

THE UNIVERSITY OF SOUTH ALABAMA  
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STEROTYPE VULNERABILITY AND PERFORMANCE ON THE NEO PI-R  
NEUROTICISM SCALE

BY

Nicholas J. Schmidt

A Thesis

Submitted to the Graduate Faculty of the  
University of South Alabama  
in partial fulfillment of the  
requirements for the degree of

Master of Science

in

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## ABSTRACT

Schmidt, Nicholas J., M.S., University of South Alabama, July, 2009. Stereotype Vulnerability and Performance on the NEO PI-R Neuroticism Scale. Chair of Committee: Elise E. Labbé-Coldsmith, Ph.D.

The emotional stability of 24 college student participants, 17 females and 7 males with a mean age of 18.96 years, was evaluated using the neuroticism scale of the *Revised NEO Personality Inventory* (NEO PI-R) prior to a challenging cognitive test, where participants in the experimental condition were exposed to a phrase implying a performance-related stereotype. Results indicated that those individuals with lower neuroticism scores are less vulnerable to the influence of stereotypes ( $r=0.635$ ,  $p<0.001$ ). A Multivariate Analysis of Variance (MANOVA) failed to find any significant physiological differences between participants exposed to the stereotype and those in the control condition, but did find significant differences in the physiological arousal of those participants identified as less vulnerable to stereotypes and those identified as more vulnerable.

# **CHAPTER I**

## **LITERATURE REVIEW**

The purpose of the study was to examine one of the influences widening the cognitive test score gap between Blacks and Whites. In examining possible factors promoting this cross-group discrepancy, negative stereotypes have surfaced. Stereotype threat theory, positing that expectations affect performance, has been cited as one factor affecting the test score gap in the United States (Steele & Aronson, 1995).

As stereotype threat theory has developed, so anomalies have come to light. It was the intention of this author to examine the personality profiles of such anomalous, resilient persons in order to both widen the scientific knowledge of personality testing as well as shed insight into some of the negative effects posed by stereotypes.

### **1.1 Stereotypes' Effects on Blacks in the United States**

Differences in both academic achievement and aptitude between Blacks and Whites have been noted for years, some of which has been attributed to the effect of stereotypes (see Steele, 1997). Even “stereotype threats,” defined as the situation where “anything one does or any of one’s features that conform to it make the stereotype more plausible as a self-characterization in the eyes of others, and perhaps even in one’s own

eyes,” (Steele & Aronson, 1995, p. 897) have been found to impair test scores and academic performance.

This introduction discusses the effects that stereotypes have on Whites, Blacks, Europeans of African descent, and women. It also discusses some of the confusion currently being examined with regard to the role that stereotypes play in people’s performance on cognitive tasks. Lastly, the introduction will discuss the role of personality, with particular attention to neuroticism.

### **1.2 Stereotypes' Effects on Other Populations**

In studying the stereotype effect among women, Cadinu and colleagues (2003) examined the math test score differences of women who had been exposed to a negative stereotype versus those exposed to either a positive stereotype or no stereotype at all. Findings in this study display significantly lower scores by the women in the negative stereotype group compared with those participants in the neutral or positive conditions. Cadinu et al. (2003) continued their studies, examining “non-stigmatized groups” by presenting Black Americans living in Italy with positive and negative stereotypes. Test scores from these groups further supported the stereotype threat theory, showing decreased scores in the presence of a negative stereotype ( $F(1,96)=15.1, p<0.001$ , Cohen’s  $d=0.79$ ). One issue related to this study is its lack of generalizability. While the results are interesting for Blacks living in Italy, they may not be as pertinent or applicable to Blacks living in America, since the two populations have possibly become acculturated to differing societal biases or lack thereof. Furthermore, this study failed to incorporate any physiological data. Since Blascovich et al. (2001) found significant physiological

components when persons are presented with stereotypes, the lack of any physiological data may have overlooked an important component of the process by which stereotypes affect performance.

### **1.3 Stereotypes' Physiological Effects**

Stereotype reactivity has been found to have an influence on physiological factors, such as blood pressure (Blascovich et al., 2001). In one of these experiments, Blascovich and colleagues (2001) studied Blacks under test conditions, and found an increase in blood pressure when stereotypes (created by the mention of cultural differences in standardized test performance) were present ( $F(1,31)=6.15, p<0.02$ , Cohen's  $d=0.89$ ). One limitation of this study is that no explanation is made of vulnerability as a predisposition to stereotype reactivity and possible differences in performance within the experimental group. While group differences were shown to exist between those persons exposed to stereotypes and those in the control condition, differences between those persons with more reactivity and those with less were not examined.

### **1.4 Lack of Consensus on Stereotypes' Effects**

Muddying the waters of stereotype threat theory is the fact that not all research is in consensus as to how much of a role stereotypes play in influencing intellectual performance. Cullen et al. (2004) tested the applicability of stereotype threat theory on two groups, one in an educational setting and one in a military setting. Results did not support hypotheses arising from stereotype threat theory, leading the authors to caution

against placing too much weight on stereotypes as a determinant of performance. One possible explanation for this lack of support for stereotype effects, not mentioned by Cullen et al. (2004), is that by the time persons reached the applied setting in which they were testing, the more stereotype-vulnerable individuals may have been weeded out. Because the group that they were testing had already attained some level of success in advancing their careers, they may have been from such a select population as to hinder the generalizability of the results.

### **1.5 Stereotype Vulnerability and Academic Self-Assessment**

Further complicating matters, Aronson and Inzlicht (2004) have found that not all Blacks react to stereotypes in the same way, suggesting that there are important differences in how vulnerable one is, or in their “tendency to expect, perceive, and be influenced by negative stereotypes about one’s social category” (p. 829). In their experiment, the researchers used the Race-Based Rejection Sensitivity Scale, described by the authors as a predictor of stereotype vulnerability. Performance on a 10-item verbal task was also examined, and Blacks identified as more stereotype vulnerable were found to show both depressed scores and an increased fluctuation of their own self-perceptions and confidence in abilities ( $r=0.66, p<0.001$ ). While lending important information for the investigation of stereotype vulnerability as a factor influencing the effects negative stereotypes might have on individuals, Aronson and Inzlicht (2004) made no attempt to examine either physiological or personality factors which may be aspects of the stereotype response.

Stereotype vulnerability, for the purposes of this study, is operationally defined as the disparity between scores on the analytical/verbal test and the participant's self-assessment of their performance. Because Aronson and Inzlicht (2004) found a significant relationship between persons' self-assessment of cognitive performance and their vulnerability to stereotypes ( $F(1,40)=7.49, p<0.01$ , Cohen's  $d=0.87$ ), this should be an adequate measure.

### **1.6 Personality Testing**

While testing for use as a measurement of personality and ability is said to have been implemented as far back as the 2<sup>nd</sup> century BCE (Bowman, 1989), the use of personality testing as we know it today seems to have been influenced largely by efforts of modern psychologists within the last 100 years. For instance, objective personality testing is regarded by Gibby & Zickar (2008) to have begun with Woodworth's Personal Data Sheet in 1917, which was used to predict soldiers' response to traumatic wartime situations. One test having its origins in the 1930s and still receiving widespread use within the field of clinical psychology is the Minnesota Multiphasic Personality Inventory, revised in 1989 (Butcher et al., 1995).

While tests such as the MMPI focus on identifying psychopathology as extremes of normal functioning (as seen with cutoffs for  $T$  scores on varying scales thought to be domains of personality), other personality tests have aimed to find utility in identifying aspects of personality not necessarily indicative of mental disorder (e.g., the Myers-Briggs Type Indicator). Regardless of the personality test, the theory it is based on (i.e., the domains that it sees as making up the construct of "personality"), seems to have a

large influence on its content. For the purposes of this project, we focus on the Revised NEO Personality Inventory.

Butcher (2002) recognizes just how complex the influences of personality, and personality itself, can be, stating that “background factors such as age, gender, and ethnicity are important, since personality is in many respects a function of the environment or groups to which a person belongs” (Butcher, 2002, p. 3). More specifically and relevant for this paper, Butcher (2002) notes that “it is important to consider influences that may come from belonging to a group that has been treated differently by our social institutions than others have” (p. 3).

While personality has been regarded as a complex and multi-faceted construct, Costa, Busch, and Zonderman (1986) have made use of five factors, also known as the Big Five, which have been factor-analyzed from thousands of descriptive adjectives related to personality (Goldberg, 1990). These factors, which attempt to offer continuums along which facets of the personality may be quantified, include Neuroticism, Openness to change, Agreeableness, Conscientiousness, and Extraversion. Cohen and Swerdlik (2005, p. 358-359) describe the 5 dimensions or factors that make up a personality:

Stated briefly, the Neuroticism domain taps aspects of adjustment and emotional stability. The Extraversion domain taps aspects of sociability and assertiveness. Openness refers to openness to experience as well as active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, intellectual curiosity, and independence of judgment. Agreeableness is primarily a dimension of interpersonal tendencies that include altruism, sympathy toward others, and the belief that others are similarly inclined. Conscientiousness is a dimension of personality that has to do with the active processes of planning, organizing, and following through.

### **1.7 Revised NEO Personality Inventory**

In an attempt to quantify these domains of personality, Costa and McCrae (1992) created the *Revised NEO Personality Inventory* (NEO PI-R). According to the NEO PI-R manual, the normative sample was created using 500 men and 500 women from a group of over 2,000 participants from other longitudinal studies. Normative participants were screened and selected to match population projections of the 1995 U.S. census data.

Convergent validity between the measures of each domain was demonstrated with preexisting tests created to measure individual aspects of personality. For instance, Costa and McCrae (1992) note that scores from the NEO PI-R scales were found to be significantly correlated with respective scales from other tests such as the Eysenck Personality Inventory and the State-Trait Personality Inventory. Additionally, test-retest reliability was shown to range between .63 and .91 on the 5 domain scales over a 3 year period (Costa & McCrae, 1992).

## **CHAPTER II**

### **STATEMENT OF THE PROBLEM**

While the extent to which negative stereotypes affect performance has not been pinpointed, the above research demonstrates that there is an effect, and that the threat can impede the scores of the targeted group. The ambiguity of knowing exactly who is affected and who is resistant to the stereotype, however, invites further research investigating the traits of those persons more resistant versus those more vulnerable.

Because of the link between stereotype vulnerability and variability in self-perceptions of confidence, the author believes that there is also an unexplored relationship between vulnerability to stereotypes and an individual's personality traits, as found in Goldberg's (1990) Big Five personality map. The fourth dimension of the Big Five has been described as a measure of emotional stability, including confidence, insecurity, and anxiety (Goldberg, 1990).

The author has found no studies before this one proposing to examine how the personality types of stereotype vulnerable individuals may differ from those of less vulnerable individuals based on a five-factor model of personality. Such research would add to the field of clinical psychology, specifically in that it would create new interpretations for high scores on the Neuroticism scale, affecting both how clinicians relate these findings to their clients as well as how treatment goals are planned.

## **2.1 Hypotheses**

The hypotheses as taken from the results of the research summarized above are as follows:

Hypothesis 1. Goldberg's (1990) fourth dimension (emotional stability/neuroticism), as measured by the Neuroticism scale of the NEO PI-R, will be a predictor of stereotype vulnerability in the present study.

Hypothesis 2. Participants in the experimental condition will show a significantly greater increase in heart rate, skin conductivity, and respiration rate compared with participants in the control condition.

Hypothesis 3. The presence of this stereotype effect should be confirmed by an impairment of test scores in the experimental group as compared to the control group.

## **CHAPTER III**

### **METHOD**

#### **3.1 Participants**

Approval to conduct this study was obtained from the university Institutional Review Board, and twenty-four participants were recruited from a medium-sized university in the Southern United States through use of a Psychology Department's subject pool. The mean age was 18.96 years (70.83% female, 29.17% male; 29.17% African-American, 12.5% Asian, 58.33% Caucasian). Participants were given 1 1/2 hours research class credit to participate.

#### **3.2 Measures**

Measures used included the NEO PI-R (Costa & McCrae, 1992), a demographic questionnaire, measures of heart rate, Galvanic skin response and respiration, and a mentally challenging verbal/quantitative timed test, and a 0-100 scale on which the participant rated their performance on the verbal/quantitative test.

##### **3.2.1 Revised NEO Personality Inventory**

The NEO PI-R was developed by Costa and McCrae (1992) by collecting a list of personality descriptors and factor analyzing them until 5 general domains were found,

sometimes being described as the “Big Five.” These domains on which personalities may vary include Neuroticism (N), Extraversion (E), Openness (O), Agreeableness (A), and Conscientiousness (C). Using these five factors as a basis of measuring personality, a 240-item questionnaire was developed to operationalize the construct of personality (Costa & McCrae, 1992). Using this model for the NEO PI-R, convergent validity between individual scales from the NEO PI-R and similar scales from other measures of personality such as the Eysenck Personality Inventory and the State-Trait Personality Inventory has been found (Costa & McCrae, 1992).

### **3.2.2 Demographic Questionnaire**

The demographic questionnaire used in this study included information which was either needed to examine the hypotheses, or otherwise contained material which might shed further insight into the participants’ performance throughout the experiment (i.e., gender, race, age, academic performance, class level, etc.). The exact questionnaire is attached in Appendix A.

### **3.2.3 Physiological Data**

In one room, a Sony computer with a Pentium 4 processor was connected to a STENS multi-trace physiological adapter set up to record heart rate, respiration, and skin conductance of participants. Adapters for these three physiological variables was run through a wall into a small, 8’ x 8’ (2.13 meters x 2.13 meters) room where the participant was seated in a leather chair. Room temperature was held between 70 and 72 degrees Fahrenheit (21.11 and 22.22 degrees Celsius). Across from the participant’s seat was a chair for the researcher, approximately 3’ (0.914 meters) away. This room

remained closed during the experimental procedure to minimize distractions for the participant.

### **3.3 Procedures**

Eleven participants were assigned with simple randomization to an experimental condition where they were told that “Persons from certain cultures do not perform as well on this test as others, but you should try your best anyways,” and 13 participants were randomly assigned to a control condition. Participants in the control condition did not receive this performance-related statement. Participants were led to believe that they were participating in an experiment investigating the physiological factors involved with cognitive tasks. The research protocol is attached in Appendix B. Participant consent was obtained, and parent consent was received if the participant was 18 years of age or younger.

Participants had individual appointments where they were greeted by a psychology graduate student and were seated in a room with minimal distractions. Participants were asked to complete a demographic questionnaire and the NEO Five-Factor Inventory. All questionnaires were coded to ensure confidentiality, and there was no need to put participants’ names on any materials that were kept.

Three non-invasive physiological sensors (EKG, GSR, and Respiration) were attached, and a ten minute period was used to constitute the baseline.

Participants in the Experimental group were told by the experimenter before introducing the test that certain cultures do not perform as well on this test, but that participants should do their best anyways. Participants then completed a mental task.

Following the test, collection of physiological data was stopped, and participants were debriefed. For example, a participant might have been told, “the test was created intentionally so that participants will have difficulty answering questions. Thank you for participating in our study.”

## CHAPTER IV

### RESULTS

Hypothesis I was tested using a Pearson's Product Moment Correlation examining this vulnerability to stereotypes and their score on the NEO PI-R's Neuroticism scale. Participants' scores (from both Control and Experimental conditions) on the challenging mental task were subtracted from their subjective evaluation of their performance to find the absolute value disparity between their perceived and actual score, operationally defined as their stereotype vulnerability. A significant, positive correlation was found between the stereotype vulnerability of participants and their score on the NEO PI-R's Neuroticism scale ( $r=0.635$ ,  $p<0.001$ ) (see Figure 1).

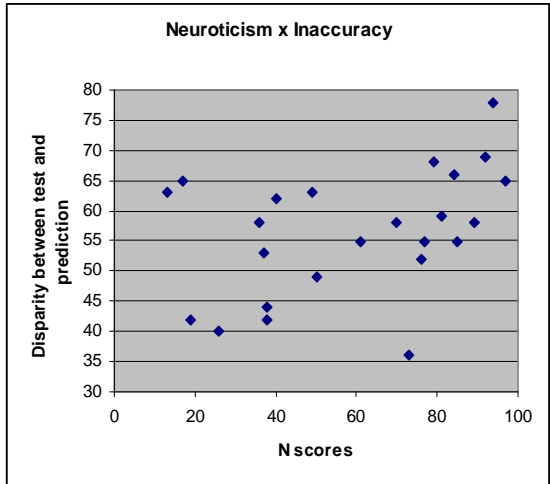


Figure 1: Neuroticism scores correlated with inaccuracy of participants' predictions of test performance.

Hypothesis II was tested using a Multivariate Analysis of Variance (MANOVA) with experimental or control condition as the independent variable and heart rate, respiration rate, and galvanic skin response as the dependent variables (see Table 1).

Table 1: Mean test scores and physiological measures by group.

<b>Test Score and Post-Test Physiological Values</b>				
	Test Score	Heart Rate	Respiration	Skin Conductance
Control	<i>M</i> =96.62,	<i>M</i> =83.38,	<i>M</i> =31.23,	<i>M</i> =2.58,
	<i>SD</i> =18.85	<i>SD</i> =9.97	<i>SD</i> =4.25	<i>SD</i> =1.55
Experimental	<i>M</i> =97.36,	<i>M</i> =83.54,	<i>M</i> =31.96,	<i>M</i> =2.97,
	<i>SD</i> =21.65	<i>SD</i> =14.04	<i>SD</i> =10.68	<i>SD</i> =1.54

Due to technical difficulties, respiration data for two of the subjects was lost. Results of the MANOVA failed to find any significant effect for group on physiological measures (Wilks'  $\lambda=0.901$ ,  $F(3,20)=0.735$ ,  $p>0.05$ ). A univariate ANOVA similarly failed to find significant differences were found between heart rate values of control and experimental groups ( $F(1,21)=0.02$ ,  $p>0.05$ ), no significant differences were found between the respiration rates of control and experimental groups ( $F(1,19)=0.28$ ,  $p>0.05$ ), and no significant differences between the skin conductivities of control and experimental groups were found ( $F(1,21)=0.555$ ,  $p>0.05$ ).

Interestingly, however, when a univariate ANOVA was conducted with high/low stereotype vulnerability as the independent variable (identified using a median-split to separate individuals into the two groups based on how far their self-assessment of performance on the stress test varied from their actual score) and heart rate, respiration, and galvanic skin response as dependent variables, a significant difference for skin conductance between groups became evident ( $F(1,21)=4.49$ ,  $p<0.05$ , Cohen's  $d=0.74$ ) (see Table 2).

Table 2: Physiological variables after testing by vulnerability group.

	Heart Rate	Respiration	Skin Conductance
Less Stereotype-	$M=83.03$	$M=25.79$	$M=2.19^*$
Vulnerable	$SD=11.99$	$SD=16.65$	$SD=1.48$
More Stereotype-	$M=83.83$	$M=31.46$	$M=3.27^*$
Vulnerable	$SD=11.78$	$SD=4.15$	$SD=1.44$

Hypothesis III was tested using an Independent Samples *t*-Test and indicated no significant differences in performance on the cognitive task between the experimental and control conditions ( $t(23)=-0.091, p>0.05$ ).

Additionally, further *t*-tests revealed no significant differences between gender, race, or condition and test performance, physiological measures, stereotype vulnerability, or scores on the neuroticism scale.

## **CHAPTER V**

### **DISCUSSION**

Confirmation of Hypothesis I, that neuroticism as measured by the NEO PI-R is related to stereotype vulnerability, brings important issues to light. For the clinical psychologist interpreting the NEO PI-R, this adds an extra area of investigation for those clients with high neuroticism scores. Persons who exhibit a high level of neuroses may have difficulty accurately assessing their own abilities, in turn affecting the decisions they make. Furthermore, a high score on the Neuroticism scale of the NEO PI-R may invite the clinician to investigate the role that stereotypes may be having in a client's life, because they may be more vulnerable to internalizing such stereotypes.

Lack of support for Hypotheses II may indicate several problems with the design of the experiment and its experimental group. First, Aronson and Inzlicht (2004) note that factors activating stereotypes may include a wide variety of subtle factors found in the environment, such as the race of the experimenter or the task being attempted. Such unintended, stereotype cues may have inadvertently had an influence on participants in both groups. A more direct comment eliciting greater cultural expectations may surpass lesser stereotype effects common to both groups and uncover a physiological effect between conditions. Second, the presence of less vulnerable individuals in the experimental condition may

have negated any physiological effect that the more stereotype-vulnerable individuals may have been having. More participants would allow for more powerful analyses, including a 2x2 design examining differences between the experimental and control groups, looking at differences between those more vulnerable and less vulnerable participants.

The lack of support for Hypothesis III, that the test scores of participants in the experimental group would be significantly lower than those of the control group, may have resulted because of issues similar to those listed above for Hypothesis II. A performance-related comment aimed at eliciting a stronger cultural expectation may elicit a stereotype effect large enough to stand out against any possible extraneous effects. Also, more participants lending more power to analyses would enable further examination to possible differences within conditions, possibly between more and less stereotype-vulnerable individuals.

Without further experimentation with more participants and possibly a more culturally provocative stereotype, it is difficult to rule out a stereotype effect which has been found again and again in populations similar to the one used in this experiment. The lack of a significant stereotype effect is supported, however, by one study mentioned earlier in this paper where Cullen et al. (2004) failed to elicit a stereotype response between groups as measured by performance on an intellectual task.

More research is needed which could focus on the differences between individuals deemed more stereotype-vulnerable and those found to be less vulnerable. One weakness of this study was the small number of participants. Having more participants would allow a researcher to examine the possible differences between more

and less vulnerable individuals in the experimental and control groups. For example, if a researcher were able to gather data from at least 80 participants, they could examine the more vulnerable individuals in each group for possible physiological and performance differences. One might expect to see a significant difference between the vulnerable individuals between groups, but no difference between the less vulnerable individuals.

This study does, however, provide an empirical starting point for future studies wishing to examine both the physiological processes underlying possible stereotype effects, as well as the possible personality differences between those thought to be more and less vulnerable to such stereotypes. With future studies increasing power with increased sample size, demonstrating adequate control, and utilizing physiological data, it is hoped that a deeper understanding of stereotype vulnerability might be attained.

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## **APPENDICES**

**Appendix A**

**Demographic Questionnaire**

Please fill out the information or check off the information pertaining to you:

Age: \_\_\_\_\_ Gender: Male \_\_\_ Female \_\_\_

Race: Caucasian \_\_\_ African American \_\_\_ Hispanic \_\_\_

Asian \_\_\_ Native American \_\_\_ Other \_\_\_

Class Level: \_\_\_\_\_ ACT Score: \_\_\_\_\_

Marital Status:

Single \_\_\_ Married \_\_\_ Divorced \_\_\_ Separated \_\_\_ Widow \_\_\_

Number of Children: none \_\_\_ one \_\_\_ two \_\_\_ three+ \_\_\_

Health/Medical Illness: Yes \_\_\_ No \_\_\_

If Yes, please describe: \_\_\_\_\_

Do you receive treatment for psychological difficulties: Yes \_\_\_ No \_\_\_

If Yes, please describe: \_\_\_\_\_

Do you currently take medication: Yes \_\_\_ No \_\_\_

If Yes, please describe: \_\_\_\_\_

## Appendix B

### Research Protocol

Participant Number: \_\_\_\_\_ Group: \_\_\_\_\_

1. Give participant the consent form to read and sign. \*If participant is 18 years old or younger, the form needs to have been signed by a parent before the participant's scheduled time.\* Make sure you indicate the participant's designated group on their form.
2. Give the participant the demographic questionnaire and the NEO PI-R on a clipboard and say **"Let me know when you are finished, I'll be right outside the door."** Make sure you hang around outside the door until they are done.
3. Attach the physiological sensors.
4. Have the person sit quietly for 10 minutes and say, **"I'm going to have you sit quietly for the next 10 minutes so that you can adjust to the environment."**
5. For the Experimental Condition say, **"Certain cultures do not perform as well on this test, but you should do your best anyways."**

TEST:

**"You will be taking an analytical and verbal cognition SPEED test. When I say go, begin working on the following items WITHOUT skipping any until I say STOP. You may begin when I say GO. GO!"**

(Hand them the math problem sheet and allow them to work for 45 seconds, and then tell them to STOP. Count the number of problems they completed [regardless of correctness] and write that number in the blank.

ATTEMPTED: \_\_\_\_\_

**"I am going to say a list of numbers. Listen carefully, and when I am finished reading all the numbers, I want you to say them right after me. Just say what I say."**

(When saying the numbers pause for 1 second between each. Write down the total number correct in the trial in the blank next to the number sequence.)

5-3-9-4-1-8-7-3-9 \_\_\_\_\_

7-2-4-8-5-6-9-3-4 \_\_\_\_\_

(Immediately after they have finished the second set tell them to **"resume completing the math equations."** Say, **"GO"** and indicate by pointing at the unfinished math problems for them to resume, and start the stopwatch. Count how many they attempted on the second trial and make a note of it. While they are working make some notes on a scratch sheet of paper. After 45 seconds tell them to **STOP**. Give them the following instructions.)

ATTEMPTED: \_\_\_\_\_

**“Now I’m going to read another list of numbers. This time, when I finish reading them, I want you to say them backward. For example, if I say 7-1-9, you would say 9-1-7.”**

(When saying the numbers pause for 1 second between each. Write down the total number correct in the trial in the blank next to the number sequence.)

6-1-9-4-7-3-6-1-6 \_\_\_\_\_

3-9-2-4-8-7-2-1-7 \_\_\_\_\_

(Immediately after they have finished the second set tell them to **“resume completing the math equations.”** Say, **“GO”** and indicate by pointing at the unfinished math problems for them to resume, and start the stopwatch. Count how many they attempted on the second trial and make a note of it. While they are working make some notes on a scratch sheet of paper. After 45 seconds tell them to **STOP**. Give them the following instructions.)

ATTEMPTED: \_\_\_\_\_ RECORD TOTAL NUMBER CORRECT: \_\_\_\_\_

**“I’m going to be giving you the first part of an analogy. I want you to complete the analogy immediately after I finish reading you the first part. For example, Peanut is to Shell as Corn is to \_\_\_\_\_, your answer would be Husk.”**

(Give the following analogies to the participant. Say the analogies slowly so that you will not have to repeat any. If the participant asks you to repeat the analogy, tell them that you cannot. Participants have 5 seconds to respond. If they don’t answer within 5 seconds, or they answer incorrectly, write their response and tell them that it is incorrect, give them the correct answer, and move on to the next analogy. Give participants 1 point for each correct answer; write the total next to the blank.)

Clarify is to Confusion like Criticize is to \_\_\_\_\_ Euphoria

Hands is to Clutch as Eyes are to \_\_\_\_\_ Blink

Employee is to Wages as Entrepreneur is to \_\_\_\_\_ Profits

Solo is to Music as Monologue is to \_\_\_\_\_ Drama

Thesaurus is to Synonyms as Encyclopedia is to \_\_\_\_\_ Facts

Sand is to Desert as Grass is to \_\_\_\_\_ Lawn

Ophthalmologist is to eyes as Dermatologist is to \_\_\_\_\_ Skin

Dollar is to Dime as Century is to \_\_\_\_\_ Decade

Scowl is to Smile as Cost is to \_\_\_\_\_ Discount

Bibliographer is to Library as Teacher is to \_\_\_\_\_ Classroom

Candy is to Sugar as Pickle is to \_\_\_\_\_ Brine

Helmet is to Head as Goggles are to \_\_\_\_\_ Eyes

TOTAL: \_\_\_\_\_

**“I am going to read another list of numbers. Listen carefully, and when I am finished, I want you to say them right after me. Just say what I say.”**

(When saying the numbers pause for 1 second between each. Write down the total number correct in the trial in the blank next to the number sequence.)

6-3-5-4-2-9-5-6-8 \_\_\_\_\_

1-3-2-4-4-8-2-3-6 \_\_\_\_\_

**“I am going to give you some words to spell. When I say each word, please repeat it back to me, spell it, then repeat the word again.”**

(If 5 seconds of silence pass without a complete response, continue on with the next word on the list. Give participants a point for every word they spell correctly. Add the number correct and write the total on the line next to the last word.)

Arrogance

Disappearance

Apostrophe

Deoxyribonucleic (DEE-OX-EE-RYE-BO-NEW-CLEE-IK)

Unanimous

Bizarre

Acetylcholine (AH-SEE-TOE-CO-LEAN)

Omniscient

Inflammation

Per Se

Hemispherectomy

Vacillate

Soliloquy

Tectopulvinar (TEC-TOE-PULVIN-AR)

TOTAL: \_\_\_\_\_

**“Now I’m going to read another list of numbers. This time, when I finish reading them, I want you to say them backward. For example, if I say 5-2-7, you would say 7-2-5.”**

(When saying the numbers pause for 1 second between each. Write down the total number correct in the trial in the blank next to the number sequence.)

3-5-4-9-1-4-7-8-9-3 \_\_\_\_\_

2-7-8-4-5-9-6-4-3-1 \_\_\_\_\_

6. Ask the participant, **“On a scale of 1 to 7, one being very poorly and 7 being very well, how well do you think you performed on this test?”**
7. Unhook the participant. Debrief and thank them for participating in the study!

# Appendix C

## IRB Form

### UNIVERSITY OF SOUTH ALABAMA

COLLEGE OF MEDICINE



07/17/2006

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#### INSTITUTIONAL REVIEW BOARD Renewal Review

**Protocol #:** 05-167                      **Review Date:** 7/13/2006                      **Renewal Date :** 08/01/2006  
**Principal Inv:** Labbe-Coldsmith, Elise, Ph.D.                      **Type:** EXPEDITED                      **Renewal Expiration :** 07/31/2007  
**Title:** EVALUATING ANGER AND RESILIENCY IN RELATION TO RACIAL STEREOTYPES DURING STRESS                      **Status:** ACTIVE

This panel, operating under the authority of the DHHS Office for Human Research and Protection, assurance number FWA 00001602, has reviewed the following items:

- 1.) Protection of the rights and the welfare of human subjects involved.
- 2.) The methods used to secure and the appropriateness of informed consent.
- 3.) The risk and potential benefits to the subject.

**On the basis of this review, we recommend:**

Board Action	Cause for Review
<input checked="" type="checkbox"/> Approval                      ( ) Deferral <input type="checkbox"/> Reactivation	<input checked="" type="checkbox"/> Renewal                      ( ) Other (See Notes)

for the protocol and consent in terms of the University of South Alabama's statement of policy and procedure concerning the use of human subjects in the investigation.

The regulations require that the investigator not initiate any changes in the research without prior IRB approval, except where necessary to eliminate immediate hazards to the human subjects, and that all problems involving risks and adverse events be reported to the IRB immediately !

Advertisements for the recruitment of subjects must receive prior IRB approval. This and subsequent consent forms that have been approved will be certified with an IRB stamp on the last page. You must use copies of the current consent form with the current IRB Approval Stamp unless consent has been waived. All subjects must receive a copy of the current consent form !

**NOTES:**

Expedited review for the continuing use of research per category:

46.110 (9) Continuing review of research, not conducted under an investigational new drug application or investigational device exemption where categories two (2) through eight do not apply but the IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and no additional risks have been identified.

*W. Kevin Green MD/PhD*  
\_\_\_\_\_  
Chair, Institutional Review Board  
*17 June 06*  
\_\_\_\_\_  
Date

## **BIOGRAPHICAL SKETCH**

## **BIOGRAPHICAL SKETCH**

Name of Author: Nicholas J. Schmidt

Place of Birth: Minneapolis, Minnesota

Date of Birth: February 3, 1982

Graduate and Undergraduate Schools Attended:

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Degrees Awarded:

Master of Science in Psychology, 2009, *cum laude*, Mobile, AL

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