

2014-01-01

# A Comparison Of Perceived Stress And Body Mass Index In Hispanic And Non-Hispanic College Students

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A COMPARISON OF PERCEIVED STRESS AND BODY MASS INDEX IN HISPANIC  
AND NON-HISPANIC COLLEGE STUDENTS

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Luisa Ileana Garcia

2014

A COMPARISON OF PERCEIVED STRESS AND BODY MASS INDEX IN HISPANIC  
AND NON-HISPANIC COLLEGE STUDENTS

by

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THESIS

Presented to the Faculty of the Graduate School of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

MASTER OF PUBLIC HEALTH

College of Health Sciences

THE UNIVERSITY OF TEXAS AT EL PASO

August 2014

## **ACKNOWLEDGMENTS**

This project couldn't have been possible without the support and encouragement of my mentor

Dr Sobin. Also, I would like to thank Dr. Davis and Dr. Solis for their help and feedback.

I am grateful for having such wonderful people in my life. For my parents who had taught me to never give up and always look at the positive side of things. I would like to thank my friends who have always encouraged me, and to my peers from the public health department and college of health science for all the great moments, I learned a lot from each and one of you. To my friend Lydia Garcia for the laughs, her trust and support; to Dr Holly Mata for your teaching, for your time and effort, you are and you will always be a great example for me. Thanks all of you for believing in me, you have all made unforgettable experience as a graduate student.

## ABSTRACT

The Hispanic population in the United States is rapidly increasing and for this reason it is critical to better understand positive and negative factors that may impact the health of Hispanics. Past studies have focused mostly on physiological stress but fewer studies have examined possible differences in cognitively perceived stress. Past studies have suggested that stress reactivity may be lower among Hispanics; and that overall, females experience greater stress than males regardless of ethnicity. Other studies have shown that stress increases the likelihood of increased body mass index (BMI) and body fat accumulation. The purpose of this study was to compare perceived stress in a large sample of male and female Hispanic and non-Hispanic college age students. Data from 806 participants (441 students from the University of Texas at El Paso and 365 students from Eastern Illinois University) were analyzed. Participants completed an online questionnaire that included items such as ethnicity, age, gender, BMI, and the Perceived Stress Reactivity Scale. It was hypothesized that 1) as compared to males, females report higher levels of perceived stress; 2) as compared to Hispanics, non-Hispanics report higher levels of perceived stress, and gender and ethnicity interact such that male Hispanics report lowest levels of perceived stress; and 3) that for all participants, perceived stress predicts BMI. As compared to males, females had higher perceived stress scores. As compared to non-Hispanics, Hispanics subjects had lower levels of perceived stress. Contrary to our prediction, the interaction of gender and ethnicity was not significant. No association between perceived stress and BMI was observed. This study added to the small but growing literature on cognitively perceived stress. The findings suggested that regardless of ethnicity college-age females as compared to males are at greatest risk of perceived stress related problems, and that ethnicity does not protect females from this risk factor (no interaction between gender and ethnicity). Additional studies are

needed to explore whether perceived stress is associated with physiological stress reactivity, and whether additional factors such as sleep and acculturation modify the influence of perceived stress on weight gain and BMI. Such studies could give us new approaches for the development of interventions and programs to reduce obesity.

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## **CHAPTER 1: INTRODUCTION AND BACKGROUND**

In recent years, stress has become recognized as an essential factor to consider when examining health behaviors. It has been shown that stress contributes to many unhealthy behaviors, such as smoking, drinking alcohol, and overeating. These behaviors are responsible for 40% of deaths in the United States among the entire population each year (Mokdad et al., 2004). Americans have been shown to be susceptible to high levels of stress. According to the American Psychological Association's (APA) 2010 Stress in America survey, 44 % of participants reported that their stress levels increased over the past five years (Clay, 2011).

People of Hispanic origin are very important to study and to understand from the point of view of stress because the Hispanic community in the US is increasing rapidly. In 2011 there were approximately 52 million Hispanics, and by 2050 the Hispanic community will reach 132.8 million (Centers for Disease Control and Prevention, 2013) and become the majority population. For this reason it is critical to better understand factors that impact the health of Hispanics such as stress. Moreover, studies have begun to show that Hispanics may respond differently to stress as compared with other ethnic groups.

First it is important to consider the concept of stress. Stress can be defined and measured in two major ways, that is, as physiological stress or perceived stress. Physiological stress is measured in the body which perceived stress refers to one's cognitive perception of stress.

## **Physiological Stress**

Physiological stress is defined as an individual's response to a taxing event (Cohen, Janicki-Deverts, & Miller, 2007). Examples of sources of everyday stressful life events include relationships among spouses, family and friends, work, socioeconomic status, school, among others. Individual physiological responses to these events could be acute adaptive responses such as increased blood pressure and heart rate, and maladaptive responses, which include hypertension, and changes to the immune system (Rebeck, et al., 2013). Both adaptive and maladaptive responses can produce unhealthy behaviors such as consuming high fat foods, drinking alcohol, or smoking (Ng & Jeffery, 2003). These behaviors might affect an individual's health, therefore putting the individual at risk of disease.

Physiological stress produces a sequence of hormonal feed-forward and feedback reactions and interactions among the hypothalamus, pituitary and adrenal glands (the three endocrine glands) and the reactions might or might not have ill effects on the body. This complex set of reactions is referred to as the hypothalamic-pituitary-adrenal (HPA) axis . In its simplest form, the HPA response begins when neurons in the paraventricular nucleus of the hypothalamus produce the corticotropin-releasing hormone. This hormone stimulates the pituitary and secretes the adrenocorticotrophic hormone, which then stimulates the emission of cortisol in the outer cortex adrenal gland (Evans et al., 2013).

The release of these hormones can produce many changes in the body. One study showed that as physiological stress increases body mass index (BMI) also increases. Rosmond et al. (1998) analyzed data of 284 men aged 51yrs from the National

Population Register. Resmond and colleagues calculated body mass index and measured diurnal cortisol with a saliva sample to collect saliva. Results showed a positive, significant relationship between stress-related cortisol secretion and BMI. Moreover, the cortisol peak after lunch was positively related to BMI (Resmond et al., 1998).

### **Perceived Stress**

Perceived stress differs from physiological stress and may capture something very different than what is measured by biomarkers such as cortisol level. Perceived stress is determined by self-report and indicates how a person perceives, experiences and is aware of inner feelings of stress.

Understanding whether perceived stress predicts health outcomes may be just as important as understanding whether physiological stress predicts health outcomes. Perceived stress is easier to measure and, perhaps for this reason, seems to have been measured more frequently in studies than physiological stress. Perceived stress evaluates what an individual considers to be stressful, whether the person perceives frequent exposure to stressors, and how the person perceives his/her ability to cope with a given stressor. These measures can be useful in quantifying and comparing differences between individuals or groups of individuals with regard to their perception of stress (Mimura & Griffiths, 2008), and its associations with health outcomes.

Few studies have examined the association between perceived stress and physiological markers of stress, and the results have been mixed. While the proposed study will not address this issue, it is relevant for understanding whether and how perceived stress may be related to physiological responses to stress.

Two studies have suggested no association between markers of physiological stress and perceived stress. In a cross-sectional study that examined if indicators of health and stress levels were different among Greek and Swedish young adults, high perceived stress but low levels of cortisol were found among Greeks. A total of 112 Swedish and 124 Greek young adults participated in the study. Participants completed a questionnaire that included sociodemographic variables, experiences of serious life-events during the last three months, self reported health, hope for the future, The Hospital Anxiety and Depression Scale (HAD) and the Perceived Self-rated Stress Scale (PSS). Levels of cortisol were analyzed using hair samples from the participants. Results showed that Greek subjects reported more serious life events, had lower hope for the future, and had more symptoms of depression and anxiety than the Swedes; also Greek subjects reported higher levels of perceived stress than Swedish subjects. Interestingly however, Greek subjects had lower levels of cortisol (Faresjö et al., 2013).

In another study, Dettenborn and colleagues (2010) compared hair cortisol levels between 31 unemployed and 28 employed individuals. Participants answered a demographic and medical history questionnaire, the Assessment of Chronic Stress and the Perceived Stress Scale to measure perceived chronic stress, and the General Self-Efficacy Scale to measure perceived self-efficacy; a hair sample was obtained from the participants to determine cortisol. Results showed higher levels of cortisol among unemployed participants. No association was found between cortisol levels and perceived stress variables however (Dettenborn et al., 2010). These studies suggested that markers of physiological stress and perceived stress might not be associated.

Other studies have returned different results. One study examined the relationship of hair cortisol and perceived stress in 135 adults. Domain-specific indices of stress were measured with the Perceived Stress Scale, Chaos, Hubbub and Order scale, and the City Stress index. A total subjective stress score was obtained from the three individual stress scales. Results showed that cortisol was not correlated to single perceived domain indices but it was positively correlated with the total subjective stress score (O'Brien, Tronick, & Moore, 2012).

Jobin and colleagues (2013) analyzed data of 135 older adults who participated in the Montreal Aging and Health Study. Participants collected their saliva to assess diurnal cortisol and responded to a questionnaire to measure perception of stress 3 days during each week for 6 years. When examining within-person associations between perceived stress and cortisol, results showed that participants produced higher levels of cortisol on days where they perceived high levels of stress (Jobin, et al., 2013).

Together these findings suggested that perceived stress when measured over time, or when measured using multiple instruments, is a good predictor of physiological stress and perhaps health outcomes. While the proposed study will not address this issue, it is relevant for understanding whether and how perceived stress may be related to physiological responses to stress.

## **Gender Differences**

When designing a study of perceived stress, it is important to consider possible gender differences. Studies have suggested that males and females differ with regard to the amount of stress each perceives during daily life.

Day and Livingstone (2003) examined perceived stress and social support between males and females. A total of 72 men and 114 women participated in the study. Participants rated and discussed the stressfulness of five different scenarios related to work, family, relationship, friends, and school. After that, participants answered the level to which they would seek support from a co-worker, partner, friend, family member, professor, and/or pet. Participants also answered questions about perceived stress and social support. Results showed that perception of stress varied between men and women. Women were more likely to perceive events as stressful than men.

Likewise in a cross-sectional study, Gehring and colleagues analyzed data of 992 participants aged 15 to 64 years to examine perceived stress and its relationship to health outcomes among a Swiss population. Participants answered a series of questions on socio-demographic status, health-related behaviors, perception of health, their level of stress and the nature of their stress. Results showed no association between perception of stress and subjective responses of general health. However, results showed higher levels of perceived stress among women, young people and parents with children at home. Moreover, women were more likely than men to perceive themselves as stressed (Gehring, et al., 2001).

## **Stress and Weight Change**

Interesting recent studies suggest why understanding perceived may be just as important for health outcomes as understanding physiological stress. Studies have begun to examine whether perceived stress influences weight change. In a randomized controlled study that examined relationships between perceived stress, race, weight, and weight change in a program for weight loss, perceived stress was significantly related to weight change (Kim et al., 2009). In this study, 217 women participated in a group-based behavioral weight control program. Subjects received individual sessions of either motivational interviewing or an attention placebo control. All women met weekly for 24 weeks and received the same weight loss program. Perceived stress was assessed and results showed that women who reported higher levels of perceived stress at baseline lost less weight than women with lower levels of perceived stress. Moreover, with every 1 unit decrease on the baseline perceived stress measure, women lost  $0.10 \pm 0.04$  Kg more weight at 6 months (Kim et al., 2009).

In another study, data was collected to examine the association of perceived stress with disturbed sleep to provide an explanation previously observed connections between stress and cardiovascular disease (CVD). Subjects participated in a CVD prevention program at the Walter Reed Army Medical Center Integrative Cardiac Health Project (ICHP), participants were asked to complete a series of questionnaires to get information about demographics, anthropometrics, current symptoms and past and current medical conditions. Participants were also asked to complete a series of surveys to assess perceived stress, quality of sleep, sleep behaviors and daytime symptoms from inadequate sleep. Results showed that subjects with high stress had higher body mass

index (BMI) and larger measured waist circumferences. Moreover, the high-stress group had shorter total sleep times (20 min less per 24h), and poorer sleep quality (Kashani, Eliasson & Vernalis, 2012).

With regard to perceived stress it turns out that Hispanics may perceive stress differently. Several studies have suggested that Hispanics, as a group, report less perceived stress than participants from other ethnicities, and less stress was associated with a number of other health outcomes.

Krueger and colleagues (2011) analyzed data of 38,891 non-Hispanic whites, blacks, and Hispanic adults from the 1990 National Health Interview Survey (NHIS), and examined whether perceived stress and unhealthy behaviors mediated race/ethnic disparities in mortality. Results showed that Hispanics had lower levels of perceived stress than whites. After adjusting for socio economic status, Hispanics had lower risks of death than non-Hispanic whites. However, perceived stress did not mediate race/ethnicity differences in mortality (Krueger, Saing Onge, & Chang, 2011).

Another study analyzed data of 9,071 non-Hispanic white, black, and Hispanic adult men aged 18 and over from combined Community Health Data Bases (CHDB) of 2002, 2004 and 2006. Rebbeck et al. (2013) found that perceived stress was most common at the youngest ages in each ethnicity, and most common among non-Hispanic whites than among Hispanics (Rebbeck et al., 2013). Despite the fact that Hispanics reported encountering more stressful events, such as discrimination and limited socioeconomic opportunities (Kessler et al., 1999; Massey, 2004), and had less access to exercise facilities (Moore et al., 1996; Powell et al., 2006), high perceived stress was

more common among non-Hispanic whites than among Hispanics (Rebbeck et al., 2013). No studies however have compared perceived stress in Hispanic and non-Hispanic college students, and studies have not yet examined whether perceived stress in college students predicts health outcomes.

It is important to mention how this project aligns with healthy people 2020. Healthy People 2020 provided science-based, 10-year national objectives for improving the health of all Americans. It has a total of 42 topics including Nutrition and Weight Status. The purpose of the objective of Nutrition and Weight Status is to promote health, reduce chronic diseases, and maintain healthy body weights. This objective focuses on six themes: Healthier Food Access, Health Care and Worksite Settings, Weight Status, Food Insecurity, Food and Nutrient Consumption, and Iron Deficiency (Healthy People, 2012). The focus of weight status has two specific objectives that are related to this project. Those are to reduce the proportion of adults who are obese, and to prevent inappropriate weight gain in adults aged 20 years and older (Healthy People, 2013).

The purpose of this study was to examine whether females reported higher perceived stress than males, whether Hispanics and non-Hispanic males and females differed with regard to their levels of perceived stress; and the extent to which perceived stress predicted the health outcome of BMI among Hispanic college and non-Hispanic students attending large state universities, one on the U.S.–Mexico border (University of Texas at El Paso) and one in the central United States (Eastern Illinois University).

It was hypothesized that:

1. Females as compared to males have higher perceived stress.
2. Controlling for gender, as compared with college age students of non-Hispanic descent, college-age students of Hispanic descent have lower levels of perceived stress; non-Hispanic females have highest levels of perceived stress as compared with the other three groups.
3. Among all participants, controlling for gender, perceived stress predicts BMI.

## CHAPTER 2: METHOD

### Overview

This study was a cross-sectional study and analyzed secondary data. The data included selected variables from a multi-site study of weight and weight management in college-age students. Two sites were included in the study and participants were students from the University of Texas at El Paso and students from Eastern Illinois University. The variables chosen for this analysis will be described in detail below, and included demographics, anthropometrics, and variables of perceived stress.

### Participants

Participants included 441 students from the University of Texas at El Paso and 365 students from Eastern Illinois University. Students were recruited by instructors who provided extra credit for participation in the study.

### Measures

**Demographics.** Demographic information included age, gender and ethnicity. These were queried at the beginning of the questionnaire.

**Anthropometrics.** Anthropometric measures included self-reported weight and height. Body mass index was calculated from reported weight and height and followed the established formula provided by the CDC (Centers for Disease, Control and Prevention, 2011).

**Perceived Stress Reactivity Scale.** The Perceived Stress Reactivity Scale (PSRS) was a 23-item questionnaire with 5 scales and 1 overall scale (Appendix 1). Each item consisted of two parts: an item that described a potentially stressful situation and three answer options representing potential stress responses. In this way, each item queried an individual's exposure to stress and a typical response to a stressor. The PSRS had five subscales: Reactivity to Work Overload (feeling nervous, agitated, irritated in response to high workload), Reactivity to Social Conflicts (feeling affected, annoyed, upset in response to social conflict, criticism, rejection), Reactivity to Social Stress (feeling nervous, losing self-confidence in response to social evaluation), Reactivity to Failure (feeling annoyed, disappointed, down in response to failure), and Prolonged Reactivity (difficulty relaxing/unwinding after high workload). The maximum score for the total Perceived Stress Reactivity Scale was 46 , and it was computed by adding together the subscale scores (Schulz et al., 2005).

## **Procedures**

**Recruitment/Data Collection.** The study was approved by the UTEP and EIU IRB boards. Recruitment was done through recruitment in classrooms at two universities, UTEP and EIU (Eastern Illinois University). The survey was conducted online using the Qualtrics survey platform. Most students received extra credit in their courses for their completion of the online questionnaire. The survey took approximately 30-40 minutes to complete.

## **Data Analysis**

All data analyses were performed using SPSS statistical software. Descriptive analyses were conducted for all study variables. Means and standard deviations were calculated for continuous variables (age, BMI and perceived stress); frequencies were determined for all categorical variables (gender and ethnicity). Because of the large sample size and the number of tests run, the criterion for statistical significance of comparisons for the main hypotheses was set as  $p < .01$

Descriptive analyses were conducted for all demographic variables and independent t-test or chi-square was used to determine whether there was a difference between ethnic groups with the intention that if differences were found, variables would be included as additional control factors.

ANOVA was used to assess the main and interactive effects of gender and ethnicity on perceived stress scores. The independent variables were ethnicity (Hispanic /non-Hispanic) and gender (male/female) and the dependent variables were the total perceived stress scale score, and each of five perceived stress scale scores.

Multiple regression was used to examine whether total perceived stress scale score predicted BMI, controlling for gender. The independent variable was perceived stress, and the dependent variable was BMI. Additional exploratory analyses were conducted to see whether or not one or more of those individual scale scores predicted BMI, controlling for gender.

## CHAPTER 3: RESULTS

Data from 806 participants were collected. Data from 25 participants were excluded due to survey non-completion and the final sample size included 781 participants. Data were collected using the Qualtrics survey platform, and included participants from the University of Texas at El Paso (UTEP) and from Eastern Illinois University (EIU). Data were entered into an SPSS database and double-checked for accuracy. The hypotheses to be tested included:

1. Females as compared to males have higher perceived stress.
2. Controlling for gender, as compared with college age students of non-Hispanic descent, college-age students of Hispanic descent have lower levels of perceived stress; and Hispanic males have lowest levels of perceived stress as compared with the other three groups and Hispanic females have lower perceived stress than non-Hispanic females.
3. Among all participants, controlling for gender, perceived stress predicts BMI.

The analysis examined first the demographic characteristics of the sample. These were summarized and compared by group. Next descriptive statistics of perceived stress reactivity scale were summarized. Finally, group differences were compared statistically to determine whether observed differences between groups were significant. Regression analyses were conducted to examine whether perceived stress predicted BMI controlling for gender.

### **Demographic Characteristics of Participants (See Table 1)**

Demographic characteristics were stratified by ethnicity and gender, and are presented in Table 1. Possible differences in demographic variables by comparison group were tested with either ANOVA or Chi-square. As indicated in Table 1, both groups were predominantly female. Hispanics were slightly younger than their non-Hispanic counterparts, with an average age of 24.17 compared to 25.62. As shown, males were taller and weighed more than females and had higher BMI's. The majority (sixty-five percent) of Hispanic participants lived with their parents while the majority (ninety percent) of non-Hispanic participants lived with someone other than their parents. Marital status did not differ significantly between groups.

### **Descriptive Statistics of the Perceived Stress Reactivity Scale (see Table 2)**

Participants were asked to respond a 23-item questionnaire with 5 scales and 1 overall scale. Each item queried an individual's exposure to stress and a typical response to a stressor. Table 2 shows the descriptive statistics means and standard deviations for the Perceived Stress Reactivity Scale stratified by group and ethnicity.

### **Comparisons of Females and Males on Total Perceived Stress Reactivity Scale Scores (See Figure 1)**

The first set of analyses compared females and males on scores of perceived stress using one-way between-subjects analyses of variance (ANOVA). The analysis showed a significant relationship between gender and perceived stress such that females reported higher levels of perceived stress,  $F(1, 779) = 32.14, p = .000$ . As predicted,

females differed significantly from males with regard to perceived stress reactivity total score. As a group, Hispanic and non-Hispanic females scored higher on total perceived stress than Hispanic and Non-Hispanic males. To determine the source of differences on total score, groups were also compared for each perceived stress subscale.

Females differed significantly from males with regard to reactivity to work overload; Hispanic and non-Hispanic females reported higher scores than Hispanic and non-Hispanic Males. Females also had higher scores on Reactivity to Social Conflict, and also reported higher scores with regard to Reactivity to Social Evaluation. Females and males did not differ with regard to prolonged reactivity to stress or Reactivity to Failure.

### **Relationship of Ethnicity and Gender to Total Perceived Stress Scores (See Figure 1)**

To examine the main and interactive effects of gender and ethnicity on perceived stress, we conducted a two-way ANOVA with gender (female or male) and ethnicity (Hispanic or non-Hispanic) as the independent variable and perceived stress as the dependent variable. There was a significant main effect of ethnicity on total perceived stress score  $F(1, 776) = 5.773, p = .02$  however using  $p < .01$ , this result was significant at the level of a trend only.

There was a significant main effect for gender on total perceived stress score,  $F(1, 776) = 27.29, p = .000$ . Total perceived stress score was significantly lower among males than among females. Contrary to our prediction however there was no significant interaction for gender and ethnicity (Figure 1). That is, Hispanic males did not score

significantly lower than the other three groups, and being Hispanic did not contribute to lower perceived stress scores among females.

**Relationship of Total Perceived Stress Score (PSRS) to Body Mass Index (BMI) (See Table 3, Figure 2, Figure 3)**

In preparation for the regression analyses zero-order correlations between BMI, total perceived stress scale score and subscale scores were calculated. Simple associations among variables were not suggested (Table 3).

To test the third hypothesis, a regression analysis was conducted to predict BMI (dependent variable) from total perceived stress score (independent variable) controlling for gender (Figure 2). The results showed that together, these two variables accounted for less than one percent of the variance in BMI ( $r^2 = .008$ ) (Figure 3). Only gender was related to BMI,  $\beta = .09$ ,  $p = .01$ .

Exploratory analyses were used to examine whether one or more of the perceived stress subscales predicted BMI. Similar to the total Perceived Stress Scale score, none of the individual subscales predicted BMI. Prolonged Reactivity and Reactivity to Failure subscales accounted for less than one percent of the variance in BMI ( $r^2 = .008$ ) ( $r^2 = .006$ ), respectively. Similarly, Reactivity to Work Overload, Reactivity to Social Evaluation and Reactivity to Social Conflict each accounted for only four percent of the variance ( $r^2 = .038$ ), ( $r^2 = .035$ ), ( $r^2 = .041$ ), respectively. In all five subscales only gender was related to BMI (Prolonged Reactivity  $\beta = -.08$ ,  $p = .01$ , Reactivity to Failure  $\beta$

= -.08,  $p = .03$ , Reactivity to Work Overload  $\beta = -.19$ ,  $p = .00$ , Reactivity to Social Evaluation  $\beta = -.18$ ,  $p = .00$ , and Reactivity to Social Conflict  $\beta = -.20$ ,  $p = .00$ .)

## CHAPTER 4: DISCUSSION

### Overview

Hispanic culture has many characteristics that distinguish it from non-Hispanic culture. For example, it is well-known that Hispanics have strong community values, have strong family ties, and cultivate interdependence (Santiago-Rivera et al., 2002). These characteristics, values, and ideals might affect the extent to which stress is perceived by Hispanics. This study examined the main and interactive effects of ethnicity and gender on perceived stress among college-age students who participated in an online survey. The purpose of this study was to examine whether females reported higher perceived stress than males, whether Hispanics and non-Hispanic males and females differed with regard to their levels of perceived stress; and the extent to which perceived stress predicted the health outcome of BMI among Hispanic college and non-Hispanic students from The University of Texas at El Paso and Eastern Illinois University.

Data from 781 subjects were analyzed. Forty-seven percent of subjects reported that they were Hispanic, and fifty-three percent reported being Non-Hispanic. Among Hispanics, the sample was sixty-eight percent female with a mean age of 24.04 years, and among Non-Hispanics, the sample was eighty-one percent female with a mean age of 25.32 years. With regard to statistical significance, age differed significantly among groups. This variable was not included as a control factor however. When the significant difference was evaluated, it was decided that the statistical significance was due to the relatively large sample size, and that the observed amount of age difference was small and not meaningful with regard to the goals of this study. In other words, it seemed

unlikely that subjects with a mean age of approximately 24 vs. 26 years would perceive stress differently.

As expected, genders differed with regard to height and weight; male subjects were taller and weighed more than females and had higher BMI. On the other hand, genders did not differ with regard to marital status; the majority of the sample reported being single. Among groups, sixty-five percent of Hispanic subjects lived with their parents, while approximately ninety-percent of non-Hispanic subject lived with someone other than their parents. .

### **Perceived Stress Reactivity Scale**

Subjects differed by gender and ethnicity on total perceived stress and four of five perceived stress subscales, including , Prolonged Reactivity, Reactivity to Work Overload, Reactivity to Social Conflict and Reactivity to Social Evaluation. Neither ethnic groups nor gender groups differed with regard to Reactivity to Failure.

### **Study Hypotheses**

We hypothesized that females would have higher levels of perceived stress than males; that Hispanic students would have lower levels of perceived stress than non-Hispanics, and we predicted an interaction effect of gender and ethnicity such that Hispanic males would have lowest stress scores, and Hispanic females would have lower stress scores than non-Hispanic females. We also hypothesized that that perceived stress would predict BMI.

The findings supported the first hypothesis and showed that females as compared to males had higher perceived stress scale scores. These findings are consistent with Day and Livingstone (2003) who showed that females were more likely to perceive events as stressful than males, and Gehring and colleagues (2001) whose results showed that females, compared with males and young people, had higher levels of perceived stress and were more likely to perceived themselves as stressed than males. To the best of our knowledge, this was the first study to compare perceived stress scale scores in males and females. The consistency of findings with prior studies suggest that perceived stress might be a reasonable alternative and less invasive measure of stress reactivity to the more commonly used physiological measures of stress. .

The second hypothesis was marginally supported. Our findings showed a trend ( $p < .02$ ) suggesting that as compared with college age students of non-Hispanic descent, college-age students of Hispanic descent had lower levels of perceived stress. These findings are consistent with the literature, specifically with Krueger and colleagues (2011) which found that Hispanics had lower levels of perceived stress than whites, and Rebbeck et al. (2013), who results showed that perceived stress was most common at the youngest ages in each ethnicity, and most common among non-Hispanic whites than among Hispanics.

There was no evidence however for the hypothesis that non-Hispanic male students had lowest perceived stress scores and female Hispanic students had lower perceived stress scores than non-Hispanic students (no interaction was found).

The third hypothesis was that among all participants perceived stress predicts BMI. This study found that overall there was no association between perceived stress and body mass index.

### **Exploratory Comparisons of the Perceived Stress Reactivity Scale and BMI**

Given the negative results of the regression analyses examining the extent to which perceived stress predicted BMI, we conducted additional exploratory analysis to see whether or not one or more of the individual stress scale scores might predict BMI. If total perceived stress score was not related to BMI but one of the individual scale scores was, this might indicate that one or more specific aspects of stress would be important to consider as health risk indicators. Unfortunately, analysis showed no association between any of the five subscales and body mass index.

This study adds valuable information to the literature on perceived stress in Hispanics because no studies have compared perceived stress in Hispanic and non-Hispanic college students, and studies have not yet examined whether perceived stress in college students predicts health outcomes. Future research could use the information presented in this study as a starting point from which to explore in further detail perceived stress and health outcomes among Hispanics.

### **Recommendations for Future Research**

The findings of this study suggested that females have higher levels of perceived stress than males and that Hispanics experience lower levels of perceived stress than non-Hispanics. This study is the first step in showing that a perceived stress scale captures

some aspect of stress that differentiates males and females and, perhaps to a lesser extent, Hispanic and non-Hispanic college-age students. Additional studies examining the extent to which perceived stress predicts physiological reactivity are needed. If there is a strong association between perceived stress and physiological reaction to stress, perceived stress might be used as a “surrogate” marker of stress that would help medical professionals identify young people at highest risk of stress-related disease. Also, determining the extent to which perceived stress affects college students’ health without measuring cortisol levels could make it easier for students to get help and avoid engaging in unhealthy behaviors such as smoking, drinking alcohol and overeating. This is very important because changing unhealthy behaviors at an early age will aid to reduce the incidence of preventable deaths as studies have shown that unhealthy behaviors are responsible for forty percent of deaths each year in the United States (Mokdad et al., 2004).

The study also suggested that perceived stress is not a good predictor of BMI. Future research is needed to further explore factors that along with perceived stress could influence weight change. For example, studies have shown that perceived stress and poor sleep could be related to overweight and obesity. Vgontzas and colleagues (2008) examined the association of BMI, subjective sleep disturbances and emotional stress, and found that obese participants (BMI >30) who scored higher for chronic emotional stress were more likely to report shorter sleep duration than non-obese participants (Vgontzas, Lin, Papaliaga, et al., 2008). Thus, it is important to consider the variable of sleep quality as a factor that could mediate perceived stress and weight change in Hispanics mainly because studies have found that sleep varies in ethnicity. Krueger & Friedman

(2009) examined the relation between sleep duration and ethnicity among US adults aged 18 years or older and found that males and non-Hispanic whites were more likely to report seven hours of sleep than were females or other race/ethnicity groups. Moreover, non-Hispanic black and Mexican Americans were more likely to report sleeping five or fewer hours and higher odds of sleeping eight or more hours (Krueger & Friedman, 2009) suggesting that too little sleep could be an important factor to include in future stress studies comparing Hispanics and non-Hispanics.

For future studies, it will also be important to add acculturation as a possible factor that could influence perceived stress and weight change in Hispanics. One study showed an association of higher acculturation level and a decline in obesity among Mexican American Women (Kahn, Sobal, & Martorell, 1997). Khan et al. (1997) examined the relationship between acculturation and obesity in the United States, and found a significant association between acculturation and BMI among Mexican Americans. Specifically, an increase of English language was associated with a decrease of 0.56 BMI units in Mexican American Women (Kahn, Sobal, & Martorell, 1997). Future studies should be done to examine the relationship of perceived stress, quality of sleep on weight change, and also measured acculturation, among Hispanic college students.

### **Limitations**

There are several limitations associated with this study that should be noted. . BMI was calculated using participants self reported height and weight. The data might not be accurate if participants either were unsure about their height and weight or

participants could have felt the need to be less than accurate regarding this sensitive information. Another important factor to consider is that although BMI is commonly used to measure how healthy a body is, factors such as age, ethnicity or gender could influence the relationship between BMI and weight change.

Another issue has to do with the method that was used to collect the data. Using an electronic source does not guarantee that participants are in fact responding to the survey (the respondent could have someone else complete the survey on their behalf) or if the participant is giving an honest response. We cannot be certain that the responses completely represent our participants, or subsequent data could be biased. Another important limitation to consider is that the sample had more females than males in both Hispanic and non- Hispanic groups. This gender distribution could have influenced the results.

Another limitation has to do with Hispanics and the perceived stress reactivity scale. It may be the case that Hispanics do not relate to the statements of perceived stress portrayed in the scale. That is, first generation Hispanics may not have the same reactions to stress as the ones presented on the perceived stress reactivity scale. Further research is necessary to clarify whether this should be of concern for future studies of stress in Hispanic populations. .

## **Conclusions**

Regardless of Hispanic ethnicity, females are at highest risk of perceived stress as compared with males. Ethnicity does not predict lower stress scores among males and it is not protective for females. Perceived stress alone does not predict BMI in males and

females. Additional studies are needed to examine whether sleep and/or acculturation may be important modifiers of the extent to which stress influences BMI.

## REFERENCES

- Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology and Behavior*, 91(4), 449-58.
- Afifi, T. O., Asmundoson, J. G., Taylor, S., & Jang, K. L. (2010). The role of genes and environment on trauma exposure and posttraumatic stress disorder symptoms: A review of twin studies. *Clinical Psychology Review*, 30(1), 101-112.
- Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S., R., & Kupfer, D. J. (1989). Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*, 28, 193–213
- Collins, J. C., & Bentz, J. E. (2009). Behavioral and Psychological Factors in Obesity. *The Journal of Lancaster General Hospital*, 4(4), 124-127.
- Centers for Disease Control and Prevention. (2012). Overweight and Obesity. Retrieved from <http://www.cdc.gov/obesity/adult/causes/index.html>
- Evans, B. E., Greaves-Lord, K., Euser, A. S., Tulen, H. M., Franken, I. H., & Huizink, A. C. (2013). Determinants of Physiological and Perceived Physiological Stress Reactivity in Children and Adolescents. *PLOS ONE*, 8(4), 1
- Guilleminault, C., & Lugaresi, E. (1983). Sleep/Wake Disorders: Natural History, Epidemiology, and Long-Term Evolution. *New York Raven Press*, 37-90.
- Healthy People. 2012. About Healthy People. Retrieved from <http://www.healthypeople.gov/2020/about/default.aspx>
- Healthy People. 2013. Nutrition and Weight Status. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=29>
- Centers for Disease Control and Prevention. (2011). Healthy Weight- it's not a diet, it's a lifestyle! Retrieved from <http://www.cdc.gov/healthyweight/assessing/>
- Centers for Disease Control and Prevention (2013). Hispanic or Latino Population. Retrieved from <http://www.cdc.gov/minorityhealth/populations/REMP/hispanic.html>
- Cohen, S., Janicki-Deverts, D., & Miller, G. E. (2007). Psychological stress and disease. *The Journal of the American Medical Association*, 298(14), 1685-1687.
- Clay, R. A. (2011). Is Stress Getting to you?: Stressed in America. *American Psychological Association*, 42(1), 60.
- Darani, F. M., Daniali, S. S., & Azadbakht, L. (2013). Relationship of Body Satisfaction, with Nutrition and Weight Control Behaviors in Women. *International Journal of Preventive Medicine*, 4(4), 467-474.

- Day, A., & Livingstone, H. A. (2003). Gender differences in perceptions of stressors and utilization of social support among university students. *Canadian Journal of Behavioural Science, 35*(2), 78-83.
- Dettenborn, L., Tietze, A., Bruckner, F., & Kirschbaum, C. (2010). Higher cortisol content in hair among long-term unemployed individuals compared to controls. *Psychoneuroendocrinology, 35*(9), 1404- 1409.
- Faresjö, Å., Theodorsson, E., Chatziarzenis, M., Sapouna, V., Claesson, H., Koppner, J., & Faresjö, T. (2013). Higher Perceived Stress but Lower Cortisol Levels Found among Young Greek Adults Living in Stressful Social Environment in Comparison with Swedish Young Adults. *PLoS ONE, 8*(9).
- Jobin, J., Wrosch, C., & Scheier, M. F. (2014). Associations between dispositional optimism and diurnal cortisol in a community sample: when stress is perceived as higher than normal. *Health Psychology, 33*(4), 382-391.
- O'Brien, K. M., Tronick E. Z., & Moore C. L. (2012). Relationship between Hair Cortisol and Perceived Chronic Stress in a Diverse Sample. *Stress Health, 29*(4), 337- 344.
- Kashani, M., Eliasson, A., & Vernalis, M. (2012). Perceived Stress correlates with disturbed sleep: A Link connecting stress and cardiovascular disease. *Stress, 15*(1), 45-51.
- Kim, K. H, Bursac, Z., DiLillo, V., White D. B., & West, D. S. (2009). Stress, race, and body weight. *Health Psychology, 28*(1), 131-135.
- Krueger, P. M., Saing Onge, J. M., & Chang, V. W. (2011). Race/ethnic differences in adult mortality: the role of perceived stress and health behaviors. *Social Science and Medicine, 73*(9), 1312-1322.
- Mimura, C., & Griffiths, P. (2008). A Japanese version of the Perceived Stress Scale: cross-cultural translation and equivalence assessment. *BMC Psychiatry, 8*(85)
- Mokdad, A. H., Marks, J. S., Stroup, D. F., & Gerberding, J. L. (2000). Actual causes of death in the United States. *Journal of the American Medical Association, 291*(10), 1238-1245.
- National Center for Health Statistics. (2013). Health, United States, 2012: With Special Feature on Emergency Care. Hyattsville, MD, 205.
- Ng, D. M., & Jeffrey, R. W. (2003). Relationships Between Perceived Stress and Health Behaviors in a Sample of Working Adults. *Health Psychology, 22*(6), 638-642.
- Rebbeck, T. R., Weber, A. L., Spangler, E., & Zeigler-Johnson, Ch. (2013). What stresses men? Predictors of perceived stress in a population-based multi-ethnic cross sectional cohort. *BMC Public Health, 13*, 113

- Rosmond, R., Dallman, M. F., & Björntorp, P. (1998). Stress- related cortisol secretion in men: relationships with abdominal obesity and endocrine, metabolic and hemodynamic abnormalities. *Journal of Clinical Endocrinology Metabolism*, 83(6), 1853-1859.
- Smith, M. S., & Vale, W. W. (2006) The Role of the Hypothalamic-pituitary-adrenal axis in neuroendocrine responses to stress. *Dialogues Clin Neuroscience*, 8(4), 383-395.
- Schulz, P., Jansen, L. J., & Schlotz, W. (2005). Stress reactivity: Theoretical concept and measurement. *Diagnostica*, 51,124–133.
- Schlotz, W., Yim, LL. S., Zoccola, P. M., Jansen, L., & Schulz, P. (2011). The perceived stress reactivity scale: Measurement invariance, stability, and validity in three countries. *Psychological Assessment*, 23(1), 80-94.
- Stubbs, R. J., & Lavin, J. H. (2013). The Challenges of implementing behavior changes that lead to sustained weight management. *Nutrition Bulletin*, 38(1), 5-22.
- Vgontzas, A. N., Lin, H. M., Papaliaga, M., Calhoun, S., Vela-Bueno, A., Chrousos, G. P., & Bixler, E. O. (2008). Short sleep duration and obesity: the role of emotional stress and sleep disturbances. *International Journal of Obesity*, 32, 801-809.
- World Health Organization. (2002). The World Health Organization Report 2002: Reducing Risks, Promoting Healthy Life. *France*, 60.
- Zurilla, T. J., & Sheedy, C. F. (1991). Relation between social problem solving and subsequent level of psychological stress in the college students. *Journal of Personality and Social Psychology*, 61(5), 841-846.

## Appendix

Instructions: This questionnaire asks about your reactions to situations which you may have experience in the past. Three answers are suggested. Please indicate the answer that most closely describes your own reaction in general. Please don't skip any item, even if it may be hard to find the best answer.

### *PSRS Scale Scoring*

---

- |  |   |
|--|---|
| 01. When tasks and duties build up to the extent that they are hard to manage... | <input type="radio"/> I am generally untroubled<br><input type="radio"/> I usually feel a little uneasy<br><input type="radio"/> I normally get quite nervous   |
| 02. When I want to relax after a hard day at work...                             | <input type="radio"/> This is usually quite difficult for me<br><input type="radio"/> I usually succeed<br><input type="radio"/> I generally have no problem at all   |
| 03. When I have conflicts with other that may no be immediately resolved...      | <input type="radio"/> I generally shrug it off<br><input type="radio"/> It usually affects me a little<br><input type="radio"/> It usually affects me a lot   |
| 04. When I make a mistake...   | <input type="radio"/> In general, I remain confident<br><input type="radio"/> I sometimes feel unsure about my abilities<br><input type="radio"/> I often have doubts about my abilities  |
| 05. When I am wrongly criticized by others...                                    | <input type="radio"/> I am normally annoyed for a long time<br><input type="radio"/> I am annoyed for just a short time<br><input type="radio"/> In general, I am hardly annoyed at all   |
| 06. When I argue with other people...  | <input type="radio"/> I usually calm down quickly<br><input type="radio"/> I usually stay upset for some time<br><input type="radio"/> It usually takes me a long time until I calm down  |
| 07. When I have little time for a job to be done...                              | <input type="radio"/> I usually stay calm<br><input type="radio"/> I usually feel uneasy<br><input type="radio"/> I usually get quite agitated  |
| 08. When I make a mistake...   | <input type="radio"/> I am normally annoyed for a long time<br><input type="radio"/> I am normally annoyed for a while<br><input type="radio"/> I generally get over it easily  |
| 09. When I am unsure what to do or say in a social situation...                  | <input type="radio"/> I generally stay cool<br><input type="radio"/> I often feel warm<br><input type="radio"/> I often begin to sweat  |
| 10. When I have spare time after working hard...                                 | <input type="radio"/> It often is difficult for me to unwind and relax<br><input type="radio"/> I usually need some time to unwind properly<br><input type="radio"/> I am usually able to unwind effectively and forget about the problems of the day |

- 
11. When I am criticized by others...
- Important arguments usually come to my mind when it is too late to still make my point
  - I often have difficulty finding a good reply
  - I usually think of a reply to defend myself
12. When something does not go the way I expected...
- I usually stay calm
  - I often get uneasy
  - I usually get very agitated
13. When I do not attain a goal...
- I usually remain annoyed for a long time
  - I am usually disappointed, but recover soon
  - In general, I am hardly concerned at all
14. When others criticize me...
- I generally don't lose confidence at all
  - I generally lose a little confidence
  - I generally feel very unconfident
15. When I fail at something...
- I usually find it hard to accept
  - I usually accept it to some degree
  - In general, I hardly think about it
16. When there are too many demands on me at the same time...
- I generally stay calm and do one thing after the other
  - I usually get uneasy
  - Usually, even minor interruptions irritate me
17. When others say something incorrect about me...
- I usually get quite upset
  - I normally get a little bit upset
  - In general, I shrug it off
18. When I fail at a task...
- I usually feel very uncomfortable
  - I usually feel somewhat uncomfortable
  - In general, I don't mind
19. When I argue with others...
- I usually get very upset
  - I usually get a little bit upset
  - I usually don't get upset
20. When I am under stress...
- I usually can't enjoy my leisure time at all
  - I usually have difficulty enjoying my leisure time
  - I usually enjoy my leisure time
21. When tasks and duties accumulate to the extent that they are hard to cope with...
- My sleep is unaffected
  - My sleep is slightly disturbed
  - My sleep is very disturbed

22. When I have to speak in front of other people...
- I often get very nervous
  - I often get somewhat nervous
  - In general, I stay calm
23. When I have many tasks and duties to fulfill...
- In general, I stay calm
  - I usually get impatient
  - I often get irritable
- 

*Note.* The first answer category of each item is coded 0, the second 1, and the third 2. Items marked with “R” are to be reversed (reverse score = 2 – original score). Prolonged Reactivity (PrR): 2R, 10R, 20R, 21; Reactivity to Work Overload (RWO): 1, 7, 12, 16, 23; Reactivity to Social Conflict (RSC): 3, 5R, 6, 17R, 19R; Reactivity to Failure (RFa): 8R, 13R, 15R, 18R; Reactivity to Social Evaluation (RSE): 4, 9, 11R, 14, 22R; Perceived Stress Reactivity total score (PSRS-tot): sum of the five scales scores ( Schlotz, et al., 2011).

Table 1

***Demographic Characteristics among college students (n= 780) and ANOVA comparisons by ethnicity and gender.***

| Variable Name                | Mean (SD) or %      |                    |                           |                     |                                |                    | F or $\chi^2$ -value |
|------------------------------|---------------------|--------------------|---------------------------|---------------------|--------------------------------|--------------------|----------------------|
|                              | Total<br>(N= 780)   |                    | Hispanic<br>(365/ 46.79%) |                     | Non- Hispanic<br>(415/ 53.21%) |                    |                      |
|                              | Female<br>(N= 587)  | Male<br>(N= 194)   | Female<br>(251/68.8%)     | Male<br>(114/31.2%) | Female<br>(336/81.0%)          | Male<br>(79/19.0%) |                      |
| Age                          | 24.77<br>(8.26)     | 25.47<br>(7.08)    | 24.04<br>(7.15)           | 24.46<br>(5.90)     | 25.32<br>(9.00)                | 26.90<br>(8.35)    | 3.05*a               |
| BMI                          | 25.70<br>(6.32)     | 26.98<br>(5.09)    | 25.20<br>(5.65)           | 26.68<br>(5.04)     | 26.06<br>(6.70)                | 27.38<br>(5.18)    | 3.32*b               |
| Height (inch)                | 64.70<br>(2.84)     | 70.14<br>(2.88)    | 64.07<br>(2.64)           | 69.77<br>(2.92)     | 65.17<br>(2.90)                | 70.62<br>(2.74)    | 188.63**c            |
| Weight (lbs)                 | 153.26<br>(40.09)   | 189.32<br>(40.13)  | 147.47<br>(35.95)         | 185.21<br>(39.69)   | 157.59<br>(42.46)              | 194.68<br>(40.27)  | 43.11**d             |
| Marital Status<br>(Single)   | 448/ 586<br>(76.3%) | 157/193<br>(81.3%) | 196/251<br>(78.1%)        | 97/113<br>(85.8%)   | 252/335<br>(75.2%)             | 59/79<br>(74.7%)   | 5.93                 |
| Living Status<br>(W/Parents) | 193/ 586<br>(32.9%) | 85/194<br>(43.8%)  | 162/251<br>(64.5%)        | 77/114<br>(67.5%)   | 31/335<br>(9.3%)               | 08/79<br>(10.1%)   | 265.93**e            |

\* p&lt;.05; \*\* p&lt;.01

a. Hispanic as compared with Non-Hispanic students were significantly younger.

b. Males had significantly higher BMI than females.

c. Males were significantly taller than females.

d. Males were significantly heavier than females.

e. Hispanics, as compare with Non- Hispanics students, are significantly more likely to live with their parents than with somebody else.

Table 2

**Perceived Stress Reactivity Scale Scores (n= 780) and ANOVA comparisons by ethnicity and gender**

| Scales                             | Total<br>(N= 780)  |                  | Mean (SD)<br>Hispanic<br>(365/ 46.79%) |                    | Non- Hispanic<br>(415/ 53.21%) |                    | F-value  |
|------------------------------------|--------------------|------------------|--|--------------------|--------------------------------|--------------------|----------|
|                                    | Female<br>(N= 587) | Male<br>(N= 194) | Female<br>(251/68.8%)                  | Male<br>(114/31.2) | Female<br>(336/81.0%)          | Male<br>(79/19.0%) |          |
| Total                              | 22.44 (8.41)       | 18.52 (8.18)     | 21.73 (7.85)                           | 17.61 (7.42)       | 22.97 (8.78)                   | 19.75 (9.09)       | 12.96**a |
| Prolonged Reactivity               | 3.67 (1.96)        | 3.30 (1.90)      | 3.64 (1.78)                            | 3.25 (1.91)        | 3.69 (2.09)                    | 3.37 (1.88)        | 1.87*b   |
| Reactivity to Work<br>Overload     | 4.65 (2.57)        | 3.50 (2.43)      | 4.65 (2.47)                            | 3.09 (2.26)        | 4.65 (2.64)                    | 4.09 (2.58)        | 12.52**c |
| Reactivity to<br>Social Conflict   | 5.22 (2.20)        | 4.16 (2.37)      | 4.91 (2.08)                            | 3.97 (2.26)        | 5.45 (2.26)                    | 4.39 (2.50)        | 15.56*d  |
| Reactivity to Failure              | 4.39 (1.68)        | 4.08 (1.63)      | 4.27 (1.61)                            | 4.03 (1.59)        | 4.48 (1.72)                    | 4.16 (1.69)        | 2.50     |
| Reactivity to Social<br>Evaluation | 4.51 (2.38)        | 3.47 (2.34)      | 4.26 (2.36)                            | 3.28 (2.16)        | 4.70 (2.39)                    | 3.73 (2.59)        | 11.50**e |

\*p<0.05; \*\*< .01

- a. Females have significantly higher total scores than Males
- b. There was a trend for females to score higher than males on the Prolonged Reactivity subscale
- c. Females scored significantly higher in the Reactivity to Work Overload subscale than Males
- d. There was a trend for females to score higher than males on the Reactivity to Social Conflict subscale
- e. Females scored significantly higher in the Reactivity to Social Evaluation subscale than Males

Table 3.

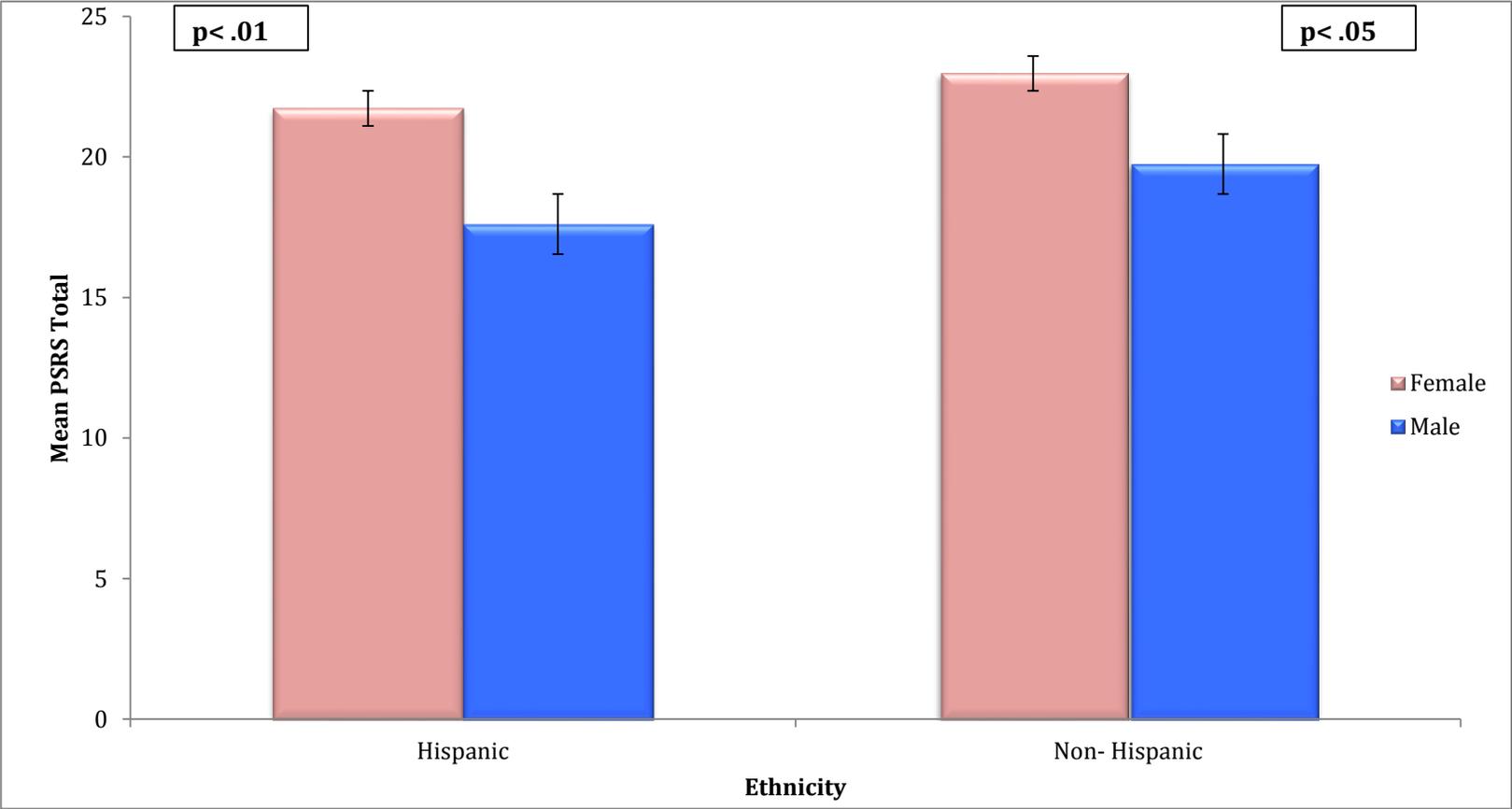
**Correlations between BMI & Perceived Stress Reactivity Scale**

|                                   | 1. | 2.   | 3.            | 4.            | 5.            | 6.            | 7.            |
|-----------------------------------|----|------|---------------|---------------|---------------|---------------|---------------|
| 1.BMI                             | —  | .032 | -.044         | .004          | -.008         | -.005         | -.008         |
| 2.Prolonged Reactivity            |    | —    | <b>.494**</b> | <b>.435**</b> | <b>.434**</b> | <b>.446**</b> | <b>.708**</b> |
| 3.Reactivity to Work Overload     |    |      | —             | <b>.590**</b> | <b>.462**</b> | <b>.577**</b> | <b>.829**</b> |
| 4.Reactivity to Social Conflict   |    |      |               | —             | <b>.533**</b> | <b>.568**</b> | <b>.814**</b> |
| 5.Reactivity to Failure           |    |      |               |               | —             | <b>.464**</b> | <b>.710**</b> |
| 6.Reactivity to Social Evaluation |    |      |               |               |               | —             | <b>.805**</b> |
| 7.Total                           |    |      |               |               |               |               | —             |

Scale Reliability:  $\alpha=.90$

\* $p < .05$ ; \*\* $p < .01$

**Figure 1. Perceived Stress Reactivity Mean Total Score by Gender and Ethnicity**



**Figure 2. BMI Mean among Females and Males by Ethnicity**

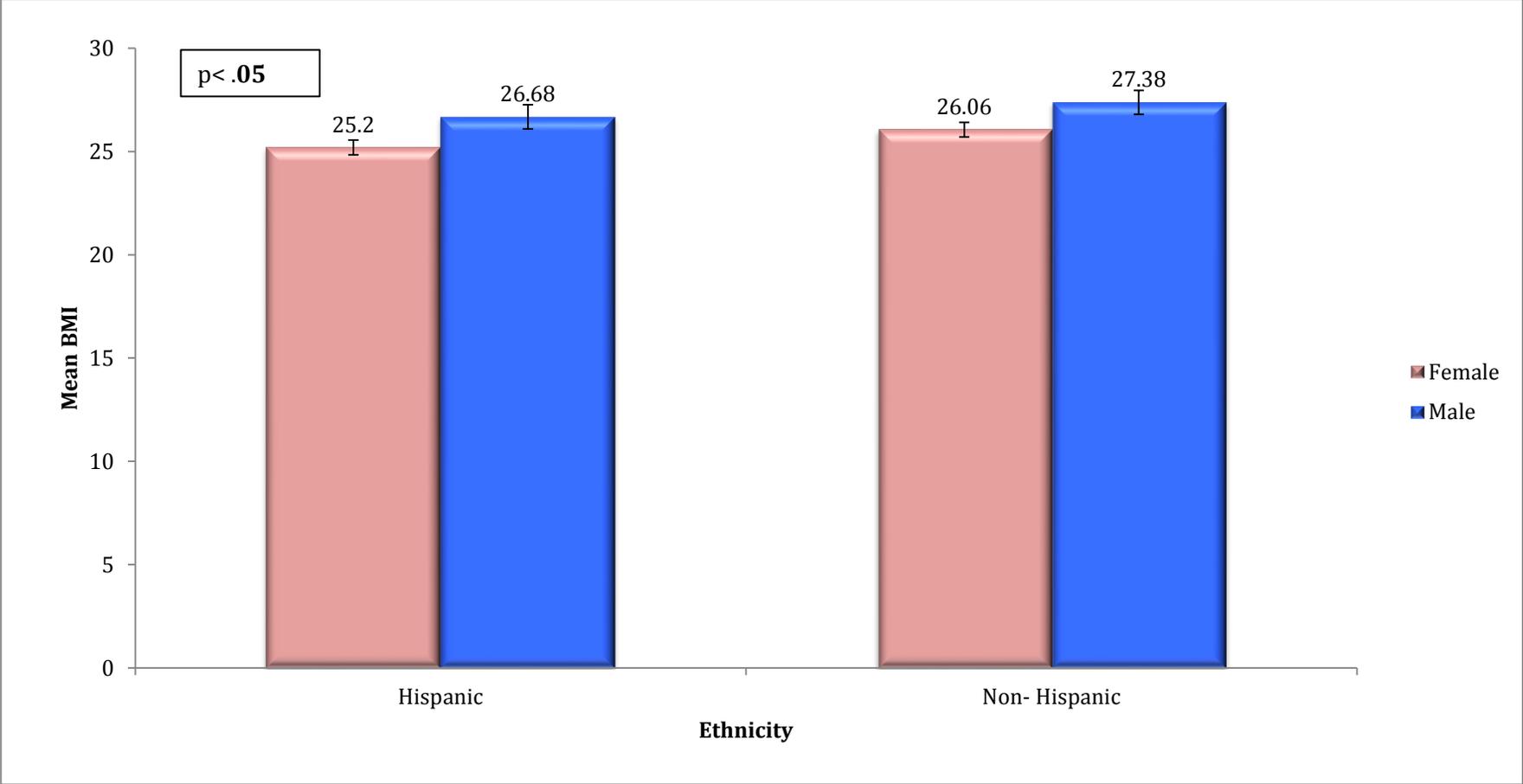
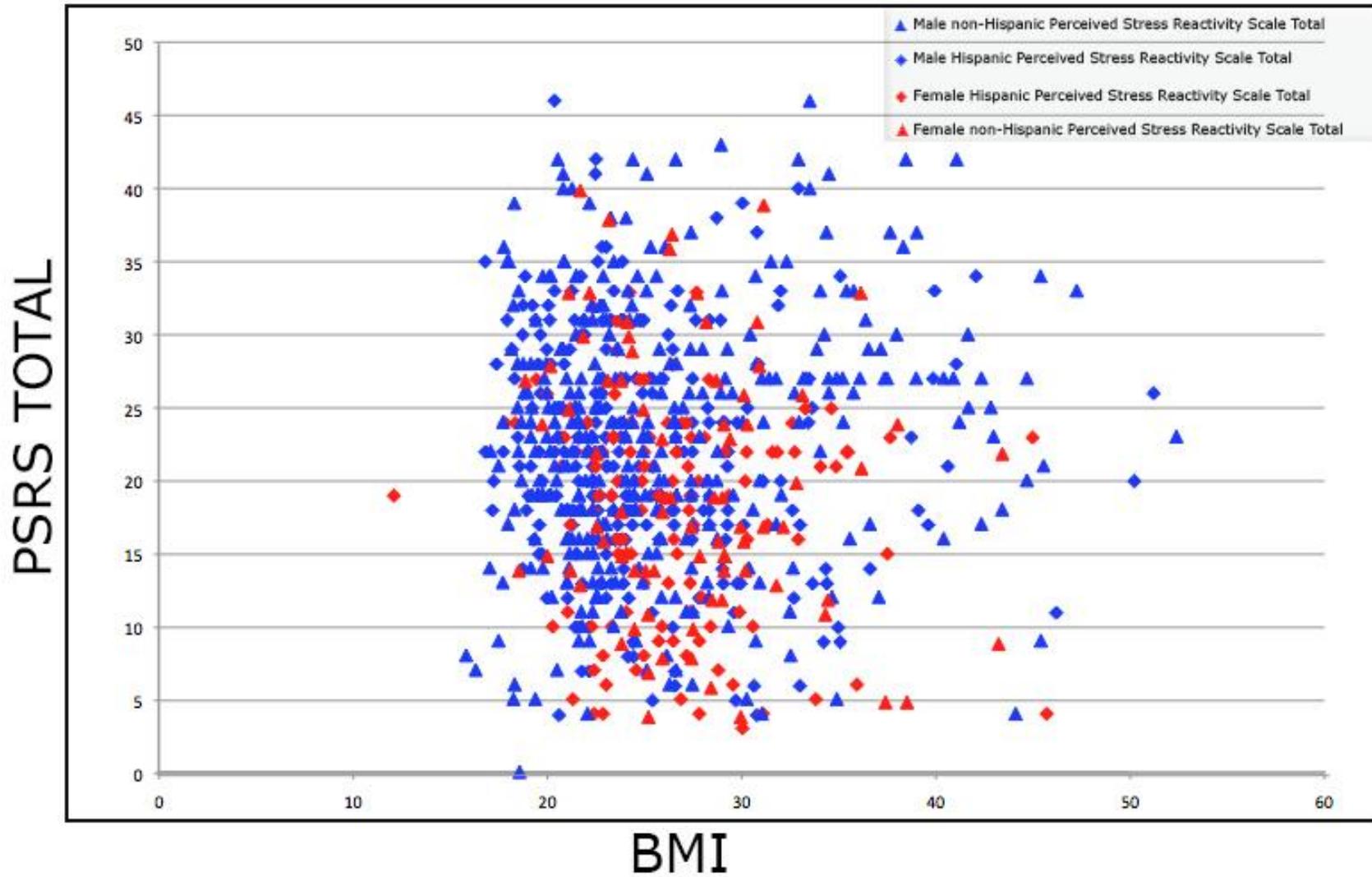


Figure 3. Regression analysis for Total Perceived Stress Score and BMI controlling for gender



## **CURRICULUM VITA**

Luisa Ileana Garcia was born and raised in Aguascalientes, Mexico. She graduated from the Instituto Renacimiento de Aguascalientes in 2004. She graduated with a Bachelors of Arts degree with a double major in Electronic Media and Psychology from the University of Texas at El Paso in 2011. During her undergraduate experience she was part of the International Honor Society in Psychology (PsiChi) as a fundraising officer, and she also developed and presented her Senior Honors Thesis. In 2011 she entered the Master of Public Health program at UTEP. Since 2013, Ms. Garcia has worked as a research assistant for the Hispanic Health Disparities Research Center and coordinated community-wide campaign for tobacco use prevention for youth. She was part of a team whose work on smoke-free policy in public housing was presented at regional and national conferences this year. Also, she has interned with the City of El Paso Department of Public Health where she collaborated with Public Health Professionals, and coordinated and promoted the Move! El Paso walking trails. All this opportunities have let Ms Garcia experience hand on the work in public health. She has especially enjoyed meeting and working with such a diverse group of community partners throughout her time at UTEP. She is particularly interested in mental health and physical health and she is very enthusiastic about her career as a public health professional.