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SAN DIEGO STATE UNIVERSITY

Subjective Social Status, Socioeconomic Status and Health Following Acute Coronary Syndrome

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy

in

Clinical Psychology

by

Shiva Geneviève Ghaed

Committee in charge:

University of California, San Diego

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Professor Thomas R. Rutledge

San Diego State University

Professor Linda C. Gallo, Chair
Professor Vanessa L. Malcarne
Professor Scott C. Roesch

2008

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The dissertation of Shiva Geneviève Ghaed is approved, and it is acceptable in quality and form for publication on microfilm:

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Chair

University of California, San Diego

San Diego State University

2008

Dedication

This work is dedicated to my mother, who inspired me to pursue my love for psychology and who has supported me every step of the way in transforming my passion into my profession.

TABLE OF CONTENTS

Signature Page..... iii

Dedication..... iv

Table of Contents..... v

List of Tables..... viii

Acknowledgements..... ix

Vita..... x

Abstract of the Dissertation..... xviii

I. Introduction..... 1

A. Coronary Heart Disease..... 1

B. Psychosocial factors and Cardiovascular Disease..... 3

C. SES and health..... 6

D. SSS..... 7

E. The present study..... 13

F. Hypotheses..... 15

II. Method..... 18

A. Sample..... 18

B. Procedures..... 20

C. Measures..... 21

1. Social status..... 21

2. Psychosocial measures..... 25

3. Covariate measures (for controlled analyses)..... 29

D. Statistical analyses..... 31

III. Results..... 35

A. Participant characteristics..... 35

B. Associations between objective and subjective social status measures..... 35

C. Baseline models (No predictors)..... 36

D. SES and health outcomes post-ACS..... 36

1. Psychological distress and well-being..... 36

2. Quality of life and functional status..... 38

3. Cardiovascular-specific health status..... 39

E. SSS and health outcomes post-ACS..... 41

1. Psychological distress and well-being..... 41

2. Quality of life and functional status..... 42

3. Cardiovascular-specific health status..... 42

F. Does SSS predict health outcomes beyond SES effects?..... 44

1. Psychological distress and well-being..... 44

2. Quality of life and functional status..... 45

3. Cardiovascular-specific health status..... 45

IV. Discussion..... 47

A. Summary of findings..... 47

B. Limitations..... 50

C. Conclusions..... 52

Tables..... 54

References..... 70

LIST OF TABLES

Table 1: Descriptives: Means for Predictor and Outcome Variables..... 54

Table 2: Bivariate correlations for US and Community SSS and objective indicators of SES..... 56

Table 3: Results of baseline (fully unconditional) MLM for all outcomes.. 57

Table 4: Results of MLM analyses regressing health outcomes on SES indicators (income and education)..... 58

Table 5: Results of MLM analyses regressing health outcomes on SSS indicators (US and community)..... 61

Table 6: Results of MLM analyses regressing health outcomes simultaneously on SES indicators (income and education) and SSS indicators (US and community) – SES results only..... 64

Table 7: Results of MLM analyses regressing health outcomes simultaneously on SES indicators (income and education) and SSS indicators (US and community) – SSS results only..... 67

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I would like to acknowledge my wonderful parents and my sister for being pillars of unwavering support and love in my life. I would like to thank all my friends, in particular Celine Ko, who has truly mentored me through this program; Saïd, Cindy, Shereen, and Vivien, who have kept me grounded throughout these years; and the wonderful JDP Psychology Clinic staff, Paulette, Virginia, and Sandy – my San Diego family. Finally, I would like to thank Ali, without whom I am certain I could not have made it through graduate school – for your sacrifice and support I am forever grateful.

VITA

EDUCATION

2002 – 2008	Ph.D., Clinical Psychology San Diego State University/University of California, San Diego Joint Doctoral Program in Clinical Psychology Behavioral Medicine Track Successful Defense completed March 20, 2008
2005 – 2006	SDSU School of Public Health, San Diego, CA M.P.H. (2006), Health Promotion Track
2006	SDSU/UCSD Joint Doctoral Program M.S. (2006), Clinical Psychology
2000 – 2001	University of Maryland (UMCP), College Park, MD B.S. (2001), Psychology
1996 – 1999	Ross University School of Medicine, Dominica, BWI (Successfully completed Basic Sciences, M.D. not completed)
1993 – 1995	University of Maryland (UMCP), College Park, MD Microbiology M.S. Program (Successfully completed academic work, Thesis not completed)
1990 – 1993	George Washington University (GWU), Washington, D.C. B.S. (1993), Major in Zoology (Pre-medicine Track), Minor in French Language & Literature

CLINICAL EXPERIENCE

2007 – 2008	APA-Accredited Clinical Internship West Los Angeles Veterans Healthcare Center (Los Angeles, CA); Internship director: Anna Okonek, Ph.D. *Position:* Psychology Intern (1) Substance Abuse *Supervisors:* J. Greg Serpa, Ph.D., Charles McCreary, Ph.D., Peter Graves, Ph.D. *Description:* Responsibilities included attending daily meetings, supervision, facilitation and co-facilitation of therapy groups in the Addiction Treatment Clinic and Recovery Treatment Center (e.g., early recovery, relapse prevention, mindfulness, anger management, relationships & communication).

(2) Health Psychology
Supervisors: Anna Okonek, Ph.D., Michelle Zeller, Psy.D., Charles McCreary, Ph.D.
Description: Responsibilities include attending team meetings in cardiopulmonary rehabilitation, acute inpatient rehabilitation, polytrauma treatment, supervision, co-facilitation of therapy groups in smoking cessation, neuropsychological assessment, and liver transplant evaluations.

(3) Ambulatory Care
Supervisors: Sara Jarvis, Ph.D., Barbara Wettstein, Ph.D., Carol Wilner, Ph.D.
Description: Responsibilities include supervision, co-facilitation of therapy groups in CBT for depression, Interpersonal skills, and Issues, and brief therapy for individuals and couples.

(4) Domiciliary Residential Rehabilitation and Treatment Program (Final internship rotation to be completed by August 20, 2008)

General Internship Activities: Weekly seminars in neuropsychology assessment and diversity, general internship seminars, licensure courses (completed to date: domestic violence, child abuse, human sexuality)
Long-Term Therapy: (Supervisor: Nicholas Caskey, Ph.D.; 2 long-term therapy cases (current focus of therapy: depression, anxiety, social isolation, limited recreational activities, unresolved bereavement, alcohol/ drug abuse in remission, financial stress, transportation difficulties)

2006 – 2007

Clinical Psychology Practicum
Position: Student Therapist, Alcohol and Drug Treatment Program (Inpatient and Outpatient), Veterans Administration Medical Center, San Diego, CA
Supervisor: Tamara Wall, Ph.D.
Description: Responsibilities included individual and group therapy for addiction-related issues, providing psychoeducation programs, co-facilitating skills training groups, intake evaluations, psychological and neuropsychological assessment. Involved in educational sessions and group therapy for family members partners and children, and participation in weekly seminar that incorporated didactic theories, detection, and treatment of addictive behaviors and case presentations/ formulations.

2005 – 2007

Position: Clinic Coordinator, SDSU Psychology Clinic, San Diego, CA
Supervisor: Richard Schulte, Ph.D.
Description: Responsibilities included peer supervision/mentoring, assistance with all clinic-related questions, therapist orientation to clinic, CBT group training of student therapists, contact with SDSU Student Health Services psychiatrists regarding referred clients, provision of relevant referrals for clients inappropriate for the clinic, client assignment/contact /tracking, annual revision of clinic manuals for CBT group and therapist protocol, monitoring/evaluation of client files to ensure fidelity of record-keeping by therapists, managing front office when other staff absent, ordering clinic equipment/assessment materials. Required attendance for all supervisory/departmental meetings/discussions of student therapist performance & evaluation, and bimonthly case conference presentations.

2005 – 2006

Position: Student Therapist, Clinical Practicum, SDSU Psychology Clinic, San Diego, CA
Supervisor: Elva Arredondo, Ph.D.
Description: Responsibilities included conducting therapy with adult clients, and couple's counseling. Clients most commonly presented with Mood and Anxiety disorders, relationship difficulties, and stress-related issues. Treatment orientation primarily cognitive-behavioral, and additional exposure to dialectical behavioral therapy. Weekly group and individual supervision meetings, and bimonthly case conferences.

2004 – 2005

Position: Student Therapist, Clinical Practicum, Behavioral Medicine Outpatient Clinic, Veterans Administration Medical Center, San Diego, CA
Supervisors: Ariel Lang, Ph.D.; Pollyanna Casmar, Ph.D.
Description: Responsibilities included assessment and brief intervention of mental health and medical patients for whom psychological issues were impacting their health status. Common presenting complaints included pain, weight management, difficulty sleeping, poor compliance with medical recommendations and anxiety/depression. Typical assessments were primarily interview-based, with some opportunity for brief neuropsychological screening and other testing. Treatment orientation primarily cognitive-behavioral, but also opportunity to learn interpersonal therapy approach. Group treatment for

weight management, pain, sleep, stress and anxiety, and weekly group supervision/seminar.

2003 – 2004 *Position:* Student Therapist, Clinical Practicum, SDSU Psychology Clinic, San Diego, CA
Supervisors: Richard Schulte, Ph.D.; Vanessa Malcarne, Ph.D.
Description: Responsibilities included conducting therapy with adult and child patients, as well as couple's and group therapy. Clients most commonly presenting with mood and anxiety disorders, relationship difficulties, and stress-related issues. Treatment orientation primarily cognitive-behavioral. Weekly group and individual supervision meetings, and bimonthly case conferences.

RESEARCH EXPERIENCE

2002 – 2008 *Position:* Project Director, Pilot study funded by the National Institute of Mental Health, National Institutes of Health, NIMH/NIH), San Diego, CA
Principal Investigators: Linda Gallo, Ph.D.; Anthony DeMaria, M.D.
Description: Project REACH (Relationships, Emotions, & Cardiovascular Health) focuses on marital adjustment and depressive symptoms/disorder following Acute Coronary Syndrome (ACS; i.e., myocardial infarction, unstable angina). We will examine the effects of depression and marital adjustment on quality of life, functional status, and the probability of recurrent events in the 6-mo following admission for ACS. The broader goal of this research is to identify aspects of social functioning that could represent modifiable risk factors for CHD and depression co-morbidity, and thus contribute to more effective intervention.

2002 – 2006 *Position:* Research Assistant, SDSU Psychophysiology Lab, San Diego, CA
Supervisor: Linda Gallo, Ph.D.
Description: Involved in research publication for studies investigating:
(a) Personality, social relationships, and emotions; Examined the associations among gender relevant traits (i.e., agency, communion, unmitigated agency, unmitigated communion) and emotional and social well-being. Measures based on the interpersonal circumplex were used as a nomological net to examine the similarities and differences among traits, and

examine the possible contribution of interpersonal factors to their associations with physical and mental health.
(b) Subjective social status and cardiovascular risk; Examined health implications of perceived social hierarchy beyond impact of objective socioeconomic status. Physical, behavioral, and psychological cardiovascular risk factors were examined in the context of U.S. and community subjective social status.

2001 – 2002

Position: Fellow, Intramural Research Training Award Program, Clinical
Neuroendocrinology Branch, NIMH/NIH, Bethesda, MD
Supervisor: Pedro Martinez, M.D.
Description: Research on the role of stress-responsive systems contributing to psychiatric/medical manifestations of depression, and methods for recognizing, diagnosing, treating, and preventing long-term medical problems that may be associated with major depression. Involved in longitudinal clinical study of child development in normal families versus families with affective disorders.

2000 – 2001

Position: Research Assistant, Department of Psychology, University of Maryland; National Institute of Drug Abuse, NIH, Bethesda, MD
Supervisor: Scott Hall, Ph.D.
Description: Involved in research projects in areas of biopsychology/ psychopharmacology. Responsibilities included data entry and analysis, literature search & update, and involvement in publications.

2000 – 2001

Position: Research Assistant, Department of Psychology, University of Maryland, College Park, MD
Supervisor: Robert Brown, Ph.D.
Description: Involved in research on commitment in Lesbian relationships. Responsibilities included data entry and analysis, proficiency in SPSS, literature search & update, and attendance of weekly graduate meetings.

2000

Position: Summer Intern, Department of Psychiatry, Clinical Psychophysiology & Psychopharmacology Laboratory, Uniformed Services University of the Health Sciences & NIMH, Bethesda, MD
Supervisors: Frances Gabbay, Ph.D.; Connie Duncan, Ph.D.
Description: Involved in psychological research on behavioral, neuropsychological, and psychophysiological assessment of psychoactive drug effects. Responsibilities included conducting

clinical screening and interviews, research subject testing, data processing and analysis, and wet lab techniques.

1999 – 2000 *Position:* Analyst/Temporary Lab Support, Microbiology Quality Control Department, MedImmune, Rockville, MD
Description: Responsibilities included routine environmental monitoring, lab and sterility testing, maintenance of calibration records, and knowledge of pharmaceutical industry regulations.

1992 – 1993 *Position:* Research Assistant, Departments of Retrovirology and Cellular Immunology, Walter Reed Army Institute of Research, Rockville, MD
Supervisor: Donald Skillman, M.D.
Description: Responsibilities included planning and conducting experiments with HIV and other organic substances, such as interleukins. Laboratory data collected was analyzed in conjunction with clinical trial data to evaluate possibility of Interleukin-3 as potential effective treatment for HIV-infected patients.

1992 *Position:* Research Assistant, Department of Molecular Biology, George Washington University, Washington, D.C.
Supervisor: Elizabeth Forston Wells, Ph.D.
Description: Involvement with projects in isolation, purification, and analysis of chloroplast DNA by restriction endonuclease enzymes. Techniques included cesium chloride gradients, dialyzation, gel electrophoresis, and Southern Blot.

TEACHING EXPERIENCE

1993 – 1995 *Position:* Lab Instructor/Teaching Assistant, Department of Microbiology, University of Maryland, College Park, MD
Supervisor: Ann Smith, Ph.D.
Description: Responsibilities included teaching microbiology laboratory techniques to approximately 40 students per semester, developing, administering, and grading exams and lab reports, and providing individual tutoring during office hours, and regular review sessions prior to examinations.

PUBLICATIONS

Ghaed, S. G., & Gallo, L.C. (2007). Subjective social status, objective socioeconomic status and cardiovascular risk in women. *Health Psychology, 26,* 668-674.

Ghaed, S. G., & Gallo, L. C. (2006). Agency, communion, and unmitigated agency and communion: Distinctions in interpersonal space, associations with the five-factor model, and socio-emotional correlates. *Journal of Personality Assessment, 86,* 77-88.

Gallo, L. C., **Ghaed, S. G.**, & Bracken, W. (2004). Emotions and cognitions in coronary heart disease: Risk and resilience. *Cognitive Therapy and Research, 28,* 669-694.

Hall, F. S., **Ghaed, S.**, Pert, A., & Xing, G. (2002). The effects of isolation rearing in rats on NMDA R1A mRNA expression determined by in situ hybridization. *Pharmacology, Biochemistry, & Behavior, 73,*185-191.

Hall, F. S., Fong, G. W., **Ghaed, S.**, & Pert, A. (2001). Locomotor-stimulating effects of indirect dopamine agonists are attenuated in Fawn hooded rats independent of postweaning social experience. *Pharmacology, Biochemistry, & Behavior, 69,* 519-526.

ABSTRACTS/ PRESENTATIONS

Ghaed, S. G., Gallo, L. C., Rocero, N., Rush, D., DeMaria, A. N., & Smith, T. W. (2006, March). Unmitigated agency and communion predict psychological and physical health following hospitalization for acute coronary syndrome. Poster presentation, *Proceedings of the Society for Behavioral Medicine*, San Francisco, CA.

Ghaed, S. G., & Gallo, L. C. (2005, August). Agency, communion, and unmitigated counterparts: Divergent properties and socioemotional correlates. Poster presentation, *American Psychological Association Annual Convention,* Washington, D.C.

Ghaed, S. G., Gallo, L. C., Corrigan, M. A., DeMaria, A. N., & Smith, T. W. (2005, August). Objective and subjective social status and QOL post coronary event. Poster presentation, *American Psychological Association Annual Convention,* Washington, D.C.

Ghaed, S. G., & Gallo, L. C. (2004, March). Subjective social status and cardiovascular risk in women. Poster presentation, *Proceedings of the Society for Behavioral Medicine*, Baltimore, MD.

HONORS/ AWARDS

2001	Mark S. Harper Memorial Award for Excellence in Psychology (University of Maryland, College Park)
2000 – 2001	Distinguished Dean's List (UMCP)

2000 – 2001	Psi Chi (UMCP), Psychology Honor Society
1993 – 1995	Teaching Assistantship Scholarship, UMCP Graduate Program
1992 – 1995	Alpha Epsilon Delta (GWU), Pre-medical Honor Society
1990, 1991	Dean's List (George Washington University)

PROFESSIONAL AFFILIATIONS

2004 – present	Society for Behavioral Medicine
2003 – present	American Psychological Association (Div 38: Health Psychology)
2002 – present	American Psychological Association (Graduate Student Affiliate)
2001 – 2002	American Public Health Association
2001 – 2002	National Society of Collegiate Scholars
1996 – 1999	American Medical Student Association

LANGUAGES

English	Fluent, written and spoken (primary language)
Farsi	Fluent, spoken and very basic written
French	Fluent, written and spoken

ABSTRACT OF THE DISSERTATION

Subjective Social Status, Socioeconomic Status and Health

Following Acute Coronary Syndrome

by

Shiva Geneviève Ghaed

Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2008

San Diego State University, 2008

Professor Linda C. Gallo, Chair

A plethora of research supports the association between socioeconomic status (SES) and physical and psychological health. More recently, the relationship between perceived or subjective social status (SSS) and health has been examined, consistently suggesting that SSS has predictive value above and beyond the influence of traditional objective SES indicators. The current study examined associations between objective SES and SSS and indicators of psychological well-being and recovery following acute coronary syndrome (ACS) – myocardial infarction or unstable angina. Participants were 90 patients recruited from UCSD Healthcare hospitals who met established criteria for ACS as confirmed by physician diagnosis. Questionnaire packets were administered at baseline (during hospitalization) and at 1-, 3-, and 6-months following

the initial assessment. The MacArthur Scale of Subjective Social Status was used to assess participants' perceived status relative to others in their communities, and in the U.S. at large. SES was assessed by household income and educational attainment. Indicators of psychological adjustment to illness included scores on measures of depression (BDI-II) and anxiety (BAI), and indicators of recovery following the acute event included measures of self-reported health (SF-12) and disease-specific quality of life (SAQ). Multi-level modeling analyses showed that after controlling for demographic and health covariates, higher income was associated with less depression and anxiety, better self-reported mental and physical health/quality of life, and better cardiovascular health outcomes overall across the 6-month follow-up period. There were few significant findings for SSS, and only two remained significant once SES indicators were controlled. Limitations of the present study should be considered in the interpretation of its findings, and additional research, optimally with a larger sample and less attrition, would be helpful for ascertaining whether the results are generalizable to men and women, ethnically diverse populations, and patients experiencing diverse CHD stages. Despite these limitations, the current study contributes to knowledge about SES, SSS, and psychological factors that not only increase the risk of adverse outcomes, but may also influence an individual's ability to lead a fulfilling and functional life following ACS.

I. Introduction

A. Coronary Heart Disease

Coronary heart disease (CHD), the leading cause of death in the United States, is responsible for roughly 450,000 deaths (i.e., 1 out of every 5 deaths) and approximately 1,000,000 new and recurrent cardiac events annually, as well as inordinate costs (surpassing $150 billion) for medical expenses, disability, and lost productivity (American Heart Association, 2008). Coronary artery disease (CAD) – an inflammatory process – is the underlying condition for CHD, which has numerous manifestations (Brydon, Magid, & Steptoe, 2006; Smith & Ruiz, 2002). Myocardial infarction (MI) is one clinical manifestation of CHD, as is unstable angina (UA), which often portends an impending MI (Jiang, Krishnan, & O'Connor, 2002). Both are clinical diagnoses of thrombotic CAD that are classified as "acute coronary syndromes" (ACS; Achar, Kundu, & Norcross, 2005; American Heart Association, 2008).

CHD case definitions for epidemiological and clinical studies continue to change as a result of improved diagnostic technology and treatment modalities, shifting CHD presentation, increased disease severity and awareness (professional and public), and insurance regulations (Luepker et al., 2003). Currently, a diagnosis of ACS requires consideration of an individual's history, as well as risk factor analysis, physical examination, electrocardiography (ECG), and tests of serum cardiac biomarkers (Achar et al., 2005; Storrow & Gibler, 2000). Cardiac signs and symptoms of ACS include acute pain, discomfort, or pressure in the chest, epigastric, neck, jaw,

or arm regions, as well as more general symptoms of fatigue, nausea, and vomiting (Luepker et al, 2003). Although a variety of cardiac biomarkers are used for the diagnosis of ACS, troponin levels are the gold standard biomarker (Achar et al., 2005; American Heart Association, 2008). In addition, ACS diagnosis is aided by the use of ECG, which informs classification of patients into one of three categories: ST elevation MI (Q-wave MI), non-ST elevation MI (non-Q-wave MI), and UA (Luepker et al., 2003).

Behavioral medicine and health psychology research in the area of CHD has focused on three main facets of cardiovascular disease progression: (1) modifiable behavioral risk factors (e.g., smoking, physical activity, diet), (2) psychological and social risk factors (e.g., stress, negative emotions), and (3) treatment and behavioral change (e.g., psychosocial interventions, medication adherence; Smith & Ruiz, 2002). Earlier research efforts focused on behavioral risk factors, and as a result, nine major risk factors for CHD have been described by the American Heart Association (2008). They include hyperlipidemia, hypertension, smoking, diabetes, abdominal obesity, lack of physical activity, low daily fruit and vegetable consumption, alcohol overconsumption, and psychosocial distress (APA, 2008). However, because research has not been able to explain health disparities by these factors alone, and many CHD patients continue to demonstrate health problems despite physiological and behavioral interventions, researchers have begun to shift their attention to psychological and social risk factors (Gallo, Ghaed, & Bracken, 2004; Merz et al., 2002).

More recent research has examined associations between CHD and a variety of emotional factors such as depression, anxiety, anger, and hostility, as well as chronic

stressors such as low socioeconomic status (SES) and social support, and work, marital, and caregiver stress (for reviews, see Rozanski, Blumenthal, Davidson, Saab, & Kubzansky, 2005 and Suls & Bunde, 2005). The elucidation of these predisposing factors for the progression of CHD is likely to inform clinical interventions that may ultimately reduce morbidity and mortality (Smith & Ruiz, 2002).

B. Psychosocial Factors and Cardiovascular Disease

The link between CHD and psychosocial risk factors (i.e., emotional factors and chronic stressors) is well-established (Barth, Schumacher, & Herrmann-Lingen, 2004; Rosen, 2007; Rozanski et al., 2005; Suls & Bunde, 2005). Furthermore, numerous studies to date provide support for the relationship between psychological factors (e.g., depression, anxiety, stress, social support) and ACS specifically (Benedetto, Lindner, Hare, & Kend, 2006; Doyle, McGee, De La Harpe, Shelley, & Conroy, 2006; Ellis, Eagle, Kline-Rogers, & Erickson, 2005; Grace et al., 2005; Jaffe et al., 2006; Kubzansky, Cole, Kawachi, Vokonas, & Sparrow, 2006; Kubzansky, Davidson, & Rozanski, 2005; Lesperance et al., 2002; Pignalberi, Patti, Chimenti, Pasceri, & Maseri, 1998; Player, King, Mainous, & Geesey, 2007; Rao et al., 2003; Rasul, Stansfeld, Hart, Gillis, & Davey-Smith, 2004; Rosengren et al. 2004; Rumsfeld et al., 2003; Sundquist, Li, Johansson, & Sundquist, 2005; Van Elderen, Maes, & Dusseldorp, 1999; Watkins et al., 2003; Whitehead, Strike, Perkins-Porras, & Steptoe, 2005).

There is growing evidence indicating that the negative emotions of anxiety, anger, and depression may influence the development and progression of CHD (for review, see Kubzansky & Kawachi, 2000 and Rosen, 2007). Depression, one of the

most frequently investigated psychological risk factors, is now the leading cause of worldwide disability and fourth leading cause of global disease burden (World Health Organization, 2008). Depressive symptomatology and major depressive disorders, which have been repeatedly linked to increased mortality, are commonly diagnosed in patients with ACS (Lesperance, Frasure-Smith, Talajic, 1996; Lesperance, Frasure-Smith, Talajic, & Bourassa, 2002). Furthermore, CHD and more specifically, ACS patients meeting criteria for major depression experience worse quality of life and greater functional limitations (Lane, Carroll, Ring, Beevers, & Lisp, 2001; Rumsfeld et al., 2003; Spertus, McDonell, Woodman, & Fihn, 2000), and a higher likelihood of recurrent events and mortality when compared with their non-depressed counterparts (e.g., Frasure-Smith, Lespérance, & Taljic, 1995; Jaffe et al., 2006; Rosengren et al., 2004; Sykes, Hanley, Boyle, Higginson, & Wilson, 1999).

Research also suggests that depression plays a role in CAD events in both healthy individuals and those with known cardiovascular diseases (Rozanski, Blumenthal, & Kaplan, 1999; Rugulies, 2002; Wulsin & Singal, 2003; Thurston, Kubzansky, Kawachi, & Berkman, 2006). Furthermore, depressive symptomatology at the time of hospitalization, versus pre-morbid depression (i.e., a history of depression prior to the cardiovascular event or admission), may be a more critical predictor of increased mortality in patients with ACS (Grace et al., 2005). Research indicates that the level of depressive symptoms and likelihood of ACS may be related in a gradient-like fashion (Lesperance et al., 2002); therefore, even mild or subclinical symptoms of depression may cause pathophysiological changes that increase risk for deleterious

health outcomes (Rozanski et al., 2005). Thus, identifying the factors that predict who will suffer depression co-morbid with CHD is an important public health concern.

Fewer studies have examined the relationship between anxiety and cardiovascular outcomes, and findings from these studies have been somewhat inconsistent (Kubzansky & Kawachi, 2000; Kubzansky, Kawachi, Weiss, & Sparrow, 1998; Rosen, 2007; Rozanski et al., 2005; Thurston et al., 2006). Despite some null findings however, numerous studies have shown higher relative risk of fatal CHD in individuals with higher levels of anxiety versus less anxious individuals (Eaker, Pinksy, & Castelli, 1992; Haines, Imeson, & Meade, 1987; Kawachi et al., 1994; Kawachi, Sparrow, Vokonas, & Weiss, 1994; Kubzansky, Kawachi, Spiro, Weiss, Vokonas, & Sparrow, 1997). Furthermore, in addition to anger, anxiety may play a potential role in triggering acute MI, thus representing a risk factor for ACS (Mittleman et al., 1995).

In addition to evidence of the link between psychological factors and health outcomes, substantial research also supports associations between social risk factors and health. More specifically, socioeconomic status (SES) has been shown to significantly influence health outcomes and mortality from all causes (Adler et al., 1994; Adler, Marmot, McEwen, & Stewart, 1999; Adler & Snibbe, 2003; Gallo & Matthews, 2003; Rosen, 2007). Despite the abundance of studies focusing on SES and health effects in general, however, much less research has examined the role of SES and SES-related factors in the development and progression of, or recovery following, ACS in particular (Rozanski et al., 2005).

C. SES and Health

SES is believed to play a multifaceted role in the development of numerous diseases, through its association with behavioral, biological, psychological, social, and environmental factors (Rutledge et al., 2003). There is strong evidence for the link between SES and the development and progression of cardiovascular diseases in particular (see reviews, Gallo & Matthews, 2003; Gonzalez, Rodriguez, & Calero, 1998; Kaplan & Keil, 1993; Matthews, 2005). More specifically, there are robust findings from a growing number of studies suggesting that SES is closely associated with increased risk for ACS and poorer outcomes in CHD patients (Lubbock, Goh, Ali, Ritchie, & Whooley, 2005; Nishi, Makino, & Tatara, 2004; Rankin, 2002; Rao et al., 2003).

SES refers to an individual's level of resources or prestige in comparison to others, and is most often assessed with single, objective, individual-level indicators, specifically, income, educational attainment, and occupational prestige (Gallo & Matthews, 2003). Research indicates that the association between SES and health follows a gradient rather than a threshold pattern, so that even relatively affluent groups exhibit poorer health than their higher SES counterparts (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Adler & Snibbe, 2003; Gallo, Bogart, Vranceanu, & Matthews, 2005; Macintyre, 1997; Rozanski et al., 2005). Although there are many explanations for the disparities in health seen among different SES groups (e.g., access to health care, residential characteristics, physiological processes, psychosocial factors, health behaviors), these do not explain the gradient, which suggests a more

complex and multidimensional association between SES and physical health (Singh-Manoux, Adler, & Marmot, 2003).

More recently, researchers have begun to question the predictive value of utilizing only traditional indicators of SES. Thus, a new line of research based on psychological theories of social evaluation has evolved in the study of health disparities, focused on the assessment of perceived or subjective social status (SSS) in addition to SES (Schnittker & McLeod, 2005). It has been suggested that SSS might influence health over the life course because it captures aspects of SES that are not necessarily included in traditional indicators (Schnittker & McLeod, 2005).

D. SSS

SSS reflects relative social standing and may include an individual's perceptions of current social circumstances, as well as educational and socioeconomic background, and future opportunities (Singh-Manoux, Adler, & Marmot, 2003). The MacArthur Scale of Subjective Social Status (Adler et al., 2000) is a relatively new measure, which was designed to provide a "summary" assessment of one's perceived social status across SES. Thus, when SSS is assessed, it may be overlapping but not necessarily redundant with SES indicators because of its summative nature. SSS is likely distinct from traditional indicators of SES, which only capture current job status, current income, and educational attainment – all objective pieces of information about one's socioeconomic position that do not take into account psychological state, self-perception, group comparison, and other potentially relevant factors. For example, two different individuals may report an income of $35,000-49,000, but depending on the neighborhood in which they live, this salary may not translate into the same

financial opportunities or standards of living. This individual perceived sense of standing within that community of comparison may have implications for psychological and physical health.

The MacArthur Scale of SSS has been examined in relation to health in an increasing number of studies. The measure consists of two 10-rung ladders on which respondents rank their standing in their "community" – however it is most meaningfully defined – and in the U.S., in terms of typical SES indicators (i.e., income, education, and occupational status). Research on the effects of income inequality on health suggest that differences in relative standing may be more predictive for health than objective or absolute levels of SES (Schnittker & McLeod, 2005; Wilkinson, 1999). Furthermore, recent research suggests that subjective assessments of social status relate to health outcomes in a variety of diverse populations (Adler, Epel, Castellazzo, & Ickovics, 2000; Adler, Singh-Manoux, Schwartz, Stewart, Matthews, & Marmot, 2008; Chen & Paterson, 2006; Finkelstein, Kubzansky, & Goodman, 2006; Franzini & Fernandez-Esquer, 2006; Goodman, Adler, Kawachi, Frazier, Huang, & Colditz, 2001; Goodman, Adler, Daniels, Morrison, Slap, & Dolan, 2003; Goodman, Huang, Schafer-Kalkhoff, & Adler, 2007; Goodman, McEwen, Dolan, Schafer-Kalkhoff, & Adler, 2005; Hu, Adler, Goldman, Weinstein, & Seeman, 2005; Jamison, Fernald, Burke, & Adler, 2005; Kopp, Skrabski, Rethelyi, Kawachi, & Adler, 2004; Kopp, Skrabski, Kawachi, & Adler, 2005; Leu, Yen, Gansky, Walton, Adler, & Takeuchi, 2008; Operario, Adler, & Williams, 2004; Ostrove, Adler, Kuppermann, & Washington, 2000; Reitzel, Vidrine, Li, Mullen, Velasquez, Cinciripini et al., 2007; Singh-Manoux, Marmot, & Adler,

2003, 2005; Wright & Steptoe, 2005;Yip & Adler, 2005). Results from these studies suggest that SSS is related to a number of health outcomes, such as mortality, cardiovascular risk, depression, diabetes, respiratory illness, and self-rated health.

Research suggests that assessing SSS potentially provides a more accurate portrayal of an individual's social circumstances, and therefore may be a better predictor of SES-related health outcomes than objective indicators (Schnittker & McLeod, 2005; Singh-Manoux et al., 2003). In several studies, SSS was shown to relate more strongly than SES to health indicators, and the significant associations remained even after controlling for SES. For example, Adler and colleagues (2000) evaluated associations among objective SES and SSS indicators and psychological and physical variables in a sample of healthy White women. The study assessed for SSS using one ladder measure referring to one's standing in "society" instead of the "U.S." Associations between SSS and psychological functioning (i.e., negative affectivity, chronic and subjective stress, pessimism, control over life, active and passive coping) and health-related factors (i.e., self-rated physical health [SF-36], waist-to-hip ratio [WHR], sleep latency, resting heart rate) were stronger and more consistent than those between objective SES indicators and these outcomes (Adler et al., 2000). Since a majority of these associations persisted even after controlling for negative affect, Adler et al. (2000) concluded that SSS has a unique and significant effect on both mental and physical outcomes.

In a similar study, Singh-Manoux, Adler, and Marmot (2003) examined SSS as a predictor of health in a very large European sample (i.e., 6981 white-collar men and women; Whitehall II study), and found that SSS significantly predicted worse health,

and only in some cases were the relationships explained by objective SES indicators. For example, individuals who rated themselves as having lower social status had higher prevalence rates of self-reported angina, diabetes (previously diagnosed by a physician), and respiratory illness (men only), as well as poor self-rated health, and depression. Further analyses revealed that occupational status accounted for the association between diabetes and SSS in men and women. Furthermore, education (for women) and employment grade (for men) attenuated the relationship between SSS and angina (Singh-Manoux et al., 2003). The study assessed for SSS using one ladder measure referring to one's standing in "society." More recently, using the same sample, Singh-Manoux, Marmot, and Adler (2005) explored the relationships between objective and subjective measures of SES and health outcomes (e.g., self-reported health [SF-36], psychological distress) among middle-aged adults. Results from this study indicated that although both objective and subjective measures of SES predicted health and change in health status over a 3-year follow-up period, when included in the model simultaneously, only subjective SES (i.e., SSS) was predictive of health outcomes (Singh-Manoux et al., 2005).

Finally, Wright and Steptoe (2005) examined associations between socioeconomic inequalities and cortisol response to awakening (CAR) in an older retired population in London, England. The study assessed for SSS using one ladder measure referring to one's standing in "society" and found that after controlling for relevant covariates (e.g., age, body mass index [BMI], smoking, time of waking, education, financial strain, chronic illnesses, medications), individuals with lower social status had greater CAR (Wright & Steptoe, 2005). The researchers concluded

that these findings provide further support for the hypothesis that neuroendocrine stimulation affects psychobiological pathways that may, in part, explain the social gradient in disease (Wright & Steptoe, 2005). They also suggested that measuring SSS may be particularly useful in elderly populations because an aggregate, individualized assessment of social status may also provide a more accurate portrayal of lifetime social experience (Wright & Steptoe, 2005).

The ladder scales have also been used to measure perceived social status in several culturally diverse populations or with a focus on race/ethnicity disparities. The associations found have been less predictable or consistent than those observed in non-Hispanic Whites. For example, Ostrove and colleagues (2000) examined SSS (using the US ladder scale) in relation to self-rated physical health in an ethnically diverse sample of pregnant women. They found disparate patterns between levels of education, income, and occupation (i.e., objective indicators of social status) and ladder assessments (i.e., subjective indicator of social status) among White, Latina, African-American, and Chinese-American women (Ostrove et al., 2000). Among White and Chinese-American women, SSS was found to be a significant predictor of self-rated health even after controlling for the effects of objective SES (Ostrove et al., 2000). In contrast, only household income was a significant predictor of self-rated health for African-American and Latina women (Ostrove et al., 2000).

Similarly, a recent study examined not only the relationship between SSS and SES but also the determinants of SSS, and the relationships between SSS and self-reported physical and mental health, and self-rated health (SRH) in a low-income population of Mexican-origin individuals (Franzini & Fernandez-Esquer, 2006). In

this study, participants were asked to rank themselves "relative to other people" and then subsequently asked to specify if they were comparing themselves to "people in the U.S., Anglos, Mexicans in the U.S., Mexicans in Mexico, or others" (Franzini & Fernandez-Esquer, 2006). They also assessed for sociocultural personal factors, i.e., religiosity, social support, social trust, perceived personal opportunities, absence of perceived victimization, and perceived racism (Franzini & Fernandez-Esquer, 2006). Findings indicated that both income and education were salient factors in determining ladder rankings, however, overall, correlations between SES and SSS were low regardless of comparison group (a proxy for acculturation), suggesting that SES and SSS capture different aspects of social standing (Franzini & Fernandez-Esquer, 2006). SSS and SES were related to all health outcomes, and even after controlling for SES, SSS was related to both self-reported mental health and SRH (Franzini & Fernandez-Esquer, 2006). This study concluded that sociocultural characteristics might mediate the effect of SSS on health (Franzini & Fernandez-Esquer, 2006).

Finally, in another recent study the associations between subjective and objective SES and health measures were compared in a large sample of older Taiwanese men and women (Hu, Adler, Goldman, Weinstein, & Seeman, 2005). The study included health-related variables such as self-rated overall health, difficulties in activities of daily living and physical activities, and depression, and found that the subjective assessment of social hierarchy rank (using the US ladder, but substituting the term "society") was uniquely associated with self-rated health and physical functional status (Hu et al., 2005). This relationship was independent of the effects of

objective SES indicators examined – specifically, income, occupation, and education (Hu et al., 2005).

Very few studies have studied SSS in the context of cardiovascular disease, or cardiovascular health outcomes. In a previous study, SSS (both the US and community ladder measures) and psychological, behavioral, and physical cardiovascular risk factors were examined in a cohort of predominantly White middle-aged women (Ghaed & Gallo, 2007). This study not only found significant associations between cardiovascular risk factors and SSS beyond the effects of SES, but findings suggested that the US and community ladder measures may have differential implications for health and well being (Ghaed & Gallo, 2007). Although the US and community SSS scales were moderately correlated (i.e., .71), they differed in their associations with cardiovascular risk factors such that community SSS, but not US SSS, was significantly related to psychosocial variables (i.e., depression, anxiety, pessimism, and stress), whereas US SSS, but not community SSS, was significantly related to behavioral risk factors (diet, physical activitiy; Ghaed & Gallo, 2007). Furthermore, only US SSS was significantly associated with clinic and ambulatory blood pressure measures (Ghaed & Gallo, 2007). This study highlights a need to further examine the nuances not only between subjective and objective social status assessment, but also those between US and community social status measurement.

E. The Present Study

Despite a well-established gradient between SES and health, underlying mechanisms, direction of causality, and interactions with other variables (including SSS) remain unclear (e.g., Adler & Snibbe, 2003; Gallo & Matthews, 2003). Further

investigation of subjective SES indicators might contribute uniquely to our understanding of the relationship between SES and psychological and physical health. The aim of the current study was to examine the associations between objective SES (income and education) and SSS (U.S. and community) and adjustment and recovery in CHD patients who were diagnosed with ACS. In addition, the study assessed the degree to which associations between SSS and health outcomes are distinct from the influences of objective SES indicators (i.e., income and educational attainment). Psychosocial indicators of recovery and psychological adjustment (e.g., negative emotions) known to be relevant to cardiovascular morbidity and mortality were examined (for reviews concerning psychosocial factors and cardiovascular disease, see Everson-Rose & Lewis, 2005; Gallo, Ghaed, & Bracken, 2004; Krantz & McCeney, 2002; Kubzansky & Kawachi, 2000; Smith & Ruiz, 2002). Specifically, depression (BDI-II: Beck Depression Inventory-II; Beck, Steer, & Brown, 1996), anxiety (BAI: Beck Anxiety Inventory; Beck, Epstein, Brown, & Steer, 1988), self-reported physical and mental (SF-12: General Health Questionnaire, Short Form 12; Ware, Kosinski, & Keller, 1996) and ACS-specific (SAQ: Seattle Angina Questionnaire; Spertus et al., 1995) symptoms and quality of life were examined. The study included a longitudinal component, so that participants were assessed at baseline (while in hospital) and at several points across a six-month follow-up.

Another focus of this study was to examine and explore discrepancies in the patterns of association of the US versus community SSS ladders with health. The current study is the second study to date (to our knowledge) that has included both SSS ladder measures simultaneously. The findings from a previous study (Ghaed &

Gallo, 2007) suggest that these scales may be qualitatively different. Specifically, the US SSS measure appears to be more closely related than the community SSS measure to objective SES indicators of income, education, and occupation (Ghaed & Gallo, 2007). In contrast, community SSS may assess for variables that are outside the range of objective SES (e.g., perceived status among neighbors and friends, future career aspirations, social standing in religious groups), and appears to be more closely associated with psychosocial well-being, thus representing an important measure of additional psychosocial variables that may impact health (Ghaed & Gallo, 2007).

E. Hypotheses

Predictions for the current study were formed based on prior research and theory regarding SSS and SES and health (Adler et al., 2000; Adler & Ostrove, 1999; Gallo & Matthews, 2003; Ghaed & Gallo, 2007; Hu et al., 2005; Macleod et al., 2005; Singh-Manoux et al., 2003, 2005; Wright & Steptoe, 2005).

First, it was hypothesized that overall, across the 6-month follow-up period, individuals with lower (objective) SES would report higher levels of depression and anxiety, and would endorse a greater number of physical symptoms and lower quality of life relative to those with higher self-reported SES. Specifically, we expected that lower income and lower educational attainment would be significantly associated with higher depression and anxiety (i.e., higher BDI-II and BAI scores) overall across 6 months, even after controlling for demographic and health covariates. In addition, we expected that lower income and education would be significantly associated with poorer self-reported health, increased symptoms, and lower quality of life (i.e., lower SF-12 and SAQ scores) overall across 6 months, even after controlling for

demographic and health covariates. Furthermore, it was hypothesized that individuals with lower SES would show a slower course of recovery (i.e., more persistent distress, poor quality of life, and functioning problems) on these same outcomes, across the 6-month follow-up period, when compared to those with higher self-reported SES.

Second, it was hypothesized that overall, across the 6-month follow-up period, individuals with lower self-reported SSS would report higher levels of depression and anxiety, and would endorse a greater number of physical symptoms and lower quality of life relative to those with higher self-reported SSS. Specifically, we expected that lower US and community SSS would be significantly associated with higher depression and anxiety (i.e., higher BDI-II and BAI scores) overall across 6 months, even after controlling for demographic and health covariates. In addition, we expected that lower US and community SSS would be significantly associated with poorer self-reported health, increased symptoms, and lower quality of life (i.e., lower SF-12 and SAQ scores) overall across 6 months, even after controlling for demographic and health covariates. Furthermore, it was hypothesized that individuals with lower self-reported SSS would show a slower course of recovery (i.e., more persistent distress, poor quality of life, and functioning problems) on these same outcomes, across the 6-month follow-up period, when compared to those with higher self-reported SSS.

Finally, it was hypothesized that overall, across the 6-month follow-up period, individuals with lower self-reported SSS would report higher levels of depression and anxiety, and would endorse a greater number of physical symptoms and lower quality of life relative to those with higher self-reported SSS, even after accounting for the influence of objective SES indicators. Specifically, we expected that lower US and

community SSS would be significantly associated with higher depression and anxiety (i.e., higher BDI-II and BAI scores) overall across 6 months, even after controlling for objective SES, as well as demographic and health covariates. In addition, we expected that lower US and community SSS would be significantly associated with poorer self-reported health, increased symptoms, and lower quality of life (i.e., lower SF-12 and SAQ scores) overall across 6 months, even after controlling for objective SES, as well as demographic and health covariates. Furthermore, it was hypothesized that individuals with lower self-reported SSS would show a slower course of recovery (i.e., more persistent distress, poor quality of life, and functioning problems) on these same outcomes across the 6-month follow-up period when compared to those with higher self-reported SSS, even after controlling for objective SES, as well as demographic and health covariates.

No studies to date have examined social status (objective and subjective) and indicators of psychological well-being, adjustment to illness, and recovery in a diseased population. Furthermore, this study was longitudinal, which enabled for an exploration of the recovery process over time following an acute event. This study is novel also in its examination of SSS in the context of CHD, more specifically ACS. In addition, an examination of unique associations of US and community SSS with indicators of recovery enabled comparisons between two different perceptions of SSS in an attempt to provide insight about more specific aspects of social status that relate to health, in particular, cardiovascular health. Our study is the first, to our knowledge, to evaluate the association between SSS and recovery and adjustment in a patient population, over-time (i.e., 6-months), and in the context of ACS.

II. Method

A. Sample

Enrollment in the study began in October 2002 and ended in February 2005. A total of 140 patients were recruited from UCSD Healthcare hospitals in the San Diego area for a larger study, Project REACH: Relationships, Emotions, and Cardiovascular Health. All patients met established criteria for ACS (MI, N = 110 and UA, N = 30), as confirmed by physician diagnosis, and based on current guidelines provided by the AHA (2006; i.e., patient symptoms and history, elevated troponin levels, and ECG abnormalities). 334 patients were screened, but were not enrolled in the study because the physician refused access (N = 9), or the patient was less than 35 years old (N = 4), not fluent in English (N = 40), not coherent or medically stable within 15 days (N = 20), experiencing substance withdrawal (N = 6), homeless (N = 8) or jailed (N = 5), had another imminently life-threatening illness (N = 4), was not married/cohabitating (N = 161; i.e., before criteria were changed to include unmarried participants), or was missed because he/she was discharged before contact could be made (N = 25). In addition, 52 patients who were eligible refused to participate in the study. Thus, 192 of 449 patients screened (not including the 25 who were missed) were eligible in the original sample, resulting in an eligibility rate of 42%. Finally, 140 patients participated, yielding a participation rate of 73%.

Because the current study sought to examine change over time, only participants who completed at least one follow-up assessment (i.e., N = 111) were included. Of the 29 patients (20.71% of sample) who did not participate beyond

baseline, 10 withdrew from the study because of illness or disinterest, 2 died following baseline, 3 moved and could not be located, and 14 did not respond to repeated contact attempts. Other participants missed one or more follow-up assessments because they did not respond to repeated attempts to contact them or had requested to complete assessments by mail but failed to return their questionnaires. In sum, 58 participants (41.43%) completed all four assessments, 38 (27.14%) completed three assessments, and 25 (17.86%) completed two assessments. Missing data analyses showed no differences in demographic characteristics and psychosocial variables (age, sex, ethnicity, educational attainment, income, depression, anxiety) according to the number of assessments completed (all $p > .20$). In addition, participants who completed the baseline assessment only did not differ from those who completed two or more assessments according to sex, ethnicity, or educational attainment (all $p > .40$), although there was a tendency for participants who dropped out after the baseline to be younger (mean age = 58.12, SD = 13.52) than those who completed at least one follow-up (mean age = 62.97, SD = 11.90), $F(1,138) = 3.61$, $p < .10$. Thus, despite a substantial amount of missing data, attrition did not appear to be systematic, and data seemed to be missing at random.

An additional 21 patients were excluded from the current analyses for the following reasons: 12 patients were missing data for income (i.e., refused to answer this question), 5 patients were missing data for one or both of the SSS ladder measures (i.e., refused to answer or could not understand the task), and 4 patients were missing data for ST elevation (i.e., a key covariate, which was unfortunately missing from some patients' medical charts). Thus, the final subsample for the current investigation

was 90 participants. Specific demographic characteristics of the sample are reported in the Results section (Participant Characteristics).

B. Procedures

The chief cardiology fellow on staff was contacted daily to obtain up-to-date admission and eligibility information about new patients. Once it was determined that there was a potentially eligible and interested patient, a research assistant traveled to the hospital to attempt recruitment. If found to be eligible, the patient provided full informed consent in accordance with university and hospital Institutional Review Boards and HIPPA regulations. The baseline assessment was then conducted in hospital, usually within the first week (but no more than 15 days, i.e., Mean = 2.12, SD = 1.81, Range = 11) after admission for ACS. A questionnaire packet was administered in-person, and included measures of demographic information, SSS, and depression and anxiety symptoms.

Follow-up assessments were conducted in person, by telephone, or were sent out (if requested) by mail at 1-, 3-, and 6-months following the date of the initial interview. Time between assessments varied across patients to some extent, due to delays in scheduling follow-ups. If unable to reach a patient for a targeted follow-up, no fewer than 5 contact attempts were made to the participant's home, office, email, or alternative contact persons. If patients could not be reached within three weeks of a scheduled follow-up, a questionnaire packet and letter of inquiry, with a self-addressed-stamped return envelope was sent to the patient's home. The follow-up assessments included evaluations of quality of life and self-reported health and functioning, in addition to depressive and anxiety symptoms. For the current study, on

average patients' 1-month assessments were completed 32.59 days following the baseline (SD = 14.28, Minimum = 16 days, Maximum = 80 days), the 3-month assessments were completed 99.16 days following the baseline (SD = 19.78, Minimum = 55 days, Maximum = 173 days), and the 6-month assessments were completed 211.91 days following the baseline (SD = 69.44, Minimum = 127 days, Maximum = 545 days). 86.40% of the 1-month assessments were completed within 14 days of 1 month, 92.90% of the 3-month assessments were completed within 30 days of 3 months, and 81.00% of the 6-month assessments were completed within 30 days of 6 months. 95.20% of the final (i.e., 6-month) assessments were obtained within one year (i.e., 365 days), which was our targeted "cutoff" for the 6-month timepoint.

All procedures were approved by the San Diego State University and University of California, San Diego Institutional Review Boards, in addition to each of the hospital sites of investigation.

C. Measures

Social Status

Subjective Social Status: The MacArthur Scale of Subjective Social Status (Adler et al., 2000) was used to assess perceived social status within the community and the U.S. at large. Patients first viewed a picture of a 10-rung ladder and were asked rank their perceived social status in the context of "community." They were provided with the following verbal instructions: *"Think of this ladder as representing where people stand in their communities. People define community in different ways; please define it in whatever way is most meaningful to you. At the top of the ladder are the people who have the highest standing in their community. At the bottom are the*

people who have the lowest standing in their community. Where would you place yourself on this ladder?" Patients placed an X on the rung indicating their perceived standing relative to other people in their community. Similarly, for US SSS, patients were shown an identical drawing of a ladder consisting of 10 rungs, and were asked to rank themselves in the context of the U.S. at large. They were provided the following verbal instructions: *"Think of this ladder as representing where people stand in the United States. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – who have the least money, the least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top and the lower you are, the closer you are to the people at the very bottom. Where would you place yourself on the ladder?"* The score for each ladder is simply the number of the rung chosen to represent one's status, with a possible low score of 1 and high score of 10.

Objective social status (SES). Participants were asked the following question regarding their educational attainment: "*What is the highest degree you earned?*" Answer choices included the following: (1) High School diploma or equivalency (GED), (2) Associate's degree (junior college), (3) Bachelor's degree, (4) Master's degree, (5) Doctorate, (6) Professional (MD, JD, DDS, etc.), (7) Other (specify), and (8) None of the above (less than a High School diploma). Participants were asked the following question regarding their household income: *"Which of these categories best describe your total combined family income for the past 12 months? This should include income (before taxes) from all sources, wages, veteran's benefits, help from*

relatives, rent from properties, and so on." Answer choices included the following: (1) less than $5,000/year, (2) $5,000 through $11,999/year, (3) $12,000-15,999/year, (4) $16,000 through 24,000/year, (5) $25,000-34,999/year, (6) $35,000-49,999/year, (7) $50,000-74,999/year, (8) $75,000-$99,999, and (9) $100,000 or greater/year, (88) Don't know, and (99) No response.

Because data for educational attainment and income were normally distributed, and because the association between objective SES and health is expected to be linear, both variables were examined as continuous predictors. For the current study, categories were condensed in cases where very few participants chose a response or when it was deemed theoretically meaningful. Specifically, education was coded into five categories: (a) less than High School, (b) High School diploma, (c) Bachelor's degree, (d) Master's degree, and (e) Higher than Master's degree. Category (a) consists of those participants who have not completed high school or GED equivalency (endorsed question 8 above; n = 4). Category (b) consists of participants who have completed high school/GED, or some college (endorsed questions 1 or 2 above; n = 33 and n = 9, respectively). Category (c) consists of participants who have completed college and earned a Bachelor's degree (endorsed question 3 above; n = 26). Category (d) consists of participants who have earned a Master's degree (endorsed question 4 above; n = 12). Finally, category (e) consists of participants who have earned any degree higher than a Master's degree (endorsed questions 5 or 6 above; n = 1 and n = 5, respectively).

Also, similarly for the current study, household income was condensed and coded into seven categories: (a) less than $11,999/year, (b) $12,000-24,999/year, (c)

$25,000-34,999/year, (d) $35,000-49,999/year, (e) $50,000-74,999/year, (f) $75,000-$99,999, and (g) $100,000 or greater/year. Category (a) consists of participants who endorsed questions 1 or 2 above (n = 4 and n = 4, respectively). Category (b) consists of participants who endorsed questions 3 or 4 above (n = 6 and n = 11, respectively). Category (c) consists of participants who endorsed question 5 (n = 7). Category (d) consists of participants who endorsed question 6 (n = 12). Category (e) consists of participants who endorsed question 7 (n = 14). Category (f) consists of participants who endorsed question 8 (n = 10), and finally category (g) consists of participants who endorsed question 9 (n = 22).

Other Demographic Factors. Participants responded to standard questions assessing age (i.e., date of birth), gender (i.e., male/female), and race/ethnicity (i.e., White/Caucasian, Black/African American, American-Indian/Alaskan, Asian, Native Hawaiian/Other Pacific Islander, Hispanic/Latino, and Other). Participants were asked to choose the category that best described their race/ethnicity. Several participants reported "other" ethnicities, but all were later placed into an existing category (i.e., 1 "Eskimo" placed into American Indian/Alaskan Native category; 1 "Mexican" placed into Hispanic/Latino category; 2 "Filipino" placed into Native Hawaiian/Other Pacific Islander category). Race/ethnicity was then represented with three distinct, dummy-coded variables. Because the greatest health disparities appear between the White/Caucasian and both Black/African American and Hispanic/Latino groups, it was most meaningful to dummy code for these groups. Also, there were so few participants in the other categories (i.e., American-Indian/Alaskan, Asian, Native Hawaiian/Other Pacific Islander), these smaller groups were condensed into one

group, "Other." For all 3 variables, White/Caucasian was assigned a value of 0 because it was the reference group. For the first dummy-coded variable, Hispanic/Latino received a value of 1 and all other ethnic groups received a value of 0. For the second dummy-coded variable, Black/African American was assigned a value of 1 and all other ethnic groups received a value of 0. Finally, for the third dummy-coded variable, Other (i.e., anything other than White, Black or Hispanic) was assigned a value of 1 and all other ethnic groups received a value of 0.

Psychosocial measures

Beck Depression Inventory-II (BDI-II) (Assessed at baseline, 1-, 3-, and 6-months). Depression symptoms were measured using the BDI-II (Beck, Steer, & Brown, 1996), the updated version of the well-validated and widely used BDI (Beck & Beamesderfer, 1974). The scale consists of 21 items describing cognitive-affective and somatic symptoms of depression, as experienced within the past two weeks (modified to time since hospitalization for the baseline visit). The BDI-II uses a 4-point scale, on which respondents rate the extent to which each symptom has been present or absent. The ratings yield a summary depression score, with higher levels indicating more severe depression. The BDI-II has excellent psychometric properties as evaluated in college student, psychiatric, and medical settings, including high test-retest reliability, convergent validity, specificity and sensitivity for detecting major depression, and internal consistency estimated at $\alpha > .90$ in prior research (e.g., Arnau, Meagher, Norris, & Bramson, 2001; Beck et al., 1996; Steer, Ball, Ranieri, & Beck, 1999). Further, it is closely related to the BDI, which has been shown to have predictive validity in studies of depression and CHD outcomes (e.g., Ahern et al., 1990; Frasure-

Smith et al., 1995; 1999; 2003; Grace et al., 2005; Jaffe et al., 2006; Watkins et al., 2003). In the current sample, internal consistency was found to be good, with a range of $\alpha = .88$ to .93 across all timepoints.

Beck Anxiety Inventory (BAI) (Assessed at baseline, 1-, 3-, and 6-months). Anxiety symptoms were measured using the BAI (Beck, Epstein, Brown, & Steer, 1988). The scale consists of 21 items that describe symptoms of anxiety within the past week and was specifically designed to minimize overlap with symptoms of depression. Consistent with the assessment of depression, the timeframe at baseline was modified to assess anxiety symptoms since hospitalization. At later follow-ups, the time-frame was modified to assess anxiety symptoms over the prior two weeks, to correspond with the BDI-II. The BAI has strong psychometric properties with internal consistency estimated at $\alpha > .90$ (Beck et al., 1988). In the current sample, internal consistency was found to be good and ranged from $\alpha = .90$ to .93 across all timepoints.

SF-12 (Assessed at 1-, 3-, and 6-months). The SF-12 was used to evaluate perceived general health-related quality of life and functional status. This measure is an abbreviated version of the widely used SF-36 (Ware, Kosinski, & Keller, 1994), which was shown to reproduce more than 90% of the variance in the original measure (Ware, Kosinski, & Keller, 1996). The SF-12 consists of the following subscales, which can be utilized as 8 individual scales or as two summary scales: Physical health (Physical Health, Role-Physical, Bodily Pain, and General Health) and Mental health (Vitality, Social Functioning, Role-Emotional, and Mental Health). Scales are normed to have a Mean of 50 and Standard Deviation of 10 in the general population, with higher scores indicative of better functioning. The scales demonstrate good test-retest

reliability (Ware et al., 1996) and have been shown to discriminate among groups with distinct mental and physical conditions. In addition, the SF-12 has been used previously in studies of CHD patients (e.g., Crilley & Farrer, 2001; Lim & Fisher, 1999). The SF-12 was not administered at baseline because this measure is not valid for the assessment of health during crisis, but rather is meant to be used as a measure of functional status and health changes during recovery. For the current study, the two larger summary scales (i.e., Mental and Physical health) were examined instead of the subscales in order to minimize the number of statistical analyses, and therefore reduce the risk for Type I error.

Seattle Angina Questionnaire (SAQ) (Assessed at 1-, 3-, and 6-months). The SAQ (Spertus et al., 1995) was used to assess disease-specific functional status and quality of life. Although overall measures of perceived health such as the SF-12 are reliable and valid for assessing health outcomes, instruments developed for specific conditions may be more responsive to change and may provide additional clinical information. The SAQ consists of 19 items that measure 5 dimensions of CHD: physical limitations caused by CHD (i.e., "exertional capacity"), frequency and stability of angina symptoms, satisfaction with treatment, and patients' perceptions of how their coronary disease limits the quality of their lives. For each scale, higher scores indicate fewer symptoms or better quality of life health status, with scores ranging from 1 to 100. There is no total or summary scale score for this questionnaire, thus each of the 5 dimensions were examined separately. The exertional capacity subscale captures the degree of limitation experienced by an individual while engaging in a series of simple to more complex tasks. Participants respond as to how limited

they are (*Severely limited* to *Not at all limited*) due to "chest pain, chest tightness, or angina" while engaging in activities such as: dressing yourself; climbing a hill or a flight of stairs without stopping; gardening, participating in strenuous sports (e.g., swimming, tennis). The anginal stability dimension consists of the following single item for which participants choose from five choices ranging from *Much more often* to *Much less often*: "Compared with 4 weeks ago, how often do you have chest pain, chest tightness, or angina when doing your most strenuous activities?" The anginal frequency dimension consists of two items for which participants choose from six choices ranging from *4 or more times per day* to *None over the past 4 weeks*, which ask on average over the past 4 weeks how many times the participant has had chest pain and how many times he/she has had to take nitroglycerin tablets or spray. The treatment satisfaction dimension is measured by the following four items (and answer choices): "How bothersome is it for you to take your pills for chest pain, chest tightness, or angina as prescribed?" (answer choices range from *Extremely bothersome* to *Not bothersome at all* and *My doctor has not prescribed pills*); "How satisfied are you that everything possible is being done to treat your chest pain, chest tightness, or angina?" (answer choices range from *Not satisfied at all* to *Completely satisfied*); "How satisfied are you with the explanations your doctor has given you about your chest pain, chest tightness, or angina?" (answer choices range from *Not satisfied at all* to *Completely satisfied*); "Overall, how satisfied are you with the current treatment of your chest pain, chest tightness, or angina?" (answer choices range from *Not satisfied at all* to *Completely satisfied*). Finally, disease perception is measured by the following three items (and answer choices): "Over the past 4 weeks, how much has

your chest pain, chest tightness, or angina limited your enjoyment of life?" (answer choices range from *It has extremely limited my enjoyment of life* to *It has not limited my enjoyment of life at all*); "If you had to spend the rest of your life with your chest pain, chest tightness, or angina the way it is right now, how would you feel about this?" (answer choices range from *Not satisfied at all* to *Completely satisfied*); "How often do you think or worry that you may have a heart attack or die suddenly?" (answer choices range from *I can't stop thinking or worrying about it* to *I never think or worry about it*).

Previous research demonstrates that the SAQ scales are reliable, valid, and responsive to clinical change (Dougherty, Dewhurst, Nichol, & Spertus, 1998; Stewart, 1992). Numerous studies have included the SAQ in CHD and specifically ACS populations (e.g., Rumsfeld et al., 2003, 2006; Spertus et al., 2006). Like the SF-12, the SAQ was not administered at baseline because it is not valid for the assessment of health during crisis, but rather is meant to be used as a measure of functional status and health changes during recovery. In addition, because many patients were admitted for a first-time cardiovascular event (and may have experienced no prior symptoms), responding to items about treatment or angina experiences would not have made sense. In the current sample, internal consistency was found to be good for all multi-item SAQ subscales, with a range of .88 to .90 across all timepoints.

Covariate measures (for controlled analyses)

Health Status Indicators (Assessed at baseline). Key cardiovascular risk factors for CHD (AHA, 2008) were assessed at baseline. Specifically, patients were asked whether they had high cholesterol and/or high blood pressure (*Yes/No*). These

were included as separate covariates because they are not categories already included in the Charlson Comorbidity Index (see below), and thus would not have otherwise been accounted for in the analyses.

Co-Morbid Conditions (Assessed at baseline, obtained from medical records). Hospital records were reviewed for evidence of prior cardiac events and comorbid conditions. The Charlson Comorbidity Index (Charlson, Pompei, Ales, & MacKenzie, 1987) was created and included as a covariate in the statistical analyses. The Charlson Comorbidity Index is a validated method of classifying comorbidity to predict mortality, and is based on International Classification of Disease (ICD-9) codes (D'Hoore, Bouckaert, & Tilquin, 1996). The index contains 19 categories of comorbidity, specifically prior MI, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer disease, mild liver disease, diabetes, hemiplegia, moderate/severe renal disease, diabetes with end-organ damage, tumor, leukemia, lymphoma, moderate/severe liver disease, metastatic solid tumor, and HIV/AIDS (Charlson et al., 1987). Each category has an associated weight, which is based on the adjusted risk of one-year mortality (Charlson et al., 1987). Weights are summed for each patient and dichotomized such that patients with scores of 0 or 1 are categorized as "low comorbidity," (and assigned a score of "1") and patients with scores greater than 2 fall into the "high comorbidity" (and assigned a score of "2") category (Goldstein, Samsa, Matchar, & Horner, 2004).

ACS Event Severity Indicators (Assessed at baseline, obtained from medical records). Indicators of severity for the acute cardiovascular event included as

covariates in the current sample were diagnosis (i.e., MI or UA – confirmed by physician or medical records) and the presence/absence of ST-elevation. Selection of the specific severity indicators was based on current established medical practice in the field of cardiology suggesting more accurate diagnosis and outcome predictions based on a combination of factors, including clinical presentation, biochemical markers (e.g., cardiac troponin) and ECG findings (e.g., ST-elevations), and background risk (Achar et al., 2005; American Heart Association, 2008; Fitchett, Goodman, & Langer, 2001; Luepker et al., 2003). We had also intended to include troponin levels, but because this data was missing for a large portion of the sample (N = 16), and because of inconsistencies in the way in which it was recorded and obtained from medical records, we ultimately decided not to include this variable.

D. Statistical Analyses

After preliminary data screening and cleaning, multilevel modeling (MLM) analyses performed in HLM 6.0 (i.e., Bryk & Raudenbush, 1992; Raudenbush, Bryk, Cheong, & Congdon, 2000) were used to analyze the data according to the particular hypotheses specified. MLM is a unique approach to repeated measures or growth curve analysis in which multiple observations on each individual are viewed as "nested" within-person. This nesting allows unequal numbers and spacing of observations per participant by using maximum likelihood estimation. This is a preferred method for a sample such as this one, which is both longitudinal and also contains missing data. MLM requires at least two data points for each measure to estimate missing points, which allows a larger sample than would otherwise be accessible with traditional repeated measures techniques.

In the current study, the primary analyses were conducted via two-level models. Specifically, Level 1 analyses modeled individual growth or change based on repeated observations nested within persons. Thus, this lower-level model enabled estimates of the intercept (i.e., average outcome level) and slope (i.e., change in health outcome given a 1-month increase in age) for each individual. Random intercepts models were conducted whenever possible, as indicated in the baseline models by the amount of between-subjects variance and reliabilities for the intercepts coefficients (i.e., significant Chi square test for variance components). Slopes models were tested as "fixed" due to insufficient sample size (and frequent missing data at each timepoint), which made it impossible to reliably estimate random slopes models.

At the higher-level, or Level 2 model, these person-specific change parameters were predicted by between-subjects factors. Thus, objective indicators of SES (education and income variables) and US and community SSS (tested simultaneously) were examined as predictors of person-specific intercepts and slopes calculated at Level 1. Repeated measures of psychological health and coping (i.e., depression, anxiety, self-rated health/quality of life, CHD-related functioning/quality of life) were considered lower-level variables, whereas single-time measures of SES (income and education) and SSS (US and community) were considered higher-level variables. US and community SSS were entered simultaneously in the model for analyses of SSS to ensure the most conservative approach to estimating each factor's influence on health. Similarly, education and income were entered simultaneously for analyses of objective SES. All predictors and all covariates were centered around the sample mean. Thus, intercepts were interpretable as the means for the samples.

Covariates in the target analyses were entered at both Level 1 (if measured repeatedly) and Level 2 (if invariant), and were grand-mean centered in all cases. Age at assessment was the only covariate entered at Level 1. Because age was grand-mean centered, the analyses adjusted for between person differences in age and time (in months) between assessments. Covariates entered at Level 2 included gender, race/ethnicity, comorbid medical conditions (i.e., the Charlson comorbidity index), high cholesterol, high blood pressure, and indicators of MI or UA severity (i.e., diagnosis, ST-elevation).

Initial MLM analyses were conducted to create "baseline" (i.e., fully unconditional) models, which included no predictors. These models were used to determine the amount of variance attributable to within versus between-subjects differences, and to examine reliability of coefficient estimates. Following the examination of baseline models, three sets of analyses (corresponding with the hypotheses) were run to test the unique effects of objective SES, SSS, and the effects of SSS above and beyond SES. Each of these models was run twice - first, accounting only demographic variables, and second, accounting for both demographic variables and health covariates (as previously described).

The first set of models tested the effects of the objective SES variables, income and education, on average levels and changes for each outcome. Specifically, random intercepts models tested the effects of SES variables on average levels of depression, anxiety, self-rated health/quality of life, and CHD-related functioning/quality of life. Fixed slopes models tested the effects of objective SES on changes in outcomes, or recovery, across the 6-month follow-up period. The next set of models tested the

effects of the subjective social status variables, US and Community SSS, on average levels and changes for each outcome. Specifically, random intercepts models and fixed slopes models tested the effects of US and community SSS on depression, anxiety, self-rated health/quality of life, and CHD-related functioning/quality of life levels and recovery, respectively, as observed across the 6-month follow-up period.

The final set of models included all predictors (i.e., objective SES, US and community SSS) to explore unique relationships between SSS and outcome variables after controlling for objective SES. Again, random intercepts models were run to examine the unique effects of SSS on depression, anxiety, self-rated health/quality of life, and CHD-related functioning/quality of life. Fixed slopes effects explored the unique predictive value of SSS in relation to changes, or recovery, in each of these outcomes.

Missing data were excluded on an analysis-specific basis, so that degrees of freedom varied somewhat across analyses. For all analyses, alpha levels of .05 (two-tailed) were considered statistically significant, and .10 was considered to represent marginal statistical significance.

III. Results

A. Participant Characteristics

Demographic characteristics of the sample were as follows: 81.11% (N = 73) men and 18.89% (N = 17) women, with a mean age of 62.69 (SD = 12.32). In the current sample, 78.89% (N = 71) of the participants were admitted for MI and 21.11% (N = 19) for UA. Ethnic/racial distributions were as follows: 70.00% (N = 63) White/Caucasian, 13.30% (N = 12) Hispanic, 10.00% (N = 9) Black/African American, 4.40% (N = 4) Asian, 1.10% (N = 1) American Indian/Alaskan Native, and 1.10% (N = 1) Native Hawaiian/Pacific Islander. The average US ladder rating for the current sample was 6.39 (*SD* = 2.10), and the average community ladder was 6.79 (*SD* = 2.08). Both represent ratings slightly above the middle rung (i.e., 5). The average household income was 4.39 (*SD* = 2.08), which corresponds to an annual income within the range of $35,000 and $49,999. The average level of educational attainment was 2.71 (*SD* = 0.99), which corresponds to educational attainment between high school and college. Slightly more than half of the participants (i.e., 51.11%; N = 46) completed all four assessments, 30.00% (N = 27), completed two follow-up assessments in addition to baseline, and 18.89% (N = 17) of the participants completed one follow-up assessment in addition to baseline. Table 1 shows descriptive information for all predictor and outcome variables included in the current analyses.

B. Associations Between Objective and Subjective Social Status Measures

Table 2 shows the bivariate correlations among SSS (US and community) and objective indicators of SES. US and community SSS were statistically significantly

correlated, as were US SSS and income, and income and education. Education showed a small but statistically significant correlation with US and community SSS.

C. Baseline Models (No Predictors)

Table 3 shows the results of fully unconditional random intercept models (i.e., no predictors), for all outcomes. These analyses showed that a significant amount of variance (all $p < .001$) was attributable to between-subjects (i.e., Level 2) differences for all outcomes with the exception of the exertional capacity and anginal stability scales of the SAQ. In these cases, intercepts models were conducted as fixed, rather than random, due to limited between-subjects variability and inadequate reliabilities of coefficients.

D. SES and Health Outcomes Post-ACS

Table 4 summarizes the results for MLM analyses regressing average levels and changes in health outcomes on the SES indicators income and educational attainment. The sections below describe more specifically the results of fully controlled analyses, which include both demographic and health covariates. Average levels (intercepts) and changes (slopes) for the entire sample will be discussed only in relation to this first set of analyses, since these results do not change across analyses given that all covariates and predictors are centered.

<u>Psychological Distress and Well-being (Depression, Anxiety)</u>

As shown in Table 4, the analysis for depression revealed that participants showed a minimal level of depression (i.e., BDI = 7.95) on average across all assessments. In addition, higher income was associated with a lower average level of depression symptoms across the 6-month follow-up period, even after controlling for

demographic and health covariates. Specifically, a one-category increase in income predicted a 1.85 point lower score on the BDI (i.e., less depression). Education did not significantly predict the average level of depression. The analysis for depression slope showed that across the sample, BDI scores tended to decrease slowly over time (0.03 points/month). In addition, a cross-level interaction between income and age suggested that income was significantly associated with change in depression over time. Simple slope analyses revealed that the depression-income relationship was significant at three different levels of age (i.e., Mean +/- SD), but strongest for those participants with the lowest age. Simple slopes for the low (age = 51), medium (age = 63), and high (age = 75) groups were as follows, respectively: -1.45, $p < .001$; -1.35, $p < .01$; -1.26, $p < .05$. Furthermore, the depression-age relationship was significant only for the lowest income group (i.e., annual income of less than $24,999), simple slope = -0.02, $p < .05$. Educational attainment was not significantly associated with depression recovery rate.

The analysis for anxiety revealed that participants showed a minimal level of anxiety (i.e., BAI = 9.66) on average across all assessments. In addition, higher income was associated with a lower average level of anxiety symptoms across the 6-month follow-up period, even after controlling for demographic and health covariates. Specifically, a one-category increase in income predicted a 1.54 point lower score on the BAI (i.e., less anxiety). Education did not significantly predict the average level of anxiety. The analysis for anxiety slope showed that across the sample, BAI scores tended to decrease slowly over time (0.02 points/month). In addition, a cross-level interaction between education and age suggested that education was significantly

associated with change in anxiety over time. Simple slope analyses revealed, however, that the anxiety-education relationship was not significant at any of the three levels of age explored, nor was the anxiety-age relationship significant at any of the three levels of education (i.e., Mean +/- SD). Income was not significantly associated with anxiety recovery rate.

Quality of Life and Functional Status (Self-rated General Mental Health, Self-rated General Physical Health)

As shown in Table 4, the analysis for self-rated general mental health (SF-12) revealed that participants showed mental health levels that were comparable to the national mean score of 50 (i.e., M = 53.01) on average across all assessments. In addition, higher income was associated with higher self-reported mental health across the 6-month follow-up period, even after controlling for demographic and health covariates. Specifically, a one-category increase in income predicted a 0.91 point higher score on the mental health scale. Education did not significantly predict the average level of self-reported mental health. The analysis for the self-rated mental health slope showed that across the sample, SF-12 scores for mental health tended to increase slowly over time (0.03 points/month). Neither income nor educational attainment predicted mental health recovery rate.

The analysis for self-reported general physical health revealed that participants reported physical health levels that were much lower than the national mean (i.e., M = 37.50), on average across the follow-up period. In addition, higher income was associated with higher self-reported physical health on average across the 6-month follow-up period, even after controlling for demographic and health covariates.

Specifically, a one-category increase in income predicted a 2.06 point higher score on the SF-12 scale for physical health. Education did not significantly predict the average level of self-reported physical health. The analysis for the self-rated physical health slope showed that across the sample, SF-12 scores for physical health tended to decrease slowly over time (0.01 points/month). Neither income nor educational attainment predicted physical health recovery rate.

Cardiovascular-specific Health Status (Exertional Capacity/Physical Limitation, Anginal Stability, Anginal Frequency, Treatment Satisfaction, Disease Perception)

The analysis for exertional capacity intercept showed that the average sample score across the follow-up period was 21.55, indicating a relatively high level of physical limitation due to chest pain, chest tightness, or angina. In addition, income was associated with better exertional capacity. Specifically, a one-category increase in income predicted a 10.36 point higher score on the exertional capacity scale (i.e., indicating fewer physical limitations). Education did not significantly predict the average level of exertional capacity. The analysis for the exertional capacity slope showed that across the sample, scores for exertional capacity tended to decrease slowly over time (0.05 points/month), indicating worsening health. Neither income nor educational attainment was significantly associated with exertional capacity recovery rate.

The average score for anginal stability across the follow-up period was 70.83 on average for all participants, indicating a relatively low level of angina symptoms when engaging in more strenuous activities. Specifically, a one-category increase in income was associated with a 2.87 point higher score on the SAQ for anginal stability

(i.e., less severe symptoms). Education did not significantly predict the average level of anginal stability. The analysis for the anginal stability slope showed that across the sample, scores for anginal stability tended to decrease over time (0.02 points/month). Neither income nor educational attainment was significantly associated with anginal stability recovery rate.

The average score for anginal frequency across the follow-up period was 83.98, indicating a relatively low level of angina symptoms. Specifically, a one-category increase in income predicted a 2.87 point higher score on the anginal frequency scale (i.e., less frequent symptoms). Education did not significantly predict the average level of anginal frequency. The analysis for the anginal frequency slope showed that across the sample, scores for anginal frequency tended to increase slowly over time (0.02 points/month). Neither income nor educational attainment was significantly associated with anginal frequency recovery rate.

The average score for treatment satisfaction across the follow-up period was 61.00 for this sample indicating a moderate level of satisfaction (i.e., around the middle of a scale ranging from 1 to 100). Neither income nor educational attainment significantly predicted the average level of treatment satisfaction. The analysis for the treatment satisfaction slope showed that across the sample, scores for treatment satisfaction tended to increase slowly over time (0.01 points/month). Neither income nor educational attainment predicted changes in treatment satisfaction.

Finally, the average score for disease perception across the follow-up period was 71.54 for this sample indicating a relatively positive attitude about illness. In addition, higher income predicted higher (i.e., better) disease perception. Specifically,

a one-category increase in income was associated with a 3.48 point higher score on the SAQ disease perception scale, meaning that participants viewed their disease more positively than those with lower income. Education did not significantly predict the average level of disease perception. The analysis for the disease perception slope showed that across the sample scores for disease perception tended to increase slowly over time (0.02 points/month), indicating improved perceptions of disease. Neither income nor educational attainment was significantly associated with disease perception recovery rate.

E. SSS and Health Outcomes Post-ACS

Table 5 summarizes the results for MLM analyses regressing average levels and changes in health outcomes on the subjective indicators of social status within one's community and in the US. The sections below describe more specifically the results of fully controlled analyses, which include both demographic and health covariates.

Psychological Distress and Well-being (Depression, Anxiety)

As shown in Table 5, higher community SSS was associated with a lower average level of depression symptoms across the 6-month follow-up period, even after controlling for demographic and health covariates. Specifically, a one-category increase in community SSS predicted a 1.22 point lower score on the BDI (i.e., less depression). US SSS did not significantly predict the average level of depression. Neither US nor community SSS was significantly associated with depression recovery rate.

The analyses for anxiety revealed that neither US nor community SSS significantly predicted the average level of anxiety, nor did they predict the anxiety recovery rate.

Quality of Life and Functional Status (Self-rated General Mental Health, Self-rated General Physical Health)

As shown in Table 5, the analysis for self-rated general mental health revealed that neither US SSS nor community SSS significantly predicted the average level of mental health, nor did they predict the mental health recovery rate.

The analysis for self-reported general physical health revealed higher US SSS was associated with higher self-reported physical health across the 6-month follow-up period, even after controlling for demographic and health covariates. Specifically, a one-category increase in US SSS predicted a 1.61 point higher score on the SF-12 scale for physical health. Community SSS did not significantly predict the average level of self-reported physical health. The analysis for the self-rated physical health slope showed that neither US SSS nor community SSS was significantly associated with physical health recovery rate.

Cardiovascular-specific Health Status (Exertional Capacity/Physical Limitation, Anginal Stability, Anginal Frequency, Treatment Satisfaction, Disease Perception)

As shown in Table 5, the analysis for exertional capacity showed that US SSS predicted better functioning on average across all assessments (i.e., fewer physical limitations due to chest pain, chest tightness, or angina). Specifically, a one-category increase in US SSS predicted an 8.32 point higher score on the SAQ for exertional capacity. Community SSS did not significantly predict the average level of exertional

capacity. The analysis for the exertional capacity slope showed that neither US nor community SSS was significantly associated with exertional capacity recovery rate.

As shown in Table 5, neither US nor community SSS significantly predicted the average level of anginal stability, nor did they predict the anginal stability recovery rate. Neither US nor community SSS significantly predicted the average level of anginal frequency. In addition, a cross-level interaction between US SSS and age suggested that US SSS was significantly associated with change in anginal frequency over time. Simple slope analyses revealed that the anginal frequency-US SSS relationship was not significant at any of the three levels of age that were explored (i.e., Mean +/- SD). However, the anginal frequency-age relationship was significant at the medium (i.e., Mean = 6) and strongest at the high (i.e., 8) level of US SSS. Simple slopes for these groups were, respectively: -0.13, $p < .05$; -0.18, $p < .05$. Community SSS was not significantly associated with anginal frequency recovery rate.

The analysis for average level of treatment satisfaction across the follow-up period showed a significant effect of community SSS. Specifically, a one-category increase in community SSS was associated with a 3.96 point lower score on the SAQ for treatment satisfaction, meaning greater discontent in these participants compared to their lower community SSS counterparts. US SSS did not significantly predict the average level of treatment satisfaction. Neither US nor community SSS was significantly associated with changes in treatment satisfaction once demographics and health covariates were controlled.

Finally, the analysis for disease perception showed that neither US nor community SSS significantly predicted the average level of disease perception, nor were these variables associated with disease perception recovery rate.

F. Does SSS Predict Health Outcomes Beyond SES Effects?

The final set of MLM analyses regressed average levels and changes in health outcomes on SES indicators and the SSS scales, to determine the predictive value of SSS (US and community) above and beyond traditional SES indicators (i.e., income and education). These analyses are shown in Table 6.

Psychological Distress and Well-being (Depression, Anxiety)

As shown in Table 6, and similar to the results seen in Table 4, higher income was associated with a lower average level of symptoms of depression and anxiety across the 6-month follow-up period, even after controlling for demographic and health covariates and when simultaneously considering effects of SSS. Furthermore, higher educational attainment was shown to be a significant predictor of change in anxiety over time. Similar to previous analyses (see Table 4), individuals with higher education showed a slightly smaller decrease in anxiety over time, relative to those with lower education. These were the only significant associations found for the analyses including both SES and SSS indicators simultaneously. In the previous analysis (see Table 5), community SSS was significantly predictive of depression, however, in the final model community SSS was not predictive for depression beyond the effects of SES. There were no other new associations or differences between these analyses and the previous analyses that included only one type of predictor (i.e., either SES or SSS).

Quality of Life and Functional Status (Self-rated General Mental Health, Self-rated General Physical Health)

As shown in Table 6, neither SES nor SSS predicted quality of life. In the previous analysis (see Table 4), income was associated with higher self-reported mental health across the 6-month follow-up period, however when SSS was included in the analyses, income no longer significantly related to mental health. There were no other new associations or differences between these analyses and the previous analyses that included only one type of predictor (i.e., either SES or SSS).

Cardiovascular-specific Health Status (Exertional Capacity, Anginal Stability, Anginal Frequency, Treatment Satisfaction, Disease Perception)

As shown in Table 6, and similar to the results seen in Table 4, higher income was associated with better cardiovascular health status across the 6-month follow-up period, even after controlling for demographic and health covariates. Specifically, income predicted exertional capacity, anginal stability and frequency, and disease perception. In the previous analysis (see Table 5), US SSS was associated with exertional capacity, however, when SES was included in the analyses (Table 6), US SSS no longer predicted higher exertional capacity across the 6-month follow-up period. There were two significant findings for SSS in this final model. First, as in the previous analysis (see Table 5), a cross-level interaction between US SSS and age suggested that US SSS was significantly associated with change in anginal frequency over time. Second, community SSS predicted lower treatment satisfaction across the 6-follow-up period. These results, however, were similar to those from previous analyses of SSS predictors alone. Overall, there were no new associations resulting

from these analyses that had not been already revealed in previous analyses (single type of predictor, i.e., either SES or SSS).

IV. Discussion

A. Summary of Findings

Research suggests that subjective assessments of social status may provide additional information about health outcomes that cannot be captured by traditional objective indicators of socioeconomic status (Adler et al., 2000; Adler & Stewart, 2007; Operario, Adler, & Williams, 2004; Ostrove et al., 2000). The current study examined the relationships of SES and SSS, assessed in the context of one's community and the U.S., to indicators of psychological well-being and adjustment to illness following an acute cardiovascular event. Notably, the current study is one of few to include both the community and US SSS ladders within the same study, and the only (to our knowledge) that has examined these ladder measures in the context of a population with cardiovascular disease – specifically ACS.

In sum, the analyses concerning objective SES indicators showed that higher income was associated with a lower average level of depression and anxiety symptoms on average, whereas education did not predict average emotional symptom levels. In addition, higher income was associated with better self-reported mental and physical health and quality of life, and better cardiovascular health outcomes, on average as measured across all timepoints. These findings are consistent with research that has demonstrated a graded relationship between SES and health (e.g., Gallo & Matthews, 2003; Rozanski et al., 2005). Income and education appeared to moderate the effects of time (age) on depression and anxiety, such that higher income and education may be predictive of slightly slower recovery in depression and anxiety symptoms. One explanation is that higher SES may relate to greater expectations about recovery post-

MI. For example, individuals with higher income or education may be accustomed to higher levels of functioning, personally and professionally, and may have heightened expectations about their resilience or capacity to recovery quickly from ACS. Furthermore, perhaps individuals with higher SES (especially income) were still working at the time of their cardiac event. This unexpected interruption to their daily routine and livelihood might be expected to cause additional distress as well, potentially accounting for slower recovery in terms of anxiety and depression.

Counter to predictions, the analyses concerning SSS identified few statistically significant effects. Higher community SSS was associated with less depression over time. This finding is consistent with a previous study (Ghaed & Gallo, 2007), in which higher community SSS predicted lower levels of depression (although marginally), and anxiety. However, for the current study, there were no other effects of community or US SSS on average levels or recovery of depression or anxiety symptoms, and even this significant finding for community SSS and depression was attenuated once SES was added to the model for the final analyses.

Higher US SSS predicted better self-reported physical health across the 6-month follow-up period. This was consistent with research showing that US SSS and income overlap to some extent (i.e., moderate correlation; Ghaed & Gallo, 2007), however, this finding was also attenuated in the final analyses examining all four predictors simultaneously. Higher US SSS predicted fewer physical limitations due to angina over time, but again, this finding dissipated in the final analysis. Finally, US SSS appeared to moderate the effects of time (age) on the frequency of angina symptoms, and participants reporting higher community SSS reported *less* satisfaction

with the treatment they were receiving for their angina symptoms. When analyses for SSS were conducted, controlling for SES, only these two latter findings persisted. Again, perhaps how individuals perceive their social status affects their expectations about not only how the acute cardiac event has disrupted their life, but also regarding their capacity to recovery quickly from ACS.

Although few of the hypotheses regarding SSS were supported, there were robust findings for the association between income and health outcomes in both analyses with SES alone, as well as those including SSS. Higher income uniquely predicted less depression and anxiety, as well as better cardiovascular health status over time. Provided that the current findings are shown to be robust, one possible explanation for the consistent association of income with health outcomes is that income may equate to access to resources. For example, income is likely to afford an individual good medical care and more opportunities for restorative activities (e.g., vacation from work, rehabilitation resources). Consistently, in previous research, lower income has been linked to increased risk for ACS and poorer health outcomes in CHD patients (Lubbock, Goh, Ali, Ritchie, & Whooley, 2005; Nishi, Makino, & Tatara, 2004; Rankin, 2002; Rao et al., 2003).

Thus, perhaps because of the serious nature of ACS and cardiovascular disease, financial security may simply outweigh other factors that would be captured by SSS. However, this would not explain the seemingly contradictory findings for SES in relation to depression and anxiety recovery rates. One would expect that if income equates to resources, it might also predict reduced psychological burden, greater capacity to cope with the disruption to daily routines, and *faster* recovery.

Thus, the inconsistent findings suggest a more complex relationship, perhaps involving yet unidentified mediators (e.g., current employment, expectations), between SES and ACS health outcomes and recovery.

There are no studies (to our knowledge) examining SSS and treatment satisfaction, but interestingly, several studies have shown significant associations between sociodemographic characteristics and patient satisfaction (Barry, Lichtman, Spertus, Rumsfeld, Vaccarino, Jones et al., 2007; Carlson, Blustein, Fiorentino, & Prestianni, 2000). These studies suggest that lower treatment satisfaction is associated with being female, younger, and being more highly educated (Barry et al., 2007). Furthermore, Barry, et al. (2007), demonstrated an association between psychosocial status before hospital discharge and a patient's treatment satisfaction post-hospitalization for MI, and suggested that assessing for sociodemographic characteristics such as social support, dispositional optimism, depression severity, age, and education, may inform psychosocial interventions prior to discharge from the hospital.

B. Limitations

There are many limitations of the present study that should be considered in the interpretation of its findings. One of the more critical concerns is the likelihood of insufficient data necessary to elucidate a consistent pattern of findings. This may explain the isolated findings for SSS (only one significant finding for US SSS and one for community SSS, after accounting for effects of SES). Furthermore, the maximum likelihood estimation procedure used in MLM analyses places more "weight" on participants with more data in calculating coefficient estimates. Thus, participants who

completed more assessments are more heavily represented in the findings than those participants who completed fewer assessments. MLM can be particularly advantageous for a dataset with substantial missing data and uneven intervals between data points, however, weighting may bias conclusions when considerable missing data are present. Estimates of change over time are particularly difficult in the presence of large amounts of missing data, thus, slope models should be viewed tentatively. The fact that a number of assessments did not relate to demographic or health characteristics at baseline lends some confidence that the conclusions were not unduly impacted by missing data in the current study. Nonetheless, further research is necessary to determine whether effects in the current study are robust.

Although the current study was longitudinal, which is generally a preferable study design and a necessary one when examining health outcomes and recovery over time, it is likely that data from missing time points affected statistical power. In particular, high attrition rates for follow-up assessments led to reduced power for testing hypotheses relating to recovery. Furthermore, the study relied extensively on self-report measures, and although we generally utilized well-validated assessments, some non-standardized study-specific questions were included as well. In addition, the sample consisted of primarily men, and to a large extent, Caucasian men. The use of a volunteer, convenience sample (associated with the typical shortcomings of nonprobability sampling methods), may limit the generalizability of the current findings, especially given the fact that non-participants may have contributed valuable information about recovery since many of them refused participation due to feeling overly stressed from the acute cardiac event.

Another important consideration involves the use of both SSS ladders in a single study. Although this approach has been recommended by Adler and Stewart (2007), only one prior study has examined both ladder measures (Ghaed & Gallo, 2007). The ladder measure for US SSS appears to most closely approximate traditional indicators of SES (specifically income), despite its use of a pictorial presentation. By contrast, there may be additional factors distinct from those captured by traditional markers of SES and US SSS that are taken into consideration by an individual when reporting perceived social status (Adler & Stewart, 2007; Ghaed & Gallo, 2007; Singh-Manoux et al., 2003). Furthermore, in a recent qualitative analysis of individuals' criteria for defining "community," Adler and Stewart (2007) reported that participants ranked themselves based on their neighborhood, city/town, religious group, social supporter, workplace, family, friends, people with shared interests, region, and nation/world. Thus, as might be expected US and community SSS did not show convergent effects on health, despite their moderate correlation (i.e., .58) in this sample. This is consistent with findings from our prior study, which showed that the two ladders appeared to have distinct associations with cardiovascular risk factors (Ghaed & Gallo, 2007).

C. Conclusions

Additional research, using a larger sample, with lower attrition would be helpful in ascertaining whether the results are robust, and generalizable to women, ethnically diverse populations, and patients irrespective of stage of cardiovascular disease. Fewer limitations may have enabled us to more confidently draw conclusions regarding our findings, but it is also probable that many factors in combination

contribute to recovery following ACS. The current study contributes to a growing body of research examining health effects of SSS, beyond the impact of SES. Current literature suggests that it would be beneficial to include measures of SSS, in addition to more commonly used objective measures, in future studies. Nonetheless, this study found that US and community SSS had few distinct implications for cardiovascular health outcomes beyond the impact of traditional SES indicators. There is a need for more research examining SSS and health risk and outcomes within the context of populations who are affected by chronic disease, especially CHD. In addition, future research should also include factors that could account for the "added value" of assessing for SSS, such as positive psychological constructs. Further elucidation of these associations is likely to inform both screening and preventative efforts that may be implemented to ensure better health care provision.

TABLES

Table 1. Descriptives: Means for Predictor and Outcome Variables.

Variable	N	%	Mean	SD
Social Status				
Objective: Income (category)	90		4.37	2.10
Less than $11,999 (1)	8	8.90		
$12,000 – $24,999 (2)	17	18.90		
$25,000 – $34,999 (3)	7	7.80		
$35,000 – $49,999 (4)	12	13.30		
$50,000 – $74,999(5)	14	15.60		
$75,000 – $99,999 (6)	10	11.10		
$100,000 and greater (7)	22	24.40		
Objective: Education (category)	90		2.71	0.99
Less than High School (1)	4	4.40		
High School Diploma (2)	42	46.70		
Bachelor's Degree (3)	26	28.90		
Master's Degree (4)	12	13.30		
Higher than Master's (5)	6	6.70		
Subjective Social Status – US	90		6.39	2.10
Subjective Social Status – Community	90		6.79	2.08
Health Outcomes				
Baseline				
Depression (BDI)	88		10.48	10.60
Anxiety (BAI)	90		14.74	11.97
1-Month Assessment				
Depression (BDI)	70		11.21	11.07
Anxiety (BAI)	70		10.23	10.42
Mental Health (SF-12)	65		48.72	11.37
Physical Health (SF-12)	65		36.88	12.69
Exertional Capacity (SAQ)	68		19.21	59.80
Anginal Stability (SAQ)	68		70.59	33.44
Anginal Frequency (SAQ)	68		78.24	24.79
Disease Perception (SAQ)	68		63.79	25.73
Treatment Satisfaction (SAQ)	67		64.71	37.14

Table 1 continued

Variable	N	%	Mean	SD
3-Month Assessment				
Depression (BDI)	69		8.61	8.16
Anxiety (BAI)	69		9.19	9.20
Mental Health (SF-12)	67		50.67	10.91
Physical Health (SF-12)	67		41.03	13.57
Exertional Capacity (SAQ)	67		28.82	75.56
Anginal Stability (SAQ)	66		74.24	28.41
Anginal Frequency (SAQ)	65		83.08	24.10
Disease Perception (SAQ)	67		73.26	23.01
Treatment Satisfaction (SAQ)	67		63.53	40.86
6-Month Assessment				
Depression (BDI)	69		6.91	8.90
Anxiety (BAI)	69		7.43	8.53
Mental Health (SF-12)	65		53.09	8.06
Physical Health (SF-12)	65		41.52	12.01
Exertional Capacity (SAQ)	70		32.02	70.33
Anginal Stability (SAQ)	65		71.92	27.78
Anginal Frequency (SAQ)	69		87.25	19.99
Disease Perception (SAQ)	69		78.14	20.47
Treatment Satisfaction (SAQ)	67		60.85	37.22

Table 2. Bivariate Correlations for US and Community SSS and objective indicators of SES (income and education).

	US SSS	Community SSS	Income	Education
US SSS	-			
Community SSS	.58**	-		
Income	.53**	.35**	-	
Education	.28**	.28**	.40**	-

Note. **Correlation is significant at $p < .01$.

Table 3. Results of baseline (fully unconditional) MLMs for all outcomes.

Outcome	Mean	SE	Reliability of Estimate	Within-subjects Variability (%)	Between-subjects Variability (%)
Depression (BDI)	10.02	1.01	0.89	26.94	73.06***
Anxiety (BAI)	11.29	0.94	0.77	49.03	50.97***
SF-12					
Mental Health	50.48	0.96	0.67	49.12	50.88***
Physical Health	39.77	1.23	0.76	37.66	62.34***
SAQ					
Exertional Capacity	26.86	5.25	0.35	80.22	19.78***
Anginal Stability	72.07	2.48	0.43	73.16	26.84***
Anginal Frequency	82.74	2.15	0.70	46.90	53.10***
Disease Perception	71.08	2.24	0.74	41.55	58.45***
Treatment Satisfaction	62.38	3.49	0.67	49.20	50.80***

Table 4. Results of MLM analyses regressing health outcomes on SES indicators (income and education).

Outcome (Models)	Intercept		Income		Education	
	B (SE)	t	B (SE)	t	B (SE)	t
Depression [BDI]:						
Intercepts						
a)	8.73 (1.10)	7.92**	-1.56 (0.42)	-3.68**	-0.16 (0.71)	-0.23
b)	7.95 (0.99)	8.02**	-1.85 (0.45)	-4.11**	0.55 (0.78)	0.70
Slopes						
a)	-0.02 (0.01)	-3.67**	0.01 (0.00)	3.66**	0.01 (0.01)	1.07
b)	-0.03 (0.01)	-5.29**	0.01 (0.00)	2.75**	0.01 (0.01)	1.25
Anxiety [BAI]:						
Intercepts						
a)	9.94 (0.83)	12.03**	-1.40 (0.35)	-4.00**	-1.04 (0.70)	-1.49
b)	9.66 (0.86)	11.29**	-1.54 (0.38)	-4.03**	-0.66 (0.71)	-0.92
Slopes						
a)	-0.01 (0.00)	-2.82**	0.00 (0.00)	1.87#	0.01 (0.00)	2.10*
b)	-0.02 (0.01)	-3.58**	0.00 (0.00)	1.57	0.01 (0.01)	1.98*
Self-rated General Mental Health:						
Intercepts						
a)	53.05 (1.08)	49.05**	0.85 (0.45)	1.89#	0.22 (0.88)	0.25
b)	53.01 (1.13)	46.96**	0.91 (0.45)	1.99*	-0.22 (0.83)	-0.27
Slopes						
a)	0.02 (0.01)	3.61**	-0.00 (0.00)	-0.89	-0.01 (0.01)	-1.47
b)	0.03 (0.01)	3.65**	-0.00 (0.00)	-0.44	-0.01 (0.01)	-1.11
Self-rated General Physical Health:						
Intercepts						
a)	37.25 (1.20)	31.16**	2.05 (0.56)	3.64**	1.96 (1.14)	1.73#
b)	37.50 (1.20)	31.25**	2.06 (0.55)	3.77**	0.85 (1.18)	0.72
Slopes						
a)	-0.02 (0.01)	-3.16**	-0.01 (0.00)	-1.59	0.01 (0.01)	1.07
b)	-0.01 (0.01)	-0.80	-0.00 (0.00)	-0.90	0.01 (0.01)	0.73

Table 4 continued

Outcome (Models)	Intercept		Income		Education	
	B (SE)	t	B (SE)	t	B (SE)	t
Exertional Capacity:						
Intercepts						
a)	24.30 (5.33)	4.56**	10.53 (2.23)	4.72**	-4.86(5.30)	-0.92
b)	21.55 (5.05)	4.27**	10.36 (2.37)	4.38**	-8.29 (5.10)	-1.63
Slopes						
a)	-0.06 (0.04)	-1.58	0.02 (0.02)	1.01	-0.00 (0.04)	-0.05
b)	-0.05 (0.04)	-1.23	0.03 (0.02)	1.91#	-0.03 (0.03)	-1.01
Anginal Stability:						
Intercepts						
a)	71.42 (2.94)	24.26**	3.32 (1.28)	2.60*	-3.47 (2.94)	-1.18
b)	70.83 (3.18)	22.28**	3.56 (1.29)	2.76**	-3.81 (3.12)	-1.22
Slopes						
a)	-0.02 (0.02)	-0.92	0.01 (0.01)	0.70	-0.03 (0.02)	-1.78#
b)	-0.00 (0.03)	-0.11	0.01 (0.27)	0.80	-0.04 (0.02)	-1.80#
Anginal Frequency:						
Intercepts						
a)	82.36 (2.66)	30.92**	2.66 (1.28)	2.08*	1.21 (2.11)	0.57
b)	83.98 (2.92)	28.76	2.87 (1.22)	2.35*	0.26 (1.89)	0.14
Slopes						
a)	-0.01 (0.01)	-0.52	0.00 (0.01)	0.06	-0.02 (0.02)	-1.20
b)	0.02 (0.02)	0.97	-0.00 (0.01)	-0.37	-0.02 (0.02)	-1.48
Treatment Satisfaction						
Intercepts						
a)	63.51 (4.09)	15.52**	-2.27 (1.65)	-1.38	-2.71 (4.27)	-0.64
b)	61.00 (4.12)	14.81**	-2.31 (1.64)	-1.41	-1.65 (3.50)	-0.47
Slopes						
a)	0.06 (0.02)	2.43*	-0.01(0.01)	-1.08	-0.02 (0.03)	-0.83
b)	0.01 (0.04)	0.33	-0.00 (0.01)	-0.23	-0.03 (0.03)	-1.00
Disease Perception:						
Intercepts						
a)	71.18 (2.49)	28.56**	3.67 (1.12)	3.27**	-1.30 (1.75)	-0.74
b)	71.54 (2.62)	27.32**	3.84 (1.10)	3.48**	-1.35 (1.93)	-0.70
Slopes						
a)	0.01 (0.01)	0.65	-0.01 (0.01)	-1.38	-0.03 (0.01)	-2.27*
b)	0.02 (0.02)	1.00	-0.01 (0.01)	-1.84#	-0.03 (0.02)	-1.87#

Table 4 continued

Note. Intercept values represent average outcome (level or change per month across the 6-month follow-up period) for the sample. T-tests indicate whether these values are statistically significantly different from zero.

a) First analysis listed for each outcome controls only for demographic variables (gender and ethnicity).
b) Second analysis listed for each outcome controls for demographic variables (i.e., gender, ethnicity) and health covariates (i.e., ST-elevation, Charlson index, diagnosis, high blood pressure, high cholesterol).

$^{\#}p < .10$, $*p < .05$, $**p < .01$

Table 5. Results of MLM analyses regressing health outcomes on SSS indicators (US and community).

Outcome (Models)	Intercept		US SSS		Community SSS	
	B (SE)	t	B (SE)	t	B (SE)	t
Depression [BDI]:						
Intercepts						
a)	8.11 (1.08)	7.54**	-0.46 (0.46)	-0.99	-0.94 (0.63)	-1.50
b)	7.62 (1.24)	6.15**	-0.17 (0.49)	-0.35	-1.22 (0.60)	-2.04*
Slopes						
a)	-0.02 (0.01)	-2.82**	0.00 (0.00)	0.54	0.00 (0.00)	0.51
b)	-0.03 (0.01)	-3.57**	-0.00 (0.00)	-0.12	0.00 (0.00)	1.23
Anxiety [BAI]:						
Intercepts						
a)	9.56 (1.09)	8.81**	-0.42 (0.43)	-0.97	-0.61 (0.53)	-1.15
b)	9.39 (1.08)	8.71**	-0.32 (0.47)	-0.69	-0.71 (0.50)	-1.42
Slopes						
a)	-0.02 (0.01)	-2.04*	-0.00 (0.00)	0.49	0.00 (0.00)	0.25
b)	-0.03 (0.01)	-3.08**	-0.00 (0.00)	0.49	0.00 (0.00)	0.40
Self-rated General Mental Health:						
Intercepts						
a)	53.42 (1.07)	49.97**	0.89 (0.49)	1.83#	0.19 (0.64)	0.29
b)	53.16 (1.17)	45.51**	0.58 (0.53)	1.08	0.48 (0.60)	0.80
Slopes						
a)	0.02 (0.01)	2.96**	-0.00 (0.00)	-1.14	0.00 (0.00)	0.48
b)	0.03 (0.01)	3.45**	-0.00 (0.00)	-1.00	0.00 (0.00)	0.54
Self-rated General Physical Health:						
Intercepts						
a)	37.73 (1.37)	27.51**	1.84 (0.56)	3.27**	0.40 (0.71)	0.57
b)	37.37 (1.32)	28.30**	1.61 (0.52)	3.07**	0.30 (0.60)	0.50
Slopes						
a)	-0.03 (0.01)	-3.04**	-0.00 (0.00)	-0.12	0.01 (0.00)	1.23
b)	-0.01 (0.01)	-1.34	0.00 (0.00)	0.46	0.00 (0.00)	1.03

Table 5 continued

Outcome (Models)	Intercept		US SSS		Community SSS	
	B (SE)	t	B (SE)	t	B (SE)	t
Exertional Capacity:						
Intercepts						
a)	25.82 (5.61)	4.60**	9.68 (2.99)	3.24**	-1.00 (2.88)	-0.35
b)	21.08 (5.33)	3.95**	8.32 (2.81)	2.97**	-1.69 (2.32)	-0.73
Slopes						
a)	-0.08 (0.04)	-2.32*	0.02 (0.03)	0.70	-0.00 (0.03)	-0.13
b)	-0.09 (0.04)	-2.45*	0.01 (0.03)	0.54	0.01 (0.02)	0.32
Anginal Stability:						
Intercepts						
a)	71.68 (3.10)	23.14**	0.94 (1.38)	0.68	0.22 (1.50)	0.15
b)	71.08 (3.59)	19.77**	1.27 (1.50)	0.85	-0.50 (1.50)	-0.33
Slopes						
a)	-0.02 (0.02)	-0.92	0.00 (0.01)	0.47	-0.01 (0.01)	-0.45
b)	-0.01 (0.03)	-0.35	-0.01 (0.01)	-0.73	0.00 (0.01)	0.47
Anginal Frequency:						
Intercepts						
a)	83.31 (2.85)	29.26**	0.53 (0.97)	0.55	0.91 (1.23)	0.74
b)	85.24 (3.29)	25.88**	0.42 (0.93)	0.45	0.54 (1.13)	0.48
Slopes						
a)	-0.01 (0.02)	-0.61	-0.02 (0.01)	-1.94*	0.01 (0.01)	0.83
b)	0.02 (0.02)	0.91	-0.03(0.01)	-2.83**	0.01 (0.01)	1.17
Treatment Satisfaction						
Intercepts						
a)	64.85 (3.92)	16.54**	1.34 (1.79)	0.75	-4.57 (1.89)	-2.42*
b)	61.36 (4.02)	15.26**	1.05 (1.74)	0.61	-3.96 (1.83)	-2.17*
Slopes						
a)	0.06 (0.02)	2.76**	-0.03 (0.01)	-2.03*	0.01 (0.01)	0.74
b)	0.02 (0.03)	0.46	-0.02 (0.02)	-1.19	0.01 (0.02)	0.43
Disease Perception:						
Intercepts						
a)	72.55 (3.13)	23.21**	0.59 (1.02)	0.58	1.72 (1.21)	1.43
b)	72.50 (3.18)	22.79**	0.34 (1.11)	0.31	1.96 (1.18)	1.66
Slopes						
a)	0.01 (0.02)	0.53	-0.00 (0.01)	-0.44	-0.01 (0.01)	-0.84
b)	0.02 (0.02)	0.96	-0.01 (0.01)	-0.72	-0.01 (0.01)	-0.88

Table 5 continued

Note. Intercept values represent average outcome (level or change per month across the 6-month follow-up period) for the sample. T-tests indicate whether these values are statistically significantly different from zero.

c) First analysis listed for each outcome controls only for demographic variables (gender and ethnicity).

d) Second analysis listed for each outcome controls for demographic variables (i.e., gender, ethnicity) and health covariates (i.e., ST-elevation, Charlson index, diagnosis, high blood pressure, high cholesterol).

$^{\#}p < .10$, $^{*}p < .05$, $^{**}p < .01$

Table 6. Results of MLM analyses regressing health outcomes simultaneously on SES indicators (income and education) and SSS indicators (US and community). Results for Income and Education only shown in this table. Intercept values included in both.

Outcome (Models)	Intercept		Income		Education	
	B (SE)	t	B (SE)	t	B (SE)	t
Depression [BDI]:						
Intercepts						
a)	8.96 (1.16)	7.71**	-1.50 (0.58)	-2.59**	-0.05 (0.66)	-0.08
b)	8.11 (1.00)	8.08**	-1.89 (0.55)	-3.42**	0.74 (0.69)	1.06
Slopes						
a)	-0.02 (0.01)	-3.39**	0.01 (0.00)	3.46**	0.01 (0.01)	1.58
b)	-0.03 (0.01)	-5.08**	0.01 (0.00)	2.54**	0.01 (0.00)	1.54
Anxiety [BAI]:						
Intercepts						
a)	10.19 (0.86)	11.89**	-1.57 (0.46)	-3.42**	-1.02 (0.70)	-1.47
b)	9.81 (0.86)	11.40**	-1.70 (0.48)	-3.55**	-0.61 (0.73)	-0.83
Slopes						
a)	-0.01 (0.00)	-2.97**	0.01 (0.00)	2.01*	0.01 (0.00)	2.64**
b)	-0.02 (0.01)	-3.51**	0.00 (0.00)	1.49	0.01 (0.01)	2.26*
Self-rated General Mental Health:						
Intercepts						
a)	53.18 (1.08)	49.14**	0.47 (0.56)	0.83	0.13 (0.80)	0.17
b)	53.07 (1.13)	44.22**	0.56 (0.59)	0.95	-0.20 (0.77)	-0.26
Slopes						
a)	0.02 (0.01)	3.20**	-0.00 (0.00)	-0.83	-0.01 (0.01)	-1.58
b)	0.03 (0.01)	2.76**	-0.00 (0.00)	-0.51	-0.01 (0.01)	-1.00
Self-rated General Physical Health:						
Intercepts						
a)	37.07 (1.24)	29.99**	1.60 (0.75)	2.14*	1.94 (1.00)	1.94*
b)	37.08 (1.28)	28.98**	1.70 (0.74)	2.30	1.07 (1.05)	1.02
Slopes						
a)	-0.03 (0.01)	-3.60**	-0.01 (0.00)	-2.35*	0.00 (0.01)	0.48
b)	-0.01 (0.01)	-1.27	-0.01 (0.00)	-1.56	0.00 (0.01)	0.22

Table 6 continued

Outcome (Models)	Intercept		Income		Education	
	B (SE)	t	B (SE)	t	B (SE)	t
Exertional Capacity:						
Intercepts						
a)	25.18 (5.43)	4.63**	7.84 (2.76)	2.85**	-5.05(5.17)	-0.98
b)	21.06 (5.28)	3.99**	8.27 (2.56)	3.24**	-7.30 (4.97)	-1.47
Slopes						
a)	-0.07 (0.04)	-1.91#	0.01 (0.02)	0.81	-0.00 (0.03)	-0.09
b)	-0.07 (0.04)	-1.62	0.03 (0.02)	1.53	-0.05 (0.03)	-1.43
Anginal Stability:						
Intercepts						
a)	71.05 (2.95)	24.04**	3.99 (1.47)	2.72**	-3.49 (2.92)	-1.19
b)	70.84 (3.30)	21.43**	4.33 (1.51)	2.86**	-3.75 (3.13)	-1.20
Slopes						
a)	-0.01 (0.02)	-0.81	0.00 (0.01)	0.51	-0.04 (0.02)	-1.86#
b)	-0.00 (0.03)	-0.05	0.01 (0.01)	0.88	-0.04 (0.02)	-1.74#
Anginal Frequency:						
Intercepts						
a)	83.11 (2.79)	29.76**	3.64 (1.84)	1.98*	0.72 (2.11)	0.34
b)	84.97 (3.19)	26.61**	3.97 (1.56)	2.54**	0.09 (1.95)	0.05
Slopes						
a)	-0.01 (0.02)	-0.45	0.01 (0.01)	0.62	-0.01 (0.02)	-0.82
b)	0.02 (0.02)	1.05	0.00 (0.01)	0.48	-0.01 (0.01)	-0.74
Treatment Satisfaction						
Intercepts						
a)	64.68 (3.82)	16.93**	-2.85 (1.98)	-1.44	-2.04 (3.94)	-0.52
b)	61.27 (3.90)	15.70**	-2.73 (1.68)	-1.63	-0.69 (3.20)	-0.21
Slopes						
a)	0.06 (0.02)	2.57**	-0.01 (0.01)	-0.78	-0.01 (0.02)	-0.61
b)	0.01 (0.03)	0.26	-0.00 (0.01)	-0.22	-0.02 (0.02)	-0.96
Disease Perception:						
Intercepts						
a)	70.80 (2.48)	28.52**	4.04 (1.42)	2.86**	-1.49 (1.74)	-0.86
b)	71.47 (2.60)	27.47**	4.23 (1.37)	3.09**	-1.66 (1.95)	-0.85
Slopes						
a)	0.01 (0.01)	0.68	-0.01 (0.01)	-1.34	-0.03 (0.01)	-2.39*
b)	0.02 (0.02)	1.09	-0.01 (0.01)	-1.63	-0.03 (0.02)	-1.91#

Table 6 continued

Note. Intercept values represent average outcome (level or change per month across the 6-month follow-up period) for the sample. T-tests indicate whether these values are statistically significantly different from zero.

e) First analysis listed for each outcome controls only for demographic variables (gender and ethnicity).

f) Second analysis listed for each outcome controls for demographic variables (i.e., gender, ethnicity) and health covariates (i.e., ST-elevation, Charlson index, diagnosis, high blood pressure, high cholesterol).

$^{\#}p < .10$, $*p < .05$, $**p < .01$

Table 7. Results of MLM analyses regressing health outcomes simultaneously on SES indicators (income and education) and SSS indicators (US and community). Results for US & community SSS only shown in this table. Intercept values included in both.

Outcome (Models)	Intercept		US SSS		Community SSS	
	B (SE)	t	B (SE)	t	B (SE)	t
Depression [BDI]:						
Intercepts						
a)	8.96 (1.16)	7.71**	0.19 (0.58)	0.32	-0.66 (0.58)	-1.15
b)	8.11 (1.00)	8.08**	0.58 (0.54)	1.08	-0.89 (0.52)	-1.71#
Slopes						
a)	-0.02 (0.01)	-3.39**	-0.00 (0.00)	-0.71	-0.00 (0.00)	-0.37
b)	-0.03 (0.01)	-5.08**	-0.00 (0.00)	-0.74	0.00 (0.00)	0.25
Anxiety [BAI]:						
Intercepts						
a)	10.19 (0.86)	11.89**	0.39 (0.49)	0.80	-0.32 (0.49)	-0.65
b)	9.81 (0.86)	11.40**	0.41 (0.50)	0.81	-0.33 (0.46)	-0.72
Slopes						
a)	-0.01 (0.00)	-2.97**	-0.00 (0.00)	-0.46	-0.00 (0.00)	-0.83
b)	-0.02 (0.01)	-3.51**	-0.00 (0.00)	-0.05	-0.00 (0.00)	-0.87
Self-rated General Mental Health:						
Intercepts						
a)	53.18 (1.08)	49.14**	0.71 (0.56)	1.27	0.05 (0.62)	0.07
b)	53.07 (1.13)	44.22**	0.41 (0.65)	0.63	0.33 (0.59)	0.57
Slopes						
a)	0.02 (0.01)	3.20**	-0.00 (0.00)	-0.36	0.00 (0.00)	0.77
b)	0.03 (0.01)	2.76**	-0.00 (0.00)	-0.42	0.00 (0.00)	0.74
Self-rated General Physical Health:						
Intercepts						
a)	37.07 (1.24)	29.99**	0.94 (0.73)	1.29	0.03 (0.66)	0.04
b)	37.08 (1.28)	28.98**	0.72 (0.71)	1.01	-0.04 (0.61)	-0.07
Slopes						
a)	-0.03 (0.01)	-3.60**	0.00 (0.01)	0.45	0.01 (0.01)	1.78#
b)	-0.01 (0.01)	-1.27	0.00 (0.01)	0.38	0.01 (0.00)	1.93#

Table 7 continued

Outcome (Models)	Intercept		US SSS		Community SSS	
	B (SE)	t	B (SE)	t	B (SE)	t
Exertional Capacity:						
Intercepts						
a)	25.18 (5.43)	4.63**	4.78 (3.11)	1.54	-0.17 (2.84)	-0.06
b)	21.06 (5.28)	3.99**	4.50 (2.39)	1.88#	-1.59 (2.22)	-0.71
Slopes						
a)	-0.07 (0.04)	-1.91#	-0.00 (0.03)	-0.09	0.01 (0.03)	0.41
b)	-0.07 (0.04)	-1.62	0.01 (0.02)	0.34	0.01 (0.02)	0.69
Anginal Stability:						
Intercepts						
a)	71.05 (2.95)	24.04**	-1.24 (1.56)	-0.79	0.48 (1.46)	0.33
b)	70.84 (3.30)	21.43**	-0.86 (1.55)	-0.55	-0.42 (1.52)	-0.28
Slopes						
a)	-0.01 (0.02)	-0.81	0.00 (0.01)	0.12	0.00 (0.01)	0.36
b)	-0.00 (0.03)	-0.05	-0.01 (0.01)	-0.90	0.01 (0.01)	1.27
Anginal Frequency:						
Intercepts						
a)	83.11 (2.79)	29.76**	-1.79 (1.59)	-1.12	0.99 (1.25)	0.80
b)	84.97 (3.19)	26.61**	-1.74 (1.36)	-1.28	0.35 (1.21)	0.29
Slopes						
a)	-0.01 (0.02)	-0.45	-0.02 (0.01)	-1.86#	0.02 (0.01)	1.53
b)	0.02 (0.02)	1.05	-0.03 (0.01)	-2.65**	0.02 (0.01)	1.78#
Treatment Satisfaction						
Intercepts						
a)	64.68 (3.82)	16.93**	3.42 (2.16)	1.59	-4.75 (1.88)	-2.53**
b)	61.27 (3.90)	15.70**	2.88 (1.87)	1.54	-4.07 (1.76)	-2.31*
Slopes						
a)	0.06 (0.02)	2.57**	-0.02 (0.02)	-1.00	0.01 (0.01)	0.38
b)	0.01 (0.03)	0.26	-0.01 (0.01)	-0.49	0.00 (0.02)	0.13
Disease Perception:						
Intercepts						
a)	70.80 (2.48)	28.52**	-1.25 (1.18)	-1.06	1.34 (1.04)	1.18
b)	71.47 (2.60)	27.47**	-1.30 (1.16)	-1.12	1.25 (1.13)	1.11
Slopes						
a)	0.01 (0.01)	0.68	0.00 (0.01)	0.34	0.00 (0.01)	0.15
b)	0.02 (0.02)	1.09	0.00 (0.01)	0.02	0.00 (0.01)	0.05

Table 7 continued

Note. Intercept values represent average outcome (level or change per month across the 6-month follow-up period) for the sample. T-tests indicate whether these values are statistically significantly different from zero.

g) First analysis listed for each outcome controls only for demographic variables (gender and ethnicity).

h) Second analysis listed for each outcome controls for demographic variables (i.e., gender, ethnicity) and health covariates (i.e., ST-elevation, Charlson index, diagnosis, high blood pressure, high cholesterol).

$^{\#}p < .10$, $*p < .05$, $**p < .01$

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