no stereotype threat, gender stereotype threat). Psychology students were given a motivational learning strategies questionnaire, a career interest measure, and a general psychology aptitude test covering four psychology domains that students had previously studied in their classes. Two fields were stereotypically male dominated
domains (Statistics/Quantitative Psychology and Neuroscience) and two were stereotypically female dominated domains (Developmental and Social Psychology). Results indicated that both men and women did poorly in the stereotype threat condition on statistics and neuroscience questions. In addition, men exposed to stereotype threat and women in both conditions reported less interest in statistics and neuroscience careers than men in the no threat condition. No significant differences were found between conditions on developmental and social psychology questions. Results of a standard multiple regression analysis indicated that self-efficacy was the strongest predictor of self-reported Major GPA. Moreover, participants high in self-efficacy in the no stereotype threat condition performed better than participants low in self-efficacy in the no stereotype threat condition and more so than participants (with high or low self-efficacy) in the gender stereotype threat condition. Taken together, these findings suggest that women, more than men, may be susceptible to stereotype threat and furthermore, that self-efficacy appears to play a significant role in determining one’s academic success.
CHAPTER I

INTRODUCTION AND LITERATURE

REVIEW

Introduction

Getting ahead in school can seem daunting and overwhelming to a freshman college student. Adjusting to college life requires moral judgments, academic decisions and social ingenuity. In particular, success in college usually requires a good set of study habits and motivational learning strategies to accomplish one's academic goals. Getting into a 4-year college may be the easy part; successfully obtaining a four-year degree is difficult.

According to the National Center for Higher Education Management Systems (NCHEMS) (2007), the graduation rate of bachelor's degree seeking students within six years is a disappointing 56% national average. The graduation rate of minorities is even less (48%). Not surprising, many universities are concerned with college retention. With far less than two thirds of incoming freshmen completing their bachelor's degree within six years, serious questions should be raised about why some students succeed and others fail.

Social psychologists have suggested several ideas about what affects student success. Perhaps some students fail to complete their degree programs because they choose majors poorly, and attempt to complete majors that will not sustain their interest.
On the other hand, students may fail because they are not properly prepared for college in the first place and lack crucial study skills or motivational learning strategies. Another issue that needs to be considered is how negative stereotypes may affect student achievement, particularly the experience of stereotype threat.

Stereotype threat is defined as a self-evaluative threat, whereby a negative stereotype about one's group affects the behavior of group members who fear confirming the negative stereotype (Steele, 1997; Steele & Aronson, 1995). For example, previous studies have shown that knowledge of a stereotype can negatively affect the test performance of females (e.g., Gonzales, Blanton, & Williams, 2002; Smith, 2002; Smith & White, 2002) and members of minority groups (e.g., Steele & Aronson, 1995). A couple studies have also shown negative academic effects of stereotype threat on white males (e.g., Aronson et al., 1999; Smith & White, 2002).

Stereotypes not only influence performance but also affect interest. Recent research has shown that women who receive gender specific discriminatory feedback on a forensic science task report less interest in that domain (Thoman & Sansone, 2004). Sansone and Thoman (2005) suggest that interest alone may account for the gender gap in math and science careers (e.g., women are less likely to pursue careers in math and science because they are not as interested in those fields). Furthermore, it is proposed that merely knowledge of these specific gender stereotypes (i.e., men are better at math and science) affects one's feelings of self-efficacy (e.g., how competent one feels about his or her abilities) in addition to one's level of interest in a particular domain which influences performance outcomes (Schmader, Johns, & Barquissau, 2004). However, the role of stereotype effects on motivation has not yet been fully explored, especially in relation to
self-efficacy and the use of effective study skill strategies (i.e., self-regulation). In addition, our understanding of the effects of stereotypes on men and members of minority groups is limited.

Along these lines, there are three main purposes of this paper. The first is to give an overview of current research on motivation, interest, and stereotype effects. Second, I will extend the findings of stereotype threat to males. I will propose possible intelligence domains that might possess similar psychological characteristics for men that math and science do for women, in order to test whether men, who are aware of a gender specific stereotype, consequently perform worse and/or report less interest in a highly valued stereotypically female domain. Finally, I will examine the relationships between stereotype threat, important motivational learning strategies (i.e., self-efficacy, self-regulation, etc.), and test performance in order to evaluate which variables are the strongest predictors for determining academic achievement and memory for material in a particular domain.

Literature Review

Motivation and Academic Success

In the following sections, motivation and academic success will be explored, first in terms of interest and career choice, and later related to specific motivational learning strategies (self-regulation and self-efficacy).

Interest and Career Choice. According to Ryan and Deci (2000), motivation is considered the basis of biological, cognitive, and social regulation. Motivation is what propels people to achieve goals. Thus, motivators are of particular concern for teachers,
coaches, parents, managers and leaders in order to facilitate and mobilize the actions of others. Social psychologists identify two primary types of motivation, extrinsic and intrinsic. *Extrinsic motivation* can be characterized as performing an activity for the sake of obtaining some separable outcome (Ryan & Deci, 2000). These separable outcomes are externally controlled goals, such as acquiring resources (e.g., money), status and power. In other words, doing homework to get a good grade, or because a teacher or parent demands it, or simply to avoid failing a class and having to repeat it, are all examples of extrinsic motivation.

Having extrinsic motivation for school may be appropriate; however, it is not the only motivator that fosters academic achievement, especially long-term achievement. *Intrinsic motivation* has been linked to more interest, more confidence, greater performance and prolonged persistence in an activity (Sheldon, Ryan, Rawsthorne, & Ilardi, 1997). Social psychologists have defined intrinsic motivation as the actual, anticipated, or sought experience of interest (e.g., Sansone & Smith, 2001; Sansone & Thoman, 2005; Smith, Sansone, & White, 2007).

More specifically, Sansone and Thoman (2005) define this interest as:

a phenomenological experience involving both cognitive and affective components. Attention is directed and focused, and the general affective tone is positive. At its extreme, this may be experienced as “flow” (Csikszentmihalyi, 1975). As such [their] definition of interest is closer to “situational” than “individual” interest (see Renninger, 2000), although it is not derived solely by situational factors. Rather, [they] emphasize the experience of interest as a dynamic state that arises through an ongoing transaction among individuals' goals, activity characteristics, and the surrounding context. (pp. 175-176; e.g., Sansone & Smith, 2000)

Sansone and Thoman (2005) also suggest that the experience of interest can become a primary motivator in pursuing and persisting at a particular activity. When the role of the
interest experience is included in their self-regulation of motivation model, one's interest level affects how a task is perceived and processed, which in turn determines if one persists, quits or resumes the activity.

Therefore, intrinsic interest is perhaps one of the most important factors in keeping one’s motivation and persistence in any endeavor. Ryan and Deci (2000) state that “people will be intrinsically motivated only for activities that hold intrinsic interest for them, activities that have the appeal of novelty, challenge, or aesthetic value” (p. 71). In effect, an intrinsically motivating activity is performed for the sake of the activity itself, because the activity is interesting and enjoyable on its own. Furthermore, it is suggested that through interest enhancing/seeking strategies, one can become more intrinsically motivated toward an activity and possibly change one’s motivational orientation all together, especially when the activity is perceived to have intrinsic value (Sansone, Weir, Harpster, & Morgan, 1992).

In research on interest and learning strategies, interest has been highly correlated with investment of time and effort, and strongly correlated with elaboration, and seeking information (Study 5; Schiefele, 1991). In other words, students interested in a subject may be more motivated to seek out new information and elaborate on existing knowledge which takes substantial time and effort. Further information about learning strategies and academic achievement is discussed in the self-regulation and self-efficacy section.

Research on achievement goals, task performance and interest has shown significant correlative paths between interest and perceived competence (i.e., self-efficacy), baseline or initial task interest, and achievement motivation goals (Senko &
Harackiewicz, 2005). This means that students who are highly interested in a particular
career may feel more competent in pursuing and achieving a degree in that field.

Not surprising, interest plays a major role in whether or not an individual
pursues a particular career or major in school. Men and women have reported “interest in
a field” as a main reason for wanting to pursue a career (Morgan, Isaac, & Sansone,
2001). Morgan et al. (2001) found that women were interested in careers that fulfilled
interpersonal goals, and their perception of math and science careers did not coincide
with being able to fulfill interpersonal goals. This suggests that women may be less
motivated to pursue careers in math and science because their interest is not sustained.
Therefore, changing one’s career pursuits may occur through decreases in interest.

Along these lines, Thoman and Sansone (2004) found that perceived gender
discriminatory feedback (telling an individual that she did worse on an activity
presumably because of gender) decreases interest and motivation for women. Decreases
in interest have also been reported with the knowledge of a stereotype (Davies, Spencer,
& Steele, 2005) and with a stereotype threat condition (Smith, 2002). This previous
research has begun to examine how the experience of interest may help explain why
some females in traditionally male-dominated fields fail to persist in that line of work.
This line of research adds to the literature about why there is a gender gap in math and
science domains. However, it is not the only theory as to why some students fail in their
academic domain.

Self-Regulation and Self-Efficacy. As previously stated, some students may
fail to complete their degree programs because they choose majors poorly, majors that
will not sustain their interest. Alternatively, students may fail because they are not
properly prepared for college in the first place and lack crucial study skills. Several studies support the relationship between academic achievement (measured by test performance, GPA and grades) and various motivational learning strategies.

Notably, academic achievement has been connected to the use of self-regulation strategies (Pintrich & De Groot, 1990; Zimmerman, 1989, 1998), concentration, information processing, selecting main ideas, time management, and test strategies (Proctor, Prevatt, Adams, Hurst, & Petscher, 2006) and work drive (Ridgell & Lounsbury, 2004). In different fields, these components of academic success have been collectively called motivational learning strategies, psychosocial and study skill factors, study behavior, and basic study skills.

In particular, many social-cognitive theorists believe that the development of self-regulatory behaviors (i.e., use of time management techniques, monitoring oneself and one's environment to enact a plan) is essential for academic success, as measured by grades and advancement in school.

According to Zimmerman (1998), the motivational learning strategy self-regulation can be defined as “self-generated thoughts, feelings, and actions for attaining academic goals” (p. 73). So far, several self-regulatory processes have been identified, such as goal setting, imagery (i.e., creating visual aids or imagining consequences of not studying), self-instruction (i.e., reading and reciting information to self), and time management. Self-regulatory processes often also include self-monitoring (i.e., keeping track of one's class performance), creating self-consequences (i.e., making television watching contingent on the completion of homework), environmental structuring (i.e.,
creating an effective place to study free of distractions), and help seeking (i.e., asking teachers and/or classmates for assistance when an assignment is particularly difficult).

Zimmerman (1998) further states that self-regulatory strategies are not only used by students, but are also utilized by writers, athletes, and musicians, as well as “just plain folks” to achieve optimum performance on tasks. Besides using self-regulatory strategies in academics, other perspectives such as evolutionary psychology add to the current literature, by discussing why a mechanism for self-regulation may have evolved.

According to evolutionary theorists, a major component of any person's success in life (e.g., achieving one's personal and financial goals) is an individual's ability to correctly gage one's current status and implement a plan to increase in rank. In evolutionary psychology, the ability to monitor one's emotions and maintain a current social and/or monetary status is often referred to as self-regulation (Nicholson & De Waal-Andrews, 2005). It is believed that there is an evolved underlying brain mechanism sensitive to social status and rank. Self-regulation theory gives reasons for why failures do not always result in a person having a negative affect (Nicholson & De Waal-Andrews, 2005). If a person is not succeeding at getting a raise at work, he or she may look to someone less fortunate than them and say “at least I'm not in their shoes” (referred to as a downward comparison). By making this affirmation, the person saves face and is able to settle for what they have, thereby diminishing any negative feelings.

Two recent articles promote the theory of self-regulation as an evolutionary mechanism. Nicholson and De Waal-Andrews (2005) outlined the role of self-regulation in procuring objective and subjective career success from an evolutionary perspective. They propose that there are four categories of success: unhappy losers, unhappy winners,
happy losers and happy winners. Accordingly, they suggest that the “unhappy winners” and the “happy losers” are a substantial minority, which can only be explained by self-regulation theory and evolutionary principles. It was stated earlier that distress can be harmful and lead to a negative affect. As a possible defense mechanism, the “happy losers” are particularly resilient to unfortunate events and setbacks, perhaps by looking at a reference group that is lower on the status ladder than themselves. On the other hand, the “unhappy winners” may be constantly striving but unfulfilled since they often compare themselves to a much wealthier reference group, leading them down a path of easier winnings that are never enough (also referred to as relative deprivation). Nicholson and De Waal-Andrews suggest that self-regulation may mediate job performance and an individual’s sense of well-being, which is similar to other examinations of self-regulation and academic performance.

Geary (2002) relates self-regulation to the creation of educational systems as a whole, in an emerging research area called Evolutionary Educational Psychology. The theory is guided by the premise that educational institutions will only exist in a society where the gap between folk knowledge and actual scientific knowledge is great or where folk knowledge is not sufficient enough for sustaining a large population in an industrial society. For example, many indigenous groups such as the Matis people of the Amazon Rainforest and other hunter-gatherers may not have educational institutions because their small population and subsistence lifestyle does not require more advanced knowledge. Geary proposes that humans are motivated to control resources and gain rank (self-regulation) through social dominance (i.e., mating strategies), biological dominance (i.e., food hording), and physical dominance (i.e., expanding territory). These three strategies
to control resources encourage evolutionary social pressures for the development of a theory of mind (ability to understand that one’s own thoughts and intentions are separate and different from others and vice versa) and thus an ability to trick and out-wit opponents; this is the basis for ingenuity and creativity. According to Geary, these are primary skills (language, creativity, etc.) that warrant humans to engage in and acquire secondary skills (reading, writing, advanced math, etc.), which in turn, enables advances in a society's technology and social structure through academic accomplishments. Feats that might not be achieved without the ability to self-regulate, gage one’s current situation and enact a plan to improve one’s rank or status.

Since the late 1980s, self-regulation has been regarded as a major component in academic performance. For example, self-regulation has been positively linked to higher academic achievement (i.e. better grades) and self-efficacy (e.g. feeling competent in a particular domain; Pintrich & De Groot, 1990). Most studies on self-regulation tend to take a social-cognitive theoretical perspective. According to social cognitive theorists, self-regulation involves more than mere personal processes.

A triadic model of self-regulation proposes that reciprocal relationships exist between a person's self perceptions, behavior and environmental circumstances (Zimmerman, 1989). This model asserts that an individual's beliefs are affected by one's actions and environmental consequences, and vice versa. For example, students may review their notes before an exam because of a belief that this action may increase their grade. Later, if the students obtain better grades, then this reward positively influences the students’ perceptions about their capabilities and self-worth. These increased feelings of competency are often referred to as self-efficacy.
**Academic self-efficacy** is defined as a self-evaluation of one's ability and/or chances for success in the academic environment (Robbins, Lauver, Le, Davis, & Langley, 2004). Self-efficacy is arguably one of the most important personal factors in academic self-regulation and academic success. According to Robbins et al. (2004), academic self-efficacy and achievement motivation were the best predictors for GPA when looking at various psychosocial and study skill factors.

In summary, self-regulation is crucial because it allows humans to properly weigh their current status and strategically move toward future goals such as academic achievement and career aspirations. Self-regulation encourages the formation of alliances and networks for pursuing resources that are not easily acquired. Furthermore, in relationships, one must self-regulate emotions and behavior, or risk being cast out of a group (Nicholson & De Waal-Andrews, 2005). Thus, self-regulation appears to be a fundamental process necessary in most aspects of daily life; and more specifically, self-efficacy may be the driving component of self-regulation and other motivational learning strategies.

**Stereotyping**

Some social psychologists suggest that women who fail to persist in male-dominated fields, or drop out of school all together, may do so because they are affected by negative stereotypes (e.g., Schmader, Johns, & Barquissau, 2004; Steele, James, & Barnett, 2002). The following sections discuss the effects of negative stereotypes on academic and career success, and furthermore, how stereotype threat can negatively affect men as well as women.
**Stereotype Effects.** Members of stigmatized groups often under-perform in stigma-threatening situations. For example, women perform significantly worse on a math task when it is presented as a diagnostic of their math intelligence as opposed to a non-threatening control condition (e.g., Martens, Johns, Greenberg, & Shimel, 2005). Also, the feeling of being stereotyped is associated with negative emotions about interacting with other members of the stereotyped group in addition to decreases in one's current self-esteem and self-concept clarity (e.g., Vorauer, Main, & O'Connell, 1998).

Members of stigmatized groups are stereotypically the targets of discrimination on the basis of gender, faith, minority status, sexual orientation, and other prejudices. Women who are in male-dominated academic domains, such as math and science, have reported higher levels of discrimination and stereotype threat than women in non-male-dominated domains. These women were also more likely to consider changing their major (Steele, James, & Barnett, 2002). Not surprising, identifying with a negative stereotype can have drawbacks when it comes to pursuing a career or persisting in a college major. For example, Schmader, Johns, and Barquissau (2004) found that college women majoring in math who endorsed a stereotype about women performing less well in math also reported less interest in continuing in that field of study and had negative self-perceptions of their math competence (i.e., self-efficacy). In addition, Schmader et al. (2004) found that women who endorsed a negative stereotype (about women performing less well in math) more, were also more likely to have decreased test performance when they were exposed to information confirming the negative stereotype.

**Stereotype Threat.** Situational factors, as well as personal factors, are important to address when discussing stereotype threat. To create stereotype threat,
persons involved must be aware of the stereotype and the stereotype must be relevant to them (Leyens, Désert, Croizet, & Darcis, 2000). Sometimes, an already internalized factor such as race or gender can cause changes in performance outcomes.

Accordingly, simply filling out demographic information has been associated with decreased test performance. In this situation, the stereotype threat can be subtle and participants may not have been aware of the stereotype activation (Steele & Aronson, 1995, Experiment 4). Some stereotypes are so salient that an explicit reminder is not needed for a decrease in test performance to occur (e.g., Smith & White, 2002).

Nonetheless, long-term exposure to feelings of inferiority or lowered self-worth is not necessary for stereotype threat to occur. In fact, stereotype threat can occur in any situation where a negative in-group stereotype can give an explanation and/or an expectation for a person's poor performance outcome (Steele, 1997). This would suggest that men, as well as women and members of minority groups, may be susceptible to stereotype threats and discrimination. Many studies have addressed the effects of stereotype threat on women but few have examined the effects on men.

To my knowledge, only five studies have involved stereotype threat and a dominant group such as white males. Two studies used a stereotype threat condition where men were exposed to the stereotype that Asians are better at math (Aronson et al., 1999; Smith & White, 2002). Another study involved Whites exposed to the stereotype that Blacks have better natural athletic ability for a golf task (Stone, Lynch, Sjomeling, & Darley, 1999). More important are the following two studies because they suggest alternate stereotypes for testing how stereotype threat affects males when compared to females.
To induce a male stereotype threat, Leyens, Désert, Croizet, and Darcis (2000) used a computer activity in which participants completed three decision tasks (lexical, valance and affective). In the threatening condition, participants were reminded that women were better at processing affective information. At the beginning of the affective decision task, the word “affective” would appear on the screen followed by another word. The participant’s job was to decide if the second word was an affective word (e.g., caress) or not (e.g., paradise). In this study, males made more errors in the threatening condition than women and non-threatened males. Although men felt that the affective domain was personally relevant to them, they did not totally believe in the stereotype that women were better at processing affective information. This is key in defining stereotype threat because it shows how one does not have to believe that the stereotype applies to the individual personally in order to affect one's behavior.

In addition, Koenig and Eagly (2005) tested a stereotype threat condition with white males on a social sensitivity task. Contrary to the previous study above, men did endorse the stereotype presented. The men performed worse when they were informed that the test was for social sensitivity, as opposed to information processing, and also informed that women typically scored higher than men. This study is more closely in line with previous research on discriminatory feedback (e.g., Thoman & Sansone, 2004) because the domain was valued by the participants and the stereotype was accepted.

This line of inquiry raises questions about what experimental design and academic domains could be used to examine how stereotype threat affects males and females under similar conditions. In order to identify possible gender stereotyped
domains, that were valued by both men and women, the following pilot study was conducted.

Pilot Study

A pilot study, conducted at the University of Utah, identified several common gender stereotypes (Capota, Mattson, & Sansone, 2006). Two questionnaires were created to examine gender stereotypes about abilities and success in a number of professions, as well as the degree to which these abilities and professions were valued.

The study focused on three intelligence domains based, in part, on Gardner's (1993) Multiple Intelligence Theory: Logical-Mathematical, Interpersonal, and Linguistic. Logical-Mathematical abilities and professions were picked because previous research commonly used science and/or math as the stereotyped ability. Interpersonal ability was chosen since it was used in Koenig and Eagly’s (2005) study where women were presumed better at interpersonal tasks (e.g., ability to understand other people's body language, behavior, motives, how to work cooperatively with others, etc.). Linguistic abilities and professions were included because linguistic abilities were used in Leyens, Désert, Croizet, and Darcis (2000) study (e.g., lexical decision tasks and word identification/grouping tasks).

Survey results showed that interpersonal abilities (i.e., providing comfort and support to others in need, interpreting other people's behavior, etc.) and linguistic abilities (i.e., communicating ideas and feelings effectively, writing well, etc.) were rated as stereotypically favoring women over men. On the other hand, men were rated as stereotypically better at logical-mathematical abilities (i.e., analyzing how a machine works, performing math calculations, etc.).
This pilot study confirmed previous notions that women are stereotyped as being better communicators and better at understanding and comforting others. The study also confirmed that men are stereotyped as being better at solving logical and mathematical problems. These stereotyped abilities were also rated as being highly valued by both men and women. Thus, academic domains that stereotypically use these abilities might therefore be valued by both sexes. For example, Neuroscience is a male-dominated field that uses logical-mathematical abilities, and Developmental Psychology is a female-dominated field that stereotypically uses both interpersonal and linguistic abilities among others.

Summary

Previous research shows how stereotype threat affects test performance and subsequent career choice. Other empirical findings highlight how interest, self-regulation and self-efficacy affect test performance and/or career pursuits. However, none of the current literature directly discusses which of these variables (stereotype threat, interest, self-regulation, or self-efficacy) are more predictive of academic success.

In the present paper, the role of motivation, interest, self-regulation and stereotype threat were examined to determine the extent to which these variables affect academic motivation and career choice. On the basis of previous literature, it was expected that males, females, and members of minority groups would be equally susceptible to stereotype threats and discriminatory feedback. Unlike many previous studies, highly valued male and female stereotyped domains in psychology were used to
assess whether stereotype threats affect men in social sciences similar to how stereotype threats affect women in math and science.

Previous research also suggests that, of the motivational learning strategies, self-efficacy is the strongest predictor of academic achievement. Therefore, psychology students will be tested to see whether self-efficacy or other motivational learning strategy or stereotype threat effects are a more powerful determiner of test performance.

Specific Hypotheses

Based on my review of the literature, it was predicted that:

1. Both men and women would perform worse when exposed to gender stereotype threat compared to those who were not exposed to stereotype threat.
2. Both men and women would have lower career interest ratings when exposed to gender stereotype threat compared to those who were not exposed to stereotype threat.
3. Level of self-efficacy (low versus high) and exposure to stereotype threat (versus no exposure) would negatively impact academic success as measured by test performance.
4. Self-efficacy would be the strongest motivational learning strategy predictive of academic achievement when measured by self-reported major GPA.
CHAPTER II

METHOD AND PROCEDURES

Participants

Participants were 84 college students at CSU Chico (75% female; 82.1% European-American, 7.1% Latino/Hispanic, 6% Asian/Asian-American, 4.8% Other/Multiple) who were enrolled in psychology courses and participated in exchange for course credit. The mean age reported was 22.6 years ($SD = 6.4$). In order to understand test questions on a general psychology exam, participants were selected for having previously taken both Introductory Psychology and Research Methods courses. The mean number of previously taken, relevant psychology courses was 4.4 ($SD = 1.8$).

Design

A between-participants quasi-experimental design was used to explore the effects of gender stereotypes and motivational learning strategies on career interest and test performance. In order to examine possible differences resulting from perceived negative gender stereotypes, all participants were given four different psychology career path descriptions. Two descriptions were selected for being stereotypically female-dominated (developmental and social psychology), and two were selected for being stereotypically male-dominated career fields (statistics/quantitative psychology and neuroscience). Participants had previously studied the different areas in their psychology
courses. The career descriptions were selected and modified from the American Psychological Association website (APA.org) and two relevant books, Careers in Psychology: Opportunities in a Changing World (Kuther & Morgan, 2004) and Opportunities in Psychology Careers (Super & Super, 2001). Each written description was between 170 and 200 words in length.

Independent Variables

The independent variable consisted of two separate conditions with slightly different informed consents (no stereotype threat condition and gender stereotype threat condition). The no stereotype threat condition was operationalized as the control condition; no gender stereotypes were expressed or implied. On the other hand, the gender stereotype threat condition was the manipulated condition; negative gender stereotypes were present for both men and women.

Participants' use of motivational learning strategies (i.e., self-efficacy, self-regulation, etc.) were treated as expo facto, non-manipulated variables, and comprised of subsection scores obtained from Pintrich and DeGroot’s (1990) Motivated Strategies for Learning Questionnaire (see Measures in this chapter).

Dependent Variables

The main dependent variable was a general psychology aptitude test comprised of 40 multiple-choice questions covering four psychology areas (10 test items from each): developmental psychology, neuroscience, quantitative, and social psychology. Each test item had 4 answer choices and was scored as correct or incorrect. Participants received 1-point for each correct response. The test was designed to assess participants' aptitude and retained knowledge for each of the four academic domains. A
second dependent variable was *Career Interest*, belief that a particular domain was interesting (see *Measures* in this chapter).

**Measures**

**Motivated Strategies for Learning Questionnaire (MSLQ)**

Pintrich and DeGroot's (1990) self-report questionnaire comprised of 44 items designed to measure motivational and cognitive factors in learning. Each item response was placed on a 7-point Likert scale ranging from “not at all true of me” (1) to “very true of me” (7). Pintrich and DeGroot observed cronbach coefficient alphas for each subscale: Self-Efficacy (.89), Intrinsic Value (.87), Test Anxiety (.75), Cognitive Strategy Use (.83), and Self-Regulation (.74). Test Anxiety correlated negatively with academic performance, measured by grades and test scores. All other scales correlated positively with academic performance (Pintrich & DeGroot, 1990).

The five subscales were operationally defined as follows. Self-Efficacy measures participants’ perceived competence and confidence. Intrinsic Value concerns participants' intrinsic interest and perceived course importance. Test Anxiety concerns worry and anxiety about performance exams. Cognitive Strategy Use measures the perceived use of rehearsal, elaboration, and organizational strategies to retain academic material. Self-Regulation is measured by perceived use of metacognitive strategies (i.e., planning, comprehension monitoring) and effort management strategies (i.e., working diligently).
Career Interest Evaluation

The self-report measure instructs participants to assess their interest levels for each of the four psychology career paths (developmental psychology, neuroscience, quantitative, and social psychology). Ratings were placed on a 7-point Likert scale from “not interesting” (1) to “very interesting” (7) (see Appendix A).

Manipulation Check

The self-report activity evaluation consisted of 3 items designed to measure the effectiveness of the stereotype threat condition. For example, participants were instructed to rate the following items: “How does the researcher believe performance will turn out for the Social Psychology and the Developmental quizzes?” and “How does the researcher believe performance will turn out for the Statistics and Neuroscience quizzes?” Responses for these items were placed on a 7-point Likert scale from “men will perform better than women” (1), to “no difference between genders” (4), to “women will perform better than men” (7) (see Appendix A).

Grade Point Average (GPA)

In addition to taking surveys and a general psychology aptitude test, participants provided various demographic data including GPA. Participants estimated both their overall (cumulative) GPA and their estimated Major GPA by selecting one of seven answer choices: less than 1.50; 1.50-2.00; 2.00-2.49; 2.50-2.99; 3.00-3.49; 3.50-3.99; and 4.00. A similar measure was used in Ridgell and Lounsbury’s (2004) study on predicting academic success.
Procedure

Recruitment

Participants were recruited by announcements made in psychology classes and sign-up sheets posted on the psychology research participation bulletin board. Participants were assigned to one of two conditions (no stereotype threat condition and gender stereotype threat condition).

Consent

After greeting and thanking the students for their participation, each student was given a consent form. In the no stereotype threat condition, participants were verbally told and read that there were no gender differences on performance between the four psychology areas being tested (developmental psychology, neuroscience, quantitative and social psychology). In the gender stereotype threat condition, participants were verbally told and read that women would perform better than men on the developmental and social psychology test sections, and in contrast, that men would perform better than women on the neuroscience and quantitative psychology test sections (see Appendix B).

Protection of Human Rights

This concept was addressed in the informed consent forms by informing participants that participation would remain anonymous since names would not be attached to any materials besides signing the consent form. Furthermore, participants were informed that they could withdraw their participation at any time and could skip questions they did not wish to answer.
Survey

A survey order was carefully created to examine the degree to which students: use motivational learning strategies, found the career paths interesting, identified with psychology fields, and finally, whether they were affected by the stereotype threat manipulation. Surveys were given to all participants in the same order to eliminate suspicions about where the study was leading, which might be apparent in different survey orders.

Procedure Order

After signing the consent forms, participants answered demographic information questions (gender, age, major, ethnicity, estimated Major GPA, etc.) and then completed the Motivated Strategies for Learning Questionnaire (MSLQ). Completion of the questionnaire was followed by participants reading descriptions about each of the four psychology career paths (developmental, neuroscience, quantitative, and social psychology). Next, students completed the career interest evaluation. Participants then took a multiple choice general psychology test designed to assess their aptitude and retained knowledge for each of the four psychology areas. Last, participants completed a final questionnaire assessing the strength of the manipulation. Respondents were then verbally debriefed and thanked for their participation (see Appendix B). Data was analyzed using SPSS software version 12.
CHAPTER III

FINDINGS AND RESULTS

Preliminary Results

Descriptive Statistics

Descriptive statistics for all variables are reported in Table 1. A correlation matrix of Pearson product-moment correlations between all variables is in Table 2. A review of the descriptive results shows that scores on the General Psychology Aptitude Test were significantly correlated with other known measures of academic achievement such as reported Major GPA, and cumulative GPA, with higher test scores associated with better grade point averages, suggesting that academic achievement is related to the General Psychology Aptitude Test.

In addition, psychology test scores were significantly correlated with motivational learning strategies, self-efficacy, intrinsic value, test anxiety, and self-regulation. This is similar to Major GPA, which was also significantly correlated with self-efficacy, intrinsic value, test anxiety, and self-regulation. In essence, higher self-efficacy, intrinsic value, higher self-regulation, and lower test anxiety are all associated with higher test scores and better grades, which provide further support for measuring academic achievement with the General Psychology Aptitude Test.
Table 1

*Descriptive Statistics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Possible range</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Cumulative GPA</td>
<td>1-7</td>
<td>4.83</td>
<td>.94</td>
</tr>
<tr>
<td>Estimated Major GPA</td>
<td>1-7</td>
<td>5.10</td>
<td>.93</td>
</tr>
<tr>
<td>General Psychology Aptitude Test</td>
<td>0-40</td>
<td>22.32</td>
<td>4.56</td>
</tr>
<tr>
<td>Developmental</td>
<td>0-10</td>
<td>5.67</td>
<td>1.88</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>0-10</td>
<td>5.20</td>
<td>1.85</td>
</tr>
<tr>
<td>Statistics</td>
<td>0-10</td>
<td>5.99</td>
<td>1.83</td>
</tr>
<tr>
<td>Social</td>
<td>0-10</td>
<td>5.46</td>
<td>1.70</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>9-63</td>
<td>46.96</td>
<td>8.23</td>
</tr>
<tr>
<td>Intrinsic Value</td>
<td>9-63</td>
<td>49.81</td>
<td>7.54</td>
</tr>
<tr>
<td>Test Anxiety</td>
<td>4-28</td>
<td>15.57</td>
<td>6.71</td>
</tr>
<tr>
<td>Cognitive Strategy Use</td>
<td>13-117</td>
<td>65.87</td>
<td>9.08</td>
</tr>
<tr>
<td>Self-Regulation</td>
<td>9-63</td>
<td>41.15</td>
<td>8.08</td>
</tr>
<tr>
<td>Career Interest</td>
<td>4-28</td>
<td>19.00</td>
<td>3.08</td>
</tr>
<tr>
<td>Developmental</td>
<td>1-7</td>
<td>5.13</td>
<td>1.51</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>1-7</td>
<td>4.79</td>
<td>1.54</td>
</tr>
<tr>
<td>Statistics</td>
<td>1-7</td>
<td>3.06</td>
<td>1.70</td>
</tr>
<tr>
<td>Social</td>
<td>1-7</td>
<td>6.02</td>
<td>1.26</td>
</tr>
</tbody>
</table>

$^a_n = 84$ for each variable
Table 2

*Pearson r Correlations Among Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 GPA</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Major GPA</td>
<td>.750**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Gen. Psych. Test</td>
<td>.335**</td>
<td>.404**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Self-Efficacy</td>
<td>.266*</td>
<td>.437**</td>
<td>.305**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Intrinsic Value</td>
<td>.209</td>
<td>.311**</td>
<td>.264*</td>
<td>.643**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Test-Anxiety</td>
<td>-.090</td>
<td>-.269*</td>
<td>-.340**</td>
<td>-.269*</td>
<td>-.164</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Cognitive Strategy Use</td>
<td>.075</td>
<td>.152</td>
<td>.076</td>
<td>.449**</td>
<td>.476**</td>
<td>-.132</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Self-Regulation</td>
<td>-.271*</td>
<td>.368**</td>
<td>.304**</td>
<td>.495**</td>
<td>.587**</td>
<td>.302**</td>
<td>.648**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9 Career Interest</td>
<td>.033</td>
<td>.080</td>
<td>-.025</td>
<td>.069</td>
<td>.278*</td>
<td>-.180</td>
<td>.378**</td>
<td>.260*</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* *p < .05; **p < .001 two-tailed

Although Career Interest was significantly correlated with Intrinsic Value, Cognitive Strategy Use, and Self-regulation, it was not significantly correlated with measures of academic achievement.

**Stereotype Threat, Test Performance and Career Interest**

**Hypothesis 1: Both Men and Women Perform Worse under Stereotype Threat**

Quantitative Psychology and Neuroscience. The following analysis was conducted to explore how exposure to stereotype threat (no stereotype threat, or
stereotype threat) and gender would affect math and science test scores (male stereotyped domains).

A between groups two-way analysis of variance was conducted to explore the impact of the stereotype threat and gender on the combined (math and science) sub-test scores, as measured by the General Psychology Aptitude Test. Participants were divided into two conditions (gender stereotype threat, and no stereotype threat). There was a significant main effect for condition $F(1,80) = 6.24, p < .015$, and the effect size was medium (partial eta squared = .07). Overall, participants in the no stereotype threat condition performed better on the math and science sub-tests ($M = 11.82, SD = 3.10$), than participants in the gender stereotype threat condition ($M = 10.64, SD = 2.79$).

Likewise, there was also a significant main effect for gender, $F(1,80) = 8.84, p < .004$, and the effect size was medium, (partial eta squared = .10). Overall, results indicate that males performed better ($M = 12.57, SD = 2.68$) than females ($M = 10.73, SD = 2.95$) on the math and science sub-tests regardless of condition. The interaction between stereotype threat and gender was not statistically significant.

Developmental and Social Psychology. This next analysis was conducted to explore how the condition (no stereotype threat, or stereotype threat) and gender would affect developmental and social psychology scores (female stereotyped domains).

Thus, a between groups two-way analysis of variance was conducted to explore the impact of the stereotype threat and gender on the combined (developmental and social psychology) sub-test scores. Interestingly, no significant interactions or main effects were found.
Hypothesis 2: Stereotype Threat Impact on Career Interest

Quantitative Psychology and Neuroscience. The following analysis was conducted to explore how exposure to stereotype threat (or no threat) and gender would affect career interest for neuroscience and statistics/quantitative psychology alone (male stereotyped math and science domains).

A between groups two-way analysis of variance was conducted to explore the impact of stereotype threat and gender on the combined math and science career interest ratings. Participants were divided into two conditions (gender stereotype threat, and no stereotype threat). There was a significant main effect for condition $F(1,80) = 7.14, p < .009$, and the effect size was medium (partial eta squared = .08). Likewise, there was a significant main effect for gender, $F(1,80) = 12.79, p < .001$, and the effect size was large, (partial eta squared = .14).

The interaction between condition and gender was also statistically significant, $F(1,80) = 5.03, p < .028$, and the effect size was medium (partial eta squared = .06). Post-hoc comparisons using the Tukey HSD test indicated that male participants in the no threat condition reported more interest ($M = 11.13, SD = 1.46$) than male participants exposed to stereotype threat ($M = 8.08, SD = 2.63$) and both groups of female participants [no threat ($M = 7.52, SD = 2.55$), gender stereotype threat ($M = 7.25, SD = 2.34$)].

Developmental and Social Psychology. This next analysis was conducted to explore how the condition (no stereotype threat, or stereotype threat) and gender would
affect career interest for developmental and social psychology (female stereotyped domains).

A between groups two-way analysis of variance was conducted to explore the impact of stereotype threat and gender on the combined developmental and social psychology career interest ratings. Participants were divided into two conditions (gender stereotype threat, and no stereotype threat). There was a significant main effect for condition $F(1,80) = 8.89, p < .004$, and the effect size was medium (partial eta squared = .10). Likewise, there was a significant main effect for gender, $F(1,80) = 5.36, p < .023$, and the effect size was medium, (partial eta squared = .06).

The interaction between condition and gender was also statistically significant, $F(1,80) = 4.68, p < .034$, although the effect size was small (partial eta squared = .05). Post-hoc comparisons using the Tukey HSD test indicated that male participants in the no threat condition reported less interest ($M = 8.63, SD = 2.07$) than males exposed to stereotype threat ($M = 11.54, SD = 1.85$) and both groups of female participants [no threat ($M = 11.16, SD = 2.28$), gender stereotype threat ($M = 11.63, SD = 2.27$)].

**Hypothesis 3: Self-Efficacy, Stereotype Threat and Test Performance**

The following analysis was conducted to explore how exposure to stereotype threat (no stereotype threat, or stereotype threat) and self-efficacy level (high, low) would affect psychology test scores.

A between groups two-way analysis of variance was conducted to explore the impact of the condition and self-efficacy level on the General Psychology Aptitude Test.
Participants were divided into two conditions (gender stereotype threat, and no stereotype threat) and separated into high and low self-efficacy groups using a median split ($Mdn = 47$). There was a significant main effect for self-efficacy level, $F(1,80) = 18.92, p < .001$ [high self efficacy ($M = 24.02, SD = 3.92$), low self-efficacy ($M = 20.26, SD = 4.46$)], and the effect size was large, (partial eta squared = .19).

The interaction between condition and self-efficacy level was statistically significant, $F(1,80) = 8.17, p < .005$, and the effect size was medium (partial eta squared = .09). Post-hoc comparisons using the Tukey HSD test indicated that the mean score for participants high in self-efficacy and in the no threat condition performed better ($M = 25.40, SD = 3.57$) than participants low in self-efficacy, no threat condition ($M = 18.93, SD = 5.03$) and both groups of participants in the threat condition [high self efficacy ($M = 22.38, SD = 3.75$), low self-efficacy ($M = 20.26, SD = 4.46$)]. The main effect for condition, $F(1,80) = .25, p = .61$, did not reach statistical significance.

Academic Success

Another purpose of this study was to explore predictors of academic achievement. The following regression analysis was used to test my fourth hypothesis which states that self-efficacy would be the strongest motivational learning strategy predictive of academic achievement when measured by self-reported major GPA.

Hypothesis 4: Self-Efficacy Predicts Academic Achievement

In order to assess which motivational learning strategy subscale (self-efficacy, intrinsic value, test-anxiety, or self-regulation) was the best predictor of a student’s Major GPA in college, a standard multiple regression analysis was performed. Career Interest
and Cognitive Strategy Use, were not included in the analysis because they were not significantly correlated with Major GPA or psychology test scores. Preliminary analyses of assumptions were examined to ensure no violations of normality, linearity, multicollinearity, and homoscedasticity. Regression analysis indicated that the model significantly predicted Major GPA, $F(4,79) = 6.14, p < .001$. $R^2$ for the model was .237 and adjusted $R^2$ was .199. Of the four motivational learning strategies included, self-efficacy made the largest unique contribution ($\beta = .33, t^2 = 2.48, p < .015$), accounting for 6% of the variance in Major GPA.

**Manipulation Check**

Three independent-samples t-tests compared scores on participants’ beliefs about how the researcher believed males and females would perform. The independent variable was stereotype threat (no stereotype threat, and gender stereotype threat). The dependent variables consisted of three items designed to measure the effectiveness of the stereotype threat condition.

For the question, “How much do you think that the researcher believes that there are gender differences between how men and women perform on statistics and neuroscience quizzes vs. developmental and social psychology quizzes?” a significant differences was found, $t (55) = -5.39, p < .001$. Participants in the threat condition believed the researcher expected gender differences ($M = 5.13, SD = 1.06$) more so than participants in the no threat condition ($M = 3.18, SD = 2.04$)

There was also significant differences in beliefs on who would perform better on the math and science tests, $t (82) = 2.95, p < .004$, as well as the developmental and
social psychology tests, \( t (82) = -2.86, p < .005 \). Participants in the gender stereotype threat condition believed, that the researcher thought, males would perform better on the math and science tests (\( M = 2.51, SD = 1.14 \)) as compared to participants in the no threat condition (\( M = 3.23, SD = 1.09 \)). Participants also believed that the researcher thought women would perform better on the developmental and social psychology tests in the gender stereotype threat condition (\( M = 5.51, SD = 1.12 \)) more so than in the no threat condition (\( M = 4.87, SD = 0.89 \)).
CHAPTER IV

DISCUSSION

Summary and Discussion of Findings

The two main purposes of my study were to explore which motivational strategy best predicts achievement and to explore the impact of stereotype threat on performance. To examine whether stereotype threat affects men in social sciences as much as it affects women in math and science, participants were placed into one of two conditions (no stereotype threat, gender stereotype threat). In each condition, male and female participants took an initial survey about one’s motivational learning strategies, career interest, and subsequent General Psychology Aptitude Test. Unlike many previous studies, the General Psychology Aptitude Test covered four highly valued gender stereotyped domains in psychology (Neuroscience, Quantitative/Statistics, Developmental, and Social Psychology) which were used to assess how stereotype threats affect men and women in the social sciences. To create a gender stereotype threat condition, participants were told that men would do better than women on the math and science quizzes, and that women would perform better than men on the developmental and social psychology quizzes. By contrast, in the no stereotype threat condition participants were told that although the quizzes were on different subjects, there were no significant differences between how men and women would perform.
In the present study, the manipulation was effective. Participants rated the researcher as exhibiting more gender biased beliefs in the gender stereotype threat condition compared to the no stereotype threat condition, as evidenced by the manipulation check results.

Stereotype Threat, Test Performance and Career Interest

**Hypothesis 1: Both Men and Women Perform Worse under Stereotype Threat**

Findings for hypothesis (1) were not quite as predicted. On the basis of previous literature it was expected that males and females would be equally susceptible to stereotype threat. Furthermore, for the combined math and science scores, it was expected that threatened females would perform worse than the other three groups (non-threatened females and all males). As expected, male and female participants in the gender stereotype threat condition performed worse on the math and science sub-tests than participants in the no stereotype threat condition, however threatened females did not perform significantly worse than all the other groups. Instead, all females performed worse than males on the math and science sub-tests regardless of condition.

These findings suggest that males and females may be equally susceptible to stereotype threat, but that the relationship between condition and gender may be more complex than previously thought. These findings may also suggest that by filling out demographic information such as gender, women (in the no stereotype threat condition) may have been affected by subtle forms of stereotype threat as well, causing women in both conditions to perform worse (e.g., Steel & Aronson, 1995, Experiment 4). Perhaps
females in the no threat condition were intimidated enough (by the questions or math and science topics) that a reminder of the stereotype was not needed to impact performance (e.g., Smith & White, 2002). Or, as Zimmerman’s (1989) triadic model of self-regulation might suggest, perhaps these female psychology students had previously struggled in math and science subjects and therefore performed low.

Similar to female math and science scores, it was expected that threatened males would perform worse than the other three groups (non-threatened males and all females) on the developmental and social psychology scores. Interestingly, on the combined (developmental and social psychology) sub-test scores, there were no significant interactions or main effects found for sex or condition suggesting that the stereotype threat only worked for the math and science tests. In other words, the developmental and social psychology fields may not have been the best choice for highly relevant stereotypically female domains.

Taken together, men and women may have been both susceptible to indirect forms of manipulation in relation to the math and science tests. For men, the mere presence of other women in the room in addition to a woman researcher could have been enough for them to believe that there would be differences between how men and women would perform in both conditions regardless of what the researcher said. Perhaps for threatened men (on the math and science tests) this created more performance anxiety and pressure causing their performance to be low.
Hypothesis 2: Stereotype Threat Impact on Career Interest

Findings for hypothesis (2) were not as predicted either. On the basis of previous literature it was expected that males and females would report less career interest under the stereotype threat condition. Furthermore, for the combined math and science career interest ratings, it was expected that threatened females would report less interest than the other three groups (non-threatened females and all males).

Results indicated that both male and female participants in the gender stereotype threat condition reported less interest in the math and science careers than male participants in the no stereotype threat condition; however, threatened females did not report significantly less interest than all the other groups. Instead, females in both conditions reported less interest than males in the no stereotype threat condition.

This pattern of findings is similar to the math and science test scores. Likewise, perhaps by filling out demographic information such as gender, women were affected by subtle forms of stereotype threat in the no threat condition too, causing women in both conditions to not only perform worse, but also report less interest in math and science careers. Previous knowledge of the negative stereotype may have been enough to cause decreases in interest (e.g. Davis et al., 2005). Or, perhaps these female psychology students had previously struggled in math and science courses and therefore were less interested in these subjects. These findings support previous research indicating a relationship between negative stereotype endorsement and decreased interest (e.g., Schmader, Johns, & Barquissau, 2004).
Similar to female math and science interest ratings, it was expected that threatened males would report less career interest in developmental and social psychology than the other three groups (non-threatened males and all females). However, the results were not as expected. Instead, males in the no stereotype threat condition reported less career interest than the other three groups. These findings may further indicate that the developmental and social psychology fields were not strong enough female stereotyped domains for males to be affected by the stereotype threat (even though they believed that the researcher held more gender biased beliefs in the stereotype threat condition). Alternately, perhaps because of the relatively small sample size of male participants, the expected results were not observed, and with a larger sample size results might be different.

**Hypothesis 3: Self-efficacy, Stereotype Threat and Test Performance**

Hypothesis (3) was partially supported when using a between groups analysis of variance to explore whether self-efficacy level (low versus high) and exposure to stereotype threat would negatively affect psychology test scores. When self-efficacy was grouped into two levels (high and low) and compared to the condition (no stereotype threat, gender stereotype threat); self-efficacy level had a significant main effect on test performance. Regardless of condition, participants low in self-efficacy received lower test scores than participants high in self-efficacy. These findings may support other research where women’s self-perceptions have been found to affect their test scores and susceptibility to stereotype threat (e.g., Schmader, Johns, & Barquissau, 2004).
In addition, non-threatened participants high in self-efficacy performed better than threatened participants high in self-efficacy and both groups of participants low in self-efficacy. However, the condition did not have a significant main effect on test performance. Perhaps all the participants low in self-efficacy simply confirmed a belief that they were low performers, and non-threatened participants high in self-efficacy confirmed a belief that they were high performers. On the other hand, it is possible that threatened participants high in self-efficacy were affected by the condition just enough to produce a lower score.

This suggests that, although there was a significant interaction between the condition and self-efficacy level, the condition alone did not significantly affect performance without the interaction of self-efficacy. Furthermore, it seems that self-efficacy may be important for test performance but it does not moderate the situational impact of stereotype threat. Future research is needed to better understand the relationship between stereotype threat, self-efficacy, and test performance when both men and women are included in the study.

Academic Success

The other main purpose of my study was to explore predictors of academic achievement. Hypothesis 4 tested the theory that (of the motivational learning strategies tested) self-efficacy would be the strongest predictor of academic success.

Hypothesis 4: Self-efficacy Predicts Academic Achievement

Hypothesis (4) was supported. In a standard multiple regression analysis, self-efficacy was the strongest predictor of one’s estimated Major GPA in comparison to
other motivational learning strategies. These results support previous research suggesting that self-efficacy is the strongest motivational learning strategy predictive of academic achievement (e.g., Robbins, Lauver, Le, Davis, & Langley, 2004).

General Implications of Findings

Self-efficacy as a Predictor of Achievement

My findings indicate that self-efficacy is undoubtedly important for academic success; however there appears to be a circular relationship between performance and self-efficacy. In other words, repeat success leads to higher self-efficacy and higher self-efficacy leads to future success. Academic self-efficacy was previously defined as a self-evaluation of one’s ability and/or chances for success in the academic environment (Robbins, Lauver, Le, Davis, & Langley, 2004). In order to correctly gage one’s chance for success in the future, an individual looks at past performance. The definition provides further support that a circular relationship exists between self-efficacy and performance. This relationship is similar to Zimmerman’s (1989) triadic model of self-regulation which proposed that reciprocal relationships exist between a person’s self-perceptions (e.g., self-efficacy), behavior (e.g., test performance), and environmental circumstances. Future research should explore cause and effect more closely in relation to self-efficacy and performance.

Stereotype Threat and Performance

In my study, stereotype threat did not influence performance exactly as predicted. Overall, females performed slightly worse than males for math and science scores. However, both male and female participants performed worse in the gender
stereotype threat condition, suggesting that both men and women may be susceptible to gender stereotype threat under similar conditions (in math and science domains). This is similar to previous findings which have shown negative stereotype threat effects on math performance for women (e.g., Schmader, Johns, & Barquissau, 2004; Steel & Aronson, 1995, Experiment 4) and men (e.g., Aronson et al., 1999; Smith & White, 2002) separately. It is interesting that males in this study were affected by the math and science questions but not the developmental and social psychology questions as expected. Taken together, these findings may also suggest that women, more than men, may be susceptible to stereotype threat.

My findings add to the current literature by possibly showing a more complex relationship between gender and stereotype threat (when both males and females are tested under the same conditions) and should be further explored. More research is needed to more clearly understand when males are affected by stereotype threat. In addition, future research may also want to explore the possible sensitivity of females to stereotype threat situations.

General Limitations of Study

Design and Internal Validity

First, in order to eliminate possible confounds from having different survey orders with a smaller sample size, all participants filled out the demographic information first. This may have slightly affected results in the no stereotype threat condition by causing participants to be reminded of their gender before they took the test. Second, if I had a larger sample size (with equal numbers of males and females), I would want to use
the number and type of psychology courses taken as a covariate in my analyses to eliminate it as a confounding variable. Although there may be concerns with the accuracy of estimated GPAs and Major GPAs, I believe these measures were appropriate since they were correlated with test performance and have been previously used in similar academic research. This said, in future research, I might want to obtain actual student grade point averages for increased accuracy.

External Validity and Generalizability

Although my sample size is small and female-dominated, and psychology students may be somewhat unique, I believe my findings are in line with similar research in the field and therefore relevant. Future studies might want to explore stereotype threat in an external setting. However, this would be challenging due to the level of difficulty in creating and measuring stereotype threat effects in the field.

Future Directions

Future research may want to replicate these findings in other highly relevant stereotypically female domains, since findings for the developmental and social psychology scores were not as expected. Future research might also want to examine how a stereotype threat situation would affect the academic achievement and interest experience of males and females when motivational learning strategies such as self-regulation and self-efficacy are held constant. Along similar lines, it would be important to examine how gender discriminating feedback might affect self-efficacy and the interest experience of an individual when he or she believes that their performance level is similar to a person of the opposite gender. Furthermore, it would be important to explore how
self-efficacy and interest affect career choice which may then lead to changes in academic performance alone.
REFERENCES


Capota, C., Mattson, K., & Sansone, C. (2006). “White men can't jump” (or relate to others, or understand other people’s behavior, or ...). Poster presented at the University of Utah's Annual Summer Research Opportunity Program Poster Session, Salt Lake City, Utah.


Smith, J. L., & White, P. H. (2002). An examination of implicitly activated, explicitly
activated, and nullified stereotypes on mathematical performance: It’s not just
a woman’s issue. *Sex Roles, 47*, 179-191.

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and

performance of African-Americans. *Journal of Personality and Social
Psychology, 69*, 797-811.

the perceptions of undergraduate women in male-dominated academic areas.
*Psychology of Women Quarterly, 26*, 46-50.

Blacks and White athletic performance. *Journal of Personality and Social
Psychology, 77*, 1213-1227.

Super, D. E., & Super, C. M. (2001). *Opportunities in psychology careers*. Columbus,
OH: McGraw-Hill.

Thoman, D. B. (2005). *Implications of discriminatory feedback for activity interest and

decreases interest and motivation*. Poster presented at the annual meeting of
the American Psychological Society, Chicago, Illinois.


MEASURES

Career Interest Evaluation

Please rate individually **how interesting** you think each of the careers are using the following scale from 1-7:

1          2          3          4          5          6          7
not                                                                     very
interesting                                                               interesting

1. Developmental Psychology _______
2. Neuropsychology ______
3. Quantitative and Measurement Psychology ______
4. Social Psychology ______
Manipulation Check*

1. How much do you think that the researcher believes that there are gender differences between how men and women perform on statistics and neuroscience quizzes vs. developmental and social psychology quizzes? Use the following scale from 1-7 (circle answer):

   1          2          3          4          5          6          7  
   not                                                                   a lot  
   at all

2. How does the researcher believe performance will turn out for the Social Psychology and the Developmental Psychology quizzes? Use the following scale from 1-7 (circle answer):

   1                  2                 3                  4                 5                   6                  7  
   men will                                       no difference                                   women will  
   perform better                           between genders                                 perform better  
   than women                                                                                          than men

3. How does the researcher believe performance will turn out for the Statistics and Neuroscience quizzes? Use the following scale from 1-7 (circle answer):

   1                  2                 3                  4                 5                   6                  7  
   men will                                       no difference                                   women will  
   perform better                           between genders                                 perform better  
   than women                                                                                          than men

*Note: The administered manipulation questionnaire was titled activity evaluation.
INFORMED CONSENT AND DEBRIEFING

Informed Consent Form A*

You are invited to participate in a study that looks at how your study habits contribute to your test performance. Test performance will be measured by taking a brief general psychology exam on four areas in psychology (developmental, neuropsychology, statistics, and social psychology) which are covered in Psychology 101 and Research Methods. If you choose to participate, you will take a short survey, read four career descriptions, and then complete a second survey and the general psychology test. This study will take approximately 60 minutes to complete. It is important for my thesis, that you read each of the psychology career descriptions and take the general psychology test in an honest and serious manner. Although the exam consists of different psychology areas, it is important to keep in mind that men and women perform equally well on each of the four areas being tested. Please do not put your name on any of the materials besides the consent form so that your answers will remain anonymous. Though only complete packets can be used for data analysis, you may stop your participation at any time and you may skip questions you do not wish to answer. If you have any further questions, you may contact Kareema Mattson at kmalmin@mail.csuchico.edu.

__________________________________________________________  Date: ____________

*Note: Form A was the no stereotype threat condition.
Informed Consent Form B*

You are invited to participate in a study that looks at gender differences on test performance. Grades and tests are particularly important because they are one way to measure whether or not a person would do well in a specific career or field of interest. Test performance will be measured by taking a brief general psychology exam on four areas in psychology (developmental, neuropsychology, statistics, and social psychology) which are covered in Psychology 101 and Research Methods. If you choose to participate, you will take a short survey, read four career descriptions, and then complete a second survey and the general psychology test. Previous studies have shown that women perform better than men on tests about developmental and social issues and situations. On the other hand, men often perform better on mathematical/statistics and science/neuropsychology exams. I am looking at whether gender or other factors are better at predicting your test performance.

This study will take approximately 60 minutes to complete. It is important for my thesis, that you read each of the psychology career descriptions and take the general psychology test in an honest and serious manner. Please do not put your name on any of the materials besides the consent form so that your answers will remain anonymous. Though only complete packets can be used for data analysis, you may stop your participation at any time and you may skip questions you do not wish to answer. If you have any further questions, you may contact Kareema Mattson at kmalmin@mail.csuchico.edu.

By printing my name and signing below, I agree to participate. I have read the description of the research study as outlined above. The investigator has explained the study to me and has answered all of my questions I have at this time. I understand that if I decide to participate, I am free to withdraw my consent and discontinue participation at any time without prejudice. I freely volunteer to participate in this study.

Signature: ___________________________________________ Date: __________

*Note: Form B is the gender stereotype threat condition.
Debriefing Script*

Before I pass out your credit, I’d like to ask you a couple of questions and discuss with you certain aspects of today’s experiment. First, was there anything in the experiment that made you suspicious? If so, what?

O.K. Let me take a minute to tell you a little more about the true nature of what we were interested in today. I’ll start by telling you that not everything I said about this experiment was true. Although most psychologists do not use deception in research, it is sometimes necessary to create a situation in the lab when the thing we are interested in is too complex for outside the lab to understand how it works. As I explain more to you, I’m sure you’ll see we could not have designed this experiment otherwise, and that we hope your participation today will help us understand important psychological processes.

Although the context of this study was set up as a test performance activity, we are actually interested in whether different instructions affect academic interest and test performance. Previous research, for example, has shown that negative stereotypes can affect one’s test performance. However, we are interested in finding out whether attributing negative stereotypes can also lead to less interest and persistence for the academic task or even domain.

We expect that different experimental conditions will lead to different psychology test scores and interest ratings.

To investigate these hypotheses, it was necessary to create this situation. Some participants are told that there are gender differences on test performance and others are told that men and women will perform equally well. Actually, there are no results analyzed from these quizzes so far. Therefore, the information you heard about gender differences today was not real.

If we had informed you of the true nature of our experiment at the beginning, it would likely have altered your responses. To ensure that other students who may be in this study are not aware of the nature of this study, I ask that you please do not discuss this experiment with anyone other than the researchers involved. It is important to us that future participants do not know in advance that some information is not real or it may influence their natural responses.

Before you leave, I want to ask you a couple more questions:

- First, do you understand why we were unable to tell you the true nature of the experiment before we began?
- Do you understand why it is very important that you do not talk to other students about the study, because of how it would affect the findings? Do you have any other questions?

If you have any further questions later or would like to find out more about the study, please contact me: Kareema Mattson at kmalmin@mail.csuchico.edu (written on white board). If you are interested in finding out more about these careers in psychology please visit the American Psychological Association website at APA.org (written on white board).

Thank you very much for your participation in this study. Without willing participants such as you, this research would not be possible.