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Prehospital Delay, Procrastination and Personality in Patients with Acute Coronary Syndrome

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Prehospital Delay, Procrastination and Personality in Patients with Acute Coronary Syndrome

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Dedication

This dissertation is dedicated to the patients participated in this study; who represented the disadvantaged and uninsured people in Harris County; who showed me their unconditional love and encouragement. Listening to them was a novel experience for me. Their enthusiasm about life through the endurance made me a better person, which I perceive as the biggest achievement in my dissertation journey**.**

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Prehospital Delay, Procrastination and Personality in Patients with Acute Coronary Syndrome

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Abstract

Coronary heart disease alone caused one out of every six deaths in the United States in 2009. Individuals who experience signs and symptoms of acute coronary syndrome (ACS) often delay seeking treatment. Compared to patients who arrive within two hours of symptom onset, those with prolonged prehospital delay are less likely to receive thrombolytic therapy and percutaneous coronary intervention (PCI) within 90 minutes of hospital arrival. Personality and procrastination has been linked to health behavior in many studies. The objective of this study was to investigate whether specific personality factors and procrastination behavior influence prehospital delay in patients with ACS. The central hypothesis was that specific personality factors (neuroticism and conscientiousness) and procrastination behavior could predict prehospital delay in patients diagnosed with ACS. An exploratory descriptive design was used on a convenience sample of patients admitted with ACS for the first time to a large metropolitan hospital. Data was collected by questionnaires and review of the medical record. Data analysis included correlations between specific personality factors (neuroticism and conscientiousness), procrastination and prehospital delay. Data analysis also included subgroup analysis across demographic variables utilizing analyses of variance and covariance and multiple regression techniques. Study results indicated that low conscientiousness and high procrastination are associated with prehospital delay. High procrastination and arrival by private vehicle instead of emergency medical system (EMS) transportation predicted longer prehospital delays. Investigating the association of personality factors and procrastination with prehospital delay was an initial step in identifying the psychological factors associated with prehospital delay. The information

on the association between conscientiousness, procrastination and prehospital delay can be utilized to redesign educational strategies for the public. Based on the study findings, individualized education approaches addressing personality and procrastination behavior should be investigated.

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List of Abbreviations

ACS	Acute Coronary Syndrome
AHA	American Heart Association
AMI	Acute Myocardial Infarction
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ARIC	Atherosclerosis Risk in Communities
CHD	Coronary Heart Disease
EMS	Emergency Medical Services
GP	General Procrastination
GSBS	Graduate School of Biomedical Science
IRB	Institutional Review Board
MI	Myocardial Infarction
NEO-FFI	NEO Five-Factor Inventory
NEO PI-R	Revised NEO Personality Inventory
NSTEMI	Non-ST Elevation Myocardial Infarction
PCI	Percutaneous Coronary Intervention
PPCI	Primary Percutaneous Coronary Intervention
STEMI	ST Elevation Myocardial Infarction
UTMB	University of Texas Medical Branch

Chapter 1 Introduction

This chapter introduces the problem of prehospital delay in patients diagnosed with acute coronary syndrome (ACS). It also describes the significance of the problem and the purpose of the current study, its design and the research questions based on the problem.

RESEARCH PROBLEM

Coronary heart disease alone caused one out of every six deaths in the United States in 2009 and approximately every 34 seconds, an American has a coronary event, and approximately every minute, an American will die of one (American Heart Association [AHA], 2013). Patient delay in seeking treatment for cardiac symptoms has been a long-standing and particularly resistant problem (Moser, Kimble et al., 2006). Patients are most likely to survive ACS with a smaller area of damage when the myocardium is reperfused quickly (Berger, Ellis et al., 1999; Pohlen, Bunzemeier et al., 2008). Compared to patients who arrive within two hours of symptom onset, those with prolonged prehospital delay were less likely to receive thrombolytic therapy and percutaneous coronary intervention (PCI) within 90 minutes of hospital arrival (Saczynski, Yarzebski et al., 2008).

ACS is the term used to represent the clinical symptoms associated with acute myocardial ischemia. Physiologically ACS is defined as plaque rupture leading to thrombus formation and leading to partial or complete blockage of a coronary artery with or without myocyte death. ACS includes unstable angina (no ST elevation, normal biomarkers), non-ST elevation myocardial infarction (NSTEMI: no ST elevation, abnormal biomarkers) and ST elevation myocardial infarction (STEMI: ST elevation, abnormal biomarkers; Anderson, 2007).

There are different phases of ACS treatment delay. These phases include the time intervals from (1) symptom onset to the decision to seek medical attention, (2) from the decision to seek medical attention to first medical contact, and (3) from first medical contact to hospital arrival. Prehospital delay has been defined as the time from symptom onset (the point in time when new symptoms causing a change in activity) to arrival at the hospital (Andersen, Cacioppo et al., 1995).

The period between the onset of symptoms and the decision to call for medical assistance, i.e. patient delay, remains the most important cause of total pre-hospital delay (Ottesen, Dixen et al., 2004). A community surveillance study (McGinn, Rosamond et al., 2005) in four US communities reported that in 2000, the overall proportion of people with delays of more than four hours from onset of acute myocardial infarction (AMI) symptoms to hospital arrival was 49.5%. The study also reported that from 1987 to 2000, there was no statistically significant change in the proportion of patients whose delays were more than four hours, which indicates that there has been little improvement in the speed at which patients with AMI symptoms arrive at the hospital after symptom onset.

SIGNIFICANCE OF THE PROBLEM

Studies from the past indicate that rapid arrival at the hospital for treatment of ACS improves long-term survival rates of patients. An important determinant of myocardial damage is the time from onset of patient symptoms to definitive treatment (Canto, Shlipak et al., 2000; Dracup & Moser, 1997; Zapka, Oakes et al., 2000). As a result, rapid arrival to the hospital for early treatment is the most effective way of preventing morbidity and mortality associated with ACS (Berger, Ellis et al., 1999). Patients are most likely to survive ACS with a smaller area of damage when the myocardium is reperfused quickly within 90 minutes of symptom onset (Berger, Ellis et al., 1999; Pohlen, Bunzemeier et al., 2008).

Compared to patients who arrive within two hours of symptom onset, those with prolonged prehospital delay were less likely to receive thrombolytic therapy and percutaneous coronary intervention (PCI) within 90 minutes of hospital arrival (Saczynski, Yarzebski et al., 2008). In a study of 565 AMI patients who underwent acute angioplasty (Berger, Ellis et al., 1999), those who received the first balloon inflation within one hour of arrival at the hospital had a 30-day mortality rate of 1.0%, but for every 15 minutes longer than one hour, the odds of death increased 1.6 times. Another study revealed a similar outcome where longer door-to-balloon time was associated with increased in-hospital mortality (mortality rate of 3.0%, 4.2%, 5.7%, and 7.4% for door-to-balloon times of 90 min, 91 to 120 min, 121 to 150 min, and 150 min, respectively) (McNamara, Herrin et al., 2006). Prompt definitive care may reduce the infarct size and thereby reduce length and complexity of the hospital course (Ottesen, Kober, et al., 1996).

Prehospital delay remains a problem even when multiple interventions are carried out to reduce the delay. A study by Saczynski, Yarzebski et al. (2008) conducted on 5,967 residents of the Worcester, MA, metropolitan area hospitalized with ACS between 1986 and 2005 showed that the mean and median delay times have remained essentially unchanged during the past two decades. The mean and median pre-hospital delay times were 4.1 and 2.0 hours, respectively, in 1986, 4.7 and 2.2 hours, respectively, in 1995 and 4.6 and 2.0 hours, respectively, in 2005. Approximately 45% of patients with ACS presented within two hours of acute symptom onset while an additional one third presented between two and six hours after the onset of acute coronary symptoms .

Although the literature on factors related to delay in seeking treatment for ACS symptoms is extensive and in-depth, few investigators have examined the impact of social, cognitive and emotional factors on delay. A recent study has demonstrated that psychosocial factors are under recognized in ACS (Figueredo, 2009). Other studies show that psychosocial factors could influence pre-hospital delay (Smolderen, Spertus, et al.,

2010; Sullivan, Ciechanowski, et al., 2009). According to an AHA scientific statement (2007), the decision to seek treatment is heavily influenced by patients' social context, cognitive process, and emotional reactions, although these aspects of delay remain underexplored. More research focusing on the association between psychosocial factors and prehospital delay is needed since many psychosocial factors may be modifiable compared to non-modifiable factors like race, gender or age.

Recognizing the complex cognitive, social and emotional processes involved in decision delay is important to enhance patients' ability to identify ACS symptoms correctly and seek care immediately. The purpose of the proposed study was to investigate whether personality and procrastination behavior could influence prehospital delay in patients with acute coronary syndrome. This study is significant because investigating the association of personality and procrastination with prehospital delay could be the first step in identifying the psychological factors associated with prehospital delay and might enable more individualized interventions to reduce delay in patients with ACS. Many interventions based on mass public education campaigns have failed to have any impact on patient delay (Caldwell & Miaskowski, 2002; Dracup, McKinley et al., 2006; Luepker, Raczynski et al., 2000). It is important to develop unique approaches that include individual education of high-risk individuals and more involvement of health care providers to reduce delay in seeking treatment. A better understanding of how personality relates to patient decision-making styles may also help clinicians tailor treatment discussions to the needs and preferences of individual patients.

VARIABLES

Pre-hospital delay is the time from symptom onset to hospital presentation and can be divided into two time periods: decision delay time and transportation delay time. Decision delay is the time from onset of symptoms to making the initial decision to seek professional healthcare and transportation delay is the time from making the initial

decision to seek professional healthcare to arrival at the hospital. For this study, the dependent variable was overall pre-hospital delay and included the period from time of onset of symptoms to arrival at the emergency department.

Independent study variables were the personality factors of neuroticism and conscientiousness, procrastination behavior and the demographic variables of age, gender, insurance, marital status, mode of arrival to the hospital, ethnicity and co-morbid conditions.

Personality factors were defined as relatively enduring personality characteristics; separate from states or moods, which are more transient. Neuroticism (N) reflects the level of chronic emotional adjustment and instability with those with high N scores prone to psychological distress, unrealistic ideas and excessive cravings; experiencing difficulty in tolerating frustration caused by not acting on urges, and maladaptive coping responses. Low N scores suggest individuals who are emotionally stable and well adjusted (Costa & Widiger, 2002).

Conscientiousness (C) assesses the degree of organization, persistence, control and motivation exhibited in goal-directed behavior with people high in C being organized, hard-working, self-directed, punctual and persevering with those low in C tending to be aimless, unreliable, careless, lax and negligent (Costa & Widiger, 2002). Conscientiousness refers to individual differences in the propensity to follow socially prescribed norms for impulse control, to be task and goal-directed, to be planful, to delay gratification and to follow norms and rules (John & Srivastava, 1999).

Procrastination is a common and pervasive problem characterized by self-regulation difficulties in the form of delaying the start and/or completion of necessary and important tasks (Ferrari & Tice, 2000).

SPECIFIC AIMS AND RELATED RESEARCH QUESTIONS AND HYPOTHESES

The overall objective of this study was to investigate the influence of specific personality factors (neuroticism and conscientiousness) and procrastination behavior on prehospital delay in patients with ACS. The central hypothesis was that the specific personality factors of neuroticism and conscientiousness and procrastination behavior could predict prehospital delay in patients diagnosed with ACS.

Specific Aim 1: Investigate the relationships between personality factors (neuroticism and conscientiousness), procrastination behavior and prehospital delay in patients with ACS controlling for relevant demographic subgroups (age, gender, marital status, insurance, mode of arrival to the hospital, ethnicity and comorbid conditions).

HYPOTHESIS 1.1: There is a relationship between personality factors (neuroticism and conscientiousness) and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups, such that people with high neuroticism scores will have more delay and people with high conscientiousness scores have less delay in seeking care.

HYPOTHESIS 1.2*:* There is a positive relationship between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups such that greater degrees of procrastination behavior is associated with longer time to seek medical care.

HYPOTHESIS 1.3: There is a relationship between personality factors (neuroticism and conscientiousness) and procrastination behavior in patients across all ethnic groups with higher neuroticism and lower conscientiousness associated with greater degrees of procrastination behavior.

Specific Aim 2: Investigate the differences across demographic subgroups (age, gender, marital status, mode of arrival, ethnicity and co-morbid conditions) in time to seek care, specific personality factors (neuroticism and conscientiousness) and

procrastination behavior in patients with acute coronary syndrome controlling for age and potential covariates.

RESEARCH QUESTION 2.1: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on time to seek medical care controlling for age and potential covariates?

RESEARCH QUESTION 2.2: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on personality factors controlling for age and potential covariates?

RESEARCH QUESTION 2.3: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on procrastination behavior controlling for age and potential covariates?

Specific Aim 3: Investigate the best model to predict time to seek care from selected demographic variables (age, gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions), specific personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with prehospital delay.

RESEARCH QUESTION 3.1: Are personality factors (neuroticism and conscientiousness), procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions predictive of the amount of time before patients experiencing symptoms of ACS seek medical care?

OVERVIEW OF RESEARCH DESIGN

A quantitative research method with an exploratory descriptive design was used to achieve the specific research objectives. Data were collected by questionnaires and from medical records. Data analysis included correlations between specific personality factors (neuroticism and conscientiousness), procrastination and prehospital delay, subgroup analysis across demographic variables utilizing analyses of variance and covariance and multiple regression techniques.

Chapter 2: Literature Review

This chapter presents the scientific literature on the magnitude of prehospital delay and the impact of prehospital delay on patient outcomes. It explains the literature on the variables influencing prehospital delay and their association in previous studies. This chapter also explores the association between personality, procrastination and health behavior. The gap in the literature and implications of the study also are explained.

MAGNITUDE OF THE PROBLEM

To examine the overall magnitude and 20-year trends (1986 to 2005) in duration of prehospital delay in middle-aged and elderly men and women hospitalized with acute myocardial infarction (AMI), Nguyen, Gore et al. (2010) conducted a study on 5967 subjects hospitalized at all greater Worcester medical centers for AMI between 1986 and 2005. Study results suggest that duration of prehospital delay in persons with symptoms of AMI remained essentially unchanged during the 20-year period under study. The overall median duration of prehospital delay in total study population was 2 hours (mean, 3.6 hours). The proportion of patients who delayed <1 hour, 1 to 1.9 hours, 2 to 3.9 hours, 4 to 5.9 hours, 6 to 11.9 hours, and >=12 hours were 18%, 28%, 25%, 9%, 11%, and 9%, respectively. Over the two decade period under study, duration of prehospital delay in patients hospitalized with AMI was relatively unchanged. Similar patterns in the delay time distributions were observed between 1986 and 2005.

A retrospective study was conducted by McGinn, Rosamond et al. (2005) to identify the trends in prehospital delay time and use of emergency medical services (EMS) for AMI from 1987-2000. Time from symptom onset to arrival at hospital and EMS use were abstracted from medical records of 18,928 patients hospitalized for AMI and captured in the community surveillance component of the Atherosclerosis Risk in Communities (ARIC) study from 1987 to 2000. The ARIC study included a retrospective

hospital surveillance program designed to monitor hospitalizations for AMI and deaths due to coronary heart disease (CHD) occurring in or out of the hospital among men and women aged 35 to 74 years in four communities. The study results showed that between 1987 and 2000, there was no statistically significant change in the proportion of patients delaying 4 hours or more.

The studies described above show that prehospital delay is a prevailing public health issue.

EFFECT OF PREHOSPITAL DELAY ON PATIENT OUTCOMES

A retrospective study over seven years from January 2004 to June 2011 evaluated the consequence of treatment delay of primary percutaneous coronary intervention (PPCI) on long-term survival of patients admitted with STEMI. Results indicated that those with a treatment delay <180 min displayed lower mortality at one, three, five and seven years (12%, 17%, 22% and 26%, respectively) than those with a treatment delay >180 min (15%, 24%, 28% and 37%, respectively; Rollando, Puggioni et al., 2012).

De Luca, Suryapranata et al. (2004) conducted a study to explore the relationship between time to treatment and mortality and to estimate the risk of mortality for each 30-minute delay. The study population consisted of a total of 1791 patients with STEMI underwent primary angioplasty from 1994 to 2001. Study results indicated that every minute of delay in treatment of patients with STEMI does affect 1-year mortality. A delay of only a few hours can have a significant impact on patient survival; with the risk of one year mortality increased by 7.5% for each 30-minute delay.

A prospective study was conducted on 536 AMI patients to address the impact of prehospital delay in treatment seeking on in-hospital complications after AMI. A significant finding of this study was that prehospital delay time in seeking timely treatment for AMI symptoms predicted in-hospital complications, including recurrent

ischemia, reinfarction, sustained ventricular tachycardia or fibrillation and cardiac death (Wu, Moser et al., 2011).

FACTORS INFLUENCING PREHOSPITAL DELAY IN PATIENTS WITH ACS

It is important to consider the confounding covariates which can influence prehospital delay. The covariates addressed in this study were age, gender, ethnicity, insurance, mode of arrival to the hospital, marital status and presence of comorbid conditions.

The large Worcester study of Nguyen, Gore et al. (2010) previously described suggested that elderly individuals are more likely to delay seeking timely medical care than younger persons. Women delayed seeking medical care significantly longer than men (median, 2.2 hours versus 2.0 hours. The median durations of prehospital delay were 2.0, 2.1, and 2.4 hours in patients <65 years, 65 to 74 years, and in those >=75 years, respectively. Patients who delayed >=2 hours in seeking medical care after the onset of symptoms suggestive of AMI were more likely to be older (>=65 years), female and widowed compared with those who delayed <2 hours. Patients who delayed seeking medical care were more likely to have a history of diabetes, hypertension and heart failure.

A randomized, controlled community trial was conducted in 20 communities on 962 community members to evaluate the factors associated with the failure to use EMS when experiencing chest pain. The study results showed that increasing age, living alone and lack of an ambulance service prepayment plan undermined a patient's intention to use EMS (Brown, Mann et al., 2000).

Dracup & Moser (1997) conducted an integrative review on the literature from 48 reports published from 1995 to 2003 support that patients with a history of comorbidities delay for much longer intervals before seeking treatment than do those without chronic illnesses. The comorbidities identified associated with markedly increased delay time in

AMI responders are diabetes, hypertension, stroke and pulmonary disorders (Lefler & Bondy, 2004). It was previously also shown in the literature that individuals with a history of heart disease, hypertension or diabetes delayed longer than did individuals without those concurrent medical problems (Dracup & Moser, 1997).

Nguyen, Saczynski et al. (2010) conducted a systematic review of the literature from 1960 to 2008 on prehospital delay in patients hospitalized with AMI. A total of 44 articles (42 studies) were included in the analysis. The majority of studies showed that in patients hospitalized with AMI, women and older persons were more likely to arrive at the hospital later than men and younger persons. Women were more likely to delay seeking medical care than men, even after adjustment for the important potentially confounding influence of age and other comorbidities.

A study conducted on 61 African American men and women diagnosed with an AMI indicated that single women delayed longer than single men and women who were alone when symptoms began delayed longer than women with someone present. Men with emergency room insurance delayed longer than men without emergency room insurance and men who took an ambulance to the hospital had shorter delay times than men who took other means of transportation (Banks & Dracup, 2007).

To examine the determinants of delayed hospital presentation in patients who have had acute myocardial infarction, a retrospective chart review was conducted by Gurwitz, McLaughlin et al. (1997) on 2409 persons hospitalized with acute myocardial infarction. Women were significantly more likely to delay than men. Patients older than 85-years of age were more likely to delay than those younger than 55-years of age. Patients who did not have living spouses, who lived alone, who resided in a long-term care facility or who were retired delayed more often than other patients. Patients with a history of coexisting disease were more likely to delay than were those without such a history.

Another study was conducted by Bunde & Martin (2006) using survival analysis to explore how depression might affect aspects of treatment-seeking delay among persons experiencing symptoms of an MI. A total of 433 patients admitted with MI completed a retrospective self-report measure of depressive symptoms with regard to the two weeks preceding the MI and a semistructured interview regarding their treatment-seeking behaviors. Study results showed that depressed participants delayed longer before seeking treatment than their nondepressed counterparts.

The study previously described by McGinn, Rosamond et al. (2005) also found that increased age, female sex and black ethnicity were all associated with longer delay times.

A retrospective study examined the association of neighborhood household income and health insurance status with prehospital delay among a weighted sample of 9700 men and women with a validated, definite or probable AMI in the ARIC community surveillance study (1993-2002). Thirty-six percent of patients arrived at the hospital within two hours of symptom onset, 42% arrived within two to 12 hours, and 22% arrived within 12 to 72 hours. Those arriving within two hours were more likely to be male and white and to have arrived at the hospital by EMS than were those with longer delays. The study also found that living in a low-income neighborhood and being a Medicaid recipient were independently associated with longer prehospital delay (Forake, Rose et al., 2008).

Summing up, the above studies (Banks & Dracup, 2007; Gurwitz, McLaughlin et al., 1997; McGinn, Rosamond et al., 2005; Nguyen, Saczynski et al., 2010) show that women delayed longer than did men. It was also evident from the literature that older patients had longer delays in seeking treatment for ACS (Brown, Mann et al., 2000; Gurwitz, McGinn et al., 2005; McLaughlin et al., 1997). African-Americans had a greater delay time between the onset of symptoms and the time to seeking treatment than that of non-African Americans (McGinn, Rosamond et al., 2005). Living in a low-income

neighborhood and being a Medicaid recipient were independently associated with longer prehospital delay (Forake, Rose et al., 2008). Reports also indicate that depressive symptoms increase patients' delay in reaching hospital following ACS (Bunde & Martin, 2006). Other factors influencing prehospital delay are living alone and not using ambulance services to reach the hospital (Gurwitz, McLaughlin et al., 1997). Patients with a history of coexisting disease were more likely to delay than were those without such a history (Lefler & Bondy, 2004). Based on this literature the variables chosen to be addressed in this study were age, gender, insurance, marital status, mode of arrival to the hospital, ethnicity and co-morbid conditions.

PERSONALITY AND HEALTH BEHAVIOR

According to Friedman (2000) there are two general mechanisms that mediate the relationship between personality and health: (1) psychophysiological reaction patterns that include changes in immune function due to stress; and (2) health behaviors. The former refers to the psychophysiological reactivity associated with activation of the stress response and its associated neuroendocrine pathways, whereas the latter reflects behavioral paths and the interaction of personality with the environment.

Several studies support that personality plays an important role in determining health-related behaviors (Donovan, Jessor, et al., 1991; Jessor, Chase, et al., 1980). Conscientiousness is considered to be the best predictor of health behaviors and health outcomes among the five behavioral domains of personality (Booth-Kewley & Vickers, 1994; Friedman et al., 1995). Neuroticism may negatively impact health through both increased stress and fewer positive health behaviors (Booth-Kewley & Vickers, 1994; Sergerstrom, 2000).

Bogg and Roberts (2004) conducted a meta-analysis of conscientiousness-related traits and the leading behavioral contributors to mortality in the United States (tobacco use, diet and activity patterns, excessive alcohol use, violence, risky sexual behavior,

risky driving, suicide, and drug use). Data sources were located by combining conscientiousness-related terms and relevant health-related behavior terms in database searches as well as by retrieving dissertations and requesting unpublished data from electronic mailing lists. The resulting database contained 194 studies that were synthesized quantitatively. Results showed that conscientiousness-related traits were negatively related to all risky health-related behaviors and positively related to all beneficial health-related behaviors. Bogg and Roberts (2004) demonstrates the importance of conscientiousness' contribution to the health process through its relationship to health-related behaviors.

Flynn and Smith (2006) explored relationships between five factors of personality and the healthcare decision-making process. They used 5,830 subjects from the Wisconsin Longitudinal Study Graduate Survey to explore relationships between five factors of personality and four preference types that account for multiple components of the healthcare decision-making process (information exchange, deliberation and selection of treatment choice). Results showed that increased conscientiousness and openness to experience and decreased agreeableness and neuroticism corresponded to preferring the most active decision-making style compared with the least active.

Tucker, Elliott and Klein (2006) examined the social regulation of health behavior in a probability sample of 509 household residents. The results suggest that the social regulation of health behavior experienced by highly conscientious individuals has more to do with their own internalized notions of responsibility and obligation to others than to specific actions by others aimed at influencing their health habits. In contrast, individuals with higher neuroticism experience more overt attempts by others to influence their health habits but have more negative affective and behavioral responses to these social influence attempts.

A study was conducted on 72 patients who had experienced a confirmed myocardial infarction (MI) to explore the psychological factors associated with a delay to

hospital following MI. Study results indicated that those who waited over 4 hours prior to seeking medical help had significantly lower scores on neuroticism (O'Carroll, Smith et al., 2001).

From the above discussion it is evident that personality factors (neuroticism and conscientiousness) are strongly associated with health behavior and healthcare decision making. Based on these findings, in my study it is hypothesized that personality factors are associated with prehospital delay.

PROCRASTINATION AND HEALTH BEHAVIOR

Procrastination has been described as a behavioral style that reflects self-regulation failure (Ferrari, 2001) and involves delay in the start and/or completion of a task (Ferrari & Tice, 2000). Many studies have shown that procrastinators reported higher stress and more health problems (Sirois & Gick, 2002; Sirois, Melia-Gordon, et al., 2003; Tice & Baumeister, 1997) and less frequent practice of health protective behaviors (Sirois, Melia-Gordon et al., 2003).

The procrastination–health model proposed by Sirois, Melia-Gordon and Pychyl (2003) suggests that procrastination may affect health through both direct and indirect routes. The direct route includes the creation of unnecessary stress through procrastination and its associated psychophysiological reactivity, which may then lead to changes in immune function that can adversely affect health. The indirect route involves behavioral paths and the interaction of personality with the environment, which may result in the delay of health-protective behaviors and the promotion of unhealthy behaviors.

Sirois, Melia-Gordon and Pychyl (2003) found that procrastination was associated with a greater tendency to delay treatment of existing health problems and the tendency

of procrastinators to delay treatment of health problems was not related to perceived stress. The researchers suggest that procrastinators might habitually put off a variety of important health-related tasks that include aspects of self-care and health maintenance regardless of other stressful demands. Sirois, Melia-Gordon and Pychyl also examined university students during a high stress period and measured their procrastination, physical health, treatment delay, stress, and wellness behaviors. Procrastinators experienced poorer health, treatment delay, stress and fewer wellness behaviors.

These studies indicate that procrastination behavior can influence heath behavior and healthcare decision- making. Hence it is hypothesized that procrastination is related to prehospital delay.

PERSONALITY AND PROCRASTINATION

Investigations of the relationship between procrastination and the five-factor personality model have identified conscientiousness (Johnson & Bloom, 1995; Lay, 1997; Lay & Brokenshire, 1997; Milgram & Tenne, 2000; Schouwenburg & Lay, 1995) and neuroticism (Milgram & Tenne, 2000; Schouwenburg & Lay, 1995; Watson, 2001) as the two main factors associated with procrastination. These studies indicate that conscientiousness is highly negatively related to procrastination and makes a significant contribution to the variance in procrastination scores, especially task avoidance procrastination. These studies also indicate that neuroticism is primarily related to decisional procrastination (Milgram & Tenne, 2000).

Watson (1999) conducted a facet-level analysis of procrastination and the five-factor model of personality. Procrastination was related to both the low conscientiousness facets (competence, order, dutifulness, achievement striving, self-discipline and

deliberation) and the neuroticism facets (anxiety, depression, self-consciousness, impulsiveness and vulnerability). Decisional procrastination has also been linked to neuroticism (Milgram & Tenne, 2000).

These studies indicate that procrastination and personality factors (neuroticism and conscientiousness) are interrelated. Literature also supports the premise that personality factors (neuroticism and conscientiousness) and procrastination can influence health behaviors and healthcare decision-making.

CONSTRUCTIVE FRAMEWORK

From the above discussion it is clear that personality and procrastination can influence health behaviors. The relationship between personality and procrastination is also evident. Based on these findings it is hypothesized that procrastination and specific factors of personality (neuroticism and conscientiousness) may predict delay in treatment.

GAPS IN THE LITERATURE

Prehospital delay remains a problem even when multiple interventions are carried out to reduce the delay. Although the literature on factors related to delay in seeking treatment for ACS symptoms is extensive and in depth, few investigators have examined the impact of social, cognitive and emotional factors on delay. Although many studies indicate that the decision to seek treatment is heavily influenced by patients' social context, cognitive processes and emotional reactions, these aspects of delay remain underexplored. More research focusing on the association between psychosocial factors and prehospital delay is needed since many of the psychosocial factors may be modifiable compared to non-modifiable factors like race, gender or age.

IMPLICATIONS OF THE STUDY

Reducing the prehospital delay for patients with ACS symptoms is a prevailing public health challenge. Several mass interventions aimed at reducing the delay have proven to be unsuccessful.

Kainth, Hewitt et al. (2004) conducted a systematic review to evaluate the effectiveness of interventions aiming to reduce time from onset of signs and symptoms of AMI to seeking medical help/arrival at hospital. Fifteen studies were examined. Study results showed that there is limited evidence that community-wide media based educational interventions were successful in reducing delay time.

Dracup, McKinley et al. (2009) did a randomized controlled trial to test education and counseling intervention designed specifically for individuals at high risk for a future ACS event. The intervention was aimed at reducing the time from ACS symptom onset to arrival at the hospital by increasing patients' knowledge about cardiac symptoms and improving their attitudes and beliefs about seeking care immediately when they experienced ACS symptoms by activating EMS. Participants (n=3522) with documented coronary heart disease were randomized to experimental (n=1777) or control (n=1745) groups. Experimental patients received education and counseling about ACS symptoms and actions required. Over the two years of follow-up, 565 patients (16.0%) were admitted to an emergency department with ACS symptoms a total of 842 times. Neither median prehospital delay time nor EMS use was different between groups. The study results concluded that the education and counseling intervention did not lead to reduced prehospital delay or increased ambulance use.

Based on the vast literature on prehospital delay in patients with ACS, this study is important because investigating the association of personality and procrastination with prehospital delay could be the first step in identifying the psychological factors associated with prehospital delay and might enable more individualized interventions to reduce delay in patients having ACS. It may also help to develop unique approaches that include individual education of high-risk individuals and more involvement of health care providers to reduce delay in seeking treatment. A better understanding of how personality relates to patient decision-making styles may also help clinicians tailor treatment discussions to the needs and preferences of individual patients.

Chapter 3: Research Design

This chapter elaborates the research design of this study. It describes the sampling method and setting where the study took place. Measurements of variables are discussed in detail. This chapter also presents ethical considerations for the study subjects. Thorough descriptions of data collection methods and data analysis techniques are provided.

STUDY DESIGN

A quantitative research method with an exploratory descriptive design was implemented to achieve the specific research objectives. The goal of exploratory research is to discover ideas and insights. According to Bell (2010) an exploratory research design does not aim to provide final and conclusive answers to the research questions, but merely explores the research topic with varying levels of depth. Exploratory research is the initial level of research, which forms the basis for more conclusive research. It helps to identify appropriate research designs, sampling methodology and data collection methods (Singh, 2007). This study explained the association of personality and procrastination with prehospital delay for the first time.

Descriptive research is usually concerned with describing a population with respect to important variables. Descriptive studies also are conducted to demonstrate associations or relationships between variables. This study describes the population of patients admitted with ACS. The central hypothesis was that specific personality factors (neuroticism and conscientiousness) and procrastination behavior could predict prehospital delay in patients diagnosed with ACS.

SAMPLING METHOD

Power analysis estimated that a sample size of 67 was required for the study. Power analysis was conducted with a proposed correlational effect size of 0.30, alpha at 0.05 and a power of 0.80. There were 10 variables in the study, two personality factors (neuroticism and conscientiousness), a general procrastination (GP) composite score and seven demographic variables (age, gender, insurance, marital status, ethnicity, mode of arrival to the hospital and co-morbid conditions). Minimum sample size guidelines for conducting a multiple regression analysis are five times the number of predictors; therefore, a minimum sample size of 50 was required for 10 predictors.

A convenience sampling method was used. To ensure the uniformity of ethnicity and to control cultural confounds surrounding different ethnic attitudes regarding healthcare, data was collected from only three ethnic groups: Hispanic, African American and Caucasians with efforts to ensure equal distribution across all three groups.

INCLUSION/EXCLUSION CRITERIA

Patients were included in the study if they met the following criteria: older than 21 years of age (patients whose age was below 21 were considered pediatric patients); confirmed diagnosis of ACS documented in the patient's medical record (elevated troponin levels and/or EKG changes consistent with ACS); diagnosed with ACS for the first time; alert and oriented; living independently in the community (i.e., not in an institutional setting); able to speak and read English; self-identified as Hispanic, African American or Caucasians; and hemodynamically stable (stable blood pressure, pulse and respiration).

Patients were excluded if they had acute psychiatric impairment, were hemodynamically unstable or were suffering from severe comorbid conditions such as renal failure, malignancy; could not read English, were younger than 21 years of age; not living independently in a community, had a previous diagnosis of ACS and were not self-identified as Hispanic, African American or Caucasian.

SETTING

The subjects were recruited from hemodynamically stable patients admitted to the cardiology intermediate care units of a metropolitan hospital in southeast Texas. Participants meeting the study criteria were identified by the researcher from the medical record. Potential participants meeting inclusion/exclusion criteria were met by the researcher in their room; the study was described and a signed informed consent was obtained from patients who were willing to participate in the study. Participants were then asked to respond to the study instruments.

ETHICAL CONSIDERATIONS

The ethical issues considered in this study were confidentiality, avoidance of harm to respondents, anonymity of the participants and informed consent. Accessing the medical records was also a privacy issue. Institutional Review Board (IRB) approval at both University of Texas Medical Branch (UTMB) and the participating institution was obtained before conducting the study. An informed consent was provided by all the participants before they were asked to respond to the questionnaires. Participants were briefed on the purpose of the study and were informed about how the data would be collected. Participants were assured that they could withdraw from the study at any time.

The investigator ensured that study inquiry caused no harm to the participants by being available to answer all questions and concerns and avoided inclusion of any questions that could offend or alarm the participants. All information reviewed in connection with the study that included data that would identify the participants (i.e., charts, consent forms) will remain confidential. All data was recorded as de-identified and without links to consent forms or identification information extracted from medical charts.

DATA COLLECTION

Data were collected by questionnaires and from patient medical records. Participants were surveyed 24 hours after admission to the hospital and if they were hemodynamically stable. Information about patients' age, sex, marital status, insurance information, mode of arrival to the hospital (private transportation or ambulance) and ethnicity were collected from the patients' medical charts. Clinical data related to comorbid conditions also were abstracted from the medical chart. The time of onset of the symptoms, time of activation of emergency system and time of arrival to the hospital were answered by the patient. Personality and procrastination questionnaires were self-administered by the patient. The investigator remained close at hand to answer questions or assisted in administering the questionnaires if requested (e.g., orally reading the items).

MEASUREMENT OF VARIABLES

The dependent variable for this study was total pre-hospital time which includes both decisional delay and transportation delay and was measured in hours and minutes from time of onset of symptoms to arrival at the emergency department.

Independent study variables were the personality factors (neuroticism and conscientiousness), procrastination behavior and demographic variables (age, gender, insurance, marital status, mode of arrival to the hospital, ethnicity and co-morbid conditions). Co-morbid conditions, insurance status and mode of arrival were measured as dichotomous variables. Co-morbid conditions were measured as present or not. Mode of arrival was categorized as either ambulance or private transportation. Insurance status was measured as insured or not. Marital status was classified as married, single or divorced from the medical chart. Due to small sample sizes across some of these subcategories, it was necessary to recategorize marital status as married or unmarried by combining single and divorced variables for the purpose of analysis.

Neuroticism, conscientiousness and procrastination behavior were measured by those domain subscales found on the NEO-Personality Inventory (Costa & Widiger, 2002) and General Procrastination Scale (GP) (Lay, 1986) described below.

INSTRUMENTS

The two dimensions of personality, neuroticism and nonscientiousness, were assessed by the NEO Five-Factor inventory (NEO-FFI), which is the updated version of the Revised NEO Personality Inventory (NEO PI-R) (Costa & Widiger, 2005). The updated version (NEO-FFI) retains the validity and reliability of NEO PI-R. Domain level reliabilities are excellent ranging from .86 to .95 for both the self and observer rating forms of this instrument. Norms are based on a sample of 1,000 subjects (500 males, 500 females) selected from three large-scale studies of the scale. Separate norms are provided for college-aged samples based on findings that adolescent and early adult samples were systematically score different. There is strong consensual validity between

self, peer and spouse reports of the instrument. The NEO manual, by Costa and McCrae (1992) reports both discriminate and convergent validity of the instrument.

The full NEO-FFI has 60 items that provide a quick, reliable and accurate measure of the five domains of personality. The present study used only neuroticism and conscientiousness subscales as they have been demonstrated to be related to health care decision making (Flynn and Smith, 2006; Friedman, 2000; Elliott and Klein, 2006) and procrastination (Johnson & Bloom, 1995; Lay, 1997; Lay & Brokenshire, 1997; Milgram & Tenne, 2000; Schouwenburg & Lay, 1995; Watson, 2001).

Procrastination behavior was assessed by the General Procrastination scale (GP) (Lay, 1986). The GP scale is composed of 20 items that measure trait procrastination on a variety of everyday activities. Items are scored on a 5-point Likert scale ranging from 1 to 5. A mean across all items yields a composite score, with higher values indicating a greater tendency to procrastinate. The GP has demonstrated good internal consistency with Cronbach alpha=0.82 (Blunt & Pychyl, 1998; Lay, 1986), and good stability with a test-retest reliability of 0.80 (Ferrari, 1989).

DATA ANALYSIS

Study data were analyzed using standard statistical methods from version 21 of the Statistical Package for Social Sciences (SPSS). All data were examined for normality and homogeneity. Significance for all statistical analyses was set at $p<0.05$. Data analyses for each research question and hypothesis are described below.

Specific Aim 1: Investigate the relationships between personality factors (neuroticism and conscientiousness), procrastination behavior and prehospital delay in

patients with ACS, controlling for relevant demographic subgroups (age, gender, marital status, insurance, mode of arrival to the hospital, ethnicity and comorbid conditions).

HYPOTHESIS 1.1: There is a relationship between personality factors (neuroticism and conscientiousness) and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups, such that people with high neuroticism scores will have more delay and people with high conscientiousness scores will have less delay in seeking care. Analyses included computation of Pearson correlation coefficients between personality factors and the amount of time before patients experiencing symptoms of ACS seek medical care within each ethnic group and across total groups.

HYPOTHESIS 1.2: There is a positive relationship between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups such that greater degree of procrastination behavior is associated with longer time to seek medical care. Analyses included computation of a Pearson correlation coefficient between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care within each ethnic group and across total groups.

HYPOTHESIS 1.3: There is a relationship between personality factors (neuroticism and conscientiousness) and procrastination behavior in patients across all ethnic groups with higher neuroticism and lower conscientiousness associated with greater degrees of procrastination. Analyses included the computation of Pearson correlation coefficients between personality factors and procrastination behavior within each ethnic group and across the total group combining three ethnic groups.

Specific Aim 2: Investigate the differences across demographic subgroups (age, gender, marital status, mode of arrival, ethnicity and co-morbid conditions) in time to seek care, specific personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with ACS controlling for age and potential covariates.

RESEARCH QUESTION 2.1: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on time to seek medical care controlling for age and potential covariates? Analysis of covariance was used to examine the differences across demographic subgroups on time to seek medical care while controlling age and covariates.

RESEARCH QUESTION 2.2: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on personality factors controlling for age and potential covariates? Analysis of covariance was employed to examine the differences across demographic subgroups on personality factors while controlling age and covariates.

RESEARCH QUESTION 2.3: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on procrastination behavior controlling for age and potential covariates? Analysis of covariance was used to examine the differences across demographic subgroups on procrastination behavior while controlling age and covariates.

Specific aim 3: Investigate the best model to predict time to seek care from selected demographic variables (age, gender, marital status, ethnicity, mode of arrival,

insurance and co-morbid conditions), specific personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with prehospital delay.

RESEARCH QUESTION 3.1: Are personality factors (neuroticism and conscientiousness), procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions predictive of the amount of time before patients experiencing symptoms of ACS seek medical care? Stepwise multiple regression techniques (both forward and backward with varimax and oblim rotations) were used to assess the contribution of the personality factors, procrastination behavior, age, gender, marital status, insurance, mode of arrival and co-morbid conditions to amount of time before patients experiencing symptoms of ACS seek medical care treating all dichotomous nominal variables as dummy variables. However, in order to assess the contribution of ethnicity (composed of three groups) to delay, a logistic regression analysis was conducted with the personality factors, procrastination behavior, age, gender, marital status, insurance, mode of arrival, co-morbid conditions and ethnicity as predictors of amount of time before patients experiencing symptoms of ACS seek medical care.

Chapter 4 : Results

This chapter describes the results of the study examining the influence of specific personality factors and procrastination behavior on prehospital delay in patients with ACS. Detailed descriptions on sample demographic characteristics as well as psychometric properties of each scale used in this study are presented. Findings for each research question are addressed separately. The overall objective of this study was to investigate whether specific personality factors (neuroticism and conscientiousness) and procrastination behavior could influence the prehospital delay in patients with ACS. The central hypothesis was that the specific personality factors (neuroticism and conscientiousness) and procrastination behavior can predict prehospital delay in patients diagnosed with ACS.

The dependent variable for this study was total pre-hospital time (includes both decisional delay and transportation delay) and was measured in hours and minutes from time of onset of symptoms to arrival at emergency department. Study variables were the personality factors (neuroticism and conscientiousness), procrastination behavior and demographic variables (age, gender, insurance, marital status, mode of arrival to the hospital, ethnicity and co-morbid conditions).

SAMPLE CHARACTERISTICS

Seventy-five patients who were admitted with the diagnosis of ACS participated in this study. Demographic breakdowns across characteristics for the total sample are shown in Table 4.1. A slight majority of the patients were males (57.3%). The age of the subjects ranged from 27-72 with a mean of 52 years old (SD=9.8). Only three ethnicities

were included in this study. They were Hispanics (37.3%), African Americans (48%) and Caucasians (14.7%) who were substantially less represented than the other two ethnic groups in this sample. Two thirds of the patients were unmarried and one-third was married. Almost 75% of patients chose a private vehicle to come to the hospital when they experienced chest pain and the rest used EMS. The vast majority of the subjects were uninsured (94.7%), only 4 subjects had insurance. Sixty-two percent of the subjects were suffering from a comorbid condition. Mean prehospital delay of the total sample was 6.5 hours and median delay was 3.5 hours.

Table 4.1: Total Sample Characteristics

Characteristic	*n*	*M* (*SD*) or %
Average age (± *SD*)	*N*= 75	52(±9.8)
Prehospital Delay(± *SD*)	*N*= 75	6.53(±6.58)
Gender	*N*= 75	
Male	43	57.3%
Female	32	42.7%
Ethnicity	*N*= 75	
Hispanic	28	37.3%
African American	36	48%
Caucasian	11	14.7%
Insurance Status	*N*= 75	
Insurance (Yes)	4	5.3%
Insurance(No)	71	94.7%
Mode of Arrival	*N*= 75	
Ambulance	19	25.3%
Private Vehicle	56	74.7%
Comorbidity Status	*N*= 75	
Comorbidity (Yes)	46	61.3%
Comorbidity (No)	29	38.7%

Characteristic	*n*	*M* (*SD*) or %
Marital Status	*N*= 75	
Married	25	33.3%
Unmarried	50	66.7%

DISTRIBUTIONS OF THE DEMOGRAPHIC VARIABLES

Chi square analysis was used to investigate the association between the nominal level variables for the total group (Table 4.2 and 4.3) as well as across ethnic groups (Table 4.2 and 4.4). Fisher's exact test was used for 2 x 2 comparisons with more than 20% of expected cell count less than 5.

The only statistically significant association was found between marital status and comorbidity (Table 4.2) with the largest proportion of individuals with comorbidity being unmarried (*n*=36, 76.1%) whereas only 23.9% (*n*=11) of the married people had any comorbid condition (Table 4.3). This unequal distribution of comorbidity supports the need to include comorbidity as a separate extraneous covariate in subsequent analyses. There were no significant differences across variables, including comorbidity, when broken down by ethnicity (Table 4.2 and 4.4).

Table 4.2: Chi Square Analyses for Total Sample

Variables	Chi Square	df	*p*
Gender*Marital Status	.027	1	.869
Gender*Arrival	2.41	1	.120
Gender* Comorbidity	1.295	1	.255
Gender*Insurance	.093[a]	1	1
Marital Status*Arrival	.035	1	.851
Marital status*Comorbidity	**4.751**	**1**	**.029[b]**

Variables	Chi Square	df	*p*
Marital Status*Insurance	.132 [a]	1	1
Arrival*Comorbidity	.539	1	.463
Arrival*Insurance	1.35 [a]	1	.264
Comorbidity*Insurance	.229 [a]	1	.638
Ethnicity*Arrival	2.223	2	.329
Ethnicity*Marital status	3.797	2	.150
Ethnicity* Comorbidity	1.606	2	.448
Ethnicity*Gender	2.63	2	.268

a- Fisher's exact test was used
b- *p* value is significant at the 0.05 level

Table 4.3: Distribution of Demographic Variables for Total Sample

% (*n*)	Marital Status		Comorbidity		Gender	
Variable	Unmarried	Married	No	Yes	Male	Female
Arrival WITH						
Private	66.1(37)	33.9 (19)	41.1 (23)	58.9 (33)	62.5 (35)	37.5(21)
Ambulance	68.4(13)	31.6(6)	31.6 (6)	68.4 (13)	42.1(8)	57.9(11)
Marital Status* WITH						
Unmarried			51.7 (15)	76.1 (35)	67.4 (29)	65.6(21)
Married			48.3 (14)	23.9 (11)	32.6 (14)	34.4(11)
Comorbidity WITH						
No					65.5 (19)	34.5(10)
Yes					52.2 (24)	47.8(22)

*Cell percentages displayed are for column variables

Table 4.4: Distribution of Demographic Variables for Ethnicity*

% (*n*)	Arrival		Marital Status		Comorbidity		Gender		Insurance	
Variable	Private	Amb.	Unm.	M	No	Yes	M	F	Yes	No
Ethnicity WITH										
Caucasian	90.9 (10)	9.1 (1)	81.8 (9)	18.2 (2)	54.5 (6)	45.5 (5)	72.7 (8)	27.3 (3)	1 (9.1)	10 (90.9)
Hispanic	67.9 (19)	32.1 (9)	53.6 (15)	46.4 (13)	39.3 (11)	60.7 (17)	46.4 (13)	53.6 (15)	3.6 (1)	96.4 (27)
AA	75 (27)	25 (9)	72.2 (26)	27.8 (10)	33.3 (12)	66.7 (24)	61.1 (22)	38.9 (14)	5.6 (2)	94.4 (34)

*Cell percentages displayed are for within each ethnic group
Note: Amb- Ambulance, Unm- Unmarried

DEMOGRAPHIC GROUP DIFFERENCES ON AGE

The independent t- test was computed to identify the differences between all two level demographic variables on age. One way ANOVA was conducted to find the differences between ethnicity on age.

There were marginally significant differences between marital status subgroups and comorbidity groups on age (Table 4.5). Given the presence of unequal and small sample sizes, marginally significant differences merited closer scrutiny and consideration, i.e., calculation of effect size rather than reliance on p values. Cohen's d on marital status subgroups had a medium effect size (d=0.45) indicating that unmarried patients were, on average, older (M=53.68, SD=8.70) than married (M= 49.12, SD=11.37). A similar medium effect (d=-0.40) between comorbidity groups (yes versus no) indicated that people with comorbid conditions were generally older (M=53.71,

SD=8.94) than people with no comorbid conditions (*M*=49.69, *SD*=10.82). Although not surprising, these findings do highlight the need to assess the impact of these subgroup variables as covariates in subsequent analyses.

Table 4.5: Test of Differences between Demographic Variables on Age

Variable		*M*	*SD*
Gender		*t*=-0.85	p=0.40
	Males (*n*=43)	51.33	9.37
	Females (*n*=32)	53.28	10.45
Marital Status		*t*=1.93	***p*=0.06+**
	Married (*n*=25)	49.12	11.37
	Unmarried (n=50)	53.68	8.70
Comorbidity		*t*=1.75	***p*=0.08+**
	Yes(*n*=46)	53.71	8.94
	No(*n*=29)	49.69	10.82
Arrival		*t*=-1.64	*p*=.11
	Private(*n*=56)	53.23	8.95
	Ambulance (*n*=19)	49	11.79

+ marginally significant $p>0.05$ but <0.1

One-way ANOVA showed no statistically significant differences across ethnic groups on age (see Appendix D1). Levene's *F* statistic was not significant indicating the assumption of homogeneity of variance was met.

EVALUATING POTENTIAL COVARIATES

To determine the degree of covariation among variables that would necessitate adjustments to analyses directed at study research questions or hypotheses, an examination of correlations between age, prehospital delay, procrastination, neuroticism and conscientiousness for the overall group as well as within demographic subgroups was necessary. One primary focus of this study was ethnic differences. Thus, initial efforts were focused on identifying differences across ethnic groups taking the other demographic variables into consideration. A second standard concern was gender differences across those same demographic variables. Results addressing potential covariates within these two primary demographic variables are presented in the next sections. In each case, an evaluation of relevant covariates to be included in study analyses to address research questions and hypotheses is provided. Insurance was eliminated as a covariate because 72 subjects (94.7%) of the total sample were uninsured.

Within Ethnicity: Within ethnic groups, Table 4.6 clearly indicates a consistent pattern of relationships for age with other study variables, especially for African Americans. In the total sample, age displayed a small negative correlation (r=-.29) with procrastination (as age increases, procrastination decreases) and a similarly small positive correlation (r=.27) with conscientiousness (as age increases, conscientiousness levels also were higher). These findings support the inclusion of age as a covariate in subsequent analyses used in Specific Aim 2.

Similarly, within ethnicity there were persistent moderate to high relationships between the personality variables and with procrastination. Unsurprisingly, conscientiousness was highly negatively correlated with procrastination (r=-.67) and

neuroticism (*r*=-.42) while procrastination and neuroticism were positively correlated (*r*=.29). These relationships signal caution for multicollinearity risks when conducting regression analyses in Specific Aim 3. The pattern of relationships also reflects substantial differences across ethnic subgroups on study variables and necessitates inclusion of ethnicity for subsequent analyses as a group covariate.

Table 4.6: Correlations between Study Variables and by Ethnicity

r	Total Sample (75)	Hispanic (28)	Caucasian (11)	African American(36)
Age WITH				
Prehospital Delay	.02	.09	.55	.14
Procrastination	**-.29***	.28	.21	**-.58*****
Neuroticism	-.19	.07	.0	**-.40***
Conscientiousness	**.27***	.07	-.19	**.45****
Procrastination WITH				
Neuroticism	**.29***	.32	.15	**.34***
Conscientiousness	**-.67*****	**-.67*****	**-.68***	**-.66*****
Neuroticism WITH				
Conscientiousness	**-.42*****	-.20	-.54	**-.48****

*p<.05, **p<.01, ***p<.001

Correlations within arrival mode between study variables across the total sample and across ethnic groups are displayed in Table 4.7. Overall, only private vehicle users showed significant relationships involving age. Age was significantly negatively correlated with procrastination (higher age related to lower procrastination scores) for private vehicle users (*r*=-.31) and significantly positively correlated with conscientiousness, higher conscientiousness is linked to higher age (*r*=.26). Overall,

prehospital delay was highly positively correlated with procrastination (longer delay was associated with greater procrastination) and moderately negatively correlated with conscientiousness (higher conscientiousness was associated with lower delay) for ambulance users.

When use of ambulance was broken down by ethnicity (Table 4.7), a similar high positive significant correlation between prehospital delay and procrastination was found only in Hispanics. In addition, a pattern of notable effects sizes can be seen for Hispanics between hospital delay across the other two study variables with a moderately high positive correlation between prehospital delay and neuroticism (r=.54) and a high inverse relationship with conscientiousness (r=-.65). Procrastination was highly negatively correlated with conscientiousness in Hispanic ambulance users but not African Americans. For private vehicle use, the small negative significant correlation between age and procrastination (higher age was associated with lower procrastination scores) in the total sample using was largely driven by a high significant negative relationship in African Americans using private vehicles. In contrast, a significant positive moderate relationship between age and neuroticism (higher age was associated with higher neuroticism scores) was found for African Americans using private vehicles which was dramatically different for African Americans using ambulance services who displayed a highly significant negative correlation between age and neuroticism that were not in evidence in any other group nor the overall group. Thus, older African Americans using ambulance transportation were low in neuroticism whereas African Americans who used private transportations were high in neuroticism. Age had a small positive correlation with conscientiousness in the total sample using private vehicles but no pattern of

significance was found when broken down by ethnicity, primarily due to loss of power with the reduced sample size.

There was a high significant positive relationship between prehospital delay and procrastination for those using ambulance transportation that was largely driven by the strong positive correlation found for Hispanics. This pattern was mirrored in the significant moderate negative correlations between prehospital delay and conscientiousness in ambulance users with Hispanics again responsible for the effect.

Procrastination demonstrated a small significant positive relationship with neuroticism at the group level for private transportation users which was mirrored in high magnitude correlaion by every group except Caucasians using private vehicles.

Within comorbidity subgroups (Table 4.8), for those patients with no comorbidity, age was significantly and highly positively correlated with prehospital delay as well as procrastination in Hispanics (i.e., older Hispanic patients had longer delay and higher procrastination scores). It is worth noting that although sample size prevented reaching significance, there is a robust pattern of moderate to high positive relationships between age and hospital delay for both comorbid status groups among Caucasians. Age was negatively correlated with neuroticism in the no comorbidity total sample driven by the very high negative relationship for African Americans. A significant high positive relationship between age and conscientiousness was seen for no comorbidity African Americans (older patients without comorbidities displayed higher conscientiousness scores). Conversely, there was a notable moderately high *negative* relationship between age and conscientiousness for the comorbid Caucasian group, i.e., comorbid older Caucasians displayed *lower* conscientiousness scores.

Prehospital delay was highly positively correlated with procrastination in the no comorbidity total sample, which was driven by similar strong relationships in all three ethnic groups. Prehospital delay also displayed a robust pattern of moderate to high positive relationships with procrastination (longer delay was associated with higher procrastination scores) for almost all ethnic x comorbid and no comorbidity groups. The small significant negative correlation between prehospital delay and conscientiousness in the no comorbidity group was revealed to be generated by the large significant negative correlation for African Americans and the large (albeit nonsignificant) effect size for Caucasians.

Procrastination was highly negatively correlated with conscientiousness in all the groups except Caucasians with no comorbidity. While procrastination and neuroticism were only moderately positively correlated in the no comorbidity total group when broken down across ethnic groups, dramatically strong positive correlations were displayed for both Hispanic comorbid (r=.87) and non-comorbid (r=.93) groups and to slightly lesser degree for comorbid Caucasians (r=.64). Neuroticism and conscientiousness displayed a consistent pattern of moderate to large negative correlations across all groups except comorbid Hispanics. The persistence of different patterns of relationships across comorbidity groups overall and within ethnic groups supports this variable as a significant covariate.

Within marital subgroups (Table 4.9), in the total sample, age was highly negatively correlated with time delay in general for married patients driven largely by the same association in African American patients indicating younger married patients exhibited greater time delays. The reverse relationship was shown for unmarried

Caucasians of similar magnitude, i.e., greater age was associated with greater time delay in this group. Age and procrastination were significantly and negatively correlated for unmarried patients and both categories of African Americans, indicating that younger patients showed greater levels of procrastination. Age and conscientiousness were positively correlated overall in the unmarried group and specifically in both groups of African Americans.

Prehospital delay was positively correlated with procrastination in both the overall married and unmarried groups. This result was largely driven by the relationships found in unmarried Hispanics and married African Americans. A significant negative correlation with prehospital delay and conscientiousness was found in unmarried Hispanics; but a notable negative relationship of comparable magnitude was also displayed by married African Americans.

Procrastination was highly negatively correlated with conscientiousness in all the groups reflecting lower levels of conscientiousness associated with higher levels of procrastination. Procrastination was positively correlated with neuroticism in the overall married group reflecting the notably high magnitude of the relationship for married African Americans. Neuroticism and conscientiousness are negatively correlated in both groups in the total sample reflecting relationships of similar magnitude in unmarried Hispanics and both groups of African Americans. These findings confirm marital status as a significant covariate to be included in subsequent analyses.

Within gender X ethnicity groups (Table 4.10), age was negatively correlated with procrastination in males in the total sample and in both males and females in African Americans, indicating that younger ages are associated with higher levels of

procrastination for these groups. Age was also negatively correlated with neuroticism in African American females.

Prehospital delay was positively correlated with procrastination in both males and females in the total sample reflecting the relationships in Hispanic females and African American males. Procrastination was highly negatively correlated with conscientiousness in all the groups. Neuroticism was negatively correlated with conscientiousness in both males and females in the total sample reflecting relationships of similar magnitude in Caucasian and African American males and African American females. These differences also confirm that gender is a significant covariate to be included in subsequent analyses.

Table 4.7: Correlations between Study Variables by Arrival X Ethnicity

r	Total Sample		Hispanic(28)		Caucasian (11)		African American(36)	
Variable	Ambulance (19)	Private (56)	Ambulance (9)	Private (19)	Ambulance (0)	Private (10)	Ambulance (9)	Private (27)
Age WITH								
Prehospital Delay	.05	-.06	-.09	.10	n/a	.50+	.37	-.26
Procrastination	-.32	**-.31***	-.13	.20		.10	-.43	**-.63*** **
Neuroticism	-.27	-.15	.30	.16		-.02	**-.92*** **	**.53****
Conscientiousness	.26	**.26***	.19	-.15		-.09	.21	.21
Prehospital Delay WITH								
Procrastination	**.71*** **	.27	**.85****	.11	n/a	.50+	.46	.30
Neuroticism	.01	-.07	.54+	-.08		-.05	-.31	-.05
Conscientiousness	**-.47***	-.22	-.65+	-.20		-.10	-.09	-.32
Procrastination WITH								
Neuroticism	.28	**.30***	.34	.35	n/a	.15	.47	.37
Conscientiousness	**-.67*** **	**-.68*** **	**-.78***	**-.62****		**-.64***	-.44	**-.72*** **
Neuroticism WITH								
Conscientiousness	-.17	**-.47*** **	-.31	-.27	n/a	-.55+	-.28	**-.53****

*p<.05, **p<.01, ***p<.001, +notable effect sizes

Table 4.8: Correlations between Study Variables by Comorbidity X Ethnicity

r	Total Sample		Hispanic(28)		Caucasian (11)		African American(36)	
Variable	Comorbid (46)	No Comorbid (29)	Comorbid (17)	No Comorbid (11)	Comorbid (5)	No Comorbid (6)	Comorbid (24)	No Comorbid (12)
Age WITH								
Prehospital Delay	.03	.07	-.28	**.69***	.63+	.51+	.14	.42
Procrastination	-.27	-.27	-.24	**.65***	.58+	.08	**-.41***	**-.77****
Neuroticism	-.09	**-.43***	.13	.49	.17	-.12	-.19	**-.83****
Conscientiousness	.24	.29	.37	-.39	-.56+	.22	.33	**.64***
Prehospital Delay WITH								
Procrastination	.10	**.63*****	.20	**.64***	.53+	.73+	-.06	**.75****
Neuroticism	-.19	.16	-.09	.54+	-.14	-.02	-.24	.07
Conscientiousness	-.10	**-.38***	-.08	-.54+	-.61+	.17	.01	**-.64***
Procrastination WITH								
Neuroticism	.26	**.42***	**.87***	**.93*****	.64+	-.07	.31	.44
Conscientiousness	**-.68*****	**-.64*****	**-.63****	**-.72***	**-.99****	-.24	**-.61****	**-.73****
Neuroticism WITH								
Conscientiousness	**-.35***	**-.56****	.14	**-.73***	-.58+	-.63+	**-.50***	-.47

*p<.05, **p<.01, ***p<.001, +notable effect sizes

Table 4.9: Correlations between Study Variables by Marital Status X Ethnicity

r	Total Sample (75)		Hispanic (28)		Caucasian (11)		African American (36)	
Variable	Married (25)	Unmarried (50)	Married (13)	Unmarried (15)	Married (2)	Unmarried (9)	Married (10)	Unmarried (26)
Age WITH								
Prehospital Delay	-.78+	.07	.39	-.34	n/a	.65+	**-.68***	.08
Procrastination	-.26	**-.38****	.04	-.32		.21	**-.67***	**-.54****
Neuroticism	-.09	-.27	.41	.01		-.17	-.46	-.37
Conscientiousness	.27	**.32***	.17	.19		.08	.59+	**.42***
Prehospital Delay WITH								
Procrastination	**.45***	**.33***	.08	**.58***	n/a	.44	**.64***	.22
Neuroticism	.12	-.18	.18	.03		-.11	.11	-.28
Conscientiousness	-.25	-.27	.06	**-.63***		-.001	-.57+	-.14
Procrastination WITH								
Neuroticism	**.50***	.17	.45	.15	n/a	.04	.61+	.19
Conscientiousness	**-.64****	**-.67*****	**-.61***	**-.68****		**-.66***	**-.68***	**-.64*****
Neuroticism WITH								
Conscientiousness	**-.42***	**-.42****	-.30	.01	n/a	-.41	-.48	**-.49***

*p<.05, **p<.01, ***p<.001, +notable effect sizes

Table 4.10: Correlations between Study Variables by Gender X Ethnicity

r	Total Sample		Hispanic(28)		Caucasian (11)		African American(36)	
Variable	Male (43)	Female (32)	Male (13)	Female (15)	Male (8)	Female (3)	Male (22)	Female (14)
Age WITH								
Prehospital Delay	-.06	.16	.23	-.09	.27		-.26	.13
Procrastination	**-.32***	-.26	.18	-.05	-.21		**-.55****	**-.66***
Neuroticism	-.07	-.33	.25	.33	-.04		-.15	**-.70****
Conscientiousness	.17	.34	-.02	.13	-.10		.38	.43
Prehospital Delay WITH								
Procrastination	**.34***	**.44***	.23	**.65****	.18		**.45***	.17
Neuroticism	.02	-.23	.17	.27	-.17		.007	-.48
Conscientiousness	-.23	-.17	-.27	-.39	-.03		-.30	-.11
Procrastination WITH								
Neuroticism	.25	.34	.26	.34	.14		.32	.36
Conscientiousness	**-.71*****	**-.63*****	**-.81****	**-.58***	**-.75***		**-.70*****	**-.71****
Neuroticism WITH								
Conscientiousness	**-.42****	**-0.41***	-.32	-.14	-.53+		**-.45***	-.46

*p<.05, **p<.01, ***p<.001, +notable effect sizes

Within Gender: Pearson correlations were also computed within gender between personality factors (neuroticism and conscientiousness), procrastination behavior and prehospital delay to investigate the gender differences on demographic subgroups.

In Table 4.11, the total sample age was negatively correlated with procrastination and positively correlated with conscientiousness. The significant negative correlation between age and procrastination for the total sample reflected a similar significant relationship for males but was not significant for females; however the effect for females was in the same direction and at an only slightly smaller magnitude.

Prehospital delay was positively correlated with procrastination across all the groups. Negative correlations of conscientiousness with procrastination and neuroticism are also found across all the groups; failure to reach significance for males and females separately was due to loss of power when broken down by gender groups. Lastly, robust moderate significant negative relationships between neuroticism and conscientiousness (higher conscientiousness is related to lower neuroticism) can be seen for the total sample as well as both genders.

Table 4.11: Correlations between Study Variables by Gender

r	Total Sample (75)	Male(43)	Female(32)
Age WITH			
Prehospital Delay	.02	-.06	.16
Procrastination	**-.29***	**-.32***	-.26
Neuroticism	-.19	-.07	-.33
Conscientiousness	**.27***	.17	.34
Prehospital Delay WITH			
Procrastination	**.37****	**.34***	**.44***
Neuroticism	-.08	.02	-.23
Conscientiousness	**-.24***	-.23	-.17
Procrastination WITH			
Neuroticism	.29*	.25	.34
Conscientiousness	**-.67*****	**-.71*****	**-.63*****

r	Total Sample (75)	Male(43)	Female(32)
Neuroticism WITH Conscientiousness	**-.42*** **	**-.42****	**-.41***

*p<.05, **p<.01, ***p<.001, +notable effect sizes

GENDER BY ARRIVAL: When gender is examined by arrival modality (Table 4.12), in the total sample, age is significantly negatively correlated with procrastination in people who used private transportation, driven by males who used the private transportation. It is worth noting that the effect for females using ambulances is even larger but fails to reach significance due to smaller sample size, underscoring the risk of weighing significance more heavily than consideration of effect size. Age is significantly positively correlated with conscientiousness in people who used private transportation and at a moderate level for females arriving by ambulance. A reverse relationship was found for males using ambulances indicating *younger* males using ambulances exhibited higher conscientiousness whereas *older* individuals of both genders using private transportation and *older* females using ambulances exhibited higher conscientiousness.

Prehospital delay is highly correlated with procrastination in the total sample using ambulance transportation. A similar high correlation was found in females who used ambulance arrival and, interestingly, in males who used private transportation. Prehospital delay is negatively correlated with conscientiousness in the total sample using ambulance transportation which is reflected in both genders using ambulance transportation.

Significant positive correlations between procrastination and neuroticism are only seen in the total sample in those who used private transportation although the magnitude

for ambulance users is not much less. Procrastination is highly negatively correlated with conscientiousness in both the groups. Neuroticism is highly negatively correlated with conscientiousness in the total sample and in both male and female groups who used private transportation. However, the magnitude for males using ambulances is of similar effect size.

GENDER BY COMORBIDITY: Gender by comorbidity is displayed in Table 4.13. Age was negatively correlated with procrastination in males with no comorbidity and females with comorbidity. Interestingly, this pattern is not found in the total sample indicating masking effects when genders are combined and highlighting the importance of examining each gender separately. Age was negatively correlated with neuroticism in the total sample with no comorbidity, reflecting an even larger effect for females with no comorbidity.

Prehospital delay was highly correlated with procrastination in the total sample with no comorbidity reflecting a similar high correlation in males with no comorbidity and a notable relationship in females with no comorbidity. The significant negative correlation between prehospital delay and conscientiousness seen in the total sample with no comorbidity was a reflection of the negative relationship demonstrated by males with no comorbidity that failed to reach significance due to small sample size.

Procrastination is negatively correlated with conscientiousness in all the groups. Procrastination is positively correlated with neuroticism in total sample with no comorbidity, reflecting the large effect size noted in females with no comorbidity. A negative correlation between neuroticism and conscientiousness was evident in both groups in the total sample.

GENDER BY MARITAL STATUS: Analyses of gender by marital groups are displayed in Table 4.14. In the total sample, a large but nonsignificant negative correlation can be seen between age and prehospital delay (older ages are associated with less delay) for those married in the total group that was not explained when separated by genders suggesting a cumulative effect. Age was negatively correlated with procrastination in the unmarried total group reflecting similar relationships for both males and females (older unmarried patients displayed less procrastination in both genders). The positive correlation between age and conscientiousness found in the total unmarried group is a reflection of the same relationship seen in unmarried males but not in unmarried females, again illustrating the importance of separate gender analyses.

Prehospital delay was positively correlated with procrastination (i.e., longer delays were associated to higher procrastination scores) in both married and unmarried groups in the total sample with similar effect sizes when broken down by gender across marital categories. A significant negative correlation between prehospital delay and neuroticism was evident for unmarried females (higher neuroticism was related to shorter delay), whereas the relationship is positive for married females (higher neuroticism was related to longer delay). Procrastination was highly negatively correlated with conscientiousness in all the groups (higher procrastination scores are related to lower conscientiousness) except in married females where the relationship was somewhat attenuated. Neuroticism was negatively correlated with conscientiousness in both groups of the total sample, driven by the similar relationship in unmarried males and married females. The persistence of different patterns for each gender across the grouping variables supports gender as a notable covariate to be included in subsequent analyses.

Table 4.12: Correlations between Study Variables by Arrival X Gender

r	Total Sample		Male(43)		Female(32)	
Variable	Ambulance (19)	Private (56)	Ambulance (8)	Private (35)	Ambulance (11)	Private (21)
Age WITH						
Prehospital Delay	.05	-.06	.36	-.24	-.08	.27
Procrastination	-.32	**-.31***	-.08	**-.39***	-.44	-.24
Neuroticism	-.27	-.15	-.24	.04	-.25	-.40
Conscientiousness	.26	**.26***	-.38	.23	.47	.27
Prehospital Delay WITH						
Procrastination	**.71*****	.27	.47	**.35***	**.85****	.21
Neuroticism	.01	-.07	.20	.08	-.11	-.27
Conscientiousness	**-.47***	-.22	**-.60+**	-.30	-.48	-.06
Procrastination WITH						
Neuroticism	.28	**.30***	.33	.23	.19	.41
Conscientiousness	**-.67*****	**-.68*****	**-.82***	**-.72*****	**-.61***	**-.69****
Neuroticism WITH						
Conscientiousness	-.17	**-.47*****	-.45	**-.39***	.19	**-.59****

*p<.05, **p<.01, ***p<.001, +notable effect size

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Table 4.13: Correlations between Study Variables by Comorbidity X Gender

r	Total Sample		Male(43)		Female(32)	
Variable	Comorbidity (46)	No Comorbidity (29)	Comorbidity (24)	No Comorbidity (19)	Comorbidity (22)	No Comorbidity (10)
Age WITH						
Prehospital Delay	.03	.07	.13	-.17	-.02	.46
Procrastination	-.27	-.27	-.02	**-.50***	-.48*	.18
Neuroticism	-.09	**-.43***	.08	-.34	-.26	**-.56+**
Conscientiousness	.24	.29	.04	.26	.40	.33
Prehospital Delay WITH						
Procrastination	.10	**.63*****	-.21	**.67****	.36	**.59+**
Neuroticism	-.19	.16	-.14	.24	-.28	-.11
Conscientiousness	-.10	**-.38***	.01	-.40	-.14	-.26
Procrastination WITH						
Neuroticism	.26	**.42***	.24	.36	.29	**.56+**
Conscientiousness	**-.68*****	**-.64*****	**-.71*****	**-.71****	**-.67****	-.61+
Neuroticism WITH						
Conscientiousness	**-.35***	**-.56****	-.36	**-.58****	-.33	**-.54+**

*p<.05, **p<.01, ***p<.001, +notable effect sizes

Table 4.14: Correlations between Study Variables by Marital Status X Gender

r	Total Sample(75)		Male(43)		Female(32)	
Variable	Married (25)	Unmarried (50)	Married (14)	Unmarried (29)	Married (11)	Unmarried (21)
Age WITH						
Prehospital Delay	**-.78+**	.07	-.22	.09	.28	.06
Procrastination	-.26	**-.38****	-.25	**-.39***	-.28	-.41
Neuroticism	-.09	-.27	.21	-.24	-.32	-.31
Conscientiousness	.27	**.32***	.11	.30	.45	.03
Prehospital Delay WITH						
Procrastination	**.45***	**.33***	.47	.28	.41	.40
Neuroticism	.12	-.18	.14	-.002	.38	**-.48***
Conscientiousness	-.25	-.27	-.31	-.24	-.08	-.20
Procrastination WITH						
Neuroticism	**.50***	.17	**.59***	.09	.52+	.34
Conscientiousness	**-.64****	**-.67*****	**-.73****	**-.71*****	-.47	**-.73*****
Neuroticism WITH						
Conscientiousness	**-.42***	**-.42****	-.38	**-.46***	**-.50+**	-.37

**p*<.05, ***p*<.01, ****p*<.001, +notable effect sizes

PSYCHOMETRICS OF INSTRUMENTS

The two dimensions of personality, neuroticism and conscientiousness, were assessed by the NEO Five-Factor inventory (NEO-FFI). Procrastination behavior was assessed by the General Procrastination (GP) scale. Neuroticism and conscientiousness subscales of NEO-FFI had item responses ranging from 1 (strongly disagree) to 5 (strongly agree). GP scale items ranged from 1 (extremely uncharacteristic) to 5 (extremely characteristic). Reliability of each scale was calculated using Cronbach's alpha coefficient. Table 4.15 illustrates the results.

Table 4.15: Instrument Reliability

Scale	α	*N*
Neuroticism	.858	75
Conscientiousness	.840	75
General Procrastination	.935	75

All three scales showed good internal consistency. Neuroticism and conscientiousness have 12 items each. Corrected item-total correlations were examined for both scales and no individual item detracted significantly from the reliability score. The GP scale has 20 items and the high internal consistency of the GP scale suggests that there are some redundant items which need further revision. Corrected item-total correlations were computed and no individual item detracted significantly from the reliability score.

SPECIFIC AIM 1

Investigate the relationships between personality factors (neuroticism and conscientiousness), procrastination behavior and prehospital delay in patients with ACS, controlling for relevant demographic subgroups (age, gender, marital status, insurance, mode of arrival to the hospital, ethnicity and comorbid conditions). Correlations between study variables by demographic variables (gender, marital status, insurance, mode of arrival and comorbid conditions) were addressed in the preliminary analyses to evaluate potential covariates. However, there were three hypotheses proposed in this specific aim investigating patterns of relationships across ethnic groups. Correlations to address the hypothesized relationships between study variables across the total sample and across ethnic groups are displayed in Table 4.16.

Hypothesis 1: There is a relationship between personality factors (neuroticism and conscientiousness) and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups, indicating that people with high neuroticism score will have more delay and people with low conscientiousness score have longer delay in seeking care.

There were almost no correlations of note between hospital delay and neuroticism at the total sample or for any of the ethnic groups, failing to support the hypothesized positive relationship. There was, however, a significant small *negative* correlation (r=-.24) for the total group between prehospital delay and conscientiousness indicating longer delay was related to lower levels of conscientiousness supporting the proposed negative relationship in SA1H1. Note that a larger effect size in the same negative direction is seen for Hispanics with a comparable effect size demonstrated for African

Americans but not for Caucasians who fail to demonstrate this negative relationship in sufficient strength to support the hypothesis. Thus, there is group specific support for this hypothesis for Hispanics and African Americans, but not for Caucasians.

Hypothesis 2: There is a positive relationship between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups, indicating that greater degrees of procrastination behavior are associated with longer time to seek medical care.

Support for this hypothesis was found in the significant moderate positive correlation for the total group (r=.37) between prehospital delay and procrastination, indicating longer delay with greater levels of procrastination. The same relationships were found at significant levels for Hispanics and African Americans and at even a larger magnitude (albeit nonsignificantly due to small sample size) for Caucasians.

Hypothesis 3: There are significant relationships between personality factors (neuroticism and conscientiousness) and procrastination behavior in patients who delay seeking medical care across all ethnic groups with higher neuroticism and lower conscientiousness associated with higher (longer) procrastination.

As hypothesized, conscientiousness was highly negatively correlated with procrastination (r=-.67) in the total group and across all ethnic groups. Neuroticism was significantly positively correlated (r=.29) with procrastination in the total sample and in African Americans and at a comparable magnitude, but not significantly, in Hispanics, supporting the hypothesis.

Table 4.16: Correlations between Prehospital Delay and Personality Variables by Ethnicity

r	Total Sample (75)	Hispanic (28)	Caucasian (11)	African American (36)
Prehospital Delay WITH				
Neuroticism	-.08	.12	-.03	-.16
Conscientiousness	**-.24***	-.30	-.17	-.25
Procrastination	**.37****	**.37***	.53	**.34***
Procrastination WITH				
Neuroticism	**.29***	.32	.15	**.34***
Conscientiousness	**-.67*****	**-.67*****	**-.68***	**-.66*****

*p<.05, **p<.01, ***p<.001

SPECIFIC AIM 2

Investigate the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival and co-morbid conditions) in time to seek care, personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with ACS controlling for covariates.

Analysis of covariance was used to examine the differences across demographic subgroups on time to seek care, personality factors and procrastination behavior. Preliminary analyses indicated that the covariates to be considered were age, gender, arrival and comorbidity. In cases where heterogeneity was significant (i.e., significance for Levene's Test of Homogeneity), the nonparametric Kruskal Wallis analysis of variance was utilized. For these analyses, new group categories were created from the combination of involved variables (e.g., gender by ethnicity, there would be Caucasian

females, Caucasian males, African American females, African American males, Hispanic females and Hispanic males). Similar to parametric analysis of variance, a significant model result does not indicate which groups differ and require pairwise post hoc analyses. For nonparametric approaches, this entails the use of Mann-Whitney U two-group comparisons. Although the research questions are organized by dependent variable, for efficiency, results for study dependent variables (personality, procrastination and time delay) are grouped by each set of independent variable covariate pairs (e.g., gender X arrival) separately. A summary across research questions will be presented at the end of the section for the Specific Aim 2.

Research Question 1: What are the differences across demographic subgroups (gender, marital status, mode of arrival, ethnicity and co-morbid conditions) on *time to seek medical care* controlling for covariates?

Research Question 2: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival and co-morbid conditions) on *personality factors* controlling for covariates?

Research Question 3: What are the differences across demographic subgroups (gender, marital status, mode of arrival, ethnicity and co-morbid conditions) on *procrastination behavior* controlling for covariates?

There were no significant differences across ethnic groups on prehospital delay, procrastination, neuroticism or conscientiousness (see Appendix D1). T-tests of independence across gender, marital status, mode of arrival and co-morbid conditions on prehospital delay, personality and procrastination yielded the following results (Appendix D2):

A statistically significant difference was found between mode of arrival and prehospital delay, indicating patients who used private vehicles (*M*=7.55, *SD*=6.71) have a longer delay than those who used ambulance (*M*=3.55, *SD*=5.22).

A marginally significant difference was found between genders on prehospital delay in which males (*M*=7.70, *SD*=6.29) had a longer delay compared to females (*M*=4.97, *SD*=6.73). Given the presence of unequal and small sample sizes, the presence of marginally significant findings indicated the need for merited scrutiny, i.e., calculation of effect size rather than reliance on p values. Cohen's d effect size was calculated and indicated a medium effect size (*d*=.42), supporting a noteworthy difference between the genders on prehospital delay.

There were no significant differences across marital status or comorbid condition status groups on study dependent variables.

ONE-WAY ANCOVA

Analyses of covariance across gender, marital status, arrival mode, ethnicity and comorbidity marital status groups on study variables *controlling for age* (see Appendix D4) found two significant main effects: 1) groups with comorbidities had significantly higher neuroticism scores and; 2) those arriving in private vehicles had significantly higher time delay. In addition two marginal main effects were detected: 1) gender groups were marginally different on prehospital delay with males having a longer time delay and 2) marital status (married/not married) displayed a marginally significant effect on procrastination showing unmarried people had higher procrastination scores. Levene's test for equality of variances was significant across comorbidity groups with prehospital delay, which violated ANCOVA assumptions; therefore, a nonparametric Mann Whitney

U was computed without controlling for age but there were no significant differences. (See Appendix D4).

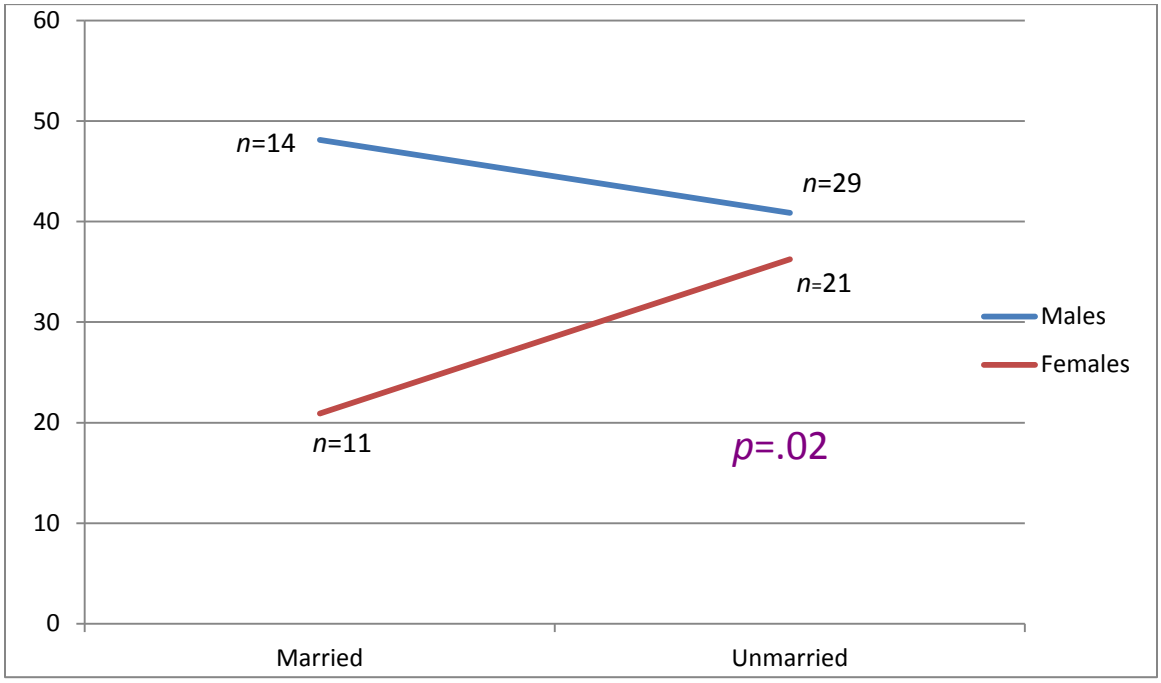
TWO-WAY ANCOVA ACROSS GENDER

Gender by Marital Status: A two-way analysis of covariance between gender and marital status on study variables controlling for age (Table 4.17) indicated a significant main effect for marital status on procrastination scores reflecting unmarried people having higher procrastination scores as previously detected. There were no other significant main or interaction effects. However, Levene's test for equality of variances was significant for gender*marital status with prehospital delay necessitating a nonparametric Kruskal-Wallis analyses in which significant differences were detected (*KW (H)* =10.4) (see Figure 4.1).

Table 4.17: Two-Way ANCOVA of Gender X Marital Status on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age			*F*=9.10	***p*=.004**	*F*=2.60	*p*=.11	*F*=6.06	***p*=.02**
Gender WITH	Levene's test for equality of variances was significant.		*F*=0.01	*p*=.92	*F*=0.01	*p*=.94	*F*=1.42	*p*=.24
Male(*n*=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (*n*=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Marital Status			*F*=4.01	***p*=.05**	*F*=0.09	*p*=.76	*F*=1.64	*p*=.21
Unmarried (*n*=50)	6.70	6.80	46.62	19.65	34.44	8.06	44.82	6.28
Married(*n*=25)	6.21	6.21	40.88	20.14	34.32	8.93	46.16	7.50
Gender* Marital Status			*F*=1.10	*p*=.30	*F*=0.59	*p*=.45	*F*=.16	*p*=.69
Males Married	9.17	6.38	43.21	23.14	33.64	7.15	45.5	7.83
Males Unmarried	6.99	6.23	45.07	18.30	35.21	9.01	43.55	5.35
Females Married	2.43	3.41	37.91	16.13	35.18	11.12	47	7.35
Females Unmarried	6.70	6.70	48.76	21.67	33.18	6.60	46.57	7.14

Figure 4.1 Kruskal Wallis Mean Ranks on Marital Status by Gender on Prehospital Delay



Mann-Whitney U post hoc analyses (Table 4.18) were used to evaluate the significance of pairwise differences indicated by the Kruskal Wallis ANOVA displayed in Figure 4.1. Pairwise comparisons indicated that married females differed from all the other groups with married females having a shorter prehospital delay compared to other groups.

Table 4.18: Mann-Whitney Analyses on Gender and Marital status variable on Prehospital Delay

	MM	MF	MM	UM	MM	UF	MF	UM	MF	UF	UM	UF
	U=24.5 ***p*=.003**		U=163 *p*=.30		U=98 *p*=.10		U=70.5 ***p*=.007**		U=69 *p*=.07+		U=270 *p*= .50	
N	14	11	14	29	14	21	11	29	11	21	29	21
Mean Ranks	16.7	8.2	24.8	20.62	21.5	15.67	12.4	23.57	12.27	18.71	26.69	27.7

Note: MM-Married male, MF- Married female, UM- Unmarried male, UF- unmarried female

Gender by Arrival: Two-way analysis of covariance on gender by arrival ACROSS THE dependent variables controlling for age (Table 4.19) confirmed a significant main effect for arrival on prehospital delay reflecting twice as long delay times for patients arriving by private transportation that did not differ across genders. However, a review of the mean delay values broken down across gender X arrival suggest caution in the failure to detect any interaction effect since males arriving by private vehicles had notably longer mean delay times (*M*=8.66) compared to females arriving by private vehicle (*M*=5.70) or either gender arriving by ambulance (male *M*=3.53; female *M*=3.56). The failure for discrepancies of such magnitude to reach significance is largely due to the unequal and small sample sizes of the breakdown groups and should not be discounted.

Gender by Ethnicity: Analyses across gender by ethnicity on study variables found no significant main or interaction effects (see Appendix D5).

Gender by Comorbidity: Two way analyses of covariance between gender and comorbidity on study variables controlling for age (Table 4.20) again indicated only a main effect for comorbidity on neuroticism, indicating people with comorbidity have higher neuroticism scores. However, it is again worth closer scrutiny of the means displayed for the gender X comorbidity groups on prehospital delay. Prehospital mean values for females are lower than males in general but notably lowest for females with comorbidities. The opposite pattern is seen for males with males with no comorbidities having the highest mean prehospital delay values of all four groups. Statistical significance for this cross-over pattern is again highly impacted by the unequal and small

sample sizes. Thus, the magnitude of these differences clearly supports the need for further study with more robust samples.

Table 4.19: Two -Way ANCOVA of Gender X Arrival on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.01	*p*=.92	*F*=7.89	*p*=.**006**	*F*=2.02	*p*=.16	*F*=4.01	*p*=.**05**
Gender WITH	*F*=0.68	*p*=.35	*F*=.16	*p*=.69	*F*=.18	*p*=.68	*F*=2.80	*p*=.10
Male(*n*=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (*n*=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Arrival	*F*=4.33	***p*=.04**	*F*=1.34	*p*=.18	*F*=0.27	*p*=.60	*F*=.47	*p*=.50
Private(*n*=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (*n*=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31
Gender*Arrival	*F*=0.75	*p*=.39	*F*=0.80	*p*=.37	*F*=0.3	*p*=.37	*F*=0.46	*p*=.50
Male Ambulance	3.53	3.90	45.37	20.38	38	8.86	41.5	4.5
Male Private	8.66	6.38	44.26	19.90	33.94	8.23	44.8	6.47
Female Ambulance	3.56	6.21	39	21.32	38.82	5.65	44.26	6.31
Female Private	5.70	7.01	48.19	19.60	34.10	9.52	46.9	7.38

Table 4.20: Two -Way ANCOVA of Gender X Comorbidity on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.30	*p*=.59	*F*=5.58	***p*=.02**	*F*=3.98	***p*=.05**	*F*=4.98	***p*=.03**
Gender WITH	*F*=2.76	*p*=.10	*F*=.15	*p*=.70	*F*=0.23	*p*=.63	*F*=2.83	*p*=.10
Male(*n*=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (*n*=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Comorbidity WITH	*F*=0.97	*p*=.33	*F*=0.59	*p*=.45	*F*=4.34	***p*=.04**	*F*=0.18	*p*=.67
No(*n*=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes(*n*=46)	5.82	5.80	42.41	18.64	35.65	8.15	45.52	6.45
Gender X Comorbidity	*F*=0.03	*p*=.87	*F*=.07	*p*=.79	*F*=.04	*p*=.85	*F*=1.04	*p*=.31
Male Comorbid	6.95	5.29	41.38	16.63	36.08	8.75	44.88	5.86
Male No Comorbid	8.66	7.41	48.37	22.95	32.95	7.79	43.32	6.74
Female Comorbid	4.60	6.22	43.55	20.95	35.18	7.63	31.4	9.50
Female No Comorbid	5.78	8.04	48.3	19.62	31.4	9.50	47.8	7.33

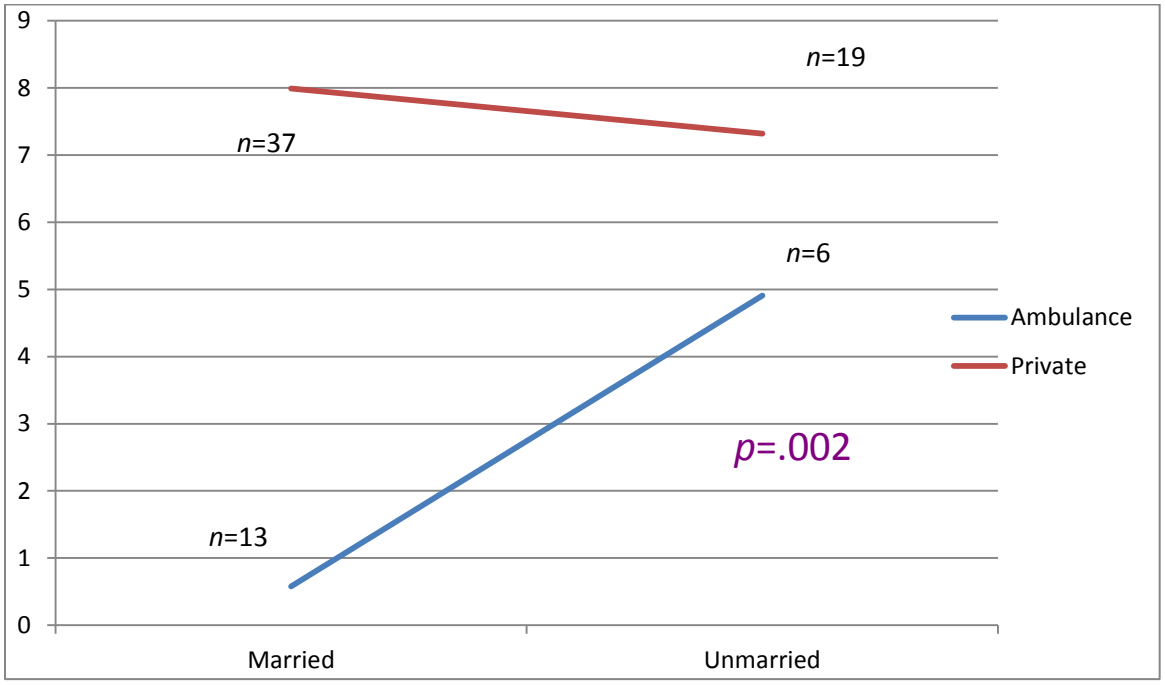
TWO-WAY ANCOVA ACROSS ARRIVAL

Arrival by Marital Status: ANCOVA results indicated that there was a marginally significant main effect for arrival mode on procrastination scores reflecting higher procrastination scores for the private transportation group (Table 4.21). A significant main effect for marital status on procrastination indicated that unmarried patients had higher procrastination scores. Levene's test for equality of variances was significant for arrival X marital status interaction with prehospital delay necessitating a nonparametric Kruskal-Wallis analysis of variance test. Kruskal-Wallis ANOVA results were significant (*KW (H)* =15.25), confirming the interaction effect and indicating group differences across arrival X marital status subgroups (Figure 4.2). Therefore, pairwise comparisons were conducted with the nonparametric Mann Whitney U and results are discussed in Table 4.22.

Table 4.21: Two-Way ANCOVA of Arrival X Marital Status on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age			*F*=10.56	***p*=.002**	*F*=2.54	*p*=.12	*F*=6.27	***p*=.02**
Arrival WITH	Levene's test for equality of variances was significant.		*F*=3.16	***p*=.08+**	*F*=0.02	*p*=.88	*F*=0.03	*p*=.88
Private(*n*=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (*n*=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31
Marital Status			*F*=5.23	***p*=.03**	*F*=1.18	*p*=.28	*F*=1.67	*p*=.20
Unmarried (*n*=50)	6.70	6.80	46.62	19.65	34.44	8.06	44.82	6.28
Married(*n*=25)	6.21	6.21	40.88	20.14	34.32	8.93	46.16	7.50
Arrival* Marital Status			*F*=1.32	*p*=.26	*F*=2.19	*p*=.14	*F*=0.04	*p*=.83
Married Private	7.99	6.13	43.79	21.86	35.05	9.40	46.36	8.16
Married Ambulance	.58	.33	31.67	9.67	32	7.56	45.5	5.47
Unmarried Private	7.32	7.07	46.73	18.73	33.46	8.32	45.22	6.14
Unmarried Ambulance	4.91	5.87	46.31	22.90	37.23	6.78	43.69	6.79

Figure 4.2: Kruskal-Wallis Test of Married Arrival on Prehospital Delay



Mann-Whitney comparisons indicated a statistically significant difference between the unmarried ambulance patients and all other groups on prehospital delay indicating that unmarried patients using EMS transportation delay shorter than all other groups before seeking care (Table 4.22). All other groups were statistically equivalent.

Table 4.22: Mann-Whitney Test on Marital Status and Gender Variable on Prehospital Delay

	MP	MA	MP	UA	MA	UP	UA	UP	MP	UP	MA	UA
	U=182 *p*=.20		U=13 ***p*=.001**		U=84.5 *p*=.13		U=3 ***p*=.001**		U=308.5 *p*=.46		U=8.5 ***p*= .007**	
N=	37	13	37	6	13	19	6	19	37	19	13	6
Mean Ranks	27	21	24.6	5.67	13.5	18.6	4	15.84	27.34	30.76	12.40	4.92

Note: MP- Married private, MA- Married Ambulance, UA-Unmarried Ambulance, UP- Unmarried Private

Arrival by Ethnicity: Analyses of covariance on arrival by ethnicity on study variables reflected a marginally significant main effect for arrival mode on prehospital

delay indicating private transportation had longer prehospital delay (Table 4.23) but no differences were indicated across ethnic groups.

Arrival by Comorbidity: Two-way analyses of variance were conducted across arrival X comorbidity groups (Table 4.24). Results indicated only a significant main effect for arrival for prehospital delay. However, evidence of significant heterogeneity (Levene's F (3, 71) =3.56, p=0.018), the occurrence of unequal and small group sizes all represented violations of assumptions for parametric analysis. Therefore, Kruskal-Wallis nonparametric ANOVA was conducted on prehospital delay with a combined arrival and comorbidity group variable and showed statistically significant differences between groups ($KW(H)$=10.33) (Figure 4.3). Mann-Whitney tests were conducted to explore the differences between groups on prehospital delay and results are explained in Table 4.25.

Table 4.23: Two -Way ANCOVA of Arrival X Ethnicity on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.04	*p*=.85	*F*=6.91	***p*=.01**	*F*=3.42	*p*=.07	*F*=4.14	***p*=.05**
Arrival WITH	*F*=3.20	***p*=.08+**	*F*=2.70	*p*=.11	*F*=.05	*p*=.82	*F*=.74	*p*=.39
Private(*n*=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (*n*=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31
Ethnicity	*F*=0.08	*p*=0.92	*F*=0.27	*p*=.77	*F*=0.95	*p*=.39	*F*=1.36	*p*=.26
Hispanic(*n*=28)	5.90	6.08	46.5	18.79	35.5	5.88	43.79	6.27
African American (*n*=36)	6.95	6.93	42.14	20.59	34.50	9.73	46.19	6.68
Caucasian (*n*=11)	6.77	7.11	48.55	20.87	31.27	8.43	46	7.68
Arrival*Ethnicity	*F*=0.49	*p*=.62	*F*=0.67	*p*=.52	*F*=2.55	*p*=.09	*F*=1.03	*p*=.36
Hispanic Private (*n*=19)	6.54	6.05	46.16	17.52	36.58	6.13	44.68	6.23
Hispanic Ambulance (*n*=9)	4.56	6.26	47.22	22.38	3.22	4.84	41.89	6.30
AA Private (*n*=27)	8.33	7.12	43.59	2.12	33.15	9.84	46.37	7.08
AA Ambulance (*n*=9)	2.82	4.44	37.78	19.38	38.56	8.67	45.67	5.63

	Prehospital delay		Procrastination		Neuroticism		Conscientiousness	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Caucasian Private (*n*=10)	7.35	7.22	5.07	20.67	35.5	5.88	45.3	7.72
Caucasian Ambulance (*n*=1)	1		27		30		53	

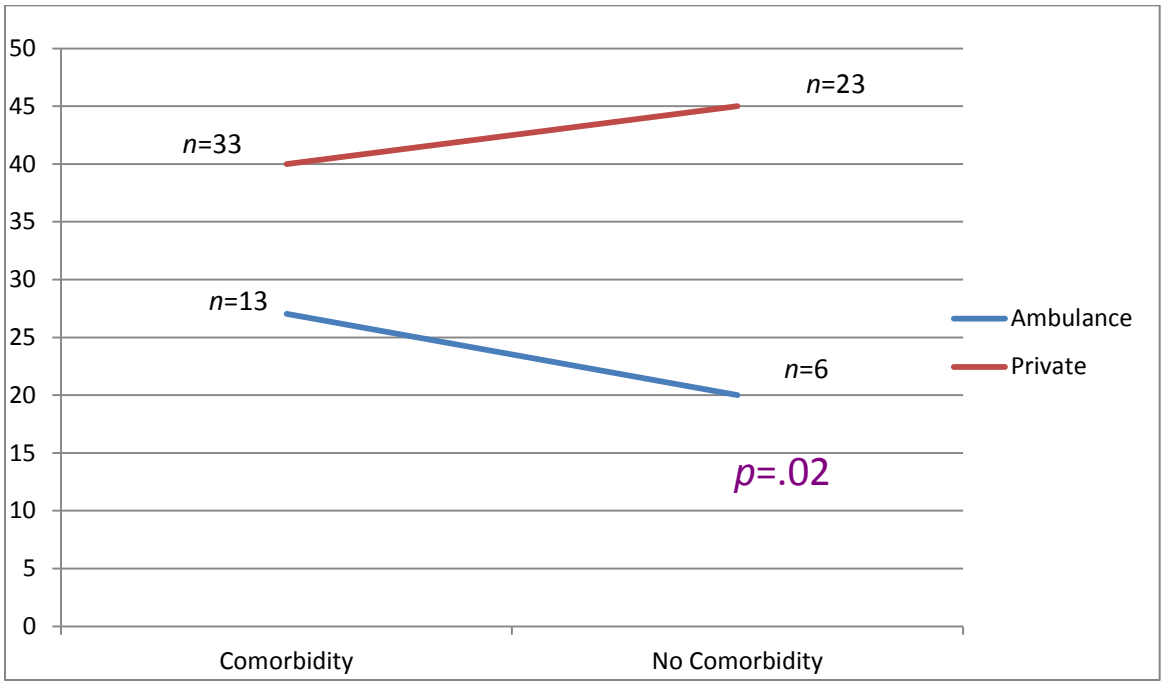
Note: AA=African American

Table 4.24: Two-Way ANCOVA of Arrival X Comorbidity on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age			*F*=7.60	**p=.007**	*F*=1.10	*p*=.30	*F*=.00	*p*=.98
Arrival WITH	Levene's test for equality of variances was significant.		*F*=2.87	*p*=.10	*F*=0.33	*p*=.57	*F*=.11	*p*=.74
Private(*n*=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (*n*=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31
Comorbidity WITH			*F*=0.10	*p*=.75	*F*=1.10	*p*=.30	*F*=.00	*p*=.98
No (*n*=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes (*n*=46)	5.82	5.80	42.41	18.64	35.65	8.15	45.52	6.45
Arrival X Comorbidity			*F*=2.53	*p*=.12	*F*=1.48	*p*=.23	*F*=.00	*p*=.96
AC	3.89	5.64	43.23	21.78	35	7.26	44.77	6.48
AN	2.79	4.58	38.33	19.23	36.83	7.81	43.17	6.34
PC	6.58	5.78	42.09	17.62	35.90	8.57	45.82	6.51
PN	8.93	7.8	50.96	21.68	31.26	8.17	45.30	7.42

Note. AC-Ambulance Comorbidity, AN-Ambulance No Comorbidity, PC- Private Comorbidity, PN- Private No Comorbidity

Figure 4.3: Kruskal-Wallis Test of Arrival Comorbidity on Prehospital Delay



While Mann-Whitney comparisons confirm the main effect indicated by the two-way ANOVA (Table 4.25), there is a trend toward an interaction effect. Significant comparisons involve groups that vary along the arrival condition, i.e., all ambulance groups differ from all private groups regardless of comorbid condition while within arrival groups do not reach statistically significant degrees of difference. However, across all comparisons, private arrival patients showed the longest prehospital delay times and those arriving in ambulances with no comorbidities had the shortest. This nonparallel pattern is indicative of an interaction and should be further explored in future studies.

Table 4.25: Mann-Whitney Test on Arrival and Comorbidity Variable on Prehospital Delay

	PC	PN	AC	AN	PC	AC	PN	AN	PN	AC	PC	AN
	U=325.5 *p*=.37		U=29.5 *p*=.40		U=132.5 ***p*=.04**		U=26 *p*=.20		U=79.5 ***p*=.02**		U=44.5 ***p*=.03**	
N=	33	23	13	6	33	13	23	6	23	13	33	6
Mean Ranks	26.8	30.8	10.7	8.42	25.9	17.19	16.87	7.83	21.54	13.1	21.6	10.6

Note. AC-Ambulance Comorbidity, AN-Ambulance No Comorbidity, PC- Private Comorbidity, PN- Private No Comorbidity

TWO -WAY ANCOVA ACROSS COMORBIDITY

Comorbidity by Marital Status: Two-way analysis of covariance on comorbidity by marital status (Table 4.26) indicated a main effect for comorbidity on neuroticism in that patients with comorbidities had higher neuroticism scores compared to those without comorbidities. A second significant main effect was found for marital status on procrastination which indicated a greater degree of procrastination for unmarried patients compared to married patients. On prehospital delay, there was a significant interaction effect indicating higher delay for unmarried patients without comorbidities compared to all other groups (see Figure 4.4). However, Levene's test for equality of variances was significant (p=.006) for prehospital delay which necessitated using a non-parametric Kruskal-Wallis ANOVA on the combined marital status by comorbidity groups to confirm this interaction but it did not yield any significant effects (*KW(H)*=3.68, p=0.30) so the finding should be viewed with caution. Similarly, there was a significant interaction effect between comorbidity and marital status on conscientiousness (Figure 4.5). Post hoc analyses using both parametric and nonparametric approaches failed to determine pairwise differences between comorbid X

marital groups although the interaction was significant. In these cases, analyses of variance are reflecting greater sensitivity to cross group variation at the model level that is not discernible in the pairwise analyses. A visual examination of the relationship displayed in Figure 4.5 clearly indicates that the pattern of differences are dramatically different depending on both marital and comorbidity status with married patients with no comorbidity having the highest conscientiousness scores and unmarried patients with no comorbidities having the lowest. Both married and unmarried groups with comorbidities fall intermediate to the no comorbid groups with unmarried comorbid patients demonstrating somewhat higher scores on conscientiousness than married comorbid patients.

Table 4.26: Two-Way ANCOVA of Comorbidity X Marital Status on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.01	*p*=0.92	*F*=8.09	***p*=.006**	*F*=4.60	***p*=.04**	*F*=8.98	***p*=.004**
	Levenes' p=.006							
Comorbidity WITH	*F*=0.45	*p*= .51	*F*=0.95	*p*=.33	*F*=4.83	***p*=.03**	*F*=.15	*p*=.70
No (*n*=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes (*n*=46)	5.82	5.80	42.41	18.64	35.65	8.15	45.52	6.45
Marital Status	*F*=0.63	*p*=.43	*F*=4.71	***p*=.03**	*F*=0.01	*p*=.93	*F*=2.86	*p*=.10
Unmarried (*n*=50)	6.70	6.80	46.62	19.65	34.44	8.06	44.82	6.28
Married(*n*=25)	6.21	6.21	40.88	20.14	34.32	8.93	46.16	7.50
Comorbidity X Marital Status	*F*=4.77	***p*=.03**	*F*=0.63	*p*=.43	*F*=0.85	*p*=.36	*F*=5.04	***p*=.03**
Unmarried Comorbid	5.26	5.44	44	19.17	35.23	7.89	45.74	6.48
Unmarried No Comorbid	10.03	8.56	52.73	20.06	32.6	8.42	42.67	5.38
Married Comorbid	7.59	6.82	37.36	16.66	37	9.21	44.81	6.62
Married No Comorbid	5.13	5.70	43.64	22.73	32.21	8.45	47.21	8.22

Figure 4.4: ANCOVA Interaction: Marital Status Comorbidity on Prehospital Delay

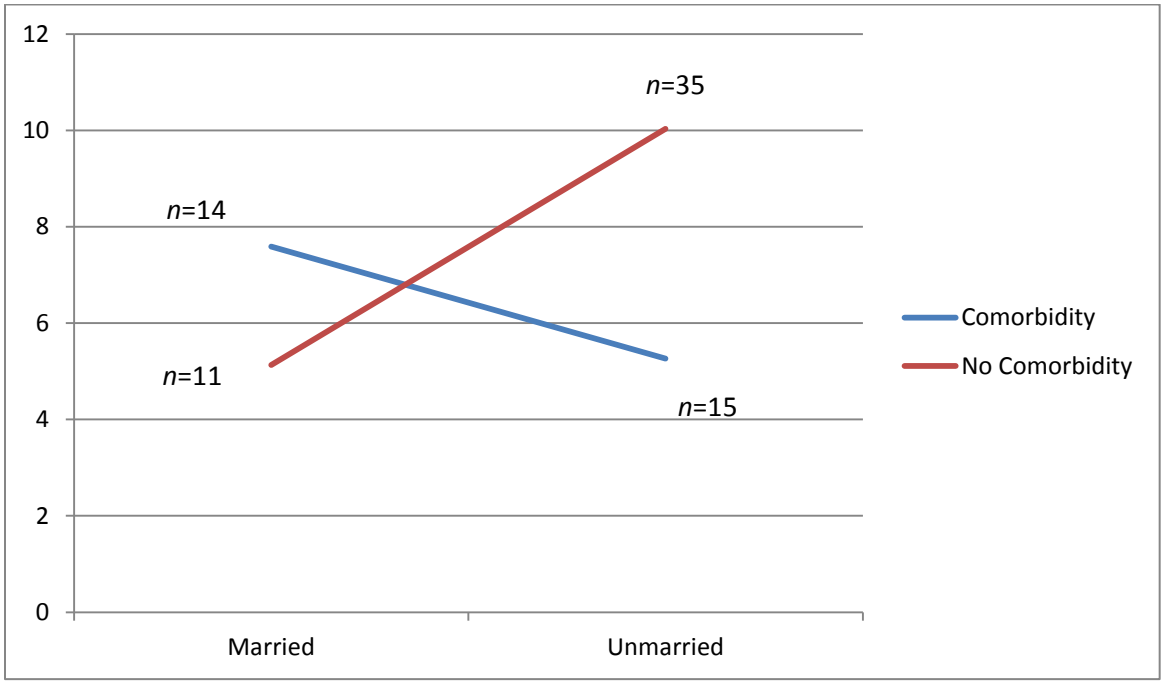
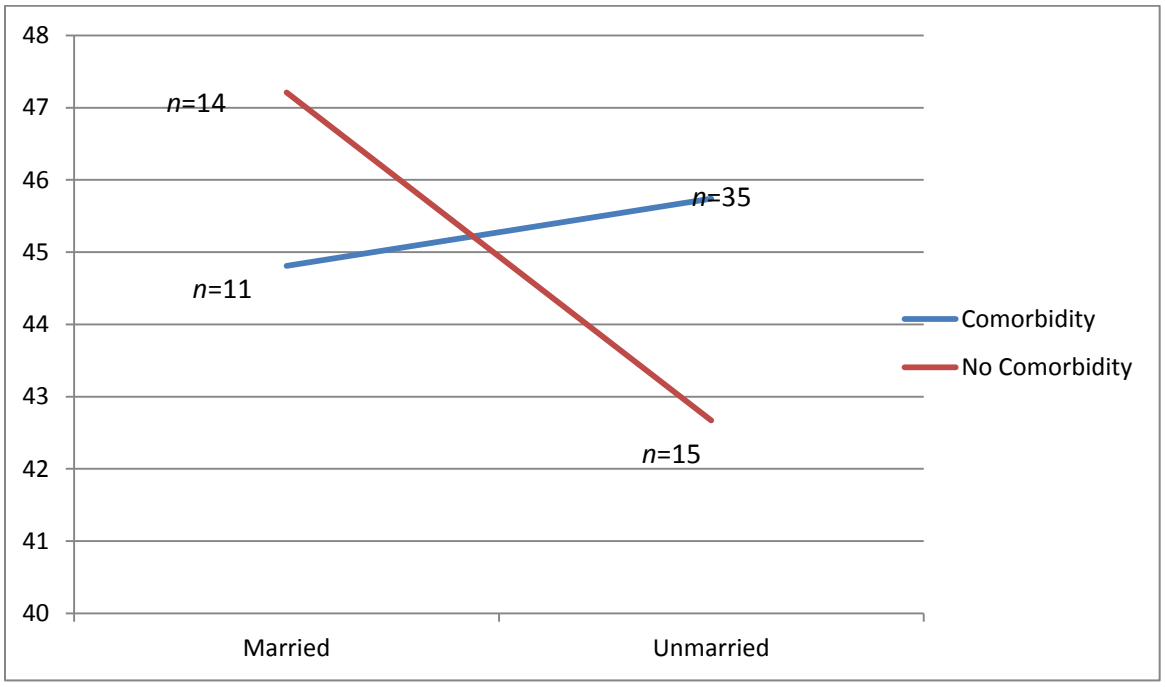


Figure 4.5 ANCOVA Interaction: Marital Status Comorbidity on Conscientiousness



Comorbidity by Ethnicity: No significant findings were found across comorbidity by ethnicity groups on study variables (see Appendix D6).

SUMMARY FOR SPECIFIC AIM 2 FINDINGS:

Research Question 1: What are the differences across demographic subgroups (gender, marital status, mode of arrival, ethnicity and co-morbid conditions) **on time to seek medical care** controlling for covariates?

1. Married females have shorter prehospital delay compared to other marital by gender groups.

2. Unmarried patients using EMS transportation had shorter delay compared to other groups of marital status arrival.

3. Patients arriving by private transportation delayed longer compared to ambulance use regardless of gender, ethnicity or comorbidity status.

4. However, while males have a longer prehospital delay compared to females regardless of age, males arriving by private vehicles had notably longer mean delay times compared to all other groups.

5. Prehospital mean values for females in both comorbidity groups are lower than males in general but notably lowest for females with comorbidities. The opposite pattern is seen for males with males with no comorbidities having the highest mean prehospital delay values of all four groups.

Research Question 2: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival and co-morbid conditions) **on personality factors** controlling for covariates?

1. People with comorbidity have higher neuroticism scores compared to people with no comorbidity regardless of gender and age.

2. Married people with no comorbidity have higher conscientiousness scores compared to other marital status comorbidity groups regardless of age.

Research Question 3: What are the differences across demographic subgroups (gender, marital status, mode of arrival, ethnicity and co-morbid conditions) **on procrastination behavior** controlling for covariates?

1. Unmarried people have a higher procrastination score compared to married people regardless of gender.

2. People who used private transportation have a higher procrastination scores compared to ambulance users regardless of age.

SPECIFIC AIM 3

Investigate the best model to predict time to seek care from selected demographic variables (age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions), personality factors (neuroticism and conscientiousness) and procrastination behavior in patients who had prehospital delay.

Research Question: Are personality factors (neuroticism and conscientiousness), procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions predictive of the amount of time before patients experiencing symptoms of ACS seek medical care?

Stepwise multiple regression techniques (both forward and backward with both varimax and oblim rotations) were used to assess the contribution of personality factors, procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival,

and co-morbid conditions to amount of time before patients experiencing symptoms of ACS seek medical care. The results indicated that two predictors, procrastination and arrival explained 17% of the variance (R2=.17, F (2, 72) =8.54, p<.001) of the model. Procrastination scores accounted for the larger contribution (35% of the variance) (Table 4.27). Arrival (24% of the variance) was negatively associated with prehospital delay indicating that those who used ambulances had a shorter time delay compared to patients who used private transportation, consistent with previously discussed findings.

Table 4.27: Stepwise Multiple Regression for Prehospital Delay

	Predictor(s)	Standardized Coefficients Beta	*t*
Prehospital Delay	Procrastination	**.35****	3.28
	Arrival	**-.24***	-2.21

*p<.05, **p<.01***p<.001

In order to assess the contribution of ethnicity to delay, a logistic regression analysis was conducted with personality factors, procrastination behavior, age, gender, marital status, insurance, mode of arrival, co-morbid conditions and ethnicity as predictors of amount of time before patients experiencing symptoms of ACS seek medical care. Descriptive statistics indicated that mean prehospital delay time of the sample is 6.5 and median delay time is 3.5. Based on these findings two logistic regression analyses were conducted to predict high and low prehospital delay based on both mean and median splits on prehospital delay.

Logistic regression on mean-split prehospital delay (Table 4.28) indicated that being male and having a high procrastination score represented a greater risk of prehospital delay over 6.5 hours. Compared to females, males had 4.7 times the risk of longer prehospital delay. Higher levels of procrastination represented a 31% increase in the risk of longer prehospital delay.

Table 4.28: Mean Split Prehospital Delay Logistic Regression

	Predictor(s)	B	Wald	Exp(B)
Mean Prehospital Delay	Sex	**1.55****	7.741	4.721
	Procrastination	**.03***	5.008	1.031

*p<.05, **p<.01, ***p<.001

Median split logistic regression analysis on prehospital delay indicated that using a private vehicle and having a high procrastination score predicted a greater risk of prehospital delay over 3.5 hours (Table 4.29). Compared to ambulance users those who used private vehicles had 7.2 times the risk of longer prehospital delay. Higher levels of procrastination represented a 50% increase in the risk of longer prehospital delay.

Table 4.29: Median Prehospital Delay Logistic Regression

	Predictor(s)	B	Wald	Exp(B)
Median Prehospital Delay	Arrival	**1.97****	8.12	7.2
	Procrastination	**.04****	8.10	1.05

*p<.05, **p<.01, ***p<.001

SUMMARY FOR SPECIFIC AIM 3

Research Question: Are personality factors (neuroticism and conscientiousness), procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions predictive of the amount of time before patients experiencing symptoms of ACS seek medical care?

1. Higher procrastination levels (35%) and arrival by private vehicle (24%) predicted longer delays before patients experiencing symptoms of ACS seek medical care.
2. Male gender and high procrastination scores represented a greater risk of prehospital delay over 6.5 hours. Compared to females, males had 4.7 times the risk of longer prehospital delay greater than 6.5 hours. Higher levels of procrastination represented a 31% increase in the risk of longer prehospital delay of greater than 6.5 hours.
3. Using a private vehicle and a high procrastination score predicted a greater risk of prehospital delay over 3.5 hours. Compared to ambulance user those who used private vehicles had 7.2 times the risk of longer prehospital delay of over 3.5 hours. Higher levels of procrastination represented a 50% increase in the risk of longer prehospital delay greater than 3.5 hours.
4. It is important to note the differences between the two time frames captured by use of a mean versus median split. Procrastination was a significant predictor for both logistic regression analyses but mode of arrival was a predictor for the shorter time frame, i.e., median split, whereas gender was the other significant

predictor for the longer time frame, i.e., mean split. This indicates that the set of factors that contribute to delay *change* over time with transportation more predictive in short frames and gender predictive for long frames.

Chapter 5: Conclusions, Discussion and Recommendations

This chapter presents the major findings of this study. Study results are related to the study framework and to the literature. Study limitations and recommendations for further research also are discussed. The chapter concludes with implications for nursing.

SAMPLE DISTRIBUTION

The distribution of the study sample was slightly biased in favor of males, African Americans and married individuals. Caucasians and insured participants were underrepresented and thus study results may not be representative of these groups.

Mode of arrival: Patients preferred to choose private vehicle (74.7%) to come to the hospital when they experienced chest pain and only 25.3% used Emergency Medical Service (EMS). The use of EMS in this study sample is much lower than the national average. EMS transport was used in 60% of ST-segment-elevation myocardial infarction (STEMI) patients who participated in an observational analysis of STEMI patients (N=37634) treated at 372 US hospitals between January 2007 and September 2009 (Mathews, Peterson et al., 2011). Lack of insurance could have been a contributing factor for choosing private transportation over EMS in this study since almost 95% of the sample was uninsured.

Prehospital delay: Prehospital delay was measured in minutes and hours from time of onset of symptoms to arrival at the emergency department. Mean prehospital delay of the total study sample was 6.5 hours and median delay was 3.5 hours. Mean and median time delay in this sample did not differ much from similar studies with larger samples. In a recent single-center observational follow-up study on 790 STEMI patients,

median treatment delay was 3 hours (Rollando, Puggioni et al., 2012). Another study of 5,967 residents of the Worcester, hospitalized with AMI from 1986 to 2005, mean and median prehospital delay times were 4.6 and 2.0 hours in 2005 (Saczynski, Yarzebski et al., 2008).

Age: The age of the subjects ranged from 27-72; mean age of the sample was 52 (SD-9.8). Unmarried patients were comparatively older than those who were married. Patients with comorbid conditions were generally older than patients with no comorbid conditions.

Age was clearly related to the study variables and varied across ethnic groups. Across ethnic groups, older African Americans had the strongest relationship with lower procrastination scores for both males and females. Similarly, older African Americans who used private vehicles had lower procrastination scores compared to all other groups in both private and ambulance arrival modes. Interestingly, overall the negative correlation between age and procrastination was different for genders with the strongest relationship for males being exhibited by those arriving by private vehicles whereas, for females, the strongest relationship was for those arriving by ambulance. Older patients showed lower levels of procrastination in the unmarried group overall and in both married and unmarried African Americans. These results support findings from other studies. Steel (2007) did a meta-analysis of causes of procrastination and showed that procrastination decreases with age. However, when taking into account the presence of comorbid conditions, the relationship between age and procrastination was somewhat moderated. Older Hispanic patients with no comorbidity had higher procrastination scores. Across gender, older males with no comorbidity and older females with

comorbidity had higher procrastination scores. Thus, the presence of comorbidities may differentially influence the recognition or willingness to act upon symptoms across genders and ethnic groups. Evidence of less procrastination identifies those groups who seek out care more quickly. Conversely, evidence of greater procrastination identifies those groups where perhaps targeted health education would have greater impact.

Older African Americans also had low neuroticism scores. Moreover, older age was also associated with low neuroticism in African American females. This result is in agreement with a study by Srivastava, John et al. (2003) that showed, as age advanced, neuroticism declined among females with no change in males. Older African American patients who used ambulances also had lower neuroticism scores. Overall, older patients had lower neuroticism in patients with no comorbidity. These results agree with previous studies on age differences on neuroticism that found older individuals have lower neuroticism (Lehmann & Denissen, 2013; Lucas & Donnellan, 2009). Contrary to the above findings showing a negative relationship between age and neuroticism, older African American patients who used private vehicles have higher neuroticism scores. Combined with lower procrastination scores for this group, it may be that higher neuroticism, i.e., the tendency to worry, promotes less procrastination when symptoms present themselves. If this is the case, then higher neuroticism would be a protective factor for seeking help during a heart attack.

Older patients had also higher conscientiousness scores in the total sample, specifically in African Americans. Higher age was also associated with higher conscientiousness in the total unmarried group, in unmarried males, patients using private vehicles and for females arriving by ambulance. Older African American patients without

comorbidities also displayed higher conscientiousness scores. These results are in line with previous studies on age differences in personality. Most studies found that older individuals have high conscientiousness (Lehmann & Denissen, 2013; Roberts, Walton et al., 2006; Srivastava, John et al., 2003). But a reverse relationship is found for males using ambulances indicating older males using ambulances exhibited lower conscientiousness. Similarly, older Caucasians with comorbid conditions displayed lower conscientiousness scores.

Younger married patients exhibited greater time delay for the total sample and in African Americans specifically. This result could be due to the fact that younger age is associated with a greater degree of procrastination. However, the reverse relationship was shown for unmarried Caucasians of similar magnitude, i.e., greater age was associated with greater time delay in this group. Older Hispanic patients with no comorbidity had longer prehospital delay compared to all others with comorbidity. These subgroups may be particularly vulnerable to deleterious effects of delayed responses.

SPECIFIC AIM 1, HYPOTHESIS 1: RELATIONSHIP BETWEEN PERSONALITY AND PREHOSPITAL DELAY

Specific Aim 1: Investigate the relationships between personality factors (neuroticism and conscientiousness), procrastination behavior and prehospital delay in patients with ACS, controlling for relevant demographic subgroups (age, gender, marital status, insurance, mode of arrival to the hospital, ethnicity and comorbid conditions).

Hypothesis 1.1: There is a relationship between personality factors (neuroticism and conscientiousness) and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups, such that people with high neuroticism

scores will have more delay and people with high conscientiousness scores will have less delay in seeking care. Analyses included computation of Pearson correlation coefficients between personality factors and the amount of time before patients experiencing symptoms of ACS seek medical care within each ethnic group and across total groups.

There were almost no correlations between hospital delay and neuroticism at the total sample or for any of the ethnic groups, failing to support the hypothesized positive relationship. But when considering mode of arrival and ethnicity, longer prehospital delay was associated with greater neuroticism in Hispanic ambulance users arguing against a protective effect for neuroticism in this group. Conversely, longer prehospital delay was associated with lower neuroticism scores in unmarried females. This result again highlights the possibility that higher neuroticism could be a protective factor in help seeking behavior for some groups. This intriguing finding may explain contrasting findings in the literature and needs further study to untangle the contribution of neuroticism in reducing prehospital delay.

A significant small *negative* correlation (r=-.24) for the total group was shown between prehospital delay and conscientiousness indicating longer delay with lower levels of conscientiousness which supported the proposed negative relationship in Specific Aim 1, Hypothesis 1. The same association was seen in ambulance users compared to private vehicle users. Longer prehospital delay was also associated with lower conscientiousness scores in patients with no comorbidity compared to patients with comorbid conditions. While taking into account ethnicity and marital status, this relationship was also evident in unmarried Hispanics and married African Americans.

These results establish that conscientiousness has a positive impact on health related behaviors.

The association between personality and treatment delay are still underexplored. A similar study examined the association between personality factors and prehospital delay on patients admitted with MI, with no finding of a significant association (Schlyter, André-Petersson et al., 2011). Another study aimed to examine the correlates of treatment seeking found neuroticism to be a strong determinant (Issakidis & Andrews, 2002). It was also shown that higher neuroticism was associated with increased utilization of mental health services (Goodwin, Hoven et al., 2002). A meta-analysis of conscientiousness-related traits conducted by Bogg and Roberts (2004) found that conscientiousness-related traits were negatively related to all risky health-related behaviors and positively related to all beneficial health-related behaviors.

SPECIFIC AIM1, HYPOTHESIS 2: RELATIONSHIP BETWEEN PROCRASTINATION AND PREHOSPITAL DELAY

Hypothesis 1.2: There is a positive relationship between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care across all ethnic groups such that greater degree of procrastination behavior is associated with longer time to seek medical care. Analyses included computation of a Pearson correlation coefficient between procrastination behavior and the amount of time before patients experiencing symptoms of ACS seek medical care within each ethnic group and across total groups.

Support for SA1H2 was found in the significant moderate positive correlation for the total group (r=.37) between prehospital delay and procrastination, indicating longer

delay is associated with greater levels of procrastination. More specifically, the same relationships were found in both males and females and in Hispanics and African Americans but not Caucasians. Longer prehospital delay was associated with greater procrastination for ambulance users only. In addition, prehospital delay was highly positively correlated with procrastination in all the ethnic and gender groups with no comorbidity, perhaps reflecting the lack of other health conditions to trigger early response concern and action. Prehospital delay was also positively correlated with procrastination in both the overall married and unmarried groups.

Even though there are no previous studies that examined the association between procrastination and prehospital delay, a few studies have shown associations between health-seeking behavior and some aspects of procrastination. Kentsch, Rodemerk et al. (2002) explored psychological factors affecting patient delay in acute myocardial infarction (AMI) and the results showed that the attitude to AMI symptoms "I wanted to wait and see" was more important for an early or late decision to seek medical help than any of the other factors. A similar result was found in another study where time delay was increased by emotional processes, such as waiting to see if symptoms would go away (Dracup, McKinley et al., 1997). Results of the present study reiterate that procrastination traits influence the decision to delay seeking medical help.

SPECIFIC AIM1, HYPOTHESIS 3 : RELATIONSHIP BETWEEN PERSONALITY AND PROCRASTINATION

Hypothesis1.3: There is a relationship between personality factors (neuroticism and conscientiousness) and procrastination behavior in patients across all ethnic groups with higher neuroticism and lower conscientiousness associated with greater degrees of

procrastination. Analyses included the computation of Pearson correlation coefficients between personality factors and procrastination behavior within each ethnic group and across the total group combining three ethnic groups.

As hypothesized, conscientiousness was highly negatively correlated with procrastination (r=-.67) in the total group and in all ethnic groups. Neuroticism was significantly positively correlated (r=.29) with procrastination in the total sample and in African Americans and at a comparable magnitude in Hispanics supporting the hypothesis. This result is consistent with many studies showing that lower conscientiousness and higher neuroticism are related to trait procrastination (Johnson & Bloom, 1995; Lee, Kelly et al., 2006; Milgram & Tenne, 2000; Schouwenburg & Lay, 1995). Steel (2007) conducted a meta-analysis of procrastination's possible causes and effects, based on 691 correlations which revealed that neuroticism is weakly associated with procrastination (r=.24) and conscientiousness is strongly negatively associated (r=-.62).

The conflicting reports on the association between higher neuroticism and increased prehospital delay highlight the possibility that higher neuroticism could be a protective factor in help seeking behavior for some groups. The moderation of the relationship between conscientiousness and delay by ethnic, marital and comorbidity strongly suggests a more complex model of contributing factors that leads to greater delay. The relationship between delay and procrastinating behavior appears to be robust and substantial across all groups.

SPECIFIC AIM 2, RESEARCH QUESTION 1: DEMOGRAPHIC SUBGROUPS AND PREHOSPITAL DELAY

Specific Aim 2: Investigate the differences across demographic subgroups (age, gender, marital status, mode of arrival, ethnicity and co-morbid conditions) in time to seek care, specific personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with ACS controlling for age and potential covariates.

Research Question 2.1: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on time to seek medical care controlling for age and potential covariates? Analysis of covariance was used to examine the differences across demographic subgroups on time to seek medical care while controlling age and covariates.

In the present study, males had a longer prehospital delay compared to females regardless of age. The literature has conflicting reports on gender differences in prehospital delay. Time from symptom onset to arrival at hospital and EMS use were abstracted by McGinn, Rosamond et al. (2005) from medical records of 18,928 patients hospitalized for AMI and captured in the community surveillance component of the Atherosclerosis Risk in Communities (ARIC) study from 1987 to 2000. Women consistently delayed longer than men. Moser, McKinley et al. (2005) examined age and gender differences in prehospital delay and found no difference in delay between men and women. Data from CRUSADE (Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the ACC/AHA Guidelines) and the National Cardiovascular Data Registry ACTION Registry showed

slightly longer median time to hospital presentation in men (3 hours) than women (2.8 hours; Diercks, Owen et al., 2010) which is consistent with findings in this study.

Another finding in the present study is that married females have shorter prehospital delay compared to other marital by gender groups. This result is supported by many other studies. In a study conducted on African Americans, single women delayed longer than single men and women who were alone when symptoms began delayed longer than women with someone (Banks & Dracup, 2007). Unmarried patients arriving by EMS transportation differed from all other arrival by marital groups with shorter delay than other groups before seeking care. This result is contradicted by another study exploring the factors related to prehospital delay in patients with MI and it suggested that unmarried patients responded significantly later than married patients (Burnett, 1995).

Patients arriving by private transportation delayed longer compared to ambulance use regardless of ethnicity, marital status or comorbidity status. This result corresponds with another study with a large sample size. An observational analysis of 37,634 STEMI patients examined independent patient factors associated with EMS transportation versus patient self-transportation and EMS-transported patients had significantly shorter delays compared to other mode of transportation (Mathews, Peterson et al., 2011).

SPECIFIC AIM 2, RESEARCH QUESTION2: DEMOGRAPHIC SUBGROUPS AND PERSONALITY

Research Question 2.2: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on personality factors controlling for age and potential covariates? Analysis of covariance

was employed to examine the differences across demographic subgroups on personality factors while controlling age and covariates.

Patients with comorbidity have higher neuroticism scores compared to patients with no comorbidity regardless of gender and age. Married patients with no comorbidity have higher conscientiousness scores compared to other marital status comorbidity groups regardless of age. These results confirm the findings from the literature (Dracup & Moser, 1997; Gurwitz, McLaughlin et al., 1997) that being married and without comorbidities are favorable factors in help seeking for ACS.

SPECIFIC AIM 2, RESEARCH QUESTION 3: DEMOGRAPHIC SUBGROUPS AND PROCRASTINATION

Research Question 2.3: What are the differences across demographic subgroups (gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions) on procrastination behavior controlling for age and potential covariates? Analysis of covariance was used to examine the differences across demographic subgroups on procrastination behavior while controlling age and covariates.

Unmarried patients had higher procrastination scores compared to married patients regardless of gender. The extent to which action is prompted by significant others is uncharacterized at this time. However, persistent evidence exists that individuals alone delay longer (Banks & Dracup, 2007). Patients who used private transportation also had higher procrastination scores compared to ambulance users regardless of age. Again, the factors contributing to use of private transportation are multiple and not yet characterized. The need to have someone drive you to an ER may play a significant role in being willing to wait. Cost for use of an ambulance may play a role. Reluctance to

impose on non-familial others may account for a large percentage of ambulance use for those without significant others or family readily at hand. These factors have yet to be closely examined as contributing components.

SPECIFIC AIM 3: FACTORS PREDICTING PREHOSPITAL DELAY

Specific Aim 3: Investigate the best model to predict time to seek care from selected demographic variables (age, gender, marital status, ethnicity, mode of arrival, insurance and co-morbid conditions), specific personality factors (neuroticism and conscientiousness) and procrastination behavior in patients with prehospital delay.

Research Question 3.1: Are personality factors (neuroticism and conscientiousness), procrastination behavior, age, gender, marital status, ethnicity, insurance, mode of arrival and co-morbid conditions predictive of the amount of time before patients experiencing symptoms of ACS seek medical care? Stepwise multiple regression techniques (both forward and backward with varimax and oblim rotations) were used to assess the contribution of the personality factors, procrastination behavior, age, gender, marital status, insurance, mode of arrival and co-morbid conditions to amount of time before patients experiencing symptoms of ACS seek medical care treating all dichotomous nominal variables as dummy variables. However, in order to assess the contribution of ethnicity (composed of three groups) to delay, a logistic regression analysis was conducted with the personality factors, procrastination behavior, age, gender, marital status, insurance, mode of arrival, co-morbid conditions and ethnicity as predictors of amount of time before patients experiencing symptoms of ACS seek medical care.

Stepwise multiple regression analysis suggested that higher procrastination levels (35%) and arrival by private vehicle (24%) predicted longer prehospital delays for

patients experiencing symptoms of ACS. Logistic regression on mean time delay revealed that male gender and high procrastination scores represented a greater risk of prehospital delay over 6.5 hours. Compared to females, males had 4.7 times the risk of longer prehospital delay greater than 6.5 hours. Higher levels of procrastination represented a 31% increase in the risk of longer prehospital delay of greater than 6.5 hours. Logistic regression on median time delay suggested that using a private vehicle and a high procrastination score predicted a greater risk of prehospital delay over 3.5 hours. Compared to ambulance users, those who used private vehicles had 7.2 times the risk of longer prehospital delay of over 3.5 hours. Higher levels of procrastination represented a 50% increase in the risk of longer prehospital delay greater than 3.5 hours. Summing up, factors predictive of prehospital delay in this study are procrastination, use of private transportation and male gender.

It is important to note the differences between the two time frames captured by use of a mean versus median split. Procrastination was a significant predictor for both logistic regression analyses but mode of arrival was a predictor for the shorter time frame, i.e., median split, whereas gender was the other significant predictor for the longer time frame, i.e., mean split. This indicates that the set of factors that contribute to delay change over time with transportation more predictive in short frames and gender predictive for long frames.

LIMITATIONS AND FUTURE STUDY RECOMMENDATIONS

There are several limitations to this study design. The NEO-FFI scale has five behavioral domains but to reduce participant burden in this study only two domains (neuroticism and conscientiousness) were examined. Relationships between three other

personality domains and prehospital delay were not explored. Other personality dimensions may moderate or mediate the relationship between pre-hospital delay and personality. In the future, exploring the association between all five factors of personality and prehospital delay could be beneficial.

A convenience sampling method and small sample sizes were other limitations. Data collection took place only in one hospital setting. Almost all study subjects were uninsured which further limited the generalization of the study as consideration of costs to use ambulance services may have significantly contributed to arrival by private vehicle. Further studies on the same variables in patients with insurance may provide new information. In the proposed study only three categories of ethnicity were included. Generalizations to other ethnic groups are outside the scope of this study.

The relationship between procrastination and prehospital delay in patients with ACS is suggested for the first time by this study. Replicating the study with larger sample sizes and different settings could provide more insights.

CONCLUSIONS AND NURSING IMPLICATIONS

The overall objective of this study was to investigate whether specific personality factors (neuroticism and conscientiousness) and procrastination behavior could influence the prehospital delay in patients with ACS. The central hypothesis was that specific personality factors (neuroticism and conscientiousness) and procrastination behavior could predict prehospital delay in patients diagnosed with ACS. This study is the first attempt to explore the relationship of procrastination with prehospital delay in patients with ACS. The study results suggest that procrastination behavior and conscientiousness could influence prehospital delay. Contrary to the popular belief that higher neuroticism

negatively influences health related behavior, neuroticism appeared to be a favorable factor to reduce prehospital delay in unmarried females.

Factors predictive of prehospital delay across the total sample in this study were procrastination, use of private transportation and male gender. Personality factors did not predict prehospital delay in this study; however differential patterns of correlations across demographic variables suggest that subgroup analyses, precluded by sample size, may provide different results for some subgroups. This strongly suggests a more complex model of contributing factors that leads to greater delay.

This study comes under the public health domain of nursing. Investigating the association of personality factors and procrastination with prehospital delay was an initial step in identifying the psychological factors associated with prehospital delay. The information on the association between conscientiousness, procrastination, and prehospital delay can be utilized in redesigning education strategies for the public. Based on the study findings, more individualized education approaches based on personality and procrastination behavior should be investigated.

Younger age is associated with high prehospital delay and higher procrastination in this study. This information highlights the importance of creating awareness among youth about taking rapid action during a heart attack. Most subjects in this study utilized private transportation to come to the hospital instead of activating the EMS. Using private transportation may be an important factor behind higher than average mean and median prehospital delay in this study. This necessitates new public health education strategies to emphasize the importance of using emergency response system when experiencing chest pain.

The study findings are also helpful for nurses taking care of ACS patients related to health teaching. Nurses can teach the patients and families about the importance of activation of EMS, emphasizing that private transportation can increase prehospital delay, resulting in detrimental delay to treatment. Most health education in the past included teaching about the clinical symptoms of ACS, however psychosocial factors associated with delay to treatment are neglected. Psychological barriers preventing activation of EMS are particularly overlooked. Nurses in all settings can emphasize the importance of considering all factors that affect prehospital delay.

Appendix A Medical Chart Data

1. Age

2. Sex
- ☐ Male
- ☐ Female

3. Marital status
- ☐ Single
- ☐ Married
- ☐ Divorced/Separated

4. Ethnicity
- ☐ Hispanic
- ☐ African American
- ☐ Caucasian

5. Insurance
- ☐ Yes
- ☐ No

6. Mode of Arrival to the Hospital
- ☐ Ambulance
- ☐ Private Vehicle

7. Comorbidity
- ☐ Yes
- ☐ No

8. Time of starting Chest pain -

9. Time of calling 911-

10. Time of Arrival to the Hospital-

Appendix B Procrastination Scale

On the following pages you will find a series of statements which people may use to describe themselves. Read each statement and decide whether or not it describes you.

You are asked to rate yourself by indicating the extent to which each statement is characteristic or uncharacteristic of you. The scale ranges from (1) "extremely uncharacteristic" to (5) "extremely characteristic." Note that (3) on the scale is neutral, that the statement is neither characteristic nor uncharacteristic of you. Please place the appropriate number in the blank space at the end of each statement.

extremely characteristic_____
moderately characteristic _____ !
neutral_____ ! !
moderately uncharacteristic_____ ! ! !
extremely uncharacteristic_____ ! ! ! !
! ! ! ! !
1 2 3 4 5

Answer every statement, even if you are not completely sure of your answer. Thank you for your participation.

PROCRASTINATION SCALE FOR NON-STUDENT POPULATIONS

The response format we now use is:

extremely uncharacteristic				extremely characteristic
!				!
1	2	3	4	5

1 . I often find myself performing tasks that I had intended to do days before.
* 2. I often miss concerts, sporting events, or the like, because I don't get around to buying tickets on time.
* 3. When planning a party, I make the necessary arrangements well in advance.
4 . When it is time to get up in the morning I most often get right out of bed.
5 . A letter may sit for days after I write it before mailing it.
6. I generally return phone calls promptly.
7. Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.
8. I usually make decisions as soon as possible.
9. I generally delay before starting on work I have to do.
* 10. When travelling, I usually have to rush in preparing to arrive at the airport or station at the appropriate time.
11. When preparing to go out, I am seldom caught having to do something at the last minute.
12. In preparing for some deadline, I often waste time by doing other things.
* 13. If a bill for a small amount comes, I pay it right away.
* 14. I usually return a "R.S.V.P." request very shortly after receiving the invitation.
15. I often have a task finished sooner than necessary.
16. I always seem to end up shopping for birthday or Christmas gifts at the last minute.
17. I usually buy even an essential item at the last minute.
18. I usually accomplish all the things I plan to do in a day.
19. I am continually saying "I'll do it tomorrow".
20. I usually take care of all the tasks I have to do before I settle down and relax for the evening.

Note: *Indicates items which differ from non-student to student forms.

Note: Reverse-keyed items: 3, 4, 6, 8**,** 11**,** 13, 14, 15, 18**,** 20

Appendix C Consent Form

IRB APPROVED
DEC 18 2012

FORM VALID THROUGH
NOV 27 2013

RESEARCH CONSENT FORM

You are being asked to participate as a subject in the research project entitled, Prehospital Delay, Procrastination and Personality in Patients with Acute Coronary Syndrome, under the direction of Sibil George, RN.

PURPOSE OF THE STUDY

The purpose of this study is to investigate whether specific personality factors and behavior influence the delay to seek help in patients with Acute Coronary Syndrome (heart attack). You are being asked to participate because you are admitted in the hospital following heart attack. The period between the onset of symptoms and the decision to call for medical assistance, i.e. patient delay, remains the most important cause of pre-hospital delay. Recognizing the psychological and social factors of decision delay is important to help future patients to identify heart attack symptoms correctly and seek care immediately. A better understanding of how personality relates to patient decision-making styles may help in treatment discussions to the needs and preferences of individual patients. For this purpose we need to ask for your help in examining these issues.

PROCEDURES RELATED ONLY TO THE RESEARCH

Your information will be collected by a set of personality and behavior questionnaires you fill out and from your medical records. The limited amount information from the medical records will include demographic information (age, sex, marital status, insurance information, and ethnicity) as well as the mode of arrival to the hospital (private transportation or ambulance) and clinical data related to other medical conditions you may have. While you fill out the questionnaire set, the researcher will remain close at hand to answer any questions or assist with the questionnaires if you need help (for instance, reading the items aloud). To protect your confidentiality, each participant will be assigned a random identification number that will allow us to link the data from the questionnaires to the data from the medical chart. Once the two sets of data are matched, all identifying information will be destroyed. All records will be secured in a locked file cabinet accessible by only the Principle Investigator. Since we are interested in how personality and behavior impacts the time it takes to seek help, all results will be reported as deidentified group data.

PROCEDURES NOT RELATED TO THIS RESEARCH (i.e, standard of care)

None

RISKS OF PARTICIPATION

The potential risks from participation in the study are loss of confidentiality should your identity be accidently disclosed before the matching key is destroyed and the time and energy needed in filling out the survey.

NUMBER OF SUBJECTS PARTICIPATING AND THE DURATION OF YOUR PARTICIPATION

The anticipated number of subjects involved in the study will be 75 25 participating at the University of Texas Medical Branch (UTMB) and 50 participating at the Harris Health System (Ben Taub Hospital). Filling out the questionnaires should not take more than 30 minutes.

BENEFITS TO THE SUBJECT

You will not benefit from your participation in the research project.

BENEFITS TO SOCIETY

Your participation in this research can benefit society. This research may help to identify the reasons for delays to seek help in patients experiencing a heart attack.

REIMBURSEMENT FOR EXPENSES

There are no reimbursements for expenses for participation in this study.

COMPENSATION FOR RESEARCH RELATED INJURY

In the event of injury resulting from this research, (UTMB Galveston) and/or the Harris Health System (Ben Taub Hospital) are not able to offer financial compensation nor to absorb the costs of medical treatment. However, necessary facilities, emergency treatment and professional services will be available to you, just as they are to the general community.

COSTS OF PARTICIPATION

There are no costs for participating in this study.

USE AND DISCLOSURE OF YOUR HEALTH INFORMATION

Each participant will be assigned a random identification number that will allow us to link the data from the questionnaires to the data from the medical chart. Once the two sets of data are matched, all identifying information will be destroyed. All records will be secured in a locked file cabinet accessible by only the Principle Investigator. While in existence, the study records that identify you will be kept confidential as required by law. Federal privacy regulations provided under the Health Insurance Portability and Accountability Act (HIPAA) provide safeguards for privacy, security, and authorized access of your records. These regulations require UTMB and Harris Health System (Ben Taub Hospital) to obtain an authorization from you for the use and disclosure of your health information. By signing this consent form, you are

authorizing the use and disclosure of your health information for the purpose of completing the research study. Except when required by law, you will not be identified by name, social security number, address, telephone number, or any other direct personal identifier in study records disclosed outside of the UTMB and Harris Health System (Ben Taub Hospital). For records disclosed outside of UTMB and Harris Health System (Ben Taub Hospital), you will be assigned a unique code number. The key to the code will be kept in a locked file in Ms. George's office.

If you sign this form, you are giving us permission to collect, use and share your health information. You do not need to sign this form. If you decide not to sign this form, you cannot be in the research study. We cannot do the research if we cannot collect, use and share your health information. Whether or not you agree to the research project or give us permission to collect, use or share your health information will not affect the care you will be given at UTMB or Harris Health System (Ben Taub Hospital).

Your records may be reviewed in order to meet federal or state regulations. Reviewers may include, for example, the Food and Drug Administration, Harris Health System (Ben Taub Hospital), UTMB IRB. This authorization for the use and disclosure of your health information as described above expires upon the conclusion of the research study except for FDA regulated studies. For FDA regulated studies, the study sponsor and government agencies, such as the FDA may review your records after the study ends.

If you change your mind later and do not want us to collect or share your health information, you need to contact the researcher listed on this consent form by telephone. You need to say that you have changed your mind and do not want the researcher to collect and share your health information. You may also need to leave the research study if we cannot collect any more health information. We may still use the information we have already collected. We need to know what happens to everyone who starts a research study, not just those people who stay in it. The results of this study may be published in scientific journals without identifying you by name.

ADDITIONAL INFORMATION

1. If you have any questions, concerns or complaints before, during or after the research study, or if you need to report a research related injury or adverse reaction (bad side effect), you should immediately contact Ms George at 832-495-9053.

2. Your participation in this study is completely voluntary and you have been told that you may refuse to participate or stop your participation in this project at any time without penalty or loss of benefits and without jeopardizing your medical care at UTMB or Harris Health System (Ben Taub Hospital). If you decide to stop your participation in this project and revoke your authorization for the use and disclosure of your health information, UTMB and Harris Health System (Ben Taub Hospital) may continue to use and disclose your health information in some instances. This would include any health information that was used or disclosed prior to your decision to stop participation and needed in order to maintain the integrity of the research study. If there are significant

new findings or we get any information that might change your mind about participating, we will give you the information and allow you to reconsider whether or not to continue.

3. If you have any complaints, concerns, input or questions regarding your rights as a subject participating in this research study or you would like more information, you may contact the Institutional Review Board Office, at (409) 266-9475.

The purpose of this research study, procedures to be followed, risks and benefits have been explained to you. You have been allowed to ask questions and your questions have been answered to your satisfaction. You have been told who to contact if you have additional questions. You have read this consent form and voluntarily agree to participate as a subject in this study. You are free to withdraw your consent, including your authorization for the use and disclosure of your health information, at any time. You may withdraw your consent by notifying Ms George at 832-495-9053. You will be given a copy of the consent form you have signed.

Informed consent is required of all persons in this project. Whether or not you provide a signed informed consent for this research study will have no effect on your current or future relationship with UTMB and Harris Health System (Ben Taub Hospital).

Signature of Subject	Date
Date	Signature of Person Obtaining Consent

HARRISHEALTH SYSTEM

Protocol Number: 12-273
Approval Date: 1/15/13
Expiration Date: 11/27/13

Appendix D Supplementary Tables

Table D1: Test of Differences between Ethnicity on Age

	Age	
Variable	*M*	*SD*
Ethnicity	*F*=1.16	*p*=0.32
Hispanic (*n*=28)	49.93	9.50
African American (*n*=36)	53.56	10.78
Caucasian (*n*=11)	53.27	6.65

Table D2: Test of Differences between Demographic Variables on Dependent Variables

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender WITH	*t*=-1.81	***p*=.08**	*t*=-.12	*p*=0.90	*t*=0.36	*p*=0.72	*t*=-1.64	*p*=0.11
Male (n=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (n=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Marital Status WITH	*t*=0.30	*p*=0.77	*t*=-1.18	*p*=0.24	*t*=0.06	*p*=0.95	*t*=-0.82	*p*=0.42
Unmarried (n=50)	6.70	6.80	46.62	19.65	34.44	8.06	44.82	6.28
Married(n=25)	6.21	6.21	40.88	20.14	34.32	8.93	46.16	7.50
Comorbidity WITH	*t*=-1.18	*p*=.27[a]	*t*=-1.26	*p*=0.21	*t*=1.67	*p*=0.10	*t*=0.41	*p*=0.68
No (n=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes (n=46)	5.82	5.80	42.41	18.64	35.65	8.15	45.52	6.45
Arrival WITH	*t*=-2.36	***p*=.01**[a]	*t*=-0.77	*p*=.45	*t*=0.71	*p*=.48	*t*=-0.75	*p*=0.45
Private(n=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (n=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31

a- Levene's Test is significant. Equal variances not assumed significance is reported.

Table D3: Test of Differences between ethnicity on Dependent Variables

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Ethnicity WITH	F=0.20	p=0.82	F=0.61	p=0.54	F=1.03*	p=0.36	F=1.10	p=0.34
Hispanic (n=28)	5.90	6.08	46.5	18.79	35.5	5.88	43.79	6.27
African American (n=36)	6.95	6.93	42.14	20.59	34.50	9.73	46.19	6.68
Caucasian (n=11)	6.77	7.11	48.55	20.87	31.27	8.43	46	7.68

* Levene's Test is significant. Tamhane's T 2 was computed and no significance findings.

Table D4: One-Way ANCOVA of Demographic Variables on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender	*F*=3.30	***p*=.07**	*F*=0.15	*p*=.70	*F*=0.04	*p*=.84	*F*=2.12	*p*=.15
Age	*F*=0.13	*p*=.72	*F*=0.15	***p*=.01**	*F*=2.56	*p*=.11	*F*=4.98	***p*=.03**
Male(*n*=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (*n*=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Marital Status	*F*=0.07	*p*=.79	*F*=3.48	***p*=.07**	*F*=0.18	*p*=.67	*F*=1.98	*p*=.16
Age	*F*=0.01	*p*=.91	*F*=8.80	***p*=.004**	*F*=2.83	*p*=.10	*F*=6.95	***p*=.01**
Unmarried (*n*=50)	6.70	6.80	46.62	19.65	34.44	8.06	44.82	6.28
Married (*n*=25)	6.21	6.21	40.88	20.14	34.32	8.93	46.16	7.50
Comorbidity	MW *U*=607[a]	*p*=.51	*F*=0.65	*p*=.42	*F*=4.23	***p*=.04**	*F*=.00	*p*=.96
Age	n/a	n/a	*F*=5.56	***p*=.02**	*F*=4.32	***p*=.04**	*F*=.00	*p*=.96
No (*n*=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes (*n*=46)	mrank=40.07[a] 5.82 mrank=36.70[a]	5.80	42.41	18.64	35.65	8.15	45.52	6.45

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Arrival	*F*=5.55	***p*=.02**	*F*=1.72	*p*=.20	*F*=0.18	*p*=.67	*F*=5.06	*p*=.74
Age	*F*=.07	*p*=.79	*F*=7.80	***p*=.007**	*F*=2.31	*p*=.13	*F*=.11	***p*=.03**
Private (*n*=56)	7.55	6.71	45.73	19.70	34	8.64	45.61	6.84
Ambulance (*n*=19)	3.55	5.22	41.68	20.60	35.58	7.27	44.26	6.31
Ethnicity	*F*=0.19	*p*=.83	*F*=0.61	*p*=.54	*F*=.86	*p*=.43	*F*=.63	*p*=.54
Age	*F*=.00	*p*=.95	*F*=6.14	***p*=.02**	*F*=2.28	*p*=.14	*F*=.45	***p*=.04**
Hispanic (*n*=28)	5.90	6.08	46.5	18.79	35.5	5.88	43.79	6.27
African American (*n*=36)	6.95	6.93	42.14	20.59	34.50	9.73	46.19	6.68
Caucasian (*n*=11)	6.77	7.11	48.55	20.87	31.27	8.43	46	7.68

[a]MW-U(Mann-Whitney U) and mranks (Mean Ranks) reported due to significant heterogeneity for ANCOVA analyses

Table D5: Two- Way ANCOVA of Gender X Ethnicity on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.06	*p*=.81	*F*=5.88	***p*=.02**	*F*=1.54	*p*=.22	*F*=2.92	*p*=.09
Gender WITH	*F*=0.90	*p*=.35	*F*=0.16	*p*=.69	*F*=0.18	*p*=.68	*F*=2.8	*p*=.10
Male(*n*=43)	7.70	6.29	44.47	19.74	34.70	8.39	44.19	6.24
Female (*n*=32)	4.97	6.73	45.03	20.35	34	8.29	46.72	7.09
Ethnicity	*F*=0.09	*p*=.92	*F*=0.42	*p*=.66	*F*=0.85	*p*=.43	*F*=1.24	*p*=.30
Hispanic (*n*=28)	5.90	6.08	46.5	18.79	35.5	5.88	43.79	6.27
African American(*n*= 36)	6.95	6.93	42.14	20.59	34.50	9.73	46.19	6.68
Caucasian (*n*=11)	6.77	7.11	48.55	20.87	31.27	8.43	46	7.68
Gender*Ethnicity	*F*=0.62	*p*=.54	*F*=0.01	*p*=.99	*F*=0.76	*p*=.47	*F*=0.10	*p*=.37

Table D6: Two- Way ANCOVA of Comorbidity X Ethnicity on Dependent Variables with Age as a Covariate

	Prehospital Delay		Procrastination		Neuroticism		Conscientiousness	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Age	*F*=0.05	*P*=.83	*F*=5.10	***p*=.03**	*F*=3.17	*p*=.08	*F*=3.83	***p*=.05**
Comorbidity WITH	*F*=0.45	*p*=.51	*F*=1.04	*p*=.31	*F*=2.35	*p*=.13	*F*=.00	*p*=.10
No (*n*=29)	7.66	7.61	48.35	21.50	32.41	8.28	44.86	7.16
Yes (*n*=46)	5.82	5.80	42.41	18.64	35.65	8.15	45.52	6.45
Ethnicity	*F*=.36	*p*=.70	*F*=.35	*p*=.71	*F*=0.59	*p*=.56	*F*=0.70	*p*=.50
Hispanic (*n*=28)	5.90	6.08	46.5	18.79	35.5	5.88	43.79	6.27
African American (*n*=36)	6.95	6.93	42.14	20.59	34.50	9.73	46.19	6.68
Caucasian (*n*=11)	6.77	7.11	48.55	20.87	31.27	8.43	46	7.68
Comorbidity X Ethnicity	*F*=.72	*p*=.50	*F*=0.47	*p*=.63	*F*=0.19	*p*=.83	*F*=0.11	*p*=.90

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