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EXPLORING RELATIONSHIP QUALITY AS A DYADIC MEDIATOR OF ADVERSE
CHILDHOOD EXPERIENCES AND HEALTH FOR ECONOMICALLY DISADVANTAGED
COUPLES

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Child, Family, and Community Sciences
in the College of Education and Human Performance
at the University of Central Florida
Orlando, Florida

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2017

Major Professor: Sejal M. Barden

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ABSTRACT

The purpose of this research study was to investigate the directional relationships between Adverse Childhood Experiences (ACE; Felitti et al., 1998), relationship quality (as measured by the Relationship Assessment Scale [Hendrick, 1988] and the Behavioral Self-Regulation for Effective Relationships Scale [Wilson, Charker, Lizzio, Halford, & Kimlin, 2005]), and health (as measured by the OQ 45.2 [Lambert et al., 2004] and a Brief Medical History Questionnaire [Daire, Wheeler, & Liekweg, 2014]) among economically disadvantaged couples. The theorized model included a dyadic structure and mediation of ACE and health by relationship quality using the Actor-Partner Interdependence Mediation Model (APIMeM). The researcher employed structural equation modeling analyses and the APIMeM to investigate the model fit with archival and enrollment data from 503 heterosexual couples in a relationship education program. The majority of participants (76.9%) also identified a racial or ethnic minority background.

Final results indicated a good fit for the model to the sample data and explained a significant portion of variance in health (i.e., 82.3% for men [a large effect], 56.5% for women [a large effect]). Significant findings included: (a) ACE exerted an effect on health indirectly through relationship quality (i.e., 98.05% of the male total actor effect, 57.4% of the female total actor effect); (b) ACE exerted a direct effect on health for women; (c) overall ACE, relationship quality, and health were significantly related at the actor-level; and (d) a dyadic influence between male and female reports of ACE, relationship quality, and health contributed to the overall model fit. Discussion of results, implications for practice, recommendations for future research, and study limitations are provided.

Dedicated to Matthew, Hannah, and Sarah – for teaching me about love.

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“It is good to have an end to journey toward, but it is the journey that matters in the end”

– U.K. Le Guin

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CHAPTER ONE: INTRODUCTION

Individuals living in poverty possess internal resources and resiliency (Distelberg, Martin, Borieux, & Oloo, 2015; Orthner, Jones-Sanpei, & Williamson, 2004); however, economic disadvantage is associated with a number of social, relational, and physical inequities. Individuals with low-income often (a) live in isolated and resource-poor environments that inhibit economic mobility (Stanford Center on Poverty and Inequality, 2015), (b) experience greater levels of adversity early in life (Child and Adolescent Health Measurement Initiative, 2013), and (c) experience greater mental health issues (Cutrona, Wallace, & Wesner, 2006; DeCarlo, Santiago, Wadsworth & Stump, 2011; Haney, 2007). Economic disadvantage also affects couples as indicated by a high risk for relationship dissolution (Conger, Rueter, & Elder, 1999) and families who report low social support, life satisfaction, and family functioning (Mansfield, Dealy, & Keitner, 2013). Specifically, parental depression and conflict result in harsher approaches to parenting (Barajas-Gonzalez & Brooks-Gunn, 2014) and strained parent-child relationships (Conger et al., 1992). Furthermore, income is a social determinant for physical and mental health disparities (Braveman & Gottlieb, 2014). Interventions that address social determinants of health in early childhood are effective. Yet, the social and economic costs of illness and disease are greatest among adults, especially for those in poverty. Thus, additional research is needed for prevention and intervention for health disparities in adulthood (Thornton et al., 2016). Initial research exists that examines social health determinants at the community and policy level (Thornton et al., 2016); however, health disparities research has not addressed the systemic influence of the couple-dyad. Thus, this study examined dyadic associations between retrospective reports of adverse childhood experiences, relationship quality and health among couples with low-income.

This investigation tested the theoretical model that couples with economic disadvantage have adverse childhood experiences (as measured by the *Adverse Childhood Experiences [ACE] survey* [Felitti et al., 1998]) that contribute to their levels of relationship quality (as measured by the *Relationship Assessment Scale* [RAS; Hendrick, 1988] and the *Behavioral Self-Regulation for Effective Relationships Scale* [BSRERS; Wilson, Charker, Lizzio, Halford, & Kimlin, 2005]) and health (as measured by the *Brief Medical History Questionnaire* [Daire, Wheeler, & Liekweg, 2014] and *Outcomes Questionnaire 45.2* [OQ45.2; Lambert et al., 2004]). Specifically, the researcher tested the hypothesized directional relationship that a higher incidence of adverse childhood experiences would contribute to lower relationship quality and reports of poorer physical and psychological distress. The researcher used the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann, Macho, & Kenny, 2011) to examine interdependence of responses between members of a couple. Specifically, the researcher tested the hypothesized dyadic influences including: (a) that a person's ACE would negatively predict both his or her own (actor effect) and his or her partner's (partner effect) relationship quality; (b) a person's relationship quality would positively predict his or her own health (actor effect), and to that of his or her partner (partner effect); and (c) a person's (actor-partner effect) and his or her partner's (partner-actor effect) relationship quality would mediate the association between his or her own ACE and health.

Statement of the Problem

According to the United States (U.S.) Census Bureau, approximately 47 million individuals are living in poverty. Poverty rates include 15 million children and a disproportionate representation of people who are Black or Hispanic (DeNavas-Walt & Proctor, 2015). Individuals with low-income experience a number of social inequities compared to

individuals in higher income brackets including lower educational attainment, lower rates of employment during prime-age for employment, and lower economic mobility (Stanford Center on Poverty and Inequality, 2016). Additionally, individuals with low-income often live in under-resourced and disorganized communities that inhibit access to quality schools, reliable transportation, well-paying jobs, healthful foods, and quality medical care (Agency for Healthcare Research and Quality [AHRQ], 2016; Braveman & Gottlieb, 2014; Thornton, et al., 2016). Furthermore, individuals with low income report the lowest access and poorest quality of health care (AHRQ, 2016). Yet, health care is estimated to be far less influential to a person's actual health in comparison to socioeconomic and social factors that seem to account for around half of a person's health status (Marmot & Allen, 2014). The Centers for Disease Control and Prevention (CDC, 2013) reported differences in health outcomes between populations (i.e., health disparities) when examining socioeconomic factors including income. In fact, individuals with low-income are five times more likely to report a poor health status than individuals with higher income (Stanford Center on Poverty and Inequality, 2016) and are exposed to greater health risks in early life; therefore, are more vulnerable to the early onset of disease and poorer trajectory for illnesses following a diagnosis (CDC, 2013; Hicken et al., 2014; Mulia & Zemore, 2012). Health and related behaviors are influenced by a person's environment and socioeconomic position and contribute as social determinants of health (Braveman & Gottlieb, 2014). Thus, researchers have identified the need for 'upstream' interventions focused on children and families to inform policy and implementation efforts aimed to reduce the inequity in health for marginalized groups (Thornton et al., 2016).

In addition to poorer physical health outcomes, children that grow up in poverty and in disadvantaged environments experience lower academic achievement and poorer mental health

(Haney, 2007; Schwartz & Gorman, 2003). Similarly, adults with lower socioeconomic status (SES) retrospectively report greater exposure to adverse childhood experiences (ACE) during their first 18 years of life (Cronholm et al., 2015) with family income inversely related to the number of ACE (Child and Adolescent Health Measurement Initiative, 2013). ACE include abuse, neglect, as well as indicators of family or household dysfunction that range from a parent/household member with a mental illness to parental divorce (Felitti et al., 1998). In general, family relationships are strained by contextual stress (i.e., lower sources of support and greater challenges from income-related neighborhood factors such as perceived safety) experienced by individuals in economically disadvantaged environments (Barajas-Gonzalez & Brooks-Gunn, 2014; Conger et al., 1992; Karney, Story, & Bradbury, 2005). Childhood economic disadvantage and adversity seem to perpetuate a life course experience of adversity in economic mobility, relationship quality, and health (Umberson, Williams, Thomas, Liu, & Thomeer, 2014). In fact, couples with low income also report lower levels of social support and relationship quality and stability (Conger, Conger, & Martin, 2010; Mansfield, Dealy, & Keitner, 2013). Thus, a strong negative relationship is demonstrated in the literature between poverty, relationship quality, and childhood adversity.

Adverse childhood experiences (ACE) can predict the most prevalent causes of death and disability as well as increase likelihood for health risk behaviors in adulthood (Felitti et al., 1998). Additionally, ACE increase risk of intimate partner violence perpetration and victimization (Whitfield, Anda, Dube, & Felitti, 2013) and adult survivors of childhood abuse report lower relationship quality (Reyome, 2010). Thus, there seems to be a clear link from ACE to poor health and ACE to low relationship quality. However, reports of high social and relationship support seem to buffer health from the influence of ACE (Nurius, Logan-Greene, &

Green, 2012; Rosand, Slinning, Eberhard-Gran, Roysamb, & Tambs, 2012), suggesting quality relationships may be an important area with potential to mitigate the identified trajectory from ACE and early life stress to health. Furthermore, meta-analysis of the relationship between marital quality and health compared effect sizes and posited relationship functioning as “similar to health behaviors that occur on a daily basis, such as diet, exercise, and sedentary activity” (Robles, Slatcher, Trombello, & McGinn, 2014, p.168). In sum, adversity, community environment, and socioeconomic position influence behavior and shape health. Individuals with economic disadvantage experience greater risk of adversity in early life, greater risk of distressed adult relationships, and poorer health over time compared to individuals with higher income. Therefore, income contributes across the lifespan as a social determinant of health and is a critical area for further research.

Theoretical Foundation

A relationship exists between economic disadvantage and relationship functioning. The family stress model (Conger, Rueter, & Elder, 1999) served as the primary theoretical foundation for the current investigation, supporting examination of the aforementioned constructs of ACE, relationship quality, and health.

Family Stress Model

Conger and colleagues (1990) examined the influence of economic disadvantage to relational factors with couples who reported financial instability associated with the agricultural crisis. Results indicated economic pressures contributed to heightened individual stress and influenced affect in husband-wife interactions. In turn, marital affect contributed to perceived relationship quality and ultimately to relationship durability (Conger et al., 1990). Conger and colleagues (1992) extended their original findings to include implications for the broader family

system through analysis of behavioral interactions as a part of the Iowa Youth and Families Project with 205 families. In their analysis, economic stress seemed to also influence the parent-child relationship and the child's adjustment in addition to the individual and couple outcomes. Parents with higher stress interacted with less warmth and more hostility towards one another, exhibited more depressive symptoms, and parented with less nurturing and involvement with their children. As a result, scores for children of parents with higher economic stress suggested higher internalized and externalized behaviors that indicated higher levels of distress experienced by the child. The family stress model developed from the addition of child outcomes associated with economic pressure and changes in the marital relationship (Conger et al., 1992). In addition, consequences of the relationship between economic stress and family relationship quality persisted inter-generationally.

Researchers (Conger, Cui, Bryant, & Elder, 2000) followed-up with the children from the initial Iowa project and examined the longitudinal effects of economic and financial pressure for their relationship formation in emerging adulthood. Results indicated participants' relationships with their parent as well as their parent's marital affect significantly predicted their own relationship behaviors and perceived relationship quality as an adult. Romantic partners interacted with more warmth and less hostility when they reported nurturing-involved parents and positive parental marital affect (Conger et al., 2000). In sum, economic disadvantage exerts a systemic and developmental influence to relationship behaviors and relationship quality. Adults that experience economic pressure exhibit greater individual distress and relationship distress. In addition, parental stress influences the parent-child dynamic and child adjustment. Furthermore, the longitudinal impact from economic disadvantage supports the notion of

relationship conflict and distress as a chronic stressor with implications for behavior, relationship quality, and health.

Operational Definitions

Adverse Childhood Experiences

Adverse childhood experiences (ACE) refer to conditions experienced prior to the age of 18 that have a demonstrated association to future relationship dynamics and health. For the current study, ACE are operationalized by 10 categories of adversity utilized in the original study that examined the associations between ACE and adult health risk behavior and health outcomes. ACE include abuse, neglect, and varied forms of household dysfunction including parental incarceration, substance abuse, or mental illness. As the number of ACE an individual experienced increases, so too does their risk for a number of chronic illnesses, disease, and early death (Felitti et al., 1998).

Relationship Quality

This study defined relationship quality as the subjective reports of relationship satisfaction and the behavioral relationship self-regulation (Halford, Sanders, & Behrens, 1994; Hendrick, Dicke, & Hendrick, 1998). Behavioral relationship self-regulation (RSR) refers to the ability to self-monitor, apply strategies, and contribute effort necessary to sustain a relationship. RSR is both correlated with and predictive of relationship satisfaction (Wilson, Charker, Lizzio, Halford, & Kimlin, 2005; Halford, Lizzio, Wilson, & Occhipinti, 2007). Relationship quality, inclusive of satisfaction and RSR, impacts individual well-being (Proulx, Helms, & Buehler, 2007) and health (Jaremka, Glaser, Malarkey, & Kiecolt-Glaser, 2013).

Health

Health is operationalized by an individual's symptoms of psychological distress and functioning in addition to physical conditions of illness or disease. Mental and physical health are closely related and often comorbid. Furthermore, chronic stress can influence the onset and trajectory of illness and disease (Kiecolt-Glaser & Newton, 2001; Mayou, Gill, Thompson, Day, Hicks, Volmink, & Neil, 2000).

Economic Disadvantage

For this study, economic disadvantage refers to the chronic and contextual influences experienced by individuals with low income and/or living in poverty. Economic disadvantage in the United States is prevalent and impacts approximately 15% of the overall population. In fact, this figure increased to 31.6% of the population across a three-year examination of personal experiences of poverty that lasted at least two months in duration (DeNavas-Walt & Proctor, 2015). Individuals with low-income often live in more disorganized environments with fewer available resources that contribute to lower educational attainment (Schwartz & Gorman, 2003), poorer physical and mental health (Cutrona, Wallace, & Wesner, 2006; DeCarlo, Santiago, Wadsworth, & Stump, 2011; Haney, 2007; Marmot & Allen, 2014) and decreased social support and relationship quality (Barajas-Gonzalez & Brooks-Gunn, 2014; Mansfield, Dealy, & Keitner, 2013).

Actor-Partner Interdependence Mediation Model

Research with couples' data may violate the assumption of independent observations necessary for most statistical analyses, due to the shared social context, influence and similarities between members of a dyad. However, the degree of interdependence between members of a dyad can be tested and included within proposed analytical models. The Actor-Partner

Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006) accounts for direct actor effects observed for an individual from his/her independent variable to his or her own dependent variable. Likewise, the APIM accounts for partner effects from a partner's independent variable to the individual's own dependent variable. In addition, the actor-partner structure can be maintained and expanded for the purposes of mediation analysis with the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann, Macho, & Kenny, 2011). Mediation analysis aims to explain the effect of an independent variable (X) on a dependent variable (Y) by adding a causal or mediating variable (M)(Hayes, 2013).

Purpose of Study

Research is limited that examines relationships between ACE, adult relationship quality, and health (Conger et al., 2000; Nurius, Green, Logan-Greene, & Borja, 2015; Umberson et al., 2014). Moreover, most of the initial studies examined constructs in a predominately homogenous sample of Caucasian and moderate-income individuals. In addition, these studies examined constructs at the individual level and did not account for the interdependent nature of dyadic stress (Bodenmann, Ledermann, & Bradbury, 2007) and relationship quality (Knapp, Norton, & Sandberg, 2015). Thus, dyadic research is needed that examines the associations between ACE, relationship quality, and health among couples with low income and inclusive of racial/ethnic minorities. Therefore, this study aimed to examine the extent to which ACE contributed to relationship quality and health among economically disadvantaged couples.

Research Questions and Hypotheses

The primary aim explored: To what extent do adverse childhood experiences (as measured by the *ACE survey* [Felitti et al., 1998]) contribute to relationship quality (as measured by the *Relationship Assessment Scale* [Hendrick, 1988] and *Behavioral Self-Regulation for*

Effective Relationships Scale [Wilson et al., 2005]), and health (as measured by the *Brief Medical History Questionnaire* [Daire, Wheeler, & Liekweg, 2014] and psychological distress as measured by the *Outcomes Questionnaire 45.2* [Lambert et al., 2004]) for heterosexual couples from economically disadvantaged backgrounds?

The current investigation sought to examine the hypothesized directional relationships between ACE, relationship quality, and health in couples with economic disadvantage within a dyadic mediational model. The researcher theorized that the association between ACE and health may, in part and indirectly, be explained by the influence of ACE to relationship quality to health (i.e., mediation). Furthermore, the researcher theorized that members of a couple would be influenced by their partner's reports of ACE, relationship quality, and health (i.e., dyadic partner effects). Analyses determined the actor effect (i.e., the strength of the relationship from an individual's own independent variable to his or her own dependent variable) as well as the partner effect (i.e. the path from the independent variable of a partner to an individual's dependent variable). Based upon existing research and theory, hypothesized outcomes included: (a) a person's own ACE negatively predicted both his or her own (actor effect) and his or her partner's (partner effect) relationship quality; (b) a person's own relationship quality positively predicted his or her own (actor effect) and his or her partner's (partner effect) health; and (c) a person's own (actor-partner effect) and his or her partner's (partner-actor effect) relationship quality mediated the association between one's own ACE and health.

Significance of the Study

Implications from this investigation exist for the practice of counseling, the field of Counselor Education including relationship education intervention, and more broadly for public health prevention and intervention efforts among individuals with economic disadvantage

including federal relationship education initiatives. Overall, identification of the relationships between ACE, relationship quality, and health provided insight for the influence of adult relationships as a mediator of ACE and health.

Counseling and Counselor Education

Counselor educators informed by the results of the current study will be better able to support the development of counselors who need to diagnose or intervene with individuals or couples who are economically disadvantaged and ethnically diverse. First, counselors-in-training and counselor educators may be better informed on dynamics pertinent to individuals and couples with low income presenting to counseling including: (a) the prevalence of ACE, (b) the influence of ACE to relationship quality, and (c) the influence of ACE and relationship quality to health. Secondly, counselors-in-training may be better informed on dynamics pertinent to couples with economic disadvantage as well as improved competence related to social class as a component of multicultural competence. Finally, the role of healthy relationships for overall physical and mental health adds support to a holistic view of health and wellness.

Developmentally, counselors may benefit from instruction related to ACE as a part of client conceptualization and treatment response. ACE includes abuse, neglect, and household dysfunction that may contribute as chronic stressors in childhood or be considered traumatic to an individual. ACE and trauma are not synonymous; yet, the response and approach to client care may share similarities in approach to understand the impact and response for a specific individual. Thus, trauma-informed approaches may be an important consideration in instruction and development of counselors-in-training. The National Center for Trauma-Informed Care (NCTIC) of the Substance Abuse and Mental Health Services Administration (SAMHSA) conceptualized a trauma-informed approach to client care inclusive of (a) awareness of the

impact of trauma, (b) recognition of the symptoms of trauma, (c) individual and organizational responses grounded in knowledge of trauma, and (d) active efforts to avoid re-traumatization (SAMHSA, 2012). In this case, a counselor who is ACE-informed would be aware of the impact of ACE, recognize the associations with ACE correlates into adulthood, and respond in accordance with this knowledge. Furthermore, initial studies of trauma-informed care found that trauma-informed intervention yielded larger gains in counseling when compared to treatment as usual (Greenwald et al., 2012; Morrissey et al., 2005). Trauma-informed care is best practice and an interdisciplinary approach to client response and treatment. Therefore, training counselors to increase awareness of the chronic and contextual stressors experienced by individuals and couples with low income, including ACE and economic disadvantage, may further contribute to efficacy and multicultural competence.

The revised Multicultural and Social Justice Counselor Competencies (MSJCC) assert that through self-awareness, a counselor can build knowledge, skills, and action towards becoming a multi-culturally competent counselor of clients representing a diverse range of intersecting identities (Ratts, Singh, Nassar-McMillan, Butler, & McCullough, 2016). The MSJCC state that diversity is inclusive of socioeconomic factors in addition to race, ethnicity, gender, sexuality, age, religion, spirituality or disability. Similarly, the MSJCC outlines that clients must be understood within the context of their social environment. Therefore, understanding the lifespan context of chronic stress for individuals with low-income may be integral to effective and competent practice. Yet, researchers indicate a slow adaptation to incorporate social class in client conceptualization and research within the helping professions (Liu, Pickett, & Ivey, 2007; West-Olatunji & Gibson, 2012). Furthermore, research supports the influence of social class and poverty beliefs to biased clinical impressions and client

conceptualizations. Multiculturally competent counselors possess less biased perspectives of poverty (Clark, 2016). Clark (2016) found that counselors who attributed poverty to structural factors versus individual factors, a less biased view of poverty attribution, also scored as more multiculturally competent in their knowledge and awareness. Similarly, counselors-in-training beliefs for a just world (i.e., that an individual's circumstances good or bad were deserved) correlated with poorer predictions of future counseling outcomes and more negative counselor views of working with a client who was poor or working-class (Smith, Mao, Perkins, & Ampuero, 2011). A counselor's beliefs about poverty and economic disadvantage may add challenge to effective client conceptualization and therapeutic relationship formation. In addition, researchers identified competencies for counselors of children and families in poverty including: (a) culture-specific knowledge; (b) client conceptualization inclusive of the contextual experiences from the environment, family structure, and influence to presenting issues; (c) flexibility to account for cultural diversity including cross-cultural differences; and (d) culture-specific dispositions related to counselor comfort and respect for differences (Tate, Lopez, Fox, Love, & McKinney, 2014). This study provided greater understanding of the contextual experiences of couples with low-income; therefore, results contributed to knowledge and awareness integral to a culturally competent approach to practice with individuals with low income.

Similarly, the Association for Assessment and Research in Counseling (AARC) developed standards for the practice of multi-culturally competent research (O'Hara et al., 2016). Thus, counselor educators may integrate findings from the present study for research with individuals or couples with low-income reflective of multicultural intentionality. Additionally, this study included examination of the measurement models through confirmatory factor

analysis. Therefore, this study contributed to understanding for the appropriateness of each measure for use with future similar samples – couples with economic disadvantage.

Finally, the field of counseling distinguishes itself from other forms of social service and intervention through an emphasis on wellness (Kaplan, Tarvydas, & Gladding, 2014). Thus, services aimed to improve wellness and functioning may be significant areas of continued prevention, intervention, and research augmented by the results of the analysis. Mediation by relationship quality provided a causal explanation for how ACE affected health. As a result, confirmation of mediation inferred the potential to mitigate negative health trajectories initiated by a high ACE through relationship-focused intervention. Given the definition of relationship quality provided (i.e., effort, regulation strategies, and satisfaction), confirmed mediation effects provided initial support that individuals may experience health-benefits from the establishment and maintenance of healthy relationship behaviors and personal relationship effort (i.e., relationship self-regulation strategies and persistence for change). In addition, the results underscored the importance of interpersonal relationships to lifelong health and well-being. Thus, the model provided a developmental and life course perspective from childhood adversity to adult relationship quality and health. The results support a holistic approach to health inclusive of the systemic and interpersonal components – that is, health is not encapsulated within one individual but an interpersonal and dynamic process influenced by relationships and relational stressors (Siegel, 2012). In addition to public awareness for the importance of diet and nutrition to health, public education efforts could promote the significance and implications from healthy relationships.

Relationship Education

Federally funded relationship education (RE) programs increased accessibility and affordability of relationship strengthening efforts for typically underserved populations including low-income and ethnic minority couples. Markman and Rhoades (2012) suggested further research is needed to identify mediators and moderators of change – how RE works and for whom it works best. Additionally, Wadsworth and Markman (2012) identified the necessity for research examining ‘moderated mediation’ or subpopulation factors that influence the effectiveness of RE. Although this study did not address program outcomes, the study sample included participants enrolled in a RE intervention; therefore, this study provided vital information for characteristics that may in future research be examined as mediators and moderators of change. Specifically, initial studies demonstrated that RE is effective with participants that presented with higher distress (Carlson, Rappleyea, Daire, Harris, & Liu, in press; McGill et al., 2016; Quirk, Strokoff, Owen, France, & Bergen, 2014). The results of the current analysis could inform future work through the identification of a potential contributor (i.e., ACE) to relationship quality and distress for individuals attending RE intervention. Therefore, the observed relationship between ACE, relationship quality, and health supported implications for federal RE practice to include targeted recruitment and engagement strategies. Furthermore, subsequent research could examine ACE as a moderated mediator for RE outcomes.

In conclusion, the association observed in the current study between ACE, relationship quality, and health inferred practical implications for counselor training and competency, as well as policy and intervention with couples with economic disadvantage. Support for a mediational model suggested the importance of relationship quality to the disruption of negative health

trajectories initiated by adverse childhood experiences. Finally, the mediation effect supported a holistic view of health, inclusive of the influence of adult relationship behaviors and satisfaction.

Methods

Prior to data analysis, the university institutional review board approved the study and use of secondary data analysis. The study examined archived data from 2014-2015 of Project TOGETHER, a community-centered healthy marriage program funded through the Department of Health and Human Service, Administration for Children and Families, Office of Family Assistance (90FM0039-01-00). The national healthy marriage initiative aimed to provide relationship education interventions to low- to moderate-income individuals and couples.

Research Design

The current study employed a nonprobability, descriptive and correlational research design to examine the relationship between adverse childhood experiences, relationship quality, and health. As a correlational study, although causation cannot be determined, sophisticated forms of analysis allow for the investigation of potential causal relationships (Tabachnick & Fidell, 2013).

Participants

For Project TOGETHER, researchers used convenience sampling and community-based recruitment of participants in partnership with local social service agencies that served primarily low-income populations. As a result, the year of archived data to be used in this study included 538 dyads that enrolled in Project TOGETHER to attend a couples-format workshop. Researchers disagree on best practices for sample size estimation in structural equation modeling (Wolf, Harrington, Clark, & Miller, 2013). Kenny, Kashy, and Cook (2006) recommend an absolute sample size of at least 200 dyads. Other researchers recommend a priori ratios between

the number of free parameters to be estimated and the number of subjects necessary to meet minimum sample size requirements. Ratios range from a high estimate of 20 participants per free parameter (Jackson, 2003) to lower estimates of 10 participants per free parameter (Bentler & Chou, 1987). Desired ratios for this data to estimate 27 free parameters ranged from a sample of 270 to 540 participants. Another approach to sample estimation computes a noncentrality parameter and sample size based on recommended values for fit indices (Kim, 2005). For this study, using a root mean square error of approximation (RMSEA) of .05 to estimate a close fit, a desired power of .8, and the equation is $N_{\varepsilon} = \frac{\delta_{1-\beta}}{\varepsilon^2 df} + 1$, we find for $df = 126$ that the noncentrality parameter is $\delta_{1-\beta} = 44.8715$. Therefore, a priori sample estimation resulted in a suggested minimum sample size of 145 participants. In sum, several forms of sample estimation supported use of the existing data that included 538 couples. All participants were at least 18 years of age and enrolled in Project TOGETHER to attend a workshop as a couple. Enrollment included a group intake where project staff reviewed the informed consent and participants completed assessments.

Instruments

Participants completed several assessments during the group intake including (a) a researcher-developed adult history and demographic form, (b) *the adverse childhood experiences (ACE) survey* (Felitti et al., 1998), (c) the *Relationship Assessment Scale* (RAS; Hendrick, 1988), (d) the *Behavioral Self-Regulation for Effective Relationships Scale* (BSRERS; Wilson et al., 2005), (e) the *Outcomes Questionnaire 45.2* (OQ45.2; Lambert et al., 2004), and (f) the *Brief Medical History Questionnaire* (Daire, Wheeler, & Liekweg, 2014). The researcher conducted confirmatory factor analyses on all instruments (presented in the results section below) to determine validity of the items for this study sample.

The adult history and demographic survey included information relevant to the proposed analysis such as: race, ethnicity, age, relationship status, cohabitation status, number of children, educational attainment, employment and income. Federal reporting guidelines dictated several categorizations for the grant including options for (a) ethnicity response as Hispanic or Non-Hispanic and (b) race response options of American Indian/Alaska Native, Asian, Black/African American, Native Hawaiian/Other Pacific Islander, White, or Other. Additionally, open response and a continuous scale of measurement captured items such as age, number of children, years of education and average monthly income.

The ACE survey included 10 statements as indicators of specific forms of childhood adversity. The survey instructs respondents to indicate, yes or no, if while growing up during the first 18 years of life they experienced each of the individual forms of adversity listed. ACE include: (a) emotional neglect, (b) physical neglect, (c) emotional abuse, (d) physical abuse, (e) sexual abuse, (f) parental divorce/separation, (g) maternal intimate partner violence, (h) household member alcohol or drug use, (i) household member mental illness, or (j) household member incarceration. A total ACE score consisted of the summed affirmative responses. Thus, ACE scores ranged from 0, an indication of no exposure to the forms of adversity included in the original study, to 10, suggestive of exposure to all 10 forms of adversity. Researchers determined retrospective reports of ACE to be fairly reliable (Dube, Williamson, Thompson, Felitti, & Anda, 2004; Reuben et al., 2016).

The RAS is a 7-item measure of perceived relationship satisfaction. The RAS is applicable to the assessment of satisfaction with dating or committed couples. It is a commonly used instrument in couples and relationship research and RAS scores have strong reliability and validity (Graham, Diebels, & Barnow, 2011; Hendrick, Dicke, & Hendrick, 1998; Vaughn &

Matyastik Baier, 1999). The instrument administrator can sum and average Likert scale items to obtain a final total score with a range from one to five. Relationship distress may be interpreted from scores below 4.0 for male scores and below 3.5 for female scores.

The BSRERS-self is composed of 16-items that measure two subscales of relationship self-regulation that includes strategies (SRS) and relationship effort (SRE). The relationship effort subscale includes questions that pertain to persistence for change and the self-regulation strategies subscale includes questions that pertain to behaviors associated with relationship maintenance and enhancement. Although not as commonly used in the literature, BSRERS scores are psychometrically sound with valid and reliable indicators for relationship self-regulation. Furthermore, BSRERS scores are predictive of relationship satisfaction.

The OQ45.2 is a 45 item measure of psychological distress including symptoms associated with anxiety and depression (symptom distress subscale) and functioning in life domains of interpersonal relationships and social roles. Furthermore, the OQ45.2 demonstrated item validity, reliability, and frequent use in counseling research and practice to determine treatment outcomes. All OQ45.2 item responses can be summed for a total score that ranges from 0 to 180, where higher scores indicate greater psychological distress.

The Brief Medical History Questionnaire is a checklist of 17 medical conditions. Participants are asked to denote any of the diseases or conditions they have had. In addition, an open response 'other' category allows for the identification of additional medical issues. One point is assigned to each of the checked conditions and items are summed for a count of the total number of medical conditions identified.

Data Analyses

Preliminary analysis of the data included tests of statistical assumptions for structural equation modeling and dyadic data analysis, reorganization of the data to a dyadic structure (if appropriate), and analysis of missing data. To examine the study variables in a mediational and dyadic model, the researcher employed the Actor-Partner Interdependence Mediation Model (APIMeM; Ledermann, Macho, & Kenny, 2011) to specify and test the theorized model.

Limitations

The current study included several limitations. Correlational designs do not support determination of causality (Campbell & Stanley, 1963). Additionally, all of the data collection instruments relied upon participant self-report. Therefore, response bias from self-report may have influenced the outcomes. Specifically, the self-report nature of the ACE survey may have contributed to underreport or biased estimates of ACE due to the potential experience of trauma from childhood abuse or neglect (Reuben et al., 2016). In addition, threats to internal and external validity existed based on measurement error and criterion-related validity (i.e., external variables associated with the constructs not included in the model). Finally, the study utilized a convenience sample from a secondary dataset of participants that enrolled in Project TOGETHER. Therefore, a volunteer bias may have existed since couples that enroll in a relationship education workshop may not be representative of all couples with economic disadvantage due to their initiation of and engagement with a relationship-focused intervention.

Chapter Summary

Chapter One provided an overview of the current investigation highlighting the statement of the problem, theoretical foundation, purpose, research questions, significance, and methods. Dyadic research is needed to examine the associations between adverse childhood experiences,

relationship quality, and health among couples with low income. Furthermore, mediation of ACE and health by relationship quality is an important area of research with implications for counselor education practice, research, and collaboration. Therefore, this study aimed to examine the extent to which ACE contribute to relationship quality and health among economically disadvantaged couples.

CHAPTER TWO: REVIEW OF THE LITERATURE

Chapter two includes a review of six major areas of theory and research: (a) economic disadvantage, (b) the family stress model, (c) chronic stress, (d) health, (e) adverse childhood experiences (ACE), and (f) relationship quality. First, the chapter begins with a discussion of the context for the population of interest: economic disadvantage and economically disadvantaged couples. Next, the primary theoretical framework, the family stress model (Conger et al., 1992), is reviewed. Then, a brief overview of chronic stress, including the dyadic stress response and dyadic coping (Bodenmann, 2005) is provided. Following, the chapter summarizes research related to health (Huber et al., 2011; Lambert et al., 2004) and social determinants of health in the United States (Braveman, Kumanyika, et al., 2011; Karney & Bradbury, 2005). The chapter presents a review of research related to ACE (Felitti & Anda, 2010; Felitti et al., 1998) as well as consequences of exposure to ACE are reviewed. Similarly, the chapter continues with a brief overview of research related to relationship quality as defined by relationship satisfaction (Hendrick, Dicke, & Hendrick, 1998) and relationship self-regulation (Halford, Sanders, & Behrens, 1994). Finally, the chapter concludes with a summary of the associations between the reviewed constructs to provide support for the current research study.

Economic Disadvantage

Recent trends for income distribution in America reflect a growing population of individuals with less income and with greater depths of poverty. From 2007 to 2009, the United States experienced an unprecedented recession since the Great Depression of the late-1920s. During this time, unemployment rates peaked around 10% nationally and impacted over 12 million individuals (Bureau of Labor Statistics, 2012). In spite of economic recovery, the number of individuals in poverty has been resistant to significant reduction. In fact, the poverty rate in

2014 accounted for 14.8% or 46.7 million people; 2.3 percentage points *higher* than the poverty rate of 2007. Additionally, poverty rates increased among individuals with higher educational attainment and for married couple families. The observed trend for increased poverty among married couples contributed to a 21.1% poverty rate among children under the age of 18 (DeNavas-Walt & Proctor, 2015). Further, the depth of poverty increased between 2007 and 2013 – that is, a larger difference existed between the total income for a family in poverty and the federal poverty threshold (Stanford Center on Poverty and Inequality, 2015). More families are living in poverty and more children are growing up affected by economic disadvantage.

Development and Health Implications

Children living in impoverished communities often experience higher rates of violence and crime. In turn, children in higher crime communities tend to also experience heightened challenges for academic success. Schwartz and Gorman (2003) examined the relationship between academic performance and exposure to community violence. The sample ($N = 237$) included children in third to fifth grade ($M = 9.5$ years old) from primarily Hispanic backgrounds (48%). Researchers compared the recorded school grades, standardized achievement tests, and teacher reports of behavioral disruption to child reports of community violence and depressive symptoms. The researchers utilized structural equation modeling (SEM) to understand associations between the constructs. Results indicated a strong negative relationship between exposure to community violence and academic functioning ($\chi^2(48) = 94.9$, CFI = .96, RMSEA = .07) after controlling for peer bullying experiences. The significant relationship among the study constructs highlighted the contributing role of systemic influences such as crime and economic disadvantage for academic achievement. Mediation of the relationship between community violence exposure and academic functioning occurred both by child symptoms of depression and

disruptive behavior. Mediation of the dependent variable implied that changes in academic functioning, although directly related to community violence, also indirectly related to the child's symptoms of depression and behavior in school. In other words, depression and disruptive behaviors are correlated with exposure to community violence and add to the total effect on a student's academic functioning. The original study did not report effect sizes. Therefore, childhood exposure to adverse conditions seems significant to mental health as well as performance in key domains of life. Additionally, the long-term sequela of early life adversity includes implications for employment. Individuals with less education are more likely to earn low-wages and work irregular shift schedules (Bond & Galinsky, 2011). As a result, the cycle between economic disadvantage and lower educational attainment may contribute to intergenerational transmission of poverty and limit an individual's resources.

Economically disadvantaged individuals often live in resource-poor environments characterized by low quality housing or schools and few or inaccessible options for transportation, childcare, employment, or healthy foods. Individuals can internalize their experience of the external environment, which lowers their self-esteem (Haney, 2007). Likewise, resource-poor environments often contribute to lower social connection and civic engagement. As a result, individuals living in resource-poor environments are often isolated and experience a greater incidence of depression and mental health issues (Cutrona, Wallace, & Wesner, 2006; DeCarlo, Santiago, Wadsworth & Stump, 2011; Haney, 2007). Economic disadvantage is a chronic environmental stress which, in turn, influences physical and mental health outcomes.

Poverty moderately correlated with health ($r = .51$; Stanford Center on Poverty and Inequality, 2015). In fact, individuals with low income reported poorer health status regardless of race or ethnicity (Schiller, Lucas, Ward, & Peregoy, 2012). Further, individuals with low income

demonstrated greater vulnerability to poor health behaviors and associated mental health outcomes. In 2005, the Public Health Institute, Alcohol Research Group (Mulia & Zemore, 2012), conducted the 10th U.S. National Alcohol survey to assess alcohol use and alcohol related problems. Researchers categorized participants ($n = 4,080$ adult drinkers) from 40 states by income poverty groups (poor or not poor), as defined by the individual's prior year of reported income and federal poverty guidelines. Results indicated that 48% of the variance in alcohol dependence attributed to social adversity in comparison between poor and non-poor groups. However, no differences existed in factor loadings for the measurement models or for associations of the study constructs between ethnic or racial groups in multiple group analysis (Mulia & Zemore, 2012). In sum, income associated disparities in health and health behaviors seem to be influenced by societal and environmental factors.

Relationship Implications

In addition to health risks, financial instability adds stress to relationships for both married and unmarried couples. Married couples who reported economic distress experienced greater risk for overall marital dissolution (Conger, Rueter, & Elder, 1999). Unmarried couples often desire long-term relationships; however, low-income couples who are not already married described financial security as the biggest obstacle to the maintenance of a lasting relationship (Charles, Orthner, Jones, & Mancini, 2006). Financial pressure, discussed in further detail below in the theoretical framework, also associated with increased risk of emotional and relationship distress (Conger, Rueter, & Elder, 1999; Landers-Potts, et al., 2015).

Mansfield, Dealy, and Keitner (2013) compared family functioning, social support, overall quality of life, and mental health between families that reported low or moderate income. Researchers recruited participating families ($N = 125$ families) from the community at various

events or school functions. Results from a factorial analysis of variance indicated that low income families reported less overall social support ($F [7, 117] = 9.94, p < .0001$), life satisfaction ($F [7, 117] = 9.03, p < .0001$), family affective responsiveness ($F [7, 117] = 4.06, p = .0005$), and family functioning ($F [7, 117] = 2.65, p = .01$). However, racial and ethnic minorities disproportionately represented the low-income group and the relatively low sample size limited power of these results. Yet, the relationships between income status and family relationship quality are noteworthy considerations for work with lower income family systems. Further, the results underscored the association between economic disadvantage and a strained family dynamic (Mansfield, Dealy, & Keitner, 2013). The family dynamic is further influenced by parent-child relationships negatively influenced by neighborhood and contextual stressors that contribute to harsh parenting practices and inconsistent discipline (Barajas & Brooks-Gunn, 2014; White, Roosa, Weaver, & Nair, 2009). Barajas and Brooks-Gunn (2014) examined correlations between neighborhood stress and approaches to parenting. The study utilized cross-sectional analysis of data from 2,132 racially and ethnically diverse families that lived in communities disadvantaged by poverty. Neighborhood stress influenced parenting practices. Disordered neighborhoods related to higher community-level fear for safety, family conflict, as well as maternal symptoms of depression that all contributed to harsher parenting approaches ($\chi^2 = 1.36, CFI = .977, TLI = .965, RMSEA = .028, CI [.000, .046]$; Barajas-Gonzalez & Brooks-Gunn, 2014). In sum, parent-child and overall family relationships are impacted by neighborhood contextual stress and economic disadvantage.

The negative impacts to family relationships and individual well-being resultant from financial strain and neighborhood disorganization seem to then play a role across an individual's life. Sobolewski and Amato (2005) found that family of origin economic hardship during

childhood predicted later adult emotional well-being, marital discord, low educational attainment, and low earned income. The stress experienced in low-resource environments impacted personal well-being, health, and adult outcomes such as education, employment, earning potential, as well as, parent-child and intimate partner relationships.

Of importance to note, among the economically disadvantaged, individuals who are Hispanic (any race) or Black reported the lowest median household income and disproportionately represented the number of people in poverty in the U.S. (Proctor, Semega, & Kollar, 2016). Similarly, racial and ethnic minorities identified institutional and social forms of discrimination that influenced health behavior and health outcomes (Rosenthal & Lobel, 2011; Williams & Mohammed, 2013). Therefore, race and ethnicity are also important factors to consider in stress examinations among economically disadvantaged populations.

In conclusion, economic disadvantage exerts a chronic and contextual influence to factors such as childhood adversity, relationship quality, and health. Individuals may experience negative outcomes as a result of economic disadvantage including restricted educational attainment, greater mental and physical health issues, and disrupted family-of-origin dynamics. Therefore, further exploration is warranted to examine these constructs among economically disadvantaged populations to better understand contextual influences to health that have the potential to inform future education or training, intervention or service, and policy. Thus, the current investigation utilized a sample of individuals with low income to explore a systemic and life course perspective of the associations between childhood adversity, adult relationship quality, and health. Further, the analysis accounted for the influence from an individual's intimate partner on these variables. As such, the family stress model is described below as the primary theoretical foundation.

Theoretical Foundation

The family stress model is the primary theoretical foundation for the current investigation and research constructs (Conger, Rueter, & Elder, 1999). The family stress model grounded the hypothesized relationship between experiences of adversity, adult intimate relationship quality, and health outcomes in economically stressed family systems. Further, the model supports the interrelated nature of these factors between members of a couple.

Family Stress Model

Originally conceptualized as the family process model of economic hardship and adjustment (Conger et al., 1992), the family stress model states that economic pressures experienced by low-income families contribute to psychological distress and strained relationship dynamics for family members (Conger et al., 1990; Conger, Ge, & Lorenz, 1994; Conger, Rueter, & Conger, 2000). Economic pressure refers to the psychological correlates of life with and experience of objective instances of economic hardship. The researchers grounded their original hypotheses in research that examined the impact of economic crises to marital stability, childhood maltreatment, and health (e.g., the Great Depression of the 1920's).

In their seminal study, Liker and Elder (1982) analyzed the influence of economic stress to observer-rated marital tension as well as observed and spouse-rated temperamental personality traits. The researchers utilized data from the famous Berkley Study and selected families that represented each third birth in the city during 1928. Participating families contributed data annually ($N = 111$) across the 1930's, although researchers averaged the data across the three time points including: pre-1930 depression, time of the economic collapse (1933 to 1935), and post-economic collapse (1936 to 1941). In sum, economic loss correlated with decreased marital quality and increased hostility. Liker and Elder determined that finances increased conflict

between the members of the couple and increased tension and eroded marital quality. Couples with initial low marital quality or low coping resources experienced the strongest negative trajectory following economic loss. Low quality relationships and coping resources seemed to create vulnerability to the negative effects of financial burden. Sex of the respondent significantly influenced outcomes associated with financial stress including the largest change observed for male temperament (i.e., increased hostility). Generationally, the observed differential effects of economic burden by sex may be attributed to the predominately male-dominated workforce in the 1930's and social expectations for males as the primary breadwinner of the family. As a result, the initial study potentially lacked validity to modern day dual-earner households or for couples that experienced chronic economic disadvantage. Additionally, an external judge determined marital tension following a brief interview, rather than subjective reports by members of the couple.

Conger and colleagues (1990) used similar constructs (i.e., economic hardship, relational characteristics including hostility and warmth, marital quality, and marital instability or risk factors for divorce) in application with families impacted by a more recent economic downturn, the agricultural crisis of the 1980s. The sample included 76 white, middle-class couples that lived in a rural Midwest area. The husband's hostility and warmth accounted for 24% of the variance in the wife's marital quality. In addition, hostility, warmth and marital quality explained 51% of the variance in female marital instability. For men, their wife's warmth, hostility, and husband marital quality explained 31% of the variance in marital instability. However, results only showed one direct effect from wife's hostility (not warmth) to marital quality ($b = -0.41, t = -3.9, p < .05$). Hostility and warmth directly related to relationship stability and indirectly related through perceived relationship quality (Conger et al., 1990). In essence, these findings point to

the influence of economic strain for a couples' behavior towards one another, perceived relationship quality, and resultant relationship durability. However, this study did not address the consequence of this relational pattern between husband and wife for their children.

Conger and colleagues (1992) expanded the theorized model and included implications for children within the broader family system that resulted in the family stress model. The researchers developed the family stress model in conjunction with the Iowa Youth and Families Project. The study sample ($N = 205$ families) included a majority of Caucasian, middle-class (e.g. high school completion as median educational attainment, median family income of \$33,300 in 1988), and rural families (34% reported living on a farm, 54% in cities with populations under 6,500). Each member of the family completed questionnaires as well as video recorded family interaction tasks including the mother, father, seventh-grade adolescent, and a sibling within at least four years of age. The researchers hypothesized that family economic pressures contributed to parental depression and resulted both in increased marital conflict and decreased nurturing/involved parenting. Further, they hypothesized that these dynamics then resulted in poor adjustment of the adolescent child. In fact, economic pressure contributed to depressed mood for both mothers ($R^2 = .46$, $b = 0.68$, $p < .05$) and fathers ($R^2 = .34$, $b = 0.58$, $p < .05$). Additionally, the direct relationship with mother's depressed mood ($b = -0.46$, $p < .05$) and indirect relationships through marital conflict from mother's and father's depressed mood explained 45% of the variance in mother's nurturant/involved parenting, in the model of maternal contributions to child adjustment. As a result, 15% of the variance in positive child adjustment could be explained by the model from mother's parenting nurturing/involved ($b = 0.39$, $p < .05$). A similar pattern of associations existed among the constructs in examination of the father's contributions to child adjustment ($R^2 = .17$, $b = 0.41$, $p < .05$). Greater economic

pressure associated with increased relationship conflict or withdrawal between members of the couple as well as between parent and child. Consequently, parenting practices (i.e., low warmth, high hostility, and poor child management behaviors) significantly predicted child adjustment (i.e., internalized and externalized indicators of distress; Conger et al., 1992). Yet, the model emphasized changes in finances as a result of economic crisis, ignoring chronic economic disadvantage. Further, the model included a limited demographic profile of white, rural, and middle-class families.

Subsequent researchers replicated the model and findings within urban settings and an ethnic and racially diverse sample (Parke et al., 2004). In a sample of African American two-parent and rural households ($N = 897$ families), the family stress model predicted hardship experiences of the family and their 10- to 11-year old child's development ($R^2 = .31$; Conger et al., 2002). White, Liu, Nair, and Tein (2015) applied the model to parent-child dyads ($N = 749$) with parents of Mexican origin and found similar results. Additionally, their model added parental perceptions of neighborhood danger. Perceived neighborhood danger significantly contributed to the fathers' version of the model and moderated the effect of paternal warmth to the child's internalizing symptoms ($B = -2.12, p < .05$). Further, the maternal value for *familism* or commitment to the family unit, added to the mothers' version of the model and moderated the effect of maternal economic pressure to maternal warmth ($B = -0.09, p < .05$). Cultural values and the environmental context exerted an influence on the pathway from economic stress to child adjustment. Finally, Neppl, Senia, and Donnellan (2016) analyzed the family stress model with a sample ($N = 273$) of families including single- and coupled-parent households from the 1989 to 1992 Family Transitions Project, an extension of the Iowa Youth and Families Project and the Iowa Single Parent Project. The model demonstrated a good fit ($\chi^2 [84] = 129.34, CFI = .98$,

RMSEA = .044) when the researchers included different family structures. Thus, the family stress model is applicable to a more diverse perspective of family and demographic composition, including racial/ethnic minorities and single-parent families. However, each of these studies of the family stress model examined separate models by sex, which may ignore non-independence of responses between members of the couple (e.g., one person's economic related stress and pressure may influence his or her partner's stress). Yet, researchers later revisited the original model and study sample in a subsequent analysis that examined longer-term impacts of financial pressure for the children.

Conger, Cui, Bryant, and Elder (2000) followed-up with participants originally interviewed as seventh graders during the Iowa Youth and Families Project and examined the longitudinal effects of economic and financial pressure for relationship formation in emerging adulthood. Researchers reassessed the original Iowa youth ($N = 210$) approximately 10 years after the original study to interview them and their current romantic partner. The majority of young adults reported their current relationship status as a committed partner ($n = 109$). Participating couples reported perceived relationship quality and completed two discussion tasks (i.e., conflict discussion and relationship history). Four Likert-scale questions assessed relationship quality, composed of questions associated with happiness, commitment, and satisfaction in their current relationship. Young adults whose parents employed practices rated as nurturing and involved during their childhood significantly predicted their affective behaviors towards their partner ($r = .51, p < .01$). Likewise, parent marital affect also related to the young adult's affect towards their partner ($r = .24, p < .05$). The final analysis employed SEM and controlled for socioeconomic background of the target youth, duration of the couple relationship, sex of the target youth, and type of relationship union (i.e., married, cohabiting, committed

relationship). The target youth's affective behavior towards their partner mediated the association between their parenting experience as an adolescent and adulthood relationship quality (Conger, Cui, Bryant, & Elder, 2000). Family-of-origin experience of financial pressure influenced the development of healthy relationships at follow-up when adolescents entered adulthood. Their parent's style of parenting contributed to their behavior in their intimate relationship as an emerging adult, an indication of a life course influence to adult relationships from adversity experienced in childhood (i.e., economic disadvantage and parental responsiveness).

In summary, stress is experienced when a person perceives demands to be greater than available resources in a given situation (Lazarus & Folkman, 1984). Stress can influence the individual in terms of his/her mental health and behavior in interaction with others in the family system. Consequently, an individual's adjustment and development are influenced by the stress and coping of members of his/her family system. Furthermore, stress can exert an intergenerational impact such as the case with economic stress for relationship behaviors. Individuals with low income experience unique stressors, including financial pressure, that contribute to distress for the individual and his/her family relationships. Therefore, the family stress model provides a foundation for the examination of systemic chronic stressors (i.e., adverse conditions experienced in childhood and intimate partner relationships) with the population of interest: economically disadvantaged couples.

Chronic Stress

Individuals experience stress on a daily basis as a part of engagement in life. Acute stressors have a clear beginning and end. Conversely, chronic stressors are contextual occurrences and relatively consistent over time. Chronic stressors can deplete an individual and

the system within which he/she resides (Karney, Story, & Bradbury, 2005). Researchers postulate many potential sources of chronic stress, such as adverse conditions during childhood such as living in poverty (Evans, 2004), experiences of racial discrimination (Rosenthal & Lobel, 2011; Williams & Mohammed, 2013), or interpersonal stress such as a high-conflict intimate partner relationship (Kiecolt-Glaser & Newton, 2001; Robles, Slatcher, Trombello, & McGinn, 2014). Stressful situations elicit physiological changes that allow an individual to respond and survive. However, traumatic or prolonged exposure, such as chronic stressors, can result in reduced physiological responsiveness or allostatic overload. Specifically, the body may become so overworked from chronic stress, that the associated systems respond differently or even shut-down. As a result, the physiological systems that respond to stress become vulnerable and less resilient to subsequent stressors (Baum, 1990; Juster, McEwen, & Lupien, 2010; McEwen & Stellar, 1993). Thus, chronically stressed individuals have poorer health trajectories and health outcomes when compared to non-chronically stressed individuals (Kiecolt-Glaser, Glaser, Gravenstein, Malarkey, & Sheridan, 1996; Kiecolt-Glaser, Bane, Glaser, & Malarkey, 2003; McEwen, 2004). In sum, chronic stress alters the body's stress response and can contribute to adverse health consequences.

In addition to the physical response to stress, Lazarus and Folkman (1984) theorized stress and coping as a cognitive process of individual appraisal related to the transaction between a person and his/her environment. Situations characterized by an initial appraisal of potential harm or loss are further appraised to determine the appropriate resources or coping response by the individual. Coping refers to the cognitive and behavioral responses through which an individual regulates his/her emotion and/or works towards changing a problem situation (e.g. emotion-focused or problem-focused coping). Both the primary and secondary appraisal

processes are influenced by social elements; however, Lazarus' model did not include social factors as an explicit component (Lazarus & Folkman, 1984). Yet, the process of stress appraisal and coping is not encapsulated within one individual in isolation. Social factors influence both the experience and response to stressful situations and events.

Dyadic Chronic Stress

Different from individual coping, dyadic coping refers to a systemic response to stress. Members of a couple are often impacted directly or indirectly by stressors shared in their environment and relationship. Related, couples also have mutual resources, goals, and concerns, including sustaining the relationship, that require a collaborative problem solving and active coping process. Therefore, dyadic coping involves an interpersonal communication process between partners to decide a joint solution to a problem. Coping, whether individual or dyadic, can be adaptive, helpful, and healthy or unhealthy and destructive. For couples, dyadic coping contributes to the maintenance and augmentation of relationship quality and stability over time (Bodenmann, 2005). Additionally, dyadic coping seems to influence relationship satisfaction to a greater extent than individual coping (Herzberg, 2013).

Bodenmann, Ledermann, and Bradbury (2007) examined the relationships between internal and external stress for a couple's relationship and indicators of relationship functioning. Participants included 369 Swiss individuals ($N = 198$ couples) with a majority of middle-aged (48% between 31 to 40 years of age), married couples ($n = 148$ couples, 75%), together an average of 12.4 years, who completed a high school education (around 48% of men and women), and had children (70.4%). This study did not collect income. Internal stressors included items related to problems, pressures, and disagreement with a partner. External stressors included items related to financial issues, work stress, and troublesome neighbors. Additionally, researchers

assessed recent stressful events, relationship functioning, sexual satisfaction, and psychological distress. The researchers used the Actor-Partner Interdependence Mediation Model (APIMeM) to account for the high correlation between responses by members of a couple dyad. Results from the analysis indicated that higher levels of external stress directly related to greater internal stress (women, $b = .38$; men, $b = .49$, $p < .001$). The observed relationship between internal and external stress included partner effects for women, where a male partner's level of external stress covaried with stronger internal stress of the female. In essence, a female respondents' own reports of external stressors as well as by her male partner's external stressors influenced her internal stress. Internal dyad stress related to lower levels of relationship functioning including lower relationship satisfaction (women actor effects: $b = -.31$, $p < .001$; men actor effects: $b = -.33$, $p < .001$; women partner effects: $b = -.23$, $p < .001$; men partner effects: $b = -.26$, $p < .001$) and sexual satisfaction (women actor effects: $b = -.33$, $p < .001$; men actor effects: $b = -.35$, $p < .001$; women partner effects: $b = -.13$, $p < .05$; men partner effects: $b = -.23$, $p < .001$). Here, external daily stress seemed more highly related to internal stress and relationship functioning in comparison to acute life events (Bodenmann et al., 2007). In sum, ongoing and chronic stressors may be more detrimental to a couple relationship than acute events and stress. Chronic stress depletes individual coping. Furthermore, chronic stress influences a couple and their dyadic response and support. Therefore, examinations of chronic stressors experienced with a dyad are important to relationship quality.

Karney, Story, and Bradbury (2005) examined the relationship between marital satisfaction and acute/chronic stressors in a sample of first-time married newlywed couples ($N = 172$ couples). Participating couples attended an initial in-person visit to the study laboratory and contributed subsequent data every six months for a four-year period after their marriage.

Researchers retained almost two-thirds of the original sample the duration of the study, including 62% of husbands and 65% of wives. Overall, marital satisfaction declined for couples over time (husbands: $F [1, 71] = 26.4, p < .001$, effect-size $r = .52$; wives: $F [1, 75] = 57.7, p < .001$, effect-size $r = .66$) and chronic stress negatively correlated to marital satisfaction (husbands' r ranged from $-.11$ to $-.38$ across assessment points; wives' r ranged from $-.11$ to $-.39$).

Additionally, initial levels of chronic stress influenced the association between relationship satisfaction and subsequent acute stress. Individual reports of high initial levels of chronic stress contributed to a negative relationship between acute stress and satisfaction; however, for participants that reported low to no chronic stress, acute stressors seemed to strengthen perceived relationship satisfaction. Thus, daily life stressors seemed to strengthen relationship satisfaction for individuals that reported low chronic stress; whereas, for individuals that reported higher chronic stress, acute stressors associated with declines within the relationship. Yet, due to the pervasive and contextual nature of chronic stress, the authors asserted that couples may not be consciously aware of the influence of chronic stress to their relationship (Karney et al., 2005). Relationship satisfaction is influenced by contextual and chronic stress, yet declines in satisfaction may be attributed internally without awareness for this powerful external force. Therefore, couples may benefit from increased understanding for the role of external and chronic stressors to relationship satisfaction.

Positive relationships and social connectivity attenuated negative physiological stress responses (Dickerson & Zoccola, 2009; Strine, Chapman, Balluz, & Mokdad, 2008). Nurius, Logan-Greene, and Green (2012) found that socioemotional support and a sense of community moderated ACE outcomes for health. However, this study assessed support using single-item measures not validated in the literature, nor specific to an intimate partner. Yet, the protective

effects from marital satisfaction to health are well-documented (Kiecolt-Glaser & Newton, 2001; Robles et al., 2014; Rosand et al., 2012). Perceived marital support contributes to resilience from financial stress for couples with low income (Conger, Rueter, & Elder, 1999). Relationship quality buffered the effects of stressful events and correlates with survivorship from serious illness (Chou, Stewart, Wild, & Bloom, 2010; Rosand, Slinning, Eberhard-Gran, Roysamb, & Tambs, 2012). Elaborated further in the sections below, social resources and connection influence health and can combat negative life circumstances.

In sum, supportive and positive relational interaction can buffer the negative effects of stress. In dual and high-earning couples, physical affection between partners is associated with reduced daily cortisol levels (a stress-related hormone) and mediated stress response associated with work-stress (Ditzen, Hoppman, & Klumb, 2008). Likewise, in a laboratory setting when stressed individuals are offered support by their partner, cortisol recovery time improved (Meuwly et al., 2012). This relationship persisted independent of attachment style. Positive interaction with an intimate partner exerts a significant influence to stress response and recovery. Most of these studies utilized experimentally induced stress responses and included a more educated, higher income sample and did not report racial or ethnic demographic data. However, it is clear that chronic stress influences individuals and dyads in multiple and multi-faceted ways. Over time and using a life course perspective, chronic stress also has additional implications for health.

Health

Most definitions of health account for an individual's physical, mental, and social domains of functioning (Huber et al., 2011). Mental and physical illness are frequently comorbid and have mutual influence – chronic mental illness increases the risk for physical

illness and inversely, chronic physical illness increases the risk of mental illness (DiBenedetto et al., 2014; Scott et al., 2007). Both physical and mental health issues are exacerbated by chronic stress. Chronic stress influences the onset and negative trajectory of chronic illness and contributes to a lower quality of life for individuals managing a chronic illness (Black & Garbutt, 2002; Curtis & O'Keefe, 2002; Mayou, Gill, Thompson, Day, Hicks, Volmink, & Neil, 2000). Mental and physical health are related and impacted by chronic stressors. In addition to the physical and mental correlates, and consistent with the definition of health provided, chronic illness also has social implications.

Family and intimate relationships may also be affected for an individual managing a chronic health issue. Specifically, characteristics of the couple dynamic may change when managing a chronic illness to include increased communication difficulty or changed roles associated with adjustment to an illness (Dalteg et al., 2011). An extensive body of research exists regarding caregiver stress, beyond the scope of the current study (See Elmstahl, Malmberg, & Annerstedt, 1996; Sav et al., 2015). Yet, health seems to be a relational and social process. Good or bad, relationships influence physiological and immune functioning, health, and disease trajectory (Chou et al., 2012; Kiecolt-Glaser & Newton, 2001; Robles et al., 2014). The comprehensive impact of chronic illness is significant, given the prevalence of chronic illness in the U.S.

The National Health Interview Survey (NHIS) is a continuous cross-sectional assessment for the incidence and prevalence of broad range of health conditions and topics within non-institutionalized U.S. civilians. Results from the 2012 NHIS survey ($N = 34,525$) indicated that about half of adults over the age of 18 are diagnosed with at least one of the most prominent physical chronic illnesses, equating to around 117 million individuals (49.8%). The most

commonly experienced physical chronic illnesses in the U.S. includes: hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, kidney failure, asthma, and chronic obstructive pulmonary disease (Ward, Schiller, & Goodman, 2014). Additionally, about 44 million adults in the U.S. (18.1%) have a mental illness (Center for Behavioral Health Statistics and Quality, 2015). Therefore, chronic physical and mental illness are commonly experienced simultaneously. Collectively, chronic illnesses impose an estimated 1.3 trillion-dollar annual burden to the economy because of costs associated with treatment and loss of work productivity (DeVol & Bedroussain, 2007). Chronic illness, inclusive of physical and mental health conditions, is common and applies costs for the individual affected, his/her family, and society as a whole. In addition to the prevalence, personal and economic impact, contextually systemic factors also seem to influence chronic health status.

Disparities in health are well-documented among socially disadvantaged groups such as individuals with lower socioeconomic status as well as racial and ethnic minorities (Braveman et al., 2011; Caputo, 2003; Nikulina & Widom, 2014). Morbidity, incidence, and trajectory of disease demonstrate more negative outcomes for non-white individuals, which seem to worsen still for economically disadvantaged minorities (Williams, 2002). Individuals who are low-income earners demonstrate greater vulnerability to poor health behaviors and associated health outcomes related to social adversity and stress (Hicken et al., 2014; Mulia & Zemore, 2012). Contextual and health-related chronic stressors experienced by ethnic minorities and low-income individuals may be further worsened by limited resources and minimal social support (Karney & Bradbury, 2005). As a result of the disparity in health and social determinants of health, the National Institute of Health (NIH; 2010) called for the analysis of contributors and treatment approaches for chronic illness with the aim to protect and promote health for all individuals.

In sum, chronic illness, which encompasses mental and physical health conditions, is a critical area of concern. Consequently, health is the targeted outcome and dependent variable for the proposed study. Physical and mental illness are often comorbid and exert bidirectional influence to one another. Similarly, chronic stress relates to the onset and prognosis of chronic illness. As an example, adverse childhood experiences (ACE) can predict chronic illness and the top 10 leading causes of death and disability (Anda, Butchart, Felitti, & Brown, 2010; Felitti et al., 1998). Also, marital quality contributes to higher survival rates independent of disease severity for patients with chronic heart failure (Whisman, Uebelacker, & Settles, 2010). Discussed in additional detail below, adverse childhood experiences and relationship quality are independently associated with poor health.

Adverse Childhood Experiences

The U.S. Department of Health and Human Services, Children's Bureau (2015) and the National Child Abuse and Neglect Data System (NCANDS) reported a total of 3.6 million referrals for child protective services following reported allegations of child maltreatment, including a national total of 6.6 million children. The report indicated a small but noteworthy increase in both reports and substantiated cases from the years prior (i.e., 7.4% increase since 2010). Additionally, child protection agencies from 48 states reported 1.3 million children received post-response services to address the ongoing needs of these children and their families within the child protection system. African-American children had the highest rate of victimization in the population – 15.3 per 1,000 African American children compared to 8.4 per 1,000 for white children. Annual victimization rates also included 1,580 child maltreatment fatalities or children who died as the result of maltreatment. The rates of maltreatment and child fatalities underscore the severity and scope of adversity, specifically abuse and neglect, in

childhood. Yet, other forms of adversity exist and are fairly common including exposure to parental intimate partner violence (i.e., 6.6% of children; Hamby, Finkelhor, Turner, & Ormrod, 2011) or parental incarceration (i.e., 2.3% or 1.7 million children; Glaze & Maruschak, 2008). Childhood adversity influences development and stress within the family system. Therefore, a need exists to better understand and address implications from the varied forms of adverse childhood experiences.

Initial ACE Research

Defined by Felitti and colleagues (1998) in their seminal study for the longitudinal impact of ACE to health, ACE refer to experiences of adversity occurring prior to the age of 18 including: (a) emotional, physical, or sexual abuse; (b) emotional or physical neglect; and (c) household dysfunction including parent/guardian mental illness or substance abuse, incarceration, maternal-directed violence or divorce. In general populations, a graded and dose response relationship existed between ACE and adult risky health behaviors ($p < .001$; e.g., smoking, alcohol or drug use, high risk sexual behavior), mental health (e.g., depression, anxiety, PTSD, etc.) and physical health outcomes. ACE occur within the context of the family and thus are more likely to be experienced chronically. Therefore, ACE exposure has lasting repercussions and implications for overall health and interpersonal functioning. Using adjusted odds ratios to compare individuals with no ACE to those with '4 or more ACE', respondents indicating 'four or more ACE' were 12 times more likely to also report a suicide attempt, 7.4 times more likely to report alcohol abuse, and 10.3 times more likely to report intravenous drug use. Respondents indicating 'four or more ACE' also reported low health quality, including adjusted odds ratios ranging between 1.6 to 3.9 for diabetes, hepatitis, or emphysema. After controlling for age, sex, race, and education, a significant relationship ($p < .05$) existed between

ACE score and disease conditions in logistic regression including conditions such as: heart disease, cancer, emphysema, hepatitis, skeletal fractures and overall perceived health. As an individual's ACE score increased their health behavior and health outcomes in adulthood declined. In addition, ACE are commonly experienced among respondents participating in the original study (Felitti & Anda, 2010; Felitti, et al., 1998).

Over half of the original study sample reported at least one form of ACE (Felitti et al., 1998); however, the initial sample represented a largely Caucasian and moderate-income demographic. Given increased frequency of ACE in more economically and racially diverse populations, the Public Health Management Corporation (2013) replicated the ACE study in urban areas of Philadelphia including approximately 36% black compared to 4% black in the original study. Results indicated close to 67% of individuals denoted at least one ACE, suggesting that racial and ethnic minorities may experience more ACE and therefore be more susceptible to the risk for poor health outcomes (Cronholm et al., 2015; Public Health Management Corporation, 2013).

Using only three of the original ACE indicators, researchers invited Utah's single-parent cash assistance program recipients to respond to a telephonic survey examining ACE correlates ($N = 1,144$ individuals). Low-income women reported a higher prevalence of ACE (65% indicating at least one of the three forms of abuse) compared to the original sample (35% indicating at least one of the three forms of abuse). In a logistic regression controlling for age, education, and race, a higher ACE score increased odds of current and lifetime experiences of anxiety, posttraumatic stress, bipolar disorder, and experiences of intimate partner violence (IPV)(Cambron, Gringeri, & Vogel-Ferguson, 2014). A correlation existed between ACE and intimate partner violence in adult relationships (Brown, Perera, Masho, Mezuk, & Cohen, 2015;

Mair, Cunradi, & Todd, 2012). Respondents from the ACE study that identified an experience of physical abuse, sexual abuse, or witnessing maternal IPV demonstrated an increased risk of IPV victimization and perpetration two-fold as adults (Whitfield et al., 2013). In addition, respondents from the ACE study that denoted an experience of physical abuse, sexual abuse, or witnessing maternal IPV demonstrated an increased risk of IPV victimization and perpetration themselves (Whitfield et al., 2013). Men and women who reported all three variables were 3.8 times and 3.5 times respectively more likely to be victims or perpetrators of violence. Intimate relationships are influenced by adversity, where higher ACE contribute to higher risk for violence and relationship distress.

Mediators of ACE

Researchers postulated relationship factors as influential in mediating the relationship between ACE and health outcomes (e.g., Nurius et al., 2015; Umberson et al., 2014). In the initial study, Felitti and colleagues (1998) identified changes in health behaviors as contributors to the risk of poor health outcomes associated with ACE exposure; however, researchers also explored other mechanisms as contributors to the relationship between ACE and health as a longitudinal process. Other mediating factors between ACE and health include: relationship support or strain, acute stress exposure, socioeconomic status, and sources of resilience such as life satisfaction or health habits.

Sources of resilience are lower in individuals reporting a high ACE score. In a cohort design study of population data from the 2009-2010 Behavioral Risk Factor Surveillance System (BRFSS) for Washington state, researchers found significant relationships between ACE, health, and resources indicating resilience across the four age groups (i.e. sleep quality, social and emotional support, and life satisfaction). The study used weighted data to match the state

demographic which included a majority of Caucasian, educated, and middle-aged participants. The analysis included only individual-level data and single-item, researcher-developed assessments of resources, physical and mental health. Researchers developed categories for total ACE score including high (3 or above) or low (0-2). A high ACE score correlated ($p \leq .001$) with poor health, lower current income, lower educational level, and lower levels of resilience resources. Hierarchical regression analysis demonstrated that in the oldest age cohort (i.e., ages 65-79 when compared to age groups for 18-34, 35-49, and 50-64 years) each additional ACE contributed to one day per month of poor self-rated health. Additionally, each decrement in income added another half to one-full day of poor health. Lower income correlated with poor mental health across cohort groups (Step One: Age 18 to 34: $b = -.28$, $p \leq .01$, $R^2 = .10$; Age 35 to 49: $b = -.79$, $p \leq .001$, $R^2 = .09$; Age 50 to 64: $b = -.93$, $p \leq .001$, $R^2 = .10$; Age 65 to 79: $b = -.44$, $p \leq .001$, $R^2 = .04$). The contribution of income to poor physical health reduced after controlling for indicators of resilience (Logan-Greene, Green, Nurius, & Longhi, 2014). Therefore, income is an important consideration in examination of ACE outcomes across the lifespan.

Additional Empirical Support for ACE

Researchers examined the relationships among socioeconomic status, ACE, and health with the 2010 BRFSS data in multivariate analysis. Although the sample still included a majority of individual, Caucasian participants with at least some college education, this study expanded upon prior findings by including adulthood stressors and sources of resilience including sense of community and physical activity. Similar to prior results, the researchers found that higher instances of ACE associated with poor health, low socioeconomic characteristics, and continued adversity and stress into adulthood. Likewise, higher ACE

associated with lower levels of resilience resources. Yet, self-reported ‘sense of community’ and health habits moderated the relationship between ACE and psychological distress after controlling for demographic and SES variables (Nurius et al., 2015). As a result, the authors posited adversity as a life course process where adverse experiences are interconnected and contribute to ongoing adversity and disadvantage.

ACE seem to relate to continued adversity. Compared to individuals reporting zero ACE, individuals with at least one or more ACE reported as more likely to be divorced and to have dropped out of high school. Similarly, respondents reporting two or more ACE also reported lower income. The 4 or more ACE group had a 23.9% higher probability of having received a diagnosis of depression at some point in their life (Font & Maguire-Jack, 2016).

Yet, ACE may have a differential impact to health outcomes. Font and Maguire-Jack (2016) examined correlations between ACE, health outcomes, and demographic factors such as income, education, health insurance status, and marital status. They examined data representing five states from the BRFSS 2012 survey that included a sample of over 29,000 adults. The sample represented the participating state population demographics including a majority non-Hispanic white (80%), married (62%), middle-aged ($M = 48$ years old), and high school educated (88%) respondents. The ACE survey employed in this study differed slightly from the original format, including a total of eight forms of adversity and excluding questions pertaining to neglect. Researchers categorized total ACE scores by four levels including: zero, one, two to three, and four or more ACE. Furthermore, researchers operationalized health risk through five indicators including diagnosis with a depressive disorder at any time in the respondent’s life, current tobacco user, binge drinking frequency, obesity, and self-report of health on a Likert measure from one (poor) to five. Using SEM and controlling for demographics (e.g. race, sex,

age and number of children), they examined mediation of the relationship between ACE and health by income, educational attainment, marital status, and health insurance status. These socioeconomic factors explained between 8 to 12% of the total effect. Additionally, as ACE score increased socioeconomic conditions declined. For example, compared to the other ACE groups, respondents with four or more ACE had the strongest correlation with being a high school dropout ($b = .098, p < .001$) or being divorced ($b = .067, p < .001$), as well as the strongest negative correlation with income ($b = -.606, p < .001$). Furthermore, specific types of ACE indicators yielded higher correlations to some socioeconomic outcomes. Parental divorce or incarceration correlated most highly with socioeconomic variables including education ($b = -.079, p < .001$ and $b = -.092, p < .001$ respectively as associations to receipt of a college degree), income ($b = -.094, p < .05$ and $b = -.419, p < .001$), and marriage ($b = -.048, p < .001$ and $b = -.027, p < .01$). Abuse indicators associated most closely with marriage (sexual abuse $b = -.094, p < .05$ and physical/emotional abuse $b = -.419, p < .001$) and income (sexual abuse $b = -.299, p < .001$). Also, all SES factors significantly related to self-report for sub-optimal health (i.e., two to 10 percentage points higher probability compared to the zero ACE group). Consequently, all ACE types are significantly ($p < .01$) and directly related to self-reports of health with exception for parental incarceration or divorce. In addition, both parental divorce, incarceration, exposure to domestic violence, and sexual abuse indirectly related to health (Font & Maguire-Jack, 2016). Overall, this study helps to understand some potential mechanisms that contribute to the observed relationship between ACE and health. Individuals who report higher ACE are more likely as adults to also have lower levels of income, educational attainment, and marriage. Therefore, intervention efforts that seek to mitigate the influence and trajectory from ACE to chronic illness may need to incorporate opportunities for increased economic stability and

marriage promotion. However, many of the socioeconomic indicators relied on single-item categorizations and the researchers noted that respondents not completing the ACE portion of the survey were more likely to be nonwhite and socioeconomically disadvantaged compared to those completing the ACE module. Similarly, some researchers refute claims that abuse or trauma as a form of adversity matter to future development and relationship functioning (e.g. Long & Vaillant, 1984; Thomas, Birch, Chess, & Robbins, 1961). Resilience processes may facilitate more positive outcomes for children who experience adversity (Kagan, 1984; Masten, Best, & Garmezy, 2008). Indeed, developments in neuroscience support the notion that even profound adversity can be overcome through reparative experiences that facilitate new neuronal growth (e.g. neuroplasticity; Kandel, 1998; Siegel, 2012). Thus, more information is needed regarding the associations between ACE and socioeconomic factors such as marital status among racial minorities and economically disadvantaged individuals. Further, additional information is needed to explicate the inverse relationships between ACE acuity, marital status, and health.

Umberson, Williams, Thomas, Liu, and Thomeer (2014) augmented investigation of the association between ACE and health outcomes in adulthood using a derivative of the original ACE survey. Their study examined racial differences in this pathway and explored relationship quality as a mediating variable. Using data from the Americans' Changing Lives study, a sample of 3,477 black or white adults over the age of 25 contributed data for ordinary least squares linear regression models. Health included three items including two Likert scale items of perceived health and impairment to daily functioning, as well as, a reverse-scored total of 10 chronic health conditions. The health construct had an index reliability of 0.78, a fairly strong reliability. Although this study did not use the ACE survey, similar indicators of adversity included: economic hardship, parental marital problems, parental divorce, never knowing their

father, having a parent die in their childhood, a household member with mental health problems, a household member with alcohol abuse, or a household member who was violent. Yet, the adversity construct did not include abuse and neglect in this study – nor household member incarceration, substance use (inclusive of drug-use), or specifically maternal experience of intimate partner violence. Additionally, relationship strain included the reported frequency of disagreement and frequency of upset in the relationship. Researchers measured relationship support by a Likert-scale for how much the individual feels loved/cared for and how much they believe they can talk about problems with their partner. The researchers utilized latent growth curve models to model the longitudinal data collected at four time points, with the primary analysis comparing change between 1986 and 1989. Childhood adversity correlated with lower levels of relationship support (Wave one: $b = -.066$, $p < .001$, Wave two: $b = -.024$, $p < .05$) and higher levels of relationship strain (Wave one: $b = .039$, $p < .001$, Wave two: $b = .025$, $p < .01$) in adult relationships as well as poor adult health. In addition, black respondents reported more relationship strain and less relationship support ($p < .05$) than white respondents. Upon further examination of racial differences in adversity, relationship quality and health, results indicated that for black men, childhood adversity strongly mediated changes over time (i.e., decrease in support, increase in strain). For black women, marital status and socioeconomic conditions most strongly predicted health and childhood adversity or relationship quality minimally contributed. The authors assert that the differences in the paths by race and sex accentuate the social influences to health and health disparities. Therefore, the study findings support a life course perspective of health inclusive of childhood adversity when examining these factors among racial minorities. However, only two items measured each of the relationship variables. More rigorous and psychometrically sound measurement of the relational component may be

beneficial to more clearly understand the observed relationships. In addition, these models examined individual reports of relationship stress, strain, and health, not accounting for the interdependence between members of a dyad. In sum, this study implies value in further examination of childhood adversity as a contributor to health and relationship quality, especially for black males. Similarly, this study supports conceptualization of contributors to health inclusive of characteristics of relationship quality, as well as childhood adversity. Further, although innovative, this study lacks inclusion of actor and partner effects for a more comprehensive perspective of the influence of adversity to relationship quality and relationship quality to health (Umberson et al., 2014).

In addition to the original ACE indicators, researchers suggested augmentation of the ACE scale to more comprehensively capture adversity pertinent to health and development. Finkelhor, Turner, Shattuck, and Hamby (2015) used data from a sample of children aged 10 to 17 years old ($N = 1,949$) and the National Survey of Children's Exposure to Violence 2014 to examine additional forms of adversity. The researchers collected the original 10 ACE indicators as well as four additional proposed items that included: low SES of the family, peer victimization, peer isolation, and exposure to community violence. Interviewers collected all indicators in an interview with the child respondent and the parent provided information regarding health status (four items) and psychological distress (28 items) using the Trauma Symptoms Checklist for Children (TSCC; Briere, 1996). In ordinary least squares regression, the new predictors contributed to outcomes. Low socioeconomic status significantly predicted health status ($IRR = 1.93; p < .01$), but not psychological distress ($IRR = .03; p > .05$). All four of the proposed indicators significantly contributed to ($p < .05$) and improved the model for the relationship between ACE and physical or mental health. Similarly, other studies proposed

expansion of the ACE survey to include indicators such as witnessing violence, perceived experiences of discrimination, unsafe neighborhood, experience of bullying, and living in foster care (Cronholm et al., 2015; Public Health Management Corporation, 2013). More racially diverse samples reported higher instances of witnessing community violence, feeling discriminated against, and living in an unsafe neighborhood than the original sample and conventional ACE categories. However, this study did not analyze the expanded ACE as contributors to health outcomes to compare magnitude of their effect.

In conclusion, early life experiences, specifically ACE are common and influential to physical and mental health across the lifespan. ACE are more likely experienced by racially diverse individuals who in adulthood are low income or less educated. Although causation cannot be ascertained, ACE correlated with risky health behaviors, lower levels of resources associated with resiliency, and poor outcomes for health in repeated examination of these constructs. These findings suggest that some individuals may be more vulnerable to ACE and that ACE contribute to further disadvantage. Relationship quality is one potential mediator of ACE and health.

Relationship Quality

There is no standardized definition or operationalization of relationship quality. Yet, most indicators of relationship quality in the literature include behavioral and/or affective characteristics. Subjective reports of relationship satisfaction (Hendrick et al., 1998) are one of the most frequently employed measurements of relationship quality. Behavioral characteristics indicative of relationship quality include communication, conflict management, and more generally, relationship self-regulation (Halford et al., 1994). Therefore, this section begins with a review of the social context and current state of relationships in the U.S., including trends in

marriage rates and divorce. Next, factors are reviewed that correlate with relationship quality (i.e. supportive or highly conflictual relationships). Then, the two primary areas of measurement for relationship quality in this study are discussed including marital/relationship satisfaction and relationship self-regulation.

Social Context for Relationships

A national study conducted by the Pew Research Center (2010) examined trends in family formation and marital status for adults ($N = 2,691$) in the U.S. Results indicated a dramatic decline in rates of marriage since the 1960s and a shifted view for the definition of a family. Comparison of responses from the 1960s and 2008 demonstrated fewer individuals in their twenties who identified as married. In the 1960's approximately 68% of respondents self-identified as married. In comparison, in the 2008 report only 26% of respondents self-identified as married. Marriage rates also associated with educational attainment. In 1960, 76% of those with a college degree also reported as married. Yet, similar marital rates existed for those with a high school education or less (72%). However, the disparity in marriage rates by education has increased over time. Today, individuals with a college-level education (64% married) are more likely to be married than those with a high school education or less (48% married). These numbers reflect a widening gap in marriage rates by educational attainment. Similarly, respondents in the 2008 survey reported greater acceptance and experience with cohabitation in lieu of or prior to marriage. The shift in marriage demographics and social definitions of family suggest the need for a broader conceptualization of *relationships* as an important distinction in couple-based research beyond just inclusion of married couples.

In the United States, almost half of first marriages end in divorce (Amato, 2010). A higher risk of divorce exists for individuals who (a) are low-income, (b) receive lower levels of

education, (c) cohabitate prior to marriage, and (d) grow up in a home with divorced parents (Amato, 2010). Divorce rates are also higher for racial and ethnic minorities (McNamee & Raley, 2013; Siordia, 2014). Divorce and high-conflict relationships can result in negative consequences for the individual members of the couple, as well as their children, including poorer physical and mental health (Amato, 2010; Fergusson, McLeod, & Horwood, 2014; Yip, Yousuf, Chan, Yung, & Wu, 2015). In sum, changes to the national landscape of relationships and marriage are evident. More couples are cohabiting in lieu of marriage and those who are married face higher chances of divorce. Further, these changes to the rate and durability of marriage differentially affect individuals who are economically disadvantaged or racial and ethnic minorities. Therefore, relationship quality is an area of research with continued relevance amidst broader social change.

Amato and Hohmann-Marriott (2007) analyzed data from the National Survey of Families and Households including 509 couples who divorced between the five-year period of data collection. Researchers categorized couples as high distress ($n = 242$ couples) or low distress ($n = 267$ couples) using cluster analysis for five marital quality variables including: (a) marital happiness, (b) interaction, (c) conflict, (d) violence, and (e) the respondents perceived chance of divorce estimate. In comparison to continuously married couples, high-distress divorcees more commonly reported divorced parents, cohabitation prior to marriage, younger age and marriage at a younger age, higher income, alcohol use problems, a blended family structure, an employed female partner and perception of a potential improvement in quality of life if they were to divorce. High distress divorced couples also reported greater levels of conflict, violence, and perceived relationship instability. Conversely, low distress divorced couples reported average levels of marital quality indicators. Subsequently, following divorce the high-distress

group reported significantly greater life happiness and the low-distress group reported a decrease in life happiness (Amato & Hohmann-Marriott, 2007). Thus, relationship dissolution has a different set of associated sociodemographic characteristics and individual outcomes for high or low distressed couples. In addition, the motivation to divorce seems most influenced by poor relationship quality or a couple's level of commitment to the relationship. In fact, relationship satisfaction uniquely contributed to relationship dissolution. Therefore, the predictive ability of relationship satisfaction for future dissolution may be an important area of consideration for further research to more intentionally target intervention for couples most at risk of dissatisfaction and divorce. Also, consequences of high distress relationships may be significant in examination of health outcomes over time given the reported correlation with more frequent and higher intensity conflicts.

Gottman and Levenson (2000) identified two critical periods where marriages are most vulnerable to dissolution and where distinct variables contributed to the likelihood of divorce. The study included 79 couples who contributed physiological data in a laboratory setting while engaged in discussions about the events of their day, a recurrent conflict, and a pleasant topic. Follow-up assessment occurred four years later including questionnaires for marital satisfaction. Finally, researchers periodically contacted couples to assess their marital status up to 14 years after the initial assessment point. To predict divorce, the researchers categorized couples as divorced 'early in marriage' or within the first seven years of a marriage ($n = 9$ couples) or they were categorized as divorced 'later in marriage' or after a couple's first child turned 14 years of age ($n = 13$ couples). Early divorced couples exhibited a high correlation for negative affect during their initial conflict conversation ($\rho = .52, \chi^2(12) = 22.36, p < .05$; correct classification 83.5%). Late divorced couples reported low marital satisfaction and a low positive affect during

the conflict and events of the day conversations at the first time point ($\rho = .73, \chi^2(11) = 33.82, p < .001$; correct classification 88.5%). Although a small sample, the results are noteworthy as indication that how couples communicate contributes to satisfaction and likelihood for divorce. Therefore, efforts targeting couples at the highest risk of divorce may seek to address negative communication patterns that influence relationship satisfaction and quality. Additionally, the daily communication patterns between members of a distressed relationship may exert a differential impact to stress and therefore health. Therefore, this study examined potential stress and distress of the couple through examination of relationship satisfaction.

Correlates of Relationship Quality

Being married correlated with higher levels of general life satisfaction in comparison to individuals who are never-married, separated, or divorced (Gove, Hughes, & Style, 1983). The benefits of marriage seem to persist over time, since older adults in later life report significant correlations between marital quality with life satisfaction (husbands: $b = .52, p < .01$; wives: $b = .72, p < .001$) and momentary happiness (husbands: $b = .49, p < .001$; wives: $b = .40, p < .001$; Carr, Freedman, Cornman, & Schwarz, 2014). Yet, life satisfaction is both a product of and a contributor to relationship adjustment. Individuals who began their relationship more satisfied with life reported greater relationship adjustment six years into the marriage. Similarly, changes in relationship adjustment influence reports of life satisfaction (Stanley, Ragan, Rhoades, & Markman, 2012). In sum, marriage seems to matter for individual well-being. In addition, satisfaction, happiness, and marital status each influence the other, where individuals who are happier and more satisfied in their relationship seem to be more satisfied with life in general. Conversely, individuals who are dissatisfied with life in general seem to also be more dissatisfied in their relationships and less happy overall.

Marital quality, as measured by relationship satisfaction and support, contributed to greater quality of life and improved mortality rates among individuals with cardiovascular disease (Orth-Gomer, Wamala, Horsten, Schenck-Gustafsson, Schneiderman, & Mittleman, 2000; Robles & Kiecolt-Glaser, 2003). Couples with high relationship quality live longer, more satisfied lives when managing a chronic illness. Overall, individuals who identify as ‘married’ seem to have lower morbidity and mortality with chronic health conditions when compared to ‘unmarried’ counterparts (Kiecolt-Glaser & Newton, 2001). Marriage seems to provide protective health benefits for the individual. Furthermore, relationship quality may buffer negative health conditions and augment quality of life (Orth-Gomer, et al., 2000; Robles & Kiecolt-Glaser, 2003). Healthy relationships support more positive health outcomes and health trajectories amidst physical health concerns. Therefore, marital quality influences health and life satisfaction. Yet, marriage is less common overall and worse among economically disadvantaged and racial or ethnic minority groups. Further, divorce is more common among socially disadvantaged groups. Therefore, the national trend towards lower marriage rates and increased divorce rates supports the necessity of further inquiry for the individual and social consequences of relationship quality as a contributor to health and chronic illness. Finally, although the benefits of *marriage* seem evident, it is unclear whether committed or cohabiting unions (reflective of shifting demographic trends) yield similar risks and benefits for individual health.

Relationship Satisfaction

Relationship satisfaction is a global assessment of one partner’s value and meaning for his or her relationship at a specific point in time (Hendrick et al., 1998). Therefore, satisfaction may be considered a measure of perceived marital quality. In fact, Bradbury (1995) identified commitment, stability, and satisfaction as important areas for the assessment of marital quality.

Marital satisfaction is related to individual well-being. In meta-analysis ($n = 93$ studies) Proulx, Helms, and Buehler (2007) examined longitudinal and cross-sectional studies for correlates of relationship satisfaction. Relationship satisfaction correlated with personal well-being, as measured by symptoms of depression, life satisfaction, physical health, or self-esteem. Cross-sectional studies yielded an effect size of $r = .37$ and longitudinal studies effect size $r = .25$, both medium effects. The strongest relationship between well-being and marital satisfaction occurred for (a) women; (b) for marriages longer than eight years in duration; and (c) in design of the dependent variable as personal well-being (Proulx et al., 2007). Relationship satisfaction is indicative of an individual's momentary perception of his/her partner and relationship. Perception and thus satisfaction in the relationship contribute to other areas of individual well-being and life satisfaction. Therefore, satisfaction is an important component of relationship quality and in the context of correlates from relationship quality to mental health.

Marital satisfaction is also related to physical health. Researchers tested newlywed couples with no children ($N = 90$ couples) for cellular immune functioning across a two-year period. Three measures assessed immune functioning influenced by interpersonal stress and indicated in immune-response related diseases. Researchers collected measures of immune functioning upon arrival to the study as well as the day after around the same time of day. The researchers admitted participants to the clinic for 24 hours to control activity and diet. The Marital Adjustment Test assessed relationship quality as a measure of relationship satisfaction. Researchers excluded participants if they met criteria for a mental health disorder, obesity, pregnancy or reported use of any type of medication. Participants provided data at the initial visit and then at two-year follow-up. Individuals that identified as distressed in their marriage demonstrated significantly larger declines in immune functioning when compared to those

without marital distress ($b = .002$, $F [1, 348] = 4.87$, $p = .028$). Thus, marital dissatisfaction adds distress for the individual. Relationship stress inhibits the body's immune response such that distressed, dissatisfied relationships can contribute to health status (Jaremka et al., 2013).

In fact, results from a 2014 meta-analysis demonstrated marital quality had a similar effect on health as diet. Robles, Slatcher, Trombello, and McGinn (2014) analyzed 126 articles to determine the strength of the association between relationship quality and health. The researchers defined relationship quality by measures of happiness, support, and satisfaction versus conflict, tension or strain. An objective measure of disease diagnosis, severity, mortality or implications to functioning defined health. Researchers also included biological mediators as dependent variables. Aggregated effect sizes suggest small effects of marital quality related to better health ($r = .07$ to $.21$). Further, marital quality related to a lower risk of mortality ($r = .11$). Studies focused on women found the greatest effects. Although the study yielded small effects, the authors provided practical context for interpretation including similar effects obtained in studies of other health behaviors such as diet and exercise. Therefore, relationship quality may be conceptualized as a health behavior due to the similar size of association with health as other commonly accepted health behaviors (i.e. inactivity, diet and nutrition). As a result, the behaviors that contribute to relationship satisfaction and quality are important considerations for health.

Behavioral Relationship Self-Regulation

According to Karoly (1993), self-regulation infers a process of goal-directed action that an individual undertakes internally and in transaction with the social environment to adapt to changes in context or circumstance. Individuals that encounter challenges to their desired goals or routine engage in a process of modification in order to maintain homeostasis. Modification

responses include changes to awareness, thoughts, feelings or behaviors. Additionally, adaptive responses and skills can be taught to promote self-regulation by the individual. Yet, self-regulation is dependent upon internal and external influences that determine an individual's motivation and behavior. Therefore, Halford, Sanders, and Behrens (1994) expanded Karoly's definition of self-regulation to include the family system. In so doing, they also applied self-regulation within the context of behavioral couple therapy (BCT). In BCT, goals are selected between members of the dyad to be mutual and in order for the desired and dyadic change to occur. The inclusion of self-regulation within BCT added unique and behavioral goals for each individual member of the couple. Thus, each partner begins BCT with an initial self-appraisal for their contribution and relationship behaviors associated with the greater dyadic relationship problem. The researchers theorized that the emphasis on personal responsibility allowed each member of the couple to focus change efforts on aspects of the relationship within his/her control and influence, rather than focusing or waiting on the partner to change. In sum, a couple's self-regulation process includes appraisal, goal setting, taking action to implement changes, and evaluating the outcomes of change effort (Halford et al., 1994). Therefore, relationship self-regulation (RSR) refers to the ability to self-monitor and contribute effort necessary to sustain a relationship. RSR is composed of an individual's strategies and effort in a relationship. Further, relationship effort infers an individual's persistence for change in relationship strategies (Halford, Lizzio, Wilson, & Occhipinti, 2007).

Wilson, Charker, Lizzio, Halford, and Kimlin (2005) conducted exploratory factor analysis of the Behavioral Self-Regulation for Effective Relationships (BSRERS) scale using principle axis factoring with an oblique rotation with 187 couples, combined for a total of 374 respondents. The combined response sample was adequate for the 32-item analysis.

Subsequently, the researchers used a different sample of 97 newlywed Australian couples for confirmatory factor analysis. Participating couples completed the RSR scale and the Dyadic Adjustment Scale (DAS), a measure of relationship satisfaction. For men and women, relationship self-regulation predicted about a quarter of the variance in relationship satisfaction as measured by the DAS (Men: $F [2, 92] = 15.81, p < .0001, R^2 = .25$; Women: $F [2, 94] = 13.51, p < .001, R^2 = .22$). For women, strategies seemed to contribute to satisfaction most ($\beta = .3, p < .01$); whereas effort mattered more for satisfaction in men ($\beta = .41, p < .001$). Models including self-regulation by both members of the couple overall accounted for 27 to 29% of the variance in satisfaction for men and women respectively. Therefore, individual relationship self-regulation matters for relationship satisfaction; however, the variance in RSR shared between members of a dyad seemed to be most influential to perceived satisfaction (Wilson et al., 2005). Thus, RSR seems to be interdependent between members of a dyad and influential to perceived relationship satisfaction.

Halford and colleagues (2007) examined longitudinal changes in RSR and satisfaction. They assessed relationship factors annually using the BSRERS scale and the DAS with 191 newlywed Australian couples across five years. The sample included a majority of Caucasian (94%), college educated (43-55% of men and women respectively), and middle-income ($M = \$30,212, SD = \$15,598$) participants. In cross-lagged multi-level modeling, RSR predicted future relationship satisfaction for men ($\chi^2 [2] = 1,528.65, p < .001$) and for women ($\chi^2 [2] = 1,587.87, p < .001$) with actor and partner effects included. Male effort contributed to predictions of male DAS and female strategies contributed to predictions of female DAS. Higher RSR correlated with higher levels of relationship satisfaction and low-RSR couples reported clinically distressed relationships after four years of marriage. In sum, RSR is an important component of

relationship satisfaction that contributes to change in satisfaction over time. Further, actor and partner effects from RSR to satisfaction exist. In essence, a husband's RSR affects his own satisfaction and his wife's RSR also affects his relationship satisfaction. Likewise, a wife's RSR and her husband's RSR affect her relationship satisfaction. RSR and satisfaction seem to be dyadic and related processes (Halford et al., 2007). RSR is a dyadic process that is influential to long-term relationship satisfaction and quality.

Shafer, Jensen, and Larson (2014) examined the relationship between relationship effort, a component of relationship self-regulation, to relationship satisfaction and stability using secondary data analysis of the Relationship Evaluation Survey ($N = 8,006$). Further, they examined differences in these factors by relationship status: first-time married, cohabiting and no prior marriages, cohabiting and divorced, or second-time married. The Relationship Evaluation survey is an on-line relationship questionnaire that assesses potential areas of couple problems and is often used in conjunction with college family-related coursework or by couples attending workshops or couples counseling. Therefore, the sample largely consisted of Caucasian (81%), females (62%), with a mean age of 31.4 years. Seven areas comprised relationship satisfaction and participants rated each on a Likert scale from 1, indicating low satisfaction, to 5, indicating high satisfaction with aspects of the relationship including time together, communication, and overall satisfaction. Researchers used three Likert items to measure relationship stability for the frequency of aspects such as thoughts about ending the relationship or discussion of dissolution. Using multiple regression, researchers found a significant ($p < .001$) and positive association between relationship effort and relationship satisfaction that ranged from $b = .599$ for the first-time married respondents and $b = .452$ for the cohabitating and divorced respondents. Similarly, effort and relationship stability significantly ($p < .001$) and positively correlated, ranging from b

= .447 for the second-time married respondents and $b = .372$ for the first-time married respondents. In summary, relationship effort is related to relationship satisfaction and relationship stability (Shafer et al., 2014). This study also demonstrated that the influence of relationship effort to satisfaction exists regardless of relationship status (i.e. married or cohabitating). Therefore, RSR is a relevant construct to examine in cohabitating and diverse relationship unions.

Yet, RSR is not solely determined internal to the dyad. Family of origin experiences of both partners contribute to RSR. The relationship between family of origin quality and RSR is mediated by an individual's emotional health and attachment behaviors (Brown, Larson, Harper, & Holman, 2015). Therefore, childhood family experiences seem influential to relationship quality in adulthood.

Knapp, Norton, and Sandberg (2015) examined the relationship between family-of-origin experiences, RSR, and attachment. They used secondary data from the RELATE data, an online tool accessible to couples for a fee to assess various relationship functioning domains. As a result, the study sample ($N = 261$ married couples) included a majority of well-educated, middle-income, and Caucasian couples. Family-of-origin quality included three-subscales to determine the impact to the individual from family quality, family influence, and perceived parents' marital quality. Additionally, researchers collected six items to assess attachment style. Attachment behaviors included being available to their partner, listening when a partner shares their feelings, and engaging/confiding by partner. Using the Actor-Partner Interdependence Model (APIM), researchers supported the theorized relationship among negative family of origin experiences, attachment behavior and RSR ($\chi^2 [45] = 78.05, p < .01; TLI = .96; CFI = .97, RMSEA = .05$). In addition, the more negative family-of-origin experiences a respondent reported, the lower their

levels of RSR ($p < .001$) including less effort and fewer relationship strategies. Similarly, using the same dataset from the Relationship Evaluation database Knapp, Sandberg, Novak and Larson (2015) examined contributions from family-of-origin quality to couple communication in dyadic analysis with the actor-partner interdependence model (APIM). Likert scale items measured communication quality including the frequency of communication-related characteristics from 1 (never) to 5 (very often). In APIM, family-of-origin quality demonstrated direct actor and partner effects ($p < .001$) for husbands and wives. Attachment behavior mediated actor and partner effects to produce a significant fit of the model to the sample data (RMSEA = .062, CFI = .968, TLI = .956, $R^2 = .81$ for females, $R^2 = .80$ for males). Individuals who reported a poor quality family-of-origin influence also reported lower attachment behaviors which contributed to poor communication quality. Further, having a partner with poor family-of-origin quality negatively related to an individual's attachment behaviors and communication quality (Knapp et al., 2015). Early life family-of-origin experiences contribute to attachment behaviors, relationship self-regulation (including strategies and effort), as well as marital communication behaviors.

Furthermore, the influence of family of origin dynamics to RSR and relationship satisfaction also relates to relationship stability. Hardy, Soloski, Ratcliffe, Anderson, and Willoughby (2015) examined the associations between family of origin, RSR and marital outcomes including satisfaction and perceived stability. This study also employed secondary analysis with the *Relationship Evaluation Questionnaire* and included a total sample of 961 married couples. Hardy and colleagues found that relationship self-regulation had direct actor effects to an individual's marital satisfaction and partner effects as well. For males, comparable effects existed (i.e. .38 and .36 respectively) for actor (i.e. path from male relationship self-

regulation to male satisfaction) and partner effects (i.e. path from the wives' relationship self-regulation to male satisfaction). However, for women, actor effects exceeded partner effects (.43 and .33 respectively). Yet, overall the model from family-of-origin experience through RSR to marital satisfaction predicted marital stability ($\chi^2 [76] = 400.11, p < .001$; CFI = .94, RMSEA = .07). These findings further support the dyadic and interdependent nature of RSR as an influential mediator of family-of-origin climate to marital satisfaction and stability.

Overall, adversity experienced in the family-of-origin seems related to an individual's relationship behavior and quality. Yet, this relationship has been predominately demonstrated in Caucasian, educated, and moderate income couples. Therefore, exploration of childhood adversity to relationship self-regulation and satisfaction with a more diverse population is needed. Additionally, most studies examined family of origin climate referring to general perceptions of family relationship quality and dynamics. As such, specific forms of adversity and household dysfunction experienced in childhood have not been explored to determine the contribution of ACE to RSR.

In sum, childhood adversity and family-of-origin dynamics are associated with adulthood relationship quality and characteristics. Relationship quality is influenced by relationship self-regulation and satisfaction. Further, relationship satisfaction and self-regulation are dyadic processes, where actor (a person's own contributions influence their relationship outcomes) and partner effects (their partner's contributions influence the actor's relationship outcomes) exist. Similarly, risk of divorce and relationship dissolution are influenced by family of origin factors, effort, and satisfaction. Finally, marriage and marital quality are associated with improved health outcomes that persist over time. Yet, marriage in the U.S. is less common than 50 years ago and less is known about general relationship quality (as opposed to marital quality). Therefore,

relationship quality may have the potential to contribute to health outcomes as both a stressor that worsens health outcomes or as a buffer that mediates health outcomes initiated by family-of-origin experience and adversity. Thus, examination of childhood adversity, relationship quality, and health are important areas of research, especially with economically disadvantaged populations where relationship quality is low and risk of relationship dissolution is high.

Chapter Summary

Economic disadvantage exerts a chronic influence to an individual through environmental and social processes that reduce resources and limit support. Family relationships are impacted by economic disadvantage, as demonstrated by the family stress model, including greater parental depression and stressed parent-child relationships. Related, environmental factors associated with economic disadvantage are correlated with a higher incidence of other forms of adverse childhood experiences including abuse, neglect, and household dysfunction. Economic disadvantage and childhood adversity as chronic stressors seem to initiate a pathway for continued adversity that is influential to physical and mental health. Subsequently, children raised in poverty and adults with low income are also more likely to have strained adult relationships. Yet, relationship quality can also improve health outcomes in couple dyads where stress is low and worsen health trajectory for distressed couples. Furthermore, relationship quality can influence the onset and trajectory of chronic illness. In conclusion, unique relationships exist in the literature for (a) ACE and health, (b) ACE and relationship quality, and (c) relationship quality and health. These processes seem to be related within the individual and between members of a couple. Dyadic stress and coping substantiate the interdependence of experiences related to an individual's relational, mental, and physical health. However, these factors have not yet been analyzed simultaneously or within a dyadic structure. Therefore, the

current study seeks to employ SEM and the actor-partner interdependence mediation model (APIMeM) to concurrently examine the influence of social factors of adversity and relationship quality for health among economically disadvantaged couples. Specifically, this study aimed to examine the relationship between adverse childhood experiences and relationship quality (including relationship self-regulation) as mediators of health. Results demonstrated the strength of relationships between variables in an ethnic/racially diverse sample of low-income couples to inform family strengthening policy, intervention, and practice.

CHAPTER THREE: METHODOLOGY

Chapter three provides an overview for the proposed study including the research design, methods, and procedures to be utilized. The investigation aimed to explore the directional relationship between ACE, relationship quality, and health with a target population of couples who are economically disadvantaged. Thus, this study tested a theoretical model that hypothesized economically disadvantaged couples' incidence of childhood adversity (as measured by the *Adverse Childhood Experiences* survey [ACE; Felitti et al., 1998]) contributed to their levels of relationship quality (as measured by the *Relationship Assessment Scale* [RAS; Hendrick, 1988] and *Behavioral Self-Regulation for Effective Relationships Scale* [BSRERS; Wilson et al., 2005]) and physical and mental health (as measured by the *Brief Medical History Questionnaire* [Daire, Wheeler, & Liekweg, 2014] and *Outcomes Questionnaire 45.2* [OQ45.2; Lambert et al., 2004]). Specifically, the study employed a correlational research design (Gall, Gall, & Borg, 2007) to examine the hypothesized directional relationship that higher incidence of ACE contributed to lower relationship quality and poorer reports of health.

Research Design

The researcher received approval from the university's institutional review board prior to analysis and evaluation (see Appendix A). The current study utilized a subset of data from a larger study, Project TOGETHER, a four-year initiative funded through the Department of Health and Human Service, Administration for Children and Families, Office of Family Assistance. Project TOGETHER was a part of the Community-Centered Healthy Marriage program, a nation-wide effort to provide relationship education and intervention for economically disadvantaged individuals and couples. Participants of Project TOGETHER received the Prevention and Relationship Education Program curriculum (PREP; Markman,

Stanley, & Blumberg, 2001). PREP is a manualized psychoeducational intervention that teaches healthy relationship skills and communication techniques. Furthermore, PREP is included in the SAMHSA list of evidence-based programs and practices for mental health promotion.

Project TOGETHER Overview

Project TOGETHER and the broader Community-Centered Healthy Marriage initiative aimed to provide services to economically disadvantaged couples, including the enrollment intake data utilized for the current analysis. Sample methods included a nonprobability, convenience sampling procedure (Gall, Gall, & Borg, 2007) with the minimum inclusion criteria that required both parties be at least 18 years of age, in a committed relationship and attend together with their partner. However, the project included voluntary participation in the study and no formal screening procedure to ascertain proof of economic disadvantage or to exclude participants by income. This study used the Project TOGETHER archived dataset in secondary data analysis.

Participants could attend workshops at multiple locations within the community, including two research clinics, churches, schools, or social service agencies. Participants had the option to attend English or Spanish language workshops on their preferred day. The workshop schedule included two to five consecutive weekday evenings or weekend days. Project TOGETHER staff provided food, childcare services for children under the age of 12, and gift cards (up to \$100 each member of the couple distributed incrementally through program completion) as an investment in participant time and to help alleviate potential barriers to participation. In this study, participants identified interest in attending 12- to 15-hours of PREP with their partner. The first night of a scheduled RE workshop participants completed a group

intake where each member of the couple completed informed consent for participation in the study and several assessments.

Across the four years of services, Project TOGETHER enrolled approximately 6,291 individuals and 5,278 completed the intervention including posttest measures. However, as a community-based effectiveness study and implementation program, project staff modified services and assessments each year to achieve federal programmatic benchmarks and to optimize services provided to participants. As a result, the current study only used data from the fourth year of Project TOGETHER when project staff administered the assessments of interest (i.e., the ACE survey, BSRERS, and Brief Medical History survey). Therefore, a total of 538 couples enrolled and thereby contributed assessment data.

Population and Sampling Procedures

Sample Size in Structural Equation Modeling. Sample size is an essential consideration to reduce the chances of incurring a Type II error or a ‘false negative’ for the hypothesized outcome. Likewise, it is desirable to obtain high power (i.e., values of 0.8 or higher) to reduce the chances of making a Type II error (Kline, 2016). Yet, discrepancies exist for the best way to determine the necessary sample size (Wolf et al., 2013). Some forms of sample size calculation for individual-level SEM analysis are computed with the desired power, alpha levels, as well as, the number of latent and observed variables (MacCallum, Browne, & Sugawara, 1998; Schumacker & Lomax, 2012; Wolf et al., 2013). A priori sample size calculation may be determined online with a free web-based platform (e.g., Preacher & Coffman, 2006). For this study, based on a desired power of .8, alpha .05, RMSEA = .05, $df = 126$, the recommended sample size for the initial model was 675 participants.

Other researchers recommend use of a priori ratios to estimate the minimum sample size that compare the number of free parameters to be estimated and the number of subjects necessary. Ratios range from a high estimate of 20 participants per free parameter (Jackson, 2003) to lower estimates of 5 to 10 participants per free parameter (Bentler & Chou, 1987). For this data, to estimate 27 free parameters a sample between 270 to 540 was desired as determined by ratios for sample size estimation. However, Wolf and colleagues (2013) asserted that rules-of-thumb for sample determination provided inaccurate estimates not specific to the given model.

Kim (2005) presented another approach to sample estimation that employed computation of a noncentrality parameter and sample size based on recommended values for fit indices. For this study, using a root mean square error of approximation (RMSEA) of .05 to estimate a close fit, a desired power of .8, and the equation is $N_{\epsilon} = \frac{\delta_{1-\beta}}{\epsilon^2 df} + 1$, we find for $df = 126$ that the noncentrality parameter is $\delta_{1-\beta} = 44.8715$. Therefore, a priori sample estimation resulted in a minimum sample size of 145 participants.

Finally, dyadic researchers provided recommendations for couple-level data to use an absolute sample size of at least 200 dyads (Kenny, Kashy, & Cook, 2006). In general, sample size reported in dyadic data analysis including a mediator (i.e., APIMeM) averaged approximately 180 dyads, ranging from 120 to 342 dyads (e.g., Chow & Tan, 2013; Lennon, Stewart, & Ledermann, 2012; Stafford, David, & McPherson, 2014). Therefore, the data used for the current analysis met and exceeded several forms of a priori sample size estimation provided in the literature. The original study sample included 538 couples that enrolled in Project TOGETHER. The sample size obtained from the archived data exceeded the recommended absolute sample size of 200 couples and met most estimations determined in RMSEA sample

size calculation. Thus, the researcher determined the size of the sample data was appropriate for the initial and saturated model.

Data Collection

Instrumentation

Participants of Project TOGETHER completed several assessments during their group intake. However, only instruments pertinent to the current research questions are outlined below.

Intake Demographic Questionnaire. The intake demographic form (see Appendix B) is a researcher developed instrument including demographic information included in this analysis such as: race, ethnicity, age, relationship status, cohabitation status, number of children, educational attainment, employment, and income. Project TOGETHER researchers collected additional items as a part of federal reporting procedures such as child support enforcement involvement, job and career development barriers, and potential barriers to program completion that indicated additional case management needs (e.g., housing, childcare, food, transportation, etc.). Participant selected options for ethnicity based on federal categorizations including Hispanic or non-Hispanic. Options for race included: American Indian/Alaska Native, Asian, Black/African American, Native Hawaiian/Other Pacific Islander, White, or Other. The researcher created a dummy coded variable to combine race and ethnicity responses and created a categorization for non-minority (i.e., White, Non-Hispanic) or minority status. Employment status options included full-time, part-time, retired, student, disabled, or unemployed. The researchers collected education as both a continuous report for years of education and as a categorical measure of educational attainment (i.e., no degree/diploma, high school diploma/GED, vocational/technical certification, associate's degree, bachelor's degree, master's/advanced degree, other). Couples relationship status options included: single never

married, committed relationship, engaged, married, separated, divorced, or widowed. Finally, researchers chose to use open and continuous entries for age, number of children, and income.

Adverse Childhood Experiences (ACE) survey (Felitti et al., 1998). The ACE survey asked respondents to indicate a ‘yes or no’ dichotomous response for 10-items related to their experience prior to the age of 18 (see Appendix C). ACE include: abuse (physical, emotional, sexual), neglect (emotional, physical), and household dysfunction. Household dysfunction referred to a parent or household member who had (a) mental illness, (b) substance abuse, (c) incarceration, (d) divorce or (e) maternal IPV. The researcher summed all affirmative responses to provide a total ACE score that ranged from zero to ten. Dube and colleagues (2004) determined acceptable test-retest reliability (Fleiss, 1981) of retrospective reports for ACE at time intervals of two-weeks and 20 months ($N = 658$) from an initial report. Kappa coefficients demonstrated the degree of agreement between waves one and two when corrected for chance. An attempt of suicide or mental illness of a household member ($K = .41$, $K = .48$ respectively) or the incarceration of a household member ($K = .46$) had the lowest kappa coefficients, an indication of good agreement. Parental divorce or separation had the largest kappa coefficient ($K = .86$), followed by maternal IPV ($K = .78$), an indication of excellent agreement. Self-reports of abuse or neglect ranged between .55 to .69 kappa coefficients. Exploratory factor analysis (EFA) of the ACE survey using the BRFSS ACE module (Ford et al., 2014) confirmed appropriateness of a total summed value as a latent structure of exposure and a three factor structure (RMSEA = .01, CFI = .997, TLI = .994) that included: household dysfunction (parental mental illness, alcohol abuse, substance abuse, incarceration, intimate partner violence, or divorce), emotional/physical abuse, and sexual abuse. Each of the subscales correlated with one another, with Cronbach’s alpha that ranged from .59 (emotional/physical abuse and sexual

abuse) to .80 (emotional/physical abuse and household dysfunction). For the household dysfunction indicator, parental divorce contributed the least (i.e., factor loading of .58) and household substance abuse contributed the most (i.e., factor loading of .79).

This investigation included three anticipated composite scores as manifest variables to include: (a) abuse, (b) neglect, and (c) household dysfunction (see Figure 1). A two-item factor (i.e., physical and emotional neglect) is not advisable for factor analysis or SEM (Kline, 2016); however, the researcher examined the three-factor solution as outlined by the CDC (2016). According to Kline (2016), composite indicators do not assume uni-dimensionality and may have patterns of intercorrelation. A reduced number of indicators are proposed to improve model identification and fit. Composite scores combine variables for an estimated influence. However, composite scores lose the individual effects of each grouped indicator. Thus, the individual effect of one type of ACE was not ascertained in this analysis. Yet, much of the ACE literature has relied on a summed total score (Felitti et al., 1998); therefore, the planned approach provided greater variance for the influence of ACE as grouped for composite values.

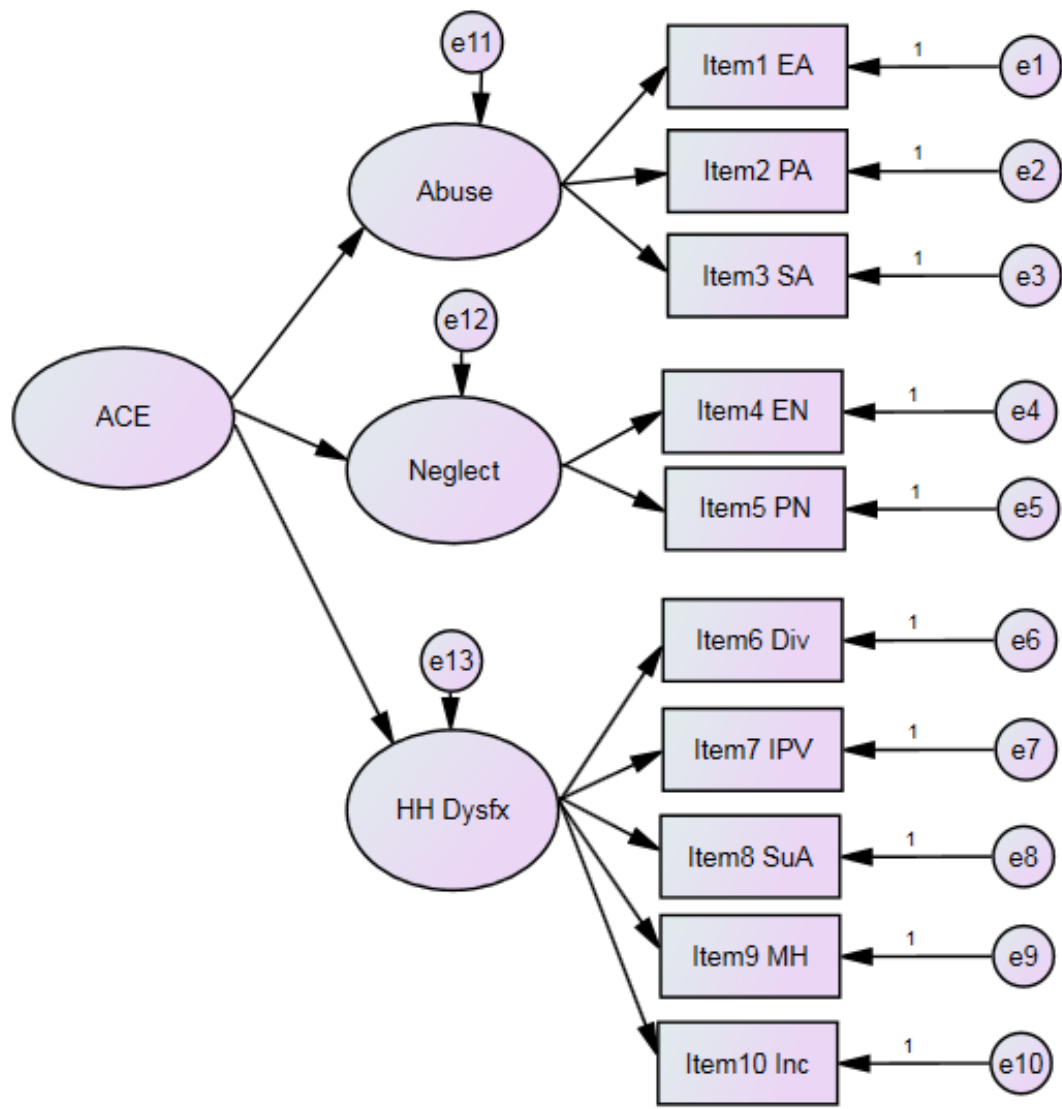


Figure 1: Anticipated Measurement Model for the Adverse Childhood Experiences survey.

Relationship Assessment Scale (RAS) (Hendrick, 1988). The RAS is a brief seven-item global and generic measure of perceived satisfaction with a current intimate relationship (see Appendix D). Researchers scored items on a Likert scale of agreement from one to five. The researcher reverse-coded several items (i.e., items 4 and 7) and obtained a total score from

summed and averaged items. Hendrick, Dicke, and Hendrick (1998) conducted a summary of studies that analyzed relational satisfaction with the RAS; results indicated couples with average scores over 4.0 were not distressed. Specifically, they interpreted that for males and females, a score below 3.5 indicated relationship dissatisfaction and distress.

The RAS is based on the *Marital Assessment Questionnaire* (MAQ), an assessment developed by Hendrick (1981) as a five-item measure of marital satisfaction. In a sample of 51 married couples, the MAQ moderately correlated with the 157-item Marriage Adjustment Inventory ($r = .48$). However, the MAQ addressed married couples and lacked applicability to more general categorizations of intimate relationships. Therefore, Hendrick (1988) modified the MAQ scale to include seven-items as a generic measure of relationship satisfaction and distress. Principal-component factor analysis of the seven-item scale identified a one-factor solution that accounted for 46% of the common variance in responses among 235 undergraduate psychology student respondents. Item-total correlations ranged from .573 to .760 among the seven items. Thus, the RAS demonstrated fair content validity. Additionally, discriminant analysis with the RAS correctly predicted relationship status at follow-up for 91% of couples still together ($n = 23$ couples) and 86% of couples who had broken up ($n = 7$ couples). Furthermore, researchers compared RAS responses from 57 dating couples to responses on the *Dyadic Adjustment Scale* (DAS), another measure of relationship satisfaction and adjustment with established and strong item psychometric properties. A high correlation existed between the RAS and DAS ($r = .83$ for the DAS dyadic satisfaction subscale; $r = .8$ for total DAS scores), providing some evidence of concurrent and criterion validity. However, the initial RAS studies used smaller samples that limited power of results (Hendrick, 1988). Vaughn and Matyastik Baier (1999) reported correlations between the DAS and RAS ($r = .84$) among a sample of men and women ($N = 118$)

that received counseling at a university clinic. Similarly, several subscales of the DAS significantly predicted RAS scores such as the DAS satisfaction subscale ($\beta = .457, p < .0001$). Moreover, in meta-analysis ($k = 196$), the RAS items demonstrated acceptable reliability ($\alpha = .872; Q = 3,007.4, p < .001$) across the studies examined. Score reliability using weighted random effects showed that overall the predictors (i.e., white, male, married, heterosexual, length of relationship) explained 30% of the variance in reliability coefficients.

For the current investigation the researcher used the total average score as one parceled manifest variable for the latent construct of relationship quality (see Figure 2). Kline (2016) defined parceling as the grouping of homogenous Likert-scale items for an average or total score. Parceling, in this case, was appropriate since the measurement model of the RAS as a unidimensional construct was not the aim of the current study.

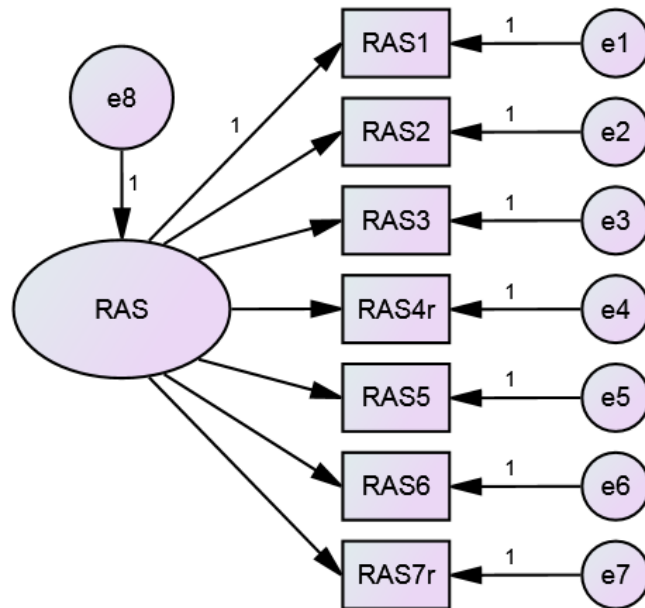


Figure 2: Anticipated Measurement Model for the Relationship Assessment Scale

Behavioral Self-Regulation for Effective Relationships Survey (BSRERS). Karoly (1993) defined self-regulation as behaviors an individual undertakes in response to changing circumstances to maintain progress towards a goal. Karoly identified the social context and influence to goal-directedness, yet emphasized the internal and individual nature of the self-regulation processes. Halford and colleagues (1994) expanded this definition of self-regulation to apply to members of a couple relationship whereby each individual contributes through their behavior to relationship quality. Additionally, the self-regulation process is inclusive of models for self-appraisal and persistence to achieve goals (Kanfer, 1970).

The BSRERS is a 32-item measure of relationship self-regulation (see Appendix E). The researcher scored Likert scale items from one to five that resulted in two subscales: (a) relationship effort and (b) self-regulation strategy (SRS). Relationship effort included six items associated with persistence for change and items such as ‘If my partner does not appreciate my efforts for change, I tend to give up’ (reverse-scored). The self-regulation strategy subscale included 10 items related to behaviors such as ‘I try to employ strategies to improve my relationship.’ The respondent answered the 16-items based on self-perception (BSRERS-Self) and the same 16-items are re-worded for an individual’s perception of their partner (BSRERS-Partner).

Wilson and colleagues (2005) examined psychometric properties of BSRERS scores with three samples of Australian couples including newlyweds in 1999 ($n = 187$ couples), newlywed couples in 2000 ($n = 97$ couples), and couples married an average of 28.4 years ($SD = 8.3$ years) or “long-married” ($n = 61$ couples). Participating couples included predominately Caucasian and higher reported average income and education than the general population in Australia. Couples completed the BSRERS, the DAS, and a measure of stress and anxiety from the past week. The

original exploratory procedure ($n = 187$), principle axis factor analysis, resulted in a two-factor solution that explained 42% of the variance in the BSRERS-self and 48% of variance in the BSRERS-partner. The 10 items that comprised the self-regulation strategies subscale accounted for 30.1% of the variance in the self-scale and 36.6% of the variance in the partner scale. Relationship effort consisted of six items that accounted for 12.1% and 9.6% of variance in the self and partner scales respectively. Effort and strategies moderately correlated with one another for the self ($r = .42$) and partner ($r = .55$) scales. Thus, the researchers recommended the two-factor structure and posited potential differential associations for self-regulation strategies and effort to satisfaction. In a subsequent confirmatory factor analysis with an independent sample ($n = 97$), the two-factor model demonstrated good fit (Self: CFI = .9, SRMR = .06, RMSEA = .06; Partner: CFI = .91, SRMR = .06, RMSEA = .07). The BSRERS demonstrated good internal consistency (self-strategies $\alpha = .86$; self-effort $\alpha = .83$; self-total $\alpha = .88$; partner strategies $\alpha = .88$; partner effort $\alpha = .75$; partner total $\alpha = .89$). Additionally, prediction of DAS scores for relationship satisfaction established concurrent validity (men: $F [2, 185] = 44.36, p < .001, R^2 = .32$; women: $F [2, 185] = 34.72, p < .001, R^2 = .27$). Overall, BSRERS scores accounted for 36% of the variance in male DAS and 33% in female DAS scores. Halford, Lizzio, Wilson, and Occhipinti (2007) annually assessed 191 newlywed couples across five years to measure changes in relationship self-regulation and satisfaction. Strategies and effort overall declined ($p < .01$) for women ($d = .2$ and $.14$ for strategy and effort respectively), but not for men. Multilevel analysis demonstrated that scores on the BSRERS could predict the intercept for relationship satisfaction (women: $\chi^2 (2) = 99.90, p < .001$; men: $\chi^2 (2) = 39.94, p < .001$), but not the slope due to the substantial amount of variance in responses across individuals.

For this investigation, the researcher used the self-BSRERS scores. The researcher used the relationship effort subscale total and relationship self-regulation strategies subscale total as two parceled manifest variables for the relationship quality construct (see Figure 3). Kline (2016) defined parceling as the grouping of homogenous Likert-scale items for an average or total score. Parceling, in this case, was appropriate since the measurement model of the BSRERS, including subscales of SRS and SRE as unidimensional constructs, was not the aim of the current study.

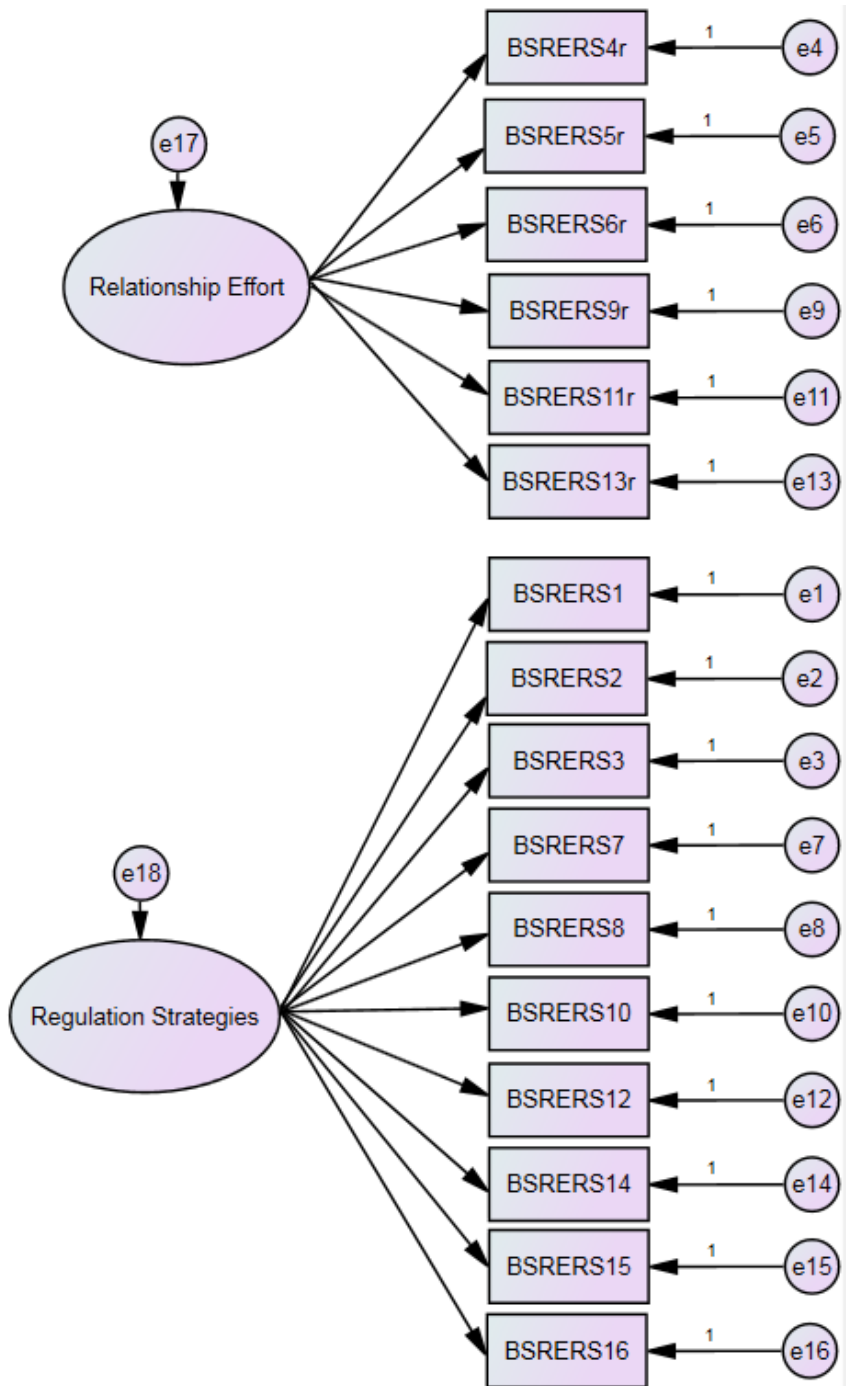


Figure 3: Anticipated Measurement Model for the Behavioral Self-Regulation for Effective Relationships Scale

Outcomes Questionnaire 45.2 (OQ 45.2) (Lambert et al., 2004). The OQ45.2 is a 45-item self-report, brief screening and outcome scale that measures functioning in several areas of

life (see Appendix F). The instrument developers designed the OQ45.2 to assess current levels of an individual's distress across three domains of functioning: (a) subjective discomfort or symptom distress; (b) satisfaction and problems in interpersonal relationships; and (c) level of distress in tasks related to employment, family roles, and leisure. Respondents self-rated items on a five-point Likert scale and the researcher reverse-coded several items ($n = 9$). Responses ranged from 'Never' to 'Almost Always' for items such as "I have frequent arguments," "I feel hopeless about the future," and "I feel stressed at work/school." The interpersonal relationships (IR) subscale included 11 items and referred to conflict and engagement in relationships including friends, family, or an intimate partner. Scores on the IR subscale ranged between 0 to 44. An IR score of 16 or higher indicated relationship distress. The symptom distress subscale (SD) included 24 items and identifies symptoms associated with anxiety and depression. A SD subscale score of 36 or higher indicated distress. Scores on the SD subscale ranged between 0 to 100. The SD subscale included symptoms associated with the most common mental health disorders including depression, anxiety, and substance abuse. The social role (SR) subscale included nine items and referred to performance or distress in life tasks of leisure, employment or family roles. Scores on the SR subscale ranged between 0 to 36. SR scores of 12 or more indicated distress in one or more roles the individual fulfills. The researcher summed the three subscale scores for a total OQ45.2 score to determine overall individual psychological distress. Total OQ45.2 scores ranged from 0 to 180. A total score of 63 or higher indicated a general subjective experience of distress. Individuals that scored below the cutoff for subscales or total score were most likely non-clinical respondents that function at a normal or satisfactory level with minimal disturbance.

Factor analysis of the OQ45.2 used pooled data from multiple settings including community, clinical, and college settings ($N = 1,085$). Two models provided fair support for the OQ45.2 as a multi-factorial assessment with two or three factors. The authors asserted that although results supported a uni- and multi-dimensional construct from the OQ45.2 scores, clinical application and utility may be warranted. Researchers based the OQ45.2 scores for reliability on a college student sample ($N = 157$ students). The Pearson product-moment coefficient for test-retest reliability of the total score was .84 (.78 for SD, .80 for IR, .82 for SR), indicating sound reliability of the OQ45.2. However, this study used a lower item to participant ratio than is generally recommended (i.e., 10 to 1 ratio; Hair, Black, Babin, & Anderson, 2010). However, replication of psychometric testing with other populations ($n = 192$ outpatient patients, $n = 268$ undergraduate students, and $n = 485$ community sampled adults) yielded similar results for reliability. Additionally, item responses seemed fairly high for internal consistency among college student and an employee assistance program patient sample (respectively .92 and .91 for SD, .74 for IR, .70 and .71 for SR, and .93 for OQ total). Finally, the OQ45.2 total score demonstrated concurrent validity ($p < .01$) with several other validated instruments including measures of (a) general symptoms (*General Symptom Index of Symptom Checklist 90 revised*, $r = .78$; *SF-36 Medical Outcome Questionnaire*, $r = .81$), (b) depression (*Beck Depression Inventory*, $r = .80$; *Zung Self Rating Depression Scale*, $r = .88$), (c) anxiety (*Zung Self Rating Anxiety Scale*, $r = .81$; *Taylor manifest anxiety scale*, $r = .86$; *State Trait Anxiety Inventory*, $r = .80$ to .64), (d) relationships (*Inventory of Interpersonal Problems*, $r = .54$ to .66; *Social Adjustment Scale*, $r = .65$), and (e) overall well-being (*Friedman Well-Being Scale*, $r = .81$). A limitation of these findings is that the sample used to determine reliability and validity included 90% Caucasian

respondents. Yet, the OQ-45.2 is one of the most widely used instruments in clinical practice and in research related to mental health (Lambert, et al., 2004).

For this study, the researcher parceled OQ45.2 responses. The researcher initially proposed the use of the symptom distress subscale total as one manifest variable and a summed composite subscale total of the social role and interpersonal relationships subscales as a manifest variable for health (see Figure 4). Kline (2016) defined parceling as the grouping of homogenous Likert-scale items for an average or total score. Parceling, in this case, was appropriate since the measurement model of the OQ45.2, including subscales of symptom distress and life functioning as unidimensional constructs, was not the aim of the current study.

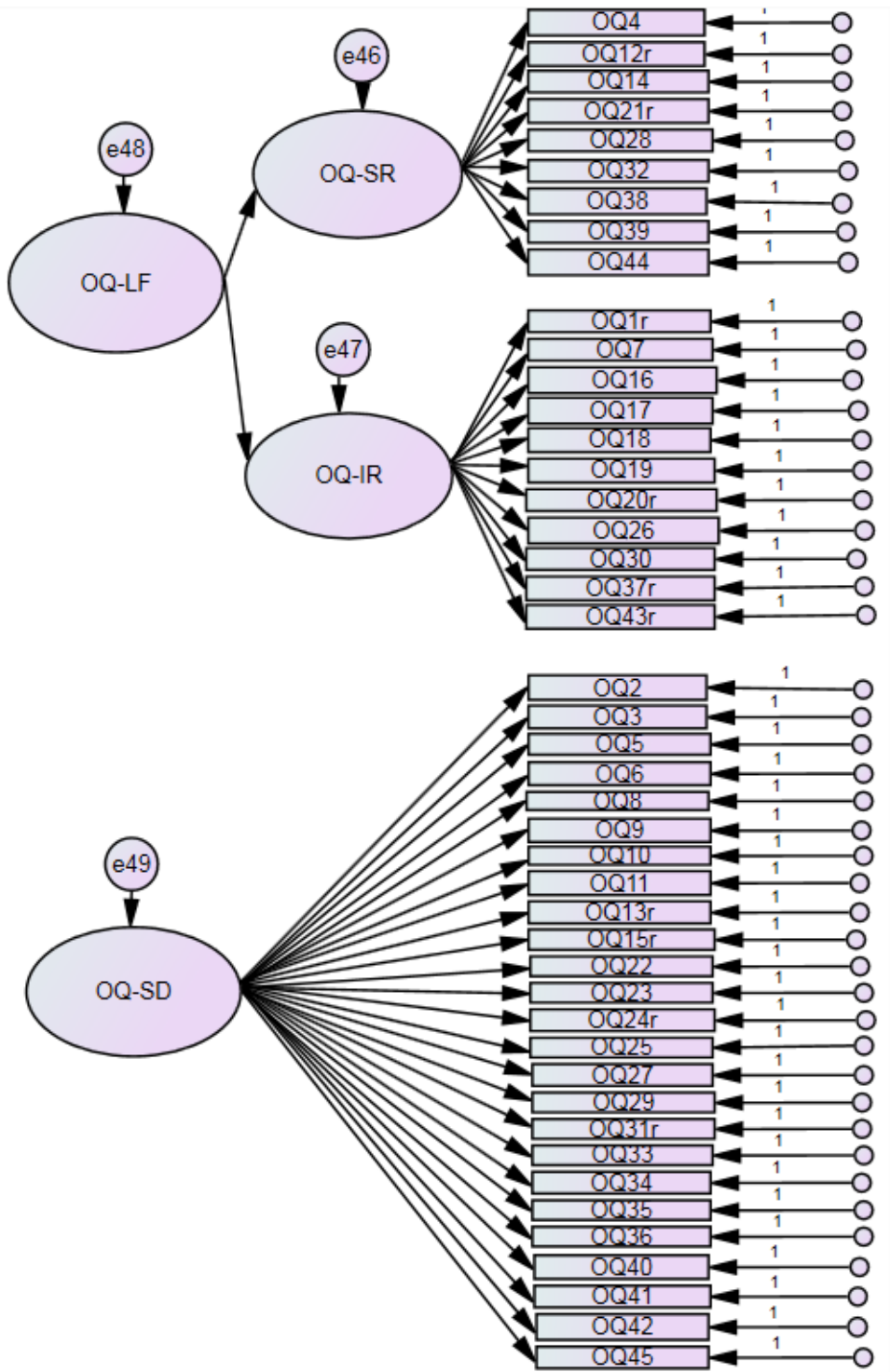


Figure 4: Anticipated Measurement Model for the Outcomes Questionnaire 45.2

Brief Medical History Questionnaire. The brief medical history questionnaire [Daire, Wheeler, & Liekweg, 2014] is a researcher developed instrument and checklist of 17 medical conditions (see Appendix G). Conditions included: (a) cancer (breast, colon, ovarian, prostate, other), (b) diabetes (childhood or adult onset), (c) obesity, (d) cardiovascular disease (coronary artery disease, hypertension, high cholesterol), (e) emphysema, (f) autoimmune disease, (g) depression/suicide/anxiety, (h) colon polyp, (i) alcoholism/drug abuse, and (j) migraine headaches. Participants self-reported any of the listed conditions as well as an ‘Other’ option where an open-response allowed the identification of any additional conditions experienced. A count of chronic health conditions is commonly used as an indicator of physical health in the literature (e.g., Chopik, & O’Brien, 2016; Korporaal, Broese van Groenou, & van Tilburg, 2013); however, the brief medical history questionnaire expanded the number of conditions included as an objective measure of health (8 and 7 conditions respectively). Furthermore, the brief medical history questionnaire broadened the number of conditions (i.e., from 10 to 17 conditions) included in prior examination of the associations between adversity, relationships, and health (Umberson, Williams, Thomas, Liu, & Thomeer, 2014). The brief medical history questionnaire resulted in a total count of existing medical conditions as an indicator of health. Count data generally have a non-normal or Poisson distribution (Kline, 2016). The Mplus software can account for variables with a Poisson distribution without transformation (Muthen, Muthen, & Asparouhov, 2016). Thus, the researcher used a composite count of total conditions for this study as a manifest variable for the latent health construct.

Research Design

Dependent and Independent Variables

This investigation utilized several dependent (endogenous) and independent (exogenous) variables for analysis. According to Kline (2016) in SEM, variables can be considered both endogenous and exogenous. In this study, relationship quality was both endogenous and exogenous.

Dependent/Endogenous Variable. The researcher used health and relationship quality as the dependent and endogenous variables for this study. The dependent variable of health included the physical and mental health symptoms and conditions of each participant. The latent health construct (see Figure 5) included: (a) a parcel of the OQ45.2, the symptom distress subscale total (OQ-SD); (b) a parcel for a combined total of the social role and interpersonal relationship subscales (OQ-LF); and (c) a composite total count of chronic illness and medical conditions from the brief medical history questionnaire (MedCount). The latent construct of relationship quality (see Figure 6) included: (a) a parcel from the RAS, an averaged total score for relationship satisfaction; (b) a parcel from the BSRERS, a subscale total for self-relationship effort (SRE); and (c) a parcel from the BSRERS, a subscale total for relationship self-regulation strategies (SRS).

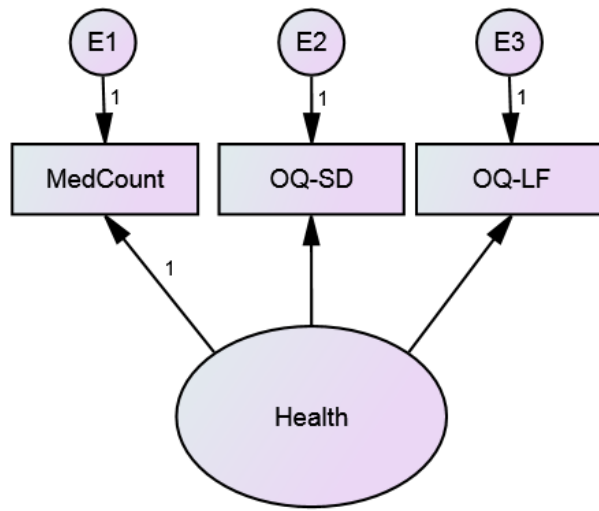


Figure 5: Second Order Measurement Model for Health

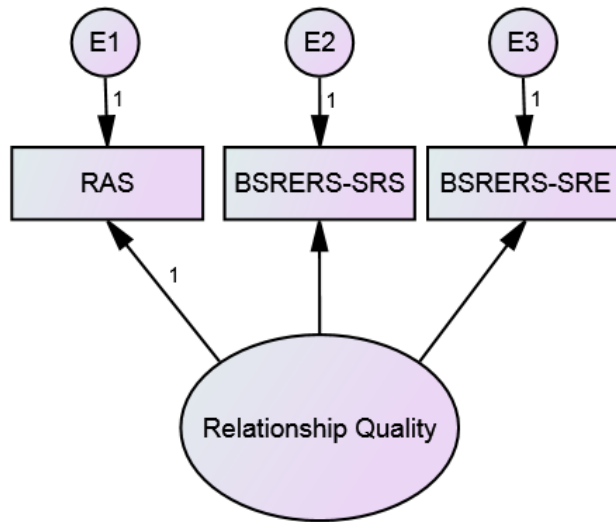


Figure 6: Second Order Measurement Model for Relationship Quality

Independent/Exogenous Variables. The researcher chose ACE and relationship quality as the exogenous variables. The researcher included relationship quality as both an exogenous and endogenous variable in this model (see description above). The latent construct of ACE included: (a) a composite total of the three forms of abuse from the ACE survey; (b) a composite total of the two forms of neglect from the ACE survey; and (c) a composite total of the five forms of household dysfunction from the ACE survey (HHDysfx).

Research Hypothesis and Exploratory Questions

This study sought to test a theoretical model that examined the directional relationship between couples with low-income ACE, relationship quality, and health. This section presents the research hypotheses and exploratory questions for the proposed analysis. Additionally, the measurement and structural models utilized for the hypotheses are provided.

Research Hypothesis

The primary aim of this study was to examine: To what extent does experiences of ACE (as measured by the ACE survey) contribute to relationship quality (as measured by the RAS [Hendrick, 1988] and BSRERS [Wilson et al., 2005]), and health (as measured by the OQ [Lambert et al., 2004] and the Brief Medical History questionnaire [Daire, Wheeler, & Liekweg, 2014]) for couples from economically disadvantaged backgrounds? Thus, the primary investigation tested a theoretical model for: (a) associations between ACE, relationship quality, and health within a mediational model; and (b) actor and partner effects on each of the aforementioned variables (e.g., examining whether each partner's ACE is related to his or her own health, and to the health of their partner). Based upon existing research and theory, hypothesized outcomes included: (a) a person's own ACE would negatively predict both his or her own (actor effect) and his or her partner's (partner effect) relationship quality; (b) a person's

own relationship quality would positively predict his or her own health (actor effect), and to that of his or her partner (partner effect); and (c) a person's own (actor-partner effect) and his or her partner's relationship quality (partner-actor effect) would mediate the association between one's own ACE and health. Therefore, based on the assumption of interdependence within a dyad for male and female reports of mental and physical health, the study employed a dyadic structure to examine the study hypotheses.

Data Analysis Plan

Data analysis included: (a) preliminary analysis, (b) the reorganization of data with a dyadic structure, and (c) SEM with the Actor-Partner Interdependence Mediation model (APIMeM). Preliminary analysis included cleaning the data and testing assumptions. Reorganization of the data to a dyadic structure allowed for the examination of interdependence in constructs between members of a dyad. Finally, SEM and the APIMeM tested the theorized relationships among the study variables ACE, relationship quality, and health.

Preliminary Analysis

Tabachnick and Fidell (2013) provided a recommended order for screening data prior to analysis that included: (a) distribution check to search for plausible ranges, missing values, normality, and univariate outliers; (b) plot variables and regressions to examine linearity and residuals; (c) use of transformation to correct violations to assumptions; (d) analyze and address missing data; (e) run a regression to examine Mahalanobis distance and multivariate outliers; (f) delete or recode and describing outliers; and, (g) evaluate multicollinearity. SEM is based on several assumptions for analysis including: multivariate normality, linearity of the variables, multicollinearity, and small residuals (Kline, 2016; Ullman, 2013). The author tested general assumptions to identify and address violations appropriately within the data. Finally, the author

explored potential covariates for inclusion in the analysis as independent variables (e.g., education, number of children, age, race, ethnicity).

Potential Anticipated Challenges

Prior to analysis, the researcher anticipated several potential challenges for the data analysis. In the social sciences, data often have a non-normal distribution. Specifically, count data (e.g., ACE and medical conditions counts) is often Poisson distributed. Non-normally distributed data can bias chi-square values and standard error of the parameter estimates. Tabachnick and Fidell (2013) identified several options for data transformation (i.e., square root, logarithm, inverse transformations) that may help to correct non-normal distributions. Additionally, Finney and DiStefano (2006) identified various approaches to SEM with non-normal data, including use of S-B scaling, bootstrapping, or use of other estimation methods such as asymptotically distribution-free estimation. Finally, Mplus software (Muthen & Muthen, 2015) allows a Poisson-distributed variable to be specified as such and included within the analysis without transformation.

Additionally, missing data may contribute to biased estimation of parameters, standard errors, confidence intervals, and tests of significance (Allison, 2003). However, no standardized approach or agreed upon method exists to address missing data and each method has potential strengths and limitations. Yet, regardless of method selected, all missing data should first be evaluated to determine the characteristics and quality as either missing completely at random (MCAR), missing at random (MAR), or not missing at random (NMAR; Rubin, 1976). After evaluation for the conditions of missing data, some form of missing data imputation may be indicated to reduce bias and to retain as many cases in the sample as possible. Results of missing values analysis determine if missing data may be ignored (e.g., represent less than 5-10% of the

data or are MCAR or MAR; Tabachnick & Fidell, 2013) and how best to address missing data using Little's MCAR test (Little, 1988). However, traditional methods for addressing missing data (i.e., listwise deletion, pairwise deletion, mean substitution) result in biased estimates and are no longer recommended. Instead, methods such as multiple imputation (MI) and full-information maximum likelihood (FIML) are recommended (Enders, 2010; Graham, 2009; Newman, 2014; Osborne, 2013).

Structural Equation Modeling

SEM, an advanced form of statistical analysis, employs a combination of multiple regression, confirmatory factor analysis, and path analysis to test a theoretical model using a sample of data. SEM allows for analysis of complex relationships between observed and theoretical latent constructs (including measurement error) through hypothesis testing. Furthermore, SEM allows for the evaluation of direct and indirect effects simultaneously. Therefore, SEM offers distinct advantages over others forms of analysis such as multi-level modeling, where only one dependent variable is permitted and no measurement error is assumed. The goals of SEM are to examine the covariance among variables and to explain the covariance using the proposed model (Kline, 2016; Ullman, 2013). As a result, causal inferences may cautiously be interpreted from SEM.

This study used SEM to test a theoretical model that contains both observed/manifest and latent variables. Manifest variables are the actual measured data that can be categorical or continuous. Manifest variables can be used as indirect indicators of a larger unmeasured factor. In the figures provided, manifest variables are represented by rectangles. Latent variables in SEM must be continuous and reflect hypothesized constructs not directly observed. In the figures provided later, latent variables are represented by ellipses. Unique to SEM, measurement error

and error variance associated with the raw data are also accounted for as latent variables. In this study, the estimated model examined the relationships between observed variables (ACE, relationship quality, health) and the variance and covariance among these variables. Finally, in the figures provided, the relationship between variables and direct effects are represented by a one-way arrow to demonstrate the direction of the path. A two-way arrow represents covariance between variables. Therefore, two models are represented within SEM including the measurement and structural models. The measurement model depicts the relationship between manifest variables to a latent variable, including measurement error. The structural model depicts the hypothesized relationships between latent constructs (Kline, 2016; Schumacker & Lomax, 2016).

Steps in SEM. The steps of SEM begin after the completion of preliminary data cleaning and assumptions testing. There are five steps of SEM: model specification, identification, estimation, testing, and modification (Crockett, 2012; Kline, 2016; Schumacker & Lomax, 2016).

The first step, model specification, relies on a thorough review of the existing literature. The variables of interest and theoretical relationships between constructs emerge from a review of related prior research. As researchers theoretically conceptualize constructs, they develop a proposed measurement model. In this case, the author created visual measurement models from the ACE survey (Figure 1), RAS (Figure 2), BSRERS (Figure 3), and OQ45.2 (Figure 4). Additionally, the author created visual measurement models for latent constructs Relationship Quality (Figure 5) and Health (Figure 6). Then, the researcher combined latent constructs to provide a structural model of the hypothesized relationships. The researcher specified relationship quality as the mediating variable to follow temporal precedence of the study

constructs (i.e., childhood adversity precedes adult relationship quality and health). For this study, the author included visual structural models for the individual-level structure (Figure 7) and the dyad-level APIMeM (explained in detail below; Figure 8).

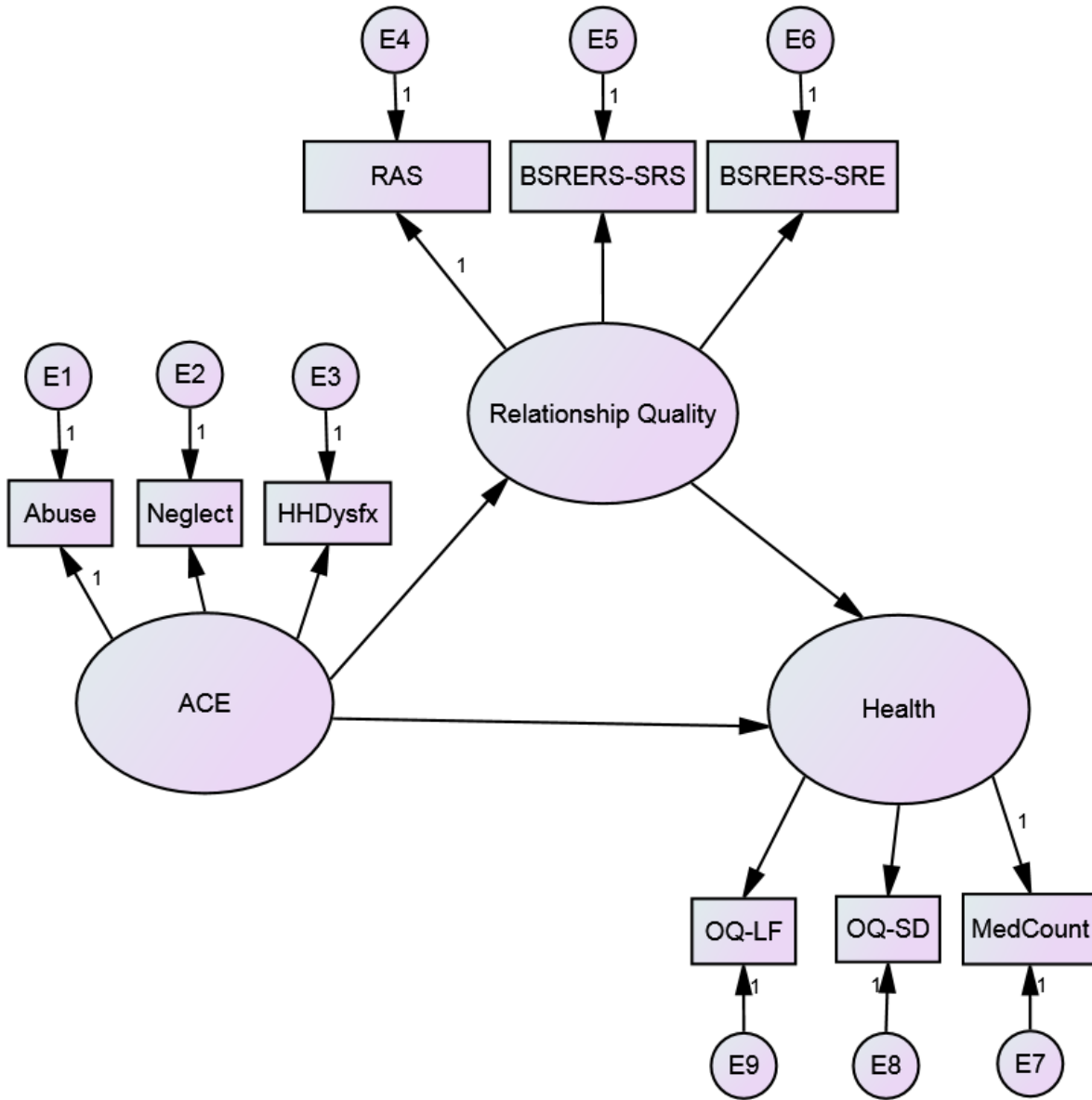


Figure 7: Individual Structural Model

The researcher mathematically examines the number of known to unknown variables in the second step, model identification. Here, the researcher evaluates the measurement and structural models to determine viability for further analysis. Identification of a model relates to the number of parameters to be estimated versus known values from our data and the variance-covariance matrix. According to Kenny and Milan (2012), for every measured variable k there are $k(k+1)/2$ known values, free or unknown in a structural equation model. Similarly, free variables correlate with others in the CFA model. Conversely, the researcher may restrict variable loadings to a fixed value or constrained pattern. The researcher can calculate the degrees of freedom for the model from the number of known or observed moments minus the number of free parameters. For identification of the model, the degrees of freedom must be greater than or equal to one (Schumacker & Lomax, 2016). The initial model for this study included 18 manifest variables as measures of the 3 latent constructs or 153 (i.e., $[18*17]/2$) known values. Additionally, the model included 27 free parameters to be estimated and 126 degrees of freedom (153 minus 27) – an overidentified model. Overidentification of the model allowed for further exploration for the parameter estimates that provide the best fit to the study data. Kenny and Milan (2012) indicated preference for overidentified models since they allowed for tests of falsifiability from fit statistics that evaluated overall model fit. However, overidentification also means that more than one solution may be possible (Kline, 2016). In sum, model identification requires that the number of known conditions must be greater than or equal to the number of unknowns to be estimated. Models with fewer knowns than unknowns are under-identified and thus, negative degrees of freedom. A just-identified model has an equal number of knowns and unknowns.

The third step of SEM is model estimation. Estimation assumes that specification of the model is correct. Simultaneous estimation methods allow all parameters to be estimated concurrently rather than estimation for one endogenous variable at a time (i.e., single-equation methods). Maximum likelihood (ML) is one form of simultaneous estimation that determines parameter estimates that maximize the likelihood that the data represent the population (Kline, 2016). Therefore, ML assumes no severe violation to multivariate normality. In the event of such a violation, other estimation techniques may be more appropriate for a less biased result. Generalized least squares (GLS) is another common estimation method that may be used if multivariate normality is violated (Crockett, 2012). Regardless of the method used, in this step, free parameters are estimated through an iterative process that seeks to minimize discrepancy between the data and the covariance matrix implied by the model. For this study, the researcher employed ML estimation for the primary analysis and ML with robust standard errors (MLR) to examine the effect of multivariate outliers to model fit.

The fourth step of SEM, model testing, assesses the measurement and structural models. Criteria recommended for the assessment of model fit often include the Tucker-Lewis index (TLI), comparative fit index (CFI), and the root-mean-square error of approximation (RMSEA; Hu & Bentler, 1999). Good fit may be indicated by CFI and/or TLI values greater than or equal to .95. CFI and TLI values between .9 and .95 suggest a marginal fit. CFI and TLI values less than .9 suggest a poor fit. CFI and TLI measure a proposed model with a rescaled chi-square value. Therefore, the better the fit of the model in comparison to a restricted or null model, the closer the resulting value to one. RMSEA values are based on the degrees of freedom and sample size. Close fit between the observed and implied model data is reflected in a RMSEA

value less than or equal to .06. A non-significant chi-square (χ^2) value is interpreted to suggest similarity between the observed and implied models.

In addition, the standardized root-mean-square residual (SRMR) index, Akaike information criterion (AIC), and Bayesian Information Criterion (BIC) also provide criteria for evaluation of a structural equation model (Kline, 2016; Schumacker & Lomax, 2016). An exact model fit of the mean absolute covariance residual is indicated by an SRMR equal to zero. SRMR values greater than or .10 suggest poor model fit. The AIC and BIC criteria are based on $-2 \log$ -likelihood chi-square fit. AIC and BIC compare models that have different numbers of latent variables. However, the BIC value is more directly influenced by sample size mathematically and AIC is influenced by complexity of the model. Thus, AIC and BIC values close to zero suggest model fit and parsimony.

The final step of SEM is model modification. Modification is used to improve the values obtained from model estimation. Researchers use the existing data to re-specify the model by adding or removing parameters to achieve a better fit. Non-significant parameters may be removed. However, model modification is exploratory in nature and therefore requires cross-validation with a new sample since procedures are based solely on the sample data.

Dyadic Data

Traditional individual-level analysis assumes independence of responses between observations. The assumption of independent observations implies that there is no common influence shared by several of the observations. Yet, this assumption may not be accurate or appropriate in the examination of interpersonal and relational phenomena (Kenny, 1996). Individual responses by members of a couple may be linked to one another as a result of their shared social context, influence, or member similarities (i.e., common fate, mutual influence,

compositional effect). Furthermore, one member of the couple can affect his or her partner's outcomes through his or her behavior or individual qualities (i.e., a partner effect). In analysis, correlation of individual responses between members of a couple can result in biased estimates of significance. Therefore, dyadic data analysis may be indicated (Kenny, Kashy, & Cook, 2006).

Dyadic data analysis is based on an assumption of non-independence. Kenny (1996) suggested estimation of non-independence through calculation of a Pearson product-moment correlation coefficient within the dyad. To calculate the degree of non-independence, members of the dyad must also be distinguishable or meaningfully identifiable by some factor for all members of the data set. The omnibus test of distinguishability empirically analyzes if: (a) the means for the two members is the same for each variable, (b) the variances for the two members is the same for each variable, and (c) the intrapersonal and interpersonal correlations are the same for each pair of variables. In this study, the researcher used sex as the within dyad distinguishing variable, thus only heterosexual couples were included. The researcher chose to distinguish couples by sex due to the theoretical and empirical support for the differences in self-reported relationship quality (e.g., Carr et al., 2014; Halford et al., 2007; Knapp et al., 2015; Wilson et al., 2005) and health (e.g., Proulx et al., 2007; Umberson et al., 2014) observed by sex. In addition, Kenny (1996) suggested use of analysis that is inclusive of both the individual and the dyad such as multilevel modeling or structural equation modeling. To do so, the data should be structured accordingly either as a dyadic or pairwise structure. A dyadic data structure depends on the dyad as the unit of measurement; therefore, each line in the dataset includes one couple's information side-by-side (e.g. respondent A, respondent B). A pairwise dataset expands this structure by adding the transposed original couple's line to include the couple a second time

reordered in the dataset (e.g. respondent B, respondent A). In so doing, each respondent is included in the data set twice – once as the actor, once as the partner and person nested within dyad. A pairwise format is most useful for analysis using multilevel modeling; whereas, a dyadic structure is most useful for structural equation modeling (Kenny, Kashy, & Cook, 2006).

Actor Partner Interdependence Model (APIM)

An independent variable can be different within the dyad for each member of the couple and between dyads in comparison of one couple to another, also called a mixed variable.

Outcome variables are often mixed variables. The Actor Partner Interdependence Model (APIM) allows for estimation of an actor effect and a partner effect for the same variables from different persons in a dyad (Kenny, Kashy, & Cook, 2006). The actor effect refers to the direct effect from one person's independent variable to their dependent variable (i.e., X Person 1 to Y Person 1).

The partner effect refers to the direct effect from a person's own independent variable to his or her partner's outcome variable (i.e., X Person 2 to Y Person 1). Both members of the dyad have actor and partner effects, resulting in four fixed effects in a basic APIM pattern (See Figure 8).

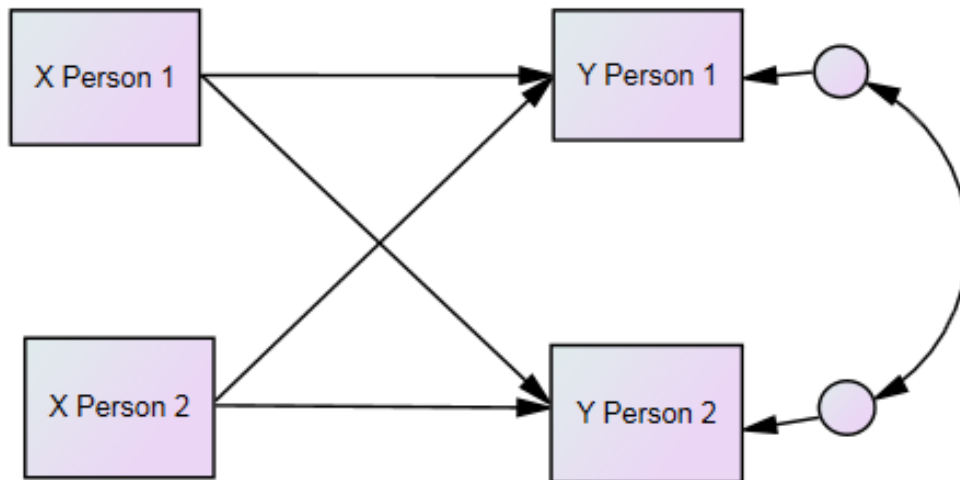


Figure 8: Actor Partner Interdependence Model (APIM)

Actor-Partner Interdependence Mediation Model (APIMeM). The Actor Partner Interdependence Mediation Model or APIMeM further extends the APIM (Ledermann, Macho, & Kenny, 2011). The APIMeM adds a third intervening variable or mediator that seeks to explain the relationship between the independent and dependent variable and how the predictor influences the outcome variable. According to Hayes (2013), mediation analysis seeks to explain how a predictor variable (X) effects a dependent variable (Y) by adding a causal variable (M). In this case, the researcher included relationship quality to explain the relationship between ACE and health. In the APIMeM, actor or intrapersonal effects refer to the pathways of one individual only (i.e., male ACE, male relationship quality, and male health)(see Figure 9). Partner or interpersonal effects refer to indirect pathways that involve any paths between partners (see Figure 10). Interpersonal effects include partner-partner (i.e., male ACE, female relationship

quality, male health), partner-actor (i.e., male ACE, female relationship quality, female health), or actor-partner (i.e., male ACE, male relationship quality, female health) indirect effects. In this study, the saturated model included all pathways of the APIMeM including actor/intrapersonal and partner/interpersonal effects. The researcher examined mediation of the relationship between our predictor value (ACE; X1 and X2) to the dependent variable (health; Y1 and Y2) via the mediator (relationship quality; M1 and M2). In the APIMeM, mediation can occur via two pathways that results in 27 free parameters including 12 estimated path coefficients (six actor effects and six partner effects) from a simple two-variable mediation model (See Figures 11, 12). The expanded second-order latent variables are included in Figure 13 below.

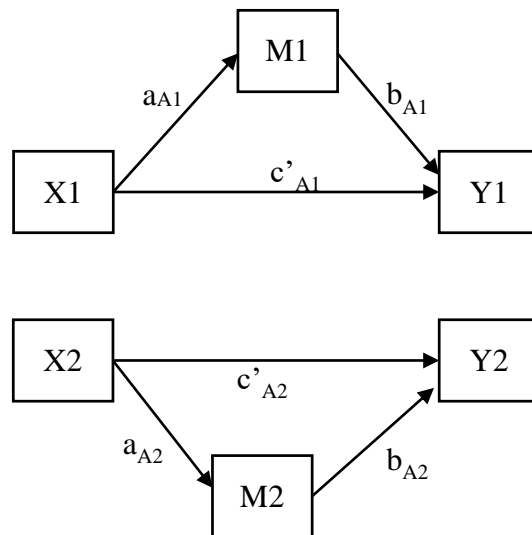


Figure 9 APIMeM Actor Effects

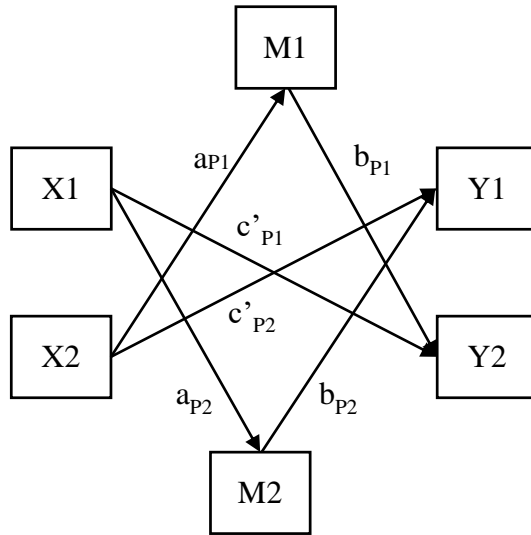


Figure 10 APIMeM Partner Effects

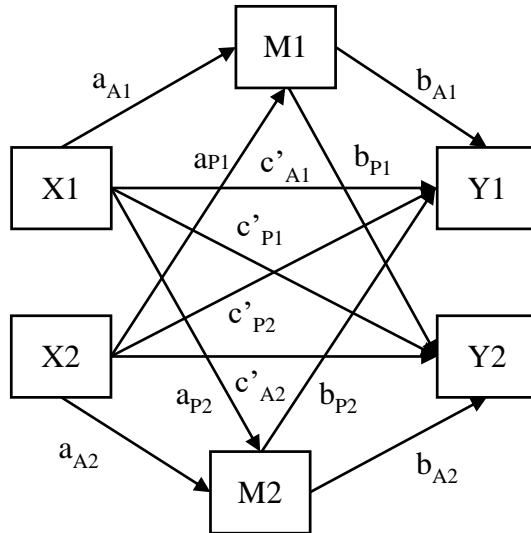


Figure 11 APIMeM Direct Effects

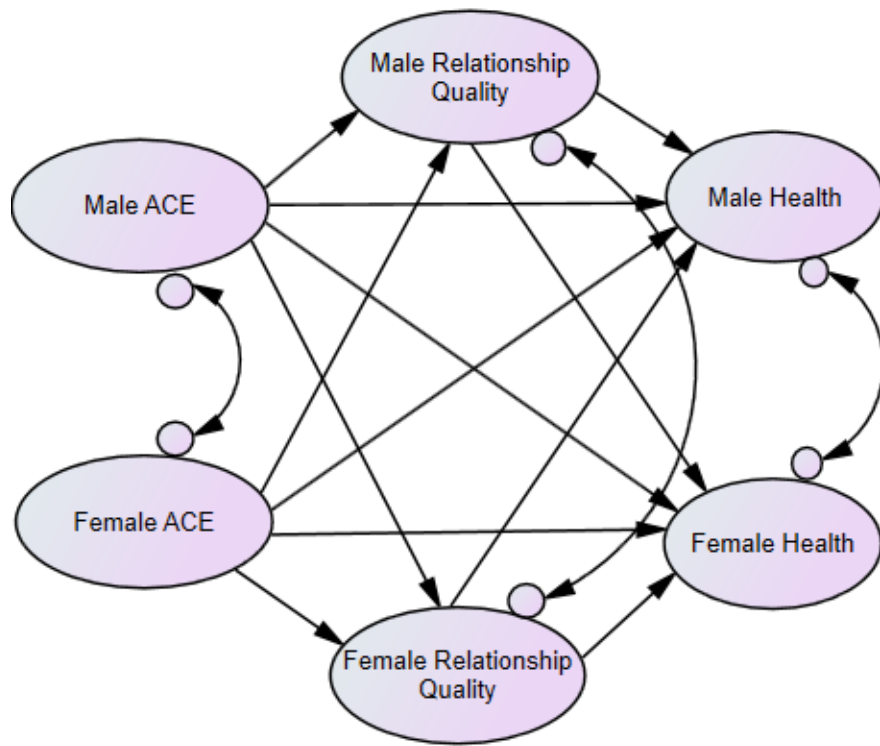


Figure 12 Simplified Actor Partner Interdependence Mediation Model

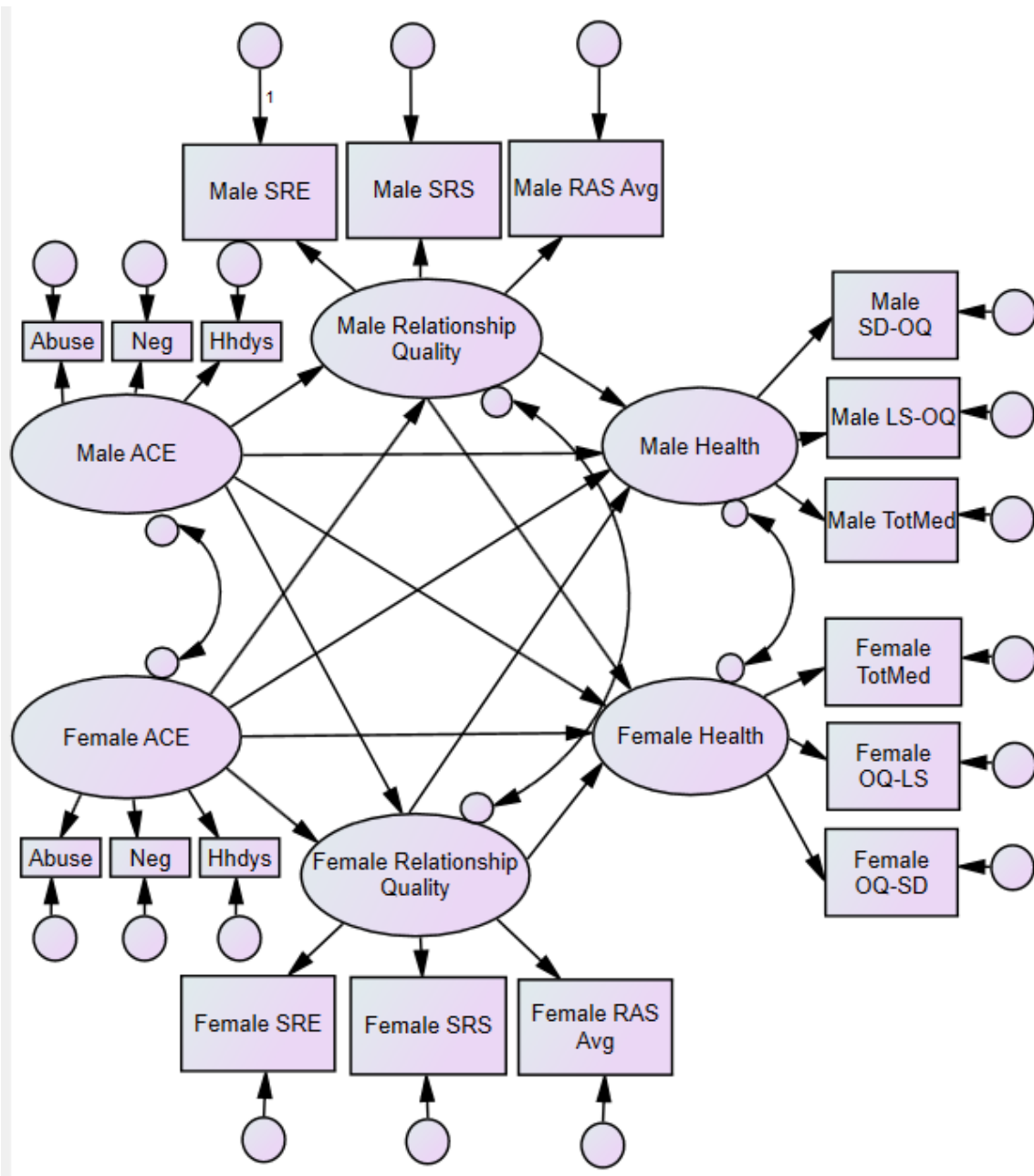


Figure 13 Expanded Actor Partner Interdependence Mediation Model

Therefore, Ledermann and colleagues (2011) provided a detailed process for APIMeM to simplify the model by strategically imposing constraints. First, an unconstrained or saturated model is assessed for all direct effects. Second, specific dyadic patterns are tested including: (a) assess direct effect distinguishability and constrain effects for indistinguishable effects; (b)

estimate partner-actor ratio or k -value and the corresponding confidence intervals; (c) assess if the k is the same as the actor or partner effect by the distinguishing variable and, if so, set those k -values to be equal; and (d) fix parameters from k to 1, 0 or -1 to determine relative model fit. Finally, a simplified model is re-specified for indirect and total effects to remove k paths and constrain effects. In mediation analysis, there are several causal assumptions made including: (a) perfect reliability for the mediator (M) and independent variable (X), (b) no reverse causal effects, meaning the dependent variable (Y) does not cause M, nor does M or Y cause X, and (c) no confounding variables are omitted. Finally, following examination of mediation, Kenny (2012) suggested an additional sensitivity analysis to test for violation of the assumptions made in a mediation model.

Sensitivity analysis examines “worst case” violations to the postulations of causal assumptions and results in implications for a mediation analysis. Causal assumptions include: (a) perfect reliability for the independent/exogenous variable and for the mediator, (b) no reverse causal effects from the dependent/endogenous variable to the mediator or exogenous variables, and (c) no confounding variables exist that I have omitted. Thus, in this study sensitivity analysis could evaluate the validity of assumptions that: (a) ACE and Relationship Quality are reliable, (b) Health does not cause Relationship Quality; and Relationship Quality and Health do not cause ACE, (c) all common causes of Relationship Quality and Health are measured and controlled. Several analyses are run using the final model to test these worst case assumption violations (Imai, Keele, & Tingley, 2010). However, the researcher did not perform sensitivity analysis for this study – an important next step for the overall evaluation of the model.

In sum, the data analysis plan included preliminary analysis, data re-structuring, SEM and APIMeM. Preliminary analysis ensured appropriateness of dyadic data analysis (i.e., couple

data are distinguishable and interdependent) and results of general statistical assumptions tests. The researcher restructured data at the dyadic level to address interdependence of dyad responses. The APIMeM specified the original model including actor and partner paths between the study variables. Finally, the researcher followed steps of SEM to test the theorized relationships between ACE, relationship quality, and health with the study sample of economically disadvantaged couples.

Ethical Considerations

Ethical considerations of importance and reviewed by the institutional review board (IRB) and the researcher's dissertation committee include the following:

1. Anonymity and confidentiality of participant information collected.
2. Voluntary participation in the study.
3. Informed consent by participants for participation in the study including rights for withdrawal from the study without consequence and approval of the study by the IRB.
4. Permission and approval to conduct this study from the dissertation chair, committee members, and the IRB at the University of Central Florida.

Chapter Summary

This study investigated the association between ACE, intimate relationship quality, and health. Chapter three provided an outline for the research methods of the current study including, (a) research design, (b) sample size estimation, (c) instrumentation, (d) dependent and independent variables, (e) research questions and hypotheses, and (f) the data analysis plan. This study used archival data from Project TOGETHER, a community-centered healthy marriage initiative for relationship education with economically disadvantaged couples. Most methods for

sample size estimation supported the appropriateness of the 538 couples' data extracted as a secondary dataset. Additionally, the instruments selected (i.e., ACE survey, RAS, BSRERS, OQ45.2) demonstrated sound psychometric properties in prior research and theoretically fit the constructs as defined by the researcher. The steps of SEM and the APIMeM provided an ordered process for dyadic data analysis and address the potential interdependence of constructs between members of a couple. Finally, this chapter presented anticipated challenges for analysis and ethical considerations from the initial data collection and current secondary data analysis.

CHAPTER FOUR: RESULTS

Chapter four includes the results for the research hypothesis and exploratory questions associated with the current investigation. The researcher developed a theoretical model to investigate the association between ACE, relationship quality, and health. The model included the dyadic influence of a partner as well as mediation of ACE and health by relationship quality (i.e. APIMeM). Therefore, this study examined the theorized model fit of data from a sample of couples from economically disadvantaged backgrounds. Results include: (a) data screening and statistical assumptions for SEM, (b) preliminary dyadic analysis, (c) participant demographics, (d) model specification and identification, and (e) analysis of the research hypotheses.

Data Screening and Statistical Assumptions

Data screening includes preliminary analysis and adjustment to ensure statistical assumptions are not violated (Tabachnick & Fidell, 2013). Therefore, data analysis began with examination of indicators for statistical assumptions including: (a) missing data analysis, (b) instrument psychometrics, (c) univariate outliers, (d) normality and multivariate outliers, (e) heteroscedasticity and multicollinearity, and (f) linearity and residuals. In addition, prior to tests of assumptions, the researcher examined the consistency and factor structure of instruments with these data to ensure reliability and validity of items for the constructs initially proposed. Finally, analysis of the statistical assumptions for this study concluded with the examination of the interdependence in responses (i.e., canonical correlation) between members of a dyad.

Missing data

The researcher examined data for plausible values and found no issue with the range of responses entered. The measures of central tendency for variables of interest are included in Table 1. Missing data is a significant issue in any form of data analysis (Tabachnick & Fidell,

2013). In SEM, improper handling of missing data can contribute to biased results. Therefore, analysis to identify patterns in missing data (i.e., missing values in Y do not depend on values for X or Y) can support the utilization of different statistical techniques to address missing values (Allison, 2003). The researcher identified less than 5% of the data were missing (i.e., 2.9%) for the current analysis. Of the 538 couples in the original sample, several respondents were missing entire assessments or unit non-response. Thus, the researcher removed the 24 couples (4.46%) that did not complete any of the assessment data via listwise deletion, which resulted in a sample of 514 couples. Couples with no assessment data enrolled towards the end of the funded-program award period, during which time the project administrators only collected information required for federal reports to support condensed versions of the intervention. Listwise deletion can result in biased estimates of parameters in cases where data is missing at random (Allison, 2003). However, Kline (2016) stated that missing less than 5% of values for any single variable may not be a significant concern. In this case, the researcher determined listwise deletion was the best approach, given the limited information available for maximum likelihood estimation (discussed below) for these couples with no assessment data collected. The researcher chose to examine couples distinguishable by sex due to the small representation of same-sex couples in the data ($n = 11$) and sex differences observed in prior research for relationship quality and health. As a result, the final sample included 503 heterosexual couples. Further exploration of the study constructs with same-sex couples may be an important consideration for future research.

From the 503 heterosexual couples with usable data, assessment item non-response included another three participants and four items (OQ45.2 item 11, 42, 32 and BSRERS item 8) that respondents had skipped. Little's missing completely at random (MCAR) test revealed a non-significant result, $\chi^2(566) = 13.568, p = 1.00$, that indicated the missing data were missing at

random (MAR) or missing with no identifiable pattern. Therefore, the researcher used maximum likelihood (ML) with the Expectation Maximization algorithm to impute the missing values.

Maximum likelihood is an appropriate method to address missing data that is MAR. Expectation-maximization (EM) uses regression imputation to produce maximum likelihood estimates for the means and covariance matrix of missing data (Allison, 2002). EM follows an iterative two-step process that begins with the full covariance matrix from all available predictors. Thus, auxiliary variables can contribute to the estimation of missing values as a component of the prediction calculation even if those variables are not included in the SEM model. For this study, the researcher used all available data including participant demographic and assessment item responses to estimate missing values for items from the OQ45.2 and BSRERS. EM that included auxiliary variables was the most appropriate approach given (a) the small percentage of missing data, (b) the determination of the nature of missing data as MAR (Tabachnick & Fidell, 2013), and (c) the intention to use subscale totals rather than item responses in the specified models. Limitations of ML with EM include possible error in imputed data sets that may result in biased analysis (Tabachnick & Fidell, 2013). Yet, all approaches for missing data have limitations. The researcher determined that the benefits from EM ML imputation outweighed the potential risks.

Table 1 *Measures of Central Tendency*

	Mean	Median	Mode	SD	Min	Max
ACE Total	2.51	2.00	0.00	2.36	0	10
SRE	19.77	20.00	20.00	5.45	6	30
SRS	36.9	37.00	38.00	7.25	15	50
RAS Average	3.77	3.86	3.86	.83	1.14	5.0
TotMed	1.034	1.00	0.00	1.40	0.00	10.00
OQ-SA	.2545	0.00	0.00	.85	0.00	7.00
OQ-LS	5.26	5.00	6.00	3.55	0.00	19.00
OQ-SD	15.96	15.00	16.00	9.08	0.00	50.00

Instrument Psychometrics

The researcher examined psychometric properties of the study instruments to assess reliability and relationships among the study variables with this sample. However, the proposed structural model did not include instruments as second-order latent variables due to the complexity of the model structure and inadequate computing power to do so. Thus, the researcher conducted factor analyses as a preliminary analysis prior to examination of the full structural model. Factor analysis examines patterns of correlation between variables that suggests an observed underlying process (Tabachnick & Fidell, 2013). Confirmatory Factor Analysis (CFA) is a part of the model identification process in SEM. The researcher chose to employ a CFA to test the theorized relationship for latent processes. For this study, the researcher used an oblique rotation that allowed correlation among the factors, as often observed in the social sciences. The resultant factor correlation matrix included (a) a pattern matrix of the unique relationships without overlap, and (b) a structure matrix of the correlations between the factors and variables with overlap. Overlap between factors can produce inflated correlations on a structure matrix (Tabachnick & Fidell, 2013); thus, the researcher reported pattern matrix values in this study.

Properties and Structure of ACE. Internal reliability for the 10-items of the ACE survey yielded a Cronbach's alpha of .76, a sound level of internal consistency (Hair et al., 2010). Removal of any items did not improve internal consistency. The mean ACE score was 2.51 ($SD = 2.36$). The frequency of reported ACE indicators is listed below (Table 2). Internal consistency of a three-factor ACE score was not supported – three items of abuse ($\alpha = .66$; $M = .86$, $SD = 1.035$), two items of neglect ($\alpha = .42$; $M = .36$, $SD = .59$), and five items of household dysfunction ($\alpha = .59$; $M = 1.30$, $SD = 1.29$). Due to the low internal consistency of the proposed

three subscales, the researcher randomly split the data and conducted an exploratory factor analysis (EFA)($n = 502$) for the ACE items.

The researcher conducted an EFA of the ACE items with a principal component extraction with oblimin rotation. EFA examines the shared variance (i.e., covariance) based on a guiding theory for the relationships among variables (Tabachnick & Fidell, 2013). The researcher inspected the correlation matrix and most coefficient values were .3 or above. The Kaiser-Meyer-Olkin (KMO) value was .807, above the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity was statistically significant ($\chi^2 [45] = 809.84, p < .001$), which suggested the factorability of the correlation matrix (Bartlett, 1954). Visual inspection of the scree plot suggested a two-factor solution and the two-factor solution explained 42.87% of the variance. Investigation of the item pattern matrix suggested content of the two factors as (a) abuse and neglect and (b) household dysfunction. However, maternal IPV seemed to cross-load between the two constructs (.37 on factor one, .40 on factor two). The researcher retained the maternal IPV item to be consistent with prior ACE research. The researcher then conducted a CFA with the remaining random half of the sample ($n = 504$). The CFA used a principal component extraction with oblimin rotation, since the proposed model is supported by theory (Tabachnick & Fidell, 2013). The KMO value was above the recommended value (.85) and Bartlett's test was significant ($\chi^2 [45] = 1045.88, p < .001$). The two-factor solution explained 45.77% of the variance. This is below the recommended percentage for variance extracted (Beavers et al., 2013), yet consistent with prior estimates obtained. Additionally, the items loaded somewhat differently in the CFA from the EFA – physical neglect loaded with the items of household dysfunction and maternal IPV loaded with the items of abuse and neglect.

Henson and Roberts (2006) recommend comparison of extracted eigenvalues to a randomly generated matrix with parallel analysis (Horn, 1965). Therefore, the researcher used a SAS-based online application to generate the correlation matrix (Patil, Singh, Mishra, & Donavan, 2007). For parallel analysis, the researcher used principle components analysis and compared resultant eigenvalues to those produced from the dataset (Table 3). Data-derived factor eigenvalues that exceeded generated eigenvalues were retained. In this case, eigenvalues derived from the data were greater than eigenvalues generated through parallel analysis for one-factor. Therefore, the researcher chose to retain all items from the original ACE survey as a one-factor total score as indicated by the parallel analysis and to maintain congruence with prior research. The one factor solution explained only 32.8% of the variance, a limitation of the one-factor model. Additionally, several factors yielded low factor loadings (e.g., parental incarceration, parental divorce) and contributed to an overall poor model fit ($\chi^2 [35] = 216.56, p < .001$; CFI = .90; TLI = .87; RMSEA = .07; SRMR = .04). However, results from the one factor model (Figure 12) are comparable to prior research with ACE total scores and met some indicators for adequate model fit (i.e., CFI, RMSEA, SRMR). The researcher computed a grand mean centered ACE total score to have greater interpretable results for regression coefficients, that resulted in one manifest variable to measure ACE.

Table 2 *Frequency of ACE Reported*

ACE Indicator	Frequency (n)	Percent
6 Parental Divorce	497	49.40%
1 Emotional Abuse	346	34.40%
2 Physical Abuse	319	31.70%
8 Household Alcohol/Drug Abuse	293	29.10%
3 Sexual Abuse	279	27.70%
4 Emotional Neglect	279	27.70%
9 Household Mental Illness/Suicide Attempt	212	21.10%
10 Household Incarceration	152	15.10%
7 Maternal IPV	148	14.70%
5 Physical Neglect	84	8.30%

Table 3 *Confirmatory Factor Analysis and Parallel Analysis Eigenvalues for the ACE survey*

	Data- Derived Eigenvalues	Generated Eigenvalues
Component 1	3.51	1.23
Component 2	1.068	1.157
Component 3	0.914	1.105

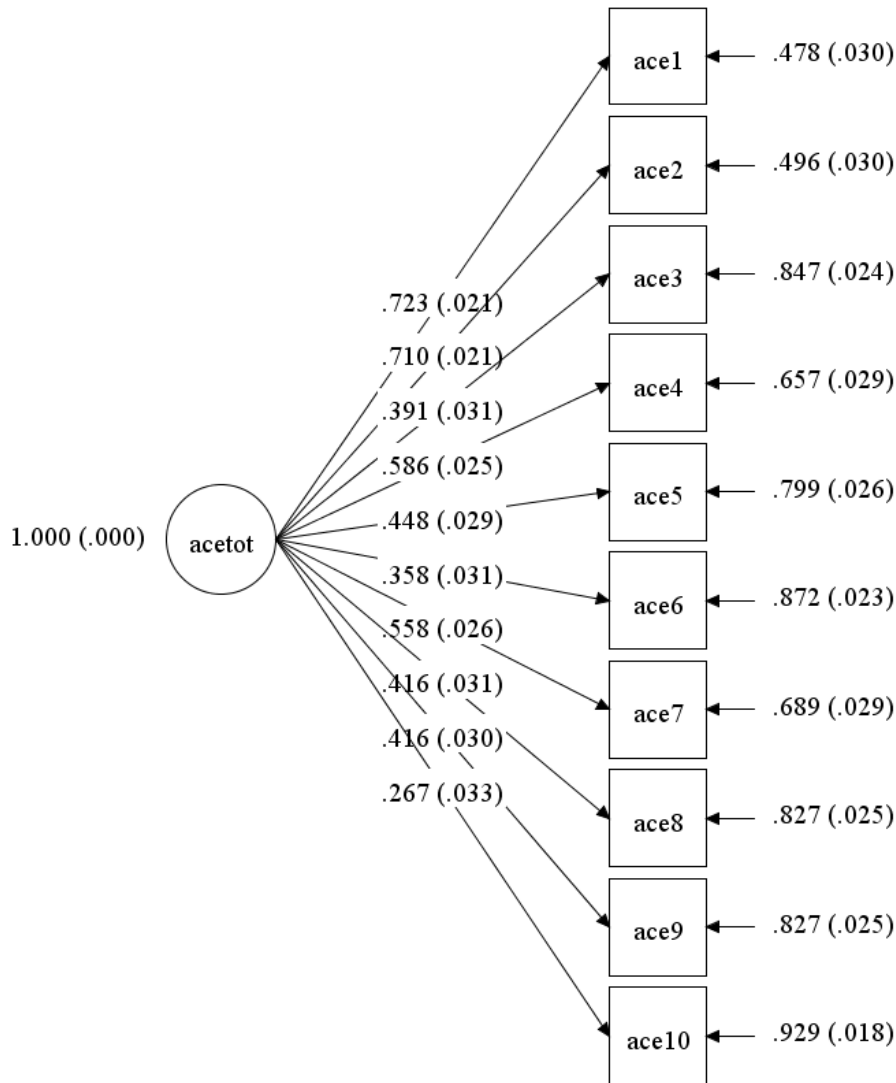


Figure 14 Confirmatory Factor Analysis: ACE

Properties and Structure of RAS. Internal reliability for the 7-items of the RAS yielded Cronbach's alpha = .901, a high level of internal consistency for the scale with these data. Removal of any of the items, except for item 6 ("How much do you love your partner"), resulted in a lower Cronbach's alpha. The corrected-item total correlation value for item 6 was moderate (.46), which could suggest appropriateness for item removal (Pallant, 2010); however,

the researcher chose to retain all items to maintain congruence with prior studies. The measures of central tendency for the 7-item RAS average included: $M = 3.77$ $SD = .825$.

The researcher assessed the one-factor solution for the RAS with a principal components extraction method and oblimin rotation to examine prior theorized structure (Tabachnick & Fidell, 2013). The correlation matrix and all coefficient values were .3 or above. The KMO value was .917, above the recommended value of .6. The Bartlett's Test of Sphericity was statistically significant ($\chi^2 [21] = 4113.37, p < .001$), which suggested the factorability of the correlation matrix (Bartlett, 1954). The one-factor solution proposed in the literature explained 62.96% of the variance and one eigenvalue above one, also supported in visual inspection of the scree plot. Further, the one-factor model demonstrated an acceptable model fit ($\chi^2 [14] = 76.59, p < .001$; CFI = .99; TLI = .98; RMSEA = .07; SRMR = .03). Factor loadings ranged from moderate (item six .47) to high (item two .91; see Figure 13). The researcher computed a grand mean centered RAS-average score used for the remainder of analyses presented.

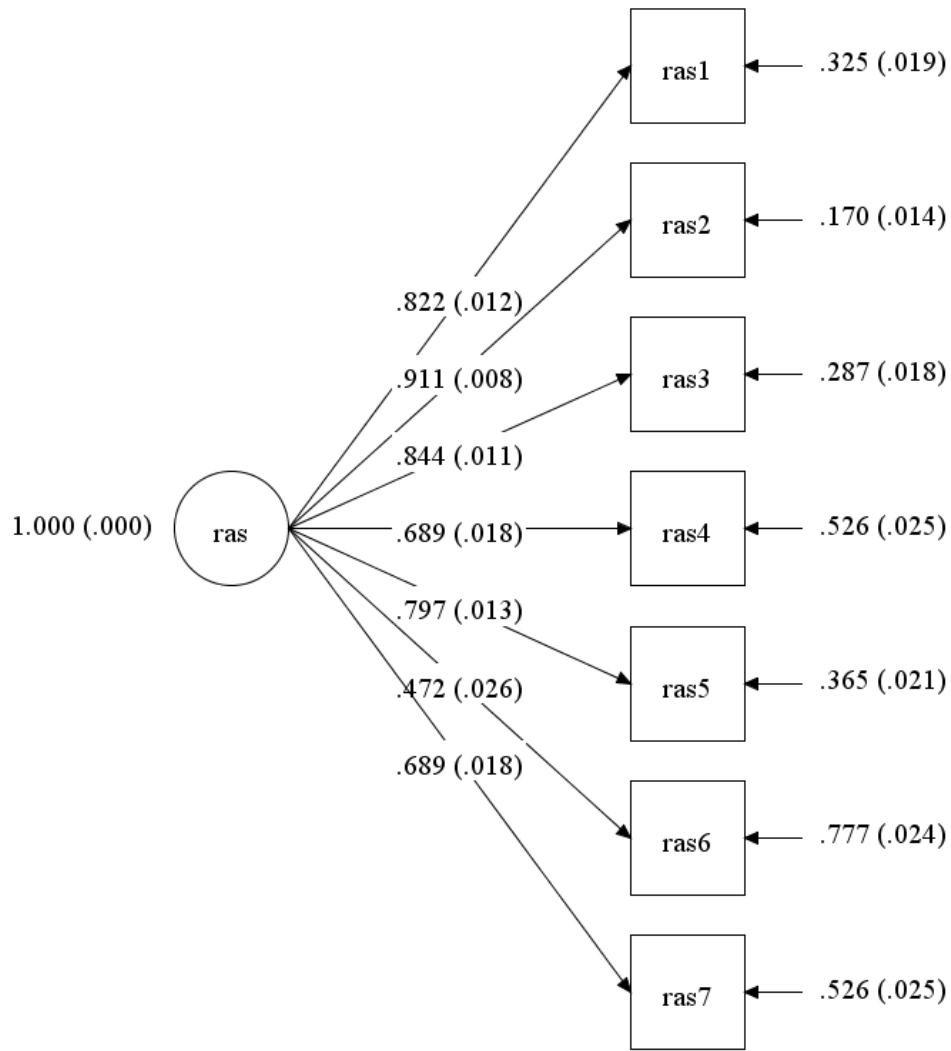


Figure 15 Confirmatory Factor Analysis: RAS

Properties and Structure of BSRERS. Internal reliability for the 16-items of the BSRERS-self assessment yielded a Cronbach alpha of .84, a high level of internal consistency for the scale items with this sample. When the researcher examined all 16-items together, a small improvement to the internal consistency would result from the removal of item four (.84; “If things go wrong in our relationship, I tend to feel powerless”). However, the researcher chose to retain this item. Furthermore, past research applied the BSRERS as a two-factor scale for

relationship self-regulation strategies (SRS) and relationship effort (SRE; Wilson et al., 2005). Therefore, the researcher also examined the two subscales as unique factors with CFA. Analysis of the 10 items of the SRS subscale resulted in a Cronbach's alpha value of .84 ($M = 36.9$, $SD = 7.26$) and no improvement with item removal. Analysis of the six items of the SRE subscale resulted in a Cronbach alpha value of .73 ($M = 19.77$, $SD = 5.45$) and no improvement with item removal.

The determinant of .02 indicated that the items of the BSRERS were fairly correlated. Additionally, there were no correlations between items that exceed .8, which suggested no issue of multicollinearity. The KMO was above .5 (KMO = .858) and Bartlett's test of sphericity was significant ($\chi^2 [105] = 4075.98$, $p < .001$). Examination of the scree plot suggested a 3-factor solution may be appropriate; however, examination of the pattern matrix showed a good fit of the data to a two-factor solution. The two-factor solution explained 42.73% of the variance. This is below the recommended percentages (i.e., at least 50% or above) for variance extracted by the factors (Beavers et al., 2013), yet consistent with prior variance estimates obtained. The two-factors correlated at .34, an indication of uni-dimensionality of the scale (Clark & Watson, 1995). The two-factor model demonstrated poor fit with most indicators ($\chi^2 [103] = 966.70$, $p < .001$; CFI = .81; TLI = .78; RMSEA = .09; SRMR = .06). However, factor loadings were all statistically significant and moderate (i.e., standardized loadings that ranged from item four .47 to item eight .66; see Figure 14). The correlation between SRS and SRE was large .52 ($p < .001$; Cohen, 1988). Proposed modification indices that would improve model fit reflected correlation of error between subscale items of the same subscale (22 modifications) and between subscales (5 modifications with six items including correlation to item four [with one and two] and 16

[with four, five, and 11]). The researcher computed grand mean centered SRS and SRE subscale scores that were used for the remainder of analyses presented.

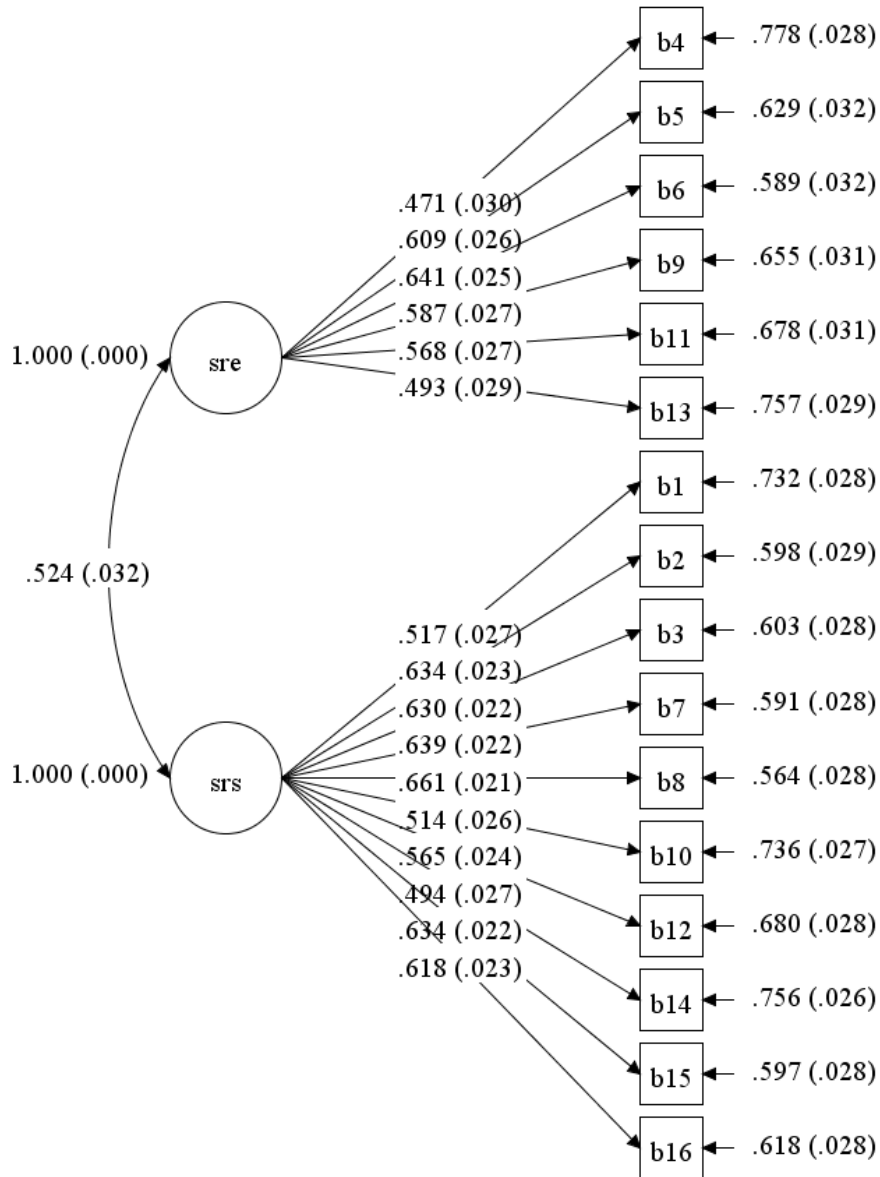


Figure 16 Confirmatory Factor Analysis: BSRERS

Properties and Structure of OQ45.2. Internal reliability for the 45-items of the OQ45.2 assessment yielded a Cronbach alpha of .915, a high level of internal consistency for the scale with these data. The Cronbach alpha was fairly consistent with the overall value if items were deleted, and ranged from .911 to .916, suggesting no improvement to reliability with item removal. However, the corrected item-total correlation was low for several items including: item 14 (.012; “I work/study too much”), item 32 (.10; “I have trouble at work/school because of drinking or drug use”), item 26 (.20; “I feel annoyed by people who criticize my drinking [or drug use]), item 11 (.12; “After heavy drinking, I need a drink the next morning to get going”), and item 16 (.26; “I am concerned about family troubles”). A low item-total correlation suggested that the researcher may want to remove these items. The original subscales proposed by the researchers (Lambert et al., 2004) included: (a) symptom distress, (b) interpersonal relationships, and (c) social role. The researcher examined the reliability of subscale items including potential improvement from item-removal. No proposed items for removal improved reliability to a meaningful degree; therefore, although the proposed items for removal are listed, the researcher retained all items at this point in the analysis. The researcher revisited the proposed items for removal in the following factor analysis. Examination of the 25 items of the symptom distress subscale yielded a Cronbach’s alpha of .90 ($n = 1,004$). There were no significant changes to Cronbach’s alpha if items were removed. Additionally, the item total correlation was low for item 11 (.10). Examination of the 11 items of the interpersonal relationships subscale yielded a Cronbach’s alpha of .79 ($n = 1,006$). Improvement of the Cronbach alpha level would result from the removal of item 16 (.80; corrected item total correlation of .26) and item 26 (.79; corrected item total correlation of .14). Finally, examination of the nine items of the social role subscale ($n = 1005$) resulted in a Cronbach’s alpha of .60.

Improvement for the Cronbach's alpha level would occur with the removal of item 12 (.61; corrected item total correlation of .15), item 14 (.62; corrected item total correlation of .11), and item 32 (.60; corrected item total correlation of .11). Overall, several of the OQ45.2 items warranted further inspection in spite of moderate to high scores of reliability.

A CFA with principal components extraction method and oblimin rotation assessed factor analysis for the theorized association of OQ45.2 items for this data. The researcher inspected the correlation matrix and some coefficient values were .3 or above (Pallant, 2010); however, many values were well below this value. The Kaiser-Meyer-Olkin (KMO) value was .929, above the recommended value of .6 (Kaiser, 1970). The Bartlett's Test of Sphericity was statistically significant ($\chi^2 [990] = 13886.12, p < .001$), which suggests the factorability of the correlation matrix (Bartlett, 1954). The three-factor solution proposed in the literature explained only 33.06% of the variance and nine eigenvalues above one. Visual inspection of the scree plot (Figure 15) also indicated nine factors. To improve the factor structure of the instrument with these data, the researcher removed items one at a time with loadings below .3 on the pattern matrix, communalities less than .5, and/or high cross-loading between variables (Pallant, 2010). Inspection of items for removal revealed a high preponderance of items related to social relationships and work/school functioning or social roles. The study sample included a sizable number of respondents that identified as unemployed (27.9%), disabled (3%), or retired (4%); therefore, the researcher determined that items related to work/school may not apply to this sample. Additionally, the researcher determined that items related to social relationships did not theoretically or conceptually relate to the construct of interest, health. Therefore, to improve content validity of the items used to measure health, the researcher removed several items that pertained to "love relationships." Thus, after several iterations of EFA to improve model fit, the

researcher removed several items to achieve the highest unique factor loadings with minimal to no cross-loading between factors. In sum, approximately half of the items were removed (23 out of 45 items). Further, the new 22-item three-factor model demonstrated an acceptable model fit ($\chi^2 [206] = 698.31, p < .001$; CFI = .92; TLI = .91; RMSEA = .05; SRMR = .04). Factor loadings ranged from moderate (item 19, 0.45) to high (item 39, 0.69; see Figure 16). The correlation between SD-OQ and LS-OQ was large .76 ($p < .001$; Cohen, 1988). As a result, the final version of the OQ45.2 with this sample included 22 items for analysis.

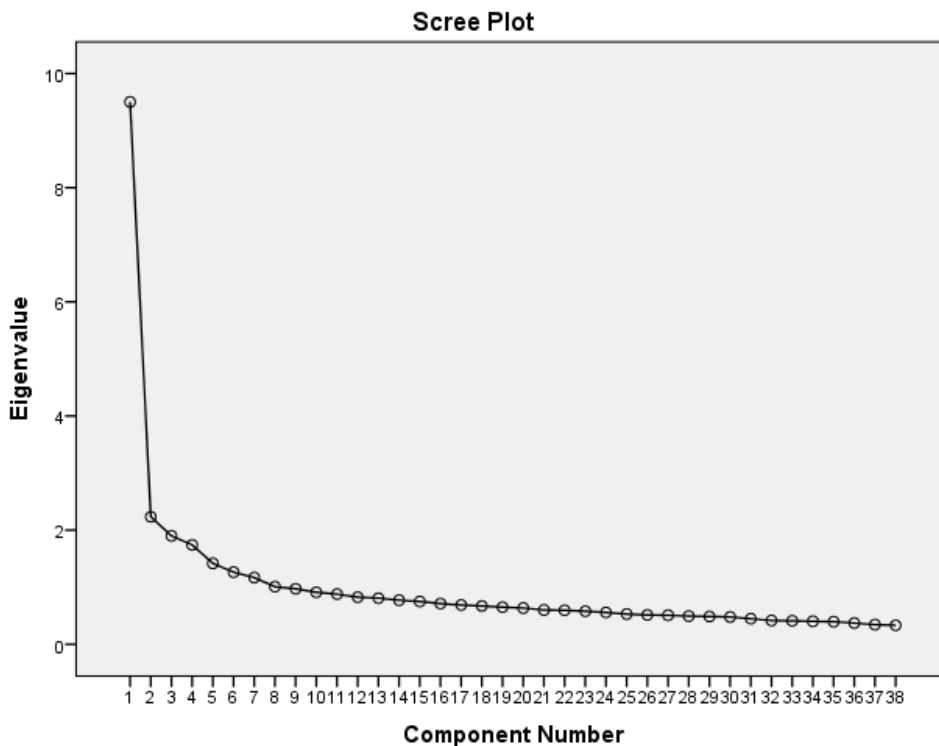


Figure 17 Scree Plot for Confirmatory Factor Analysis of the Original 45 Items of the OQ45.2

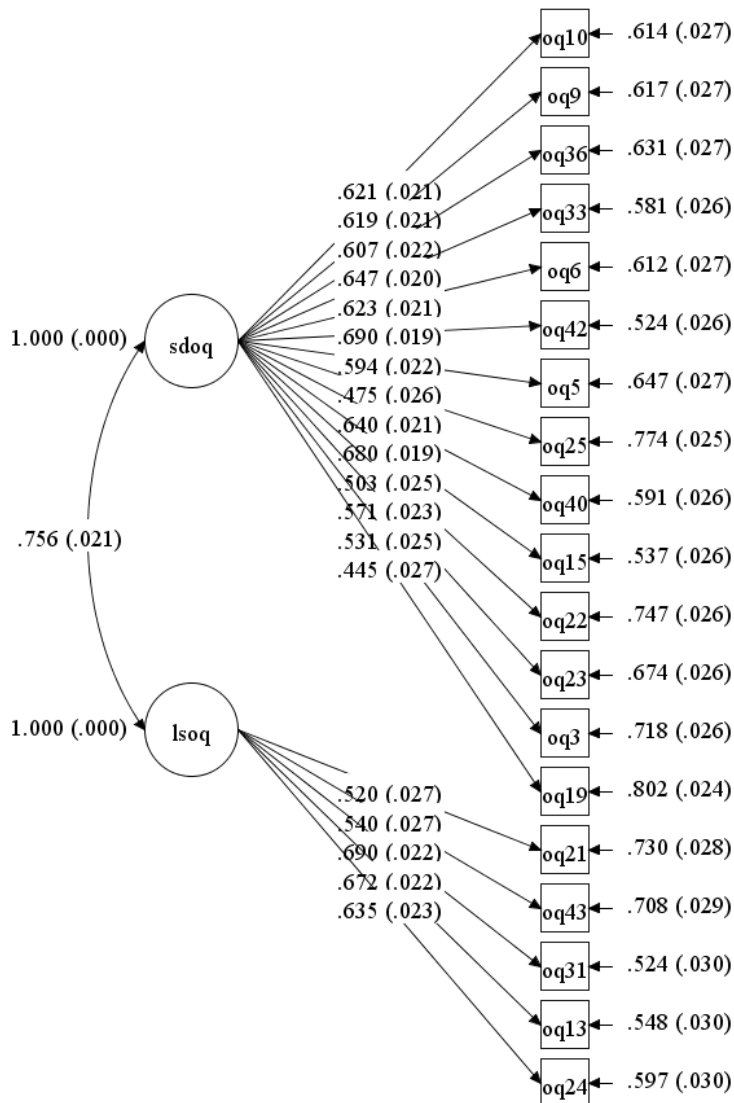


Figure 18 Confirmatory Factor Analysis OQ45.2 Modified

Kline (2016) stated that an EFA may be appropriate in instances of poor model fit. Subsequently, a CFA may then be conducted with the remaining half of the sample. Therefore, the researcher used a random subsample of half of the respondents ($n = 502$) to conduct an exploratory factor analysis (EFA) with the 22 items of the OQ 45.2-instrument. The EFA resulted in $KMO = .922$ and a non-significant Bartlett's test. Total variance explained by four factors (four eigenvalues above a value of one) was 49.64%. For parallel analysis, the researcher

used principle components analysis and compared resultant eigenvalues to those produced from the dataset. Data-derived factor eigenvalues that exceeded generated eigenvalues (Figure 17) were retained. However, parallel analysis supported a three factor solution (Table 4).

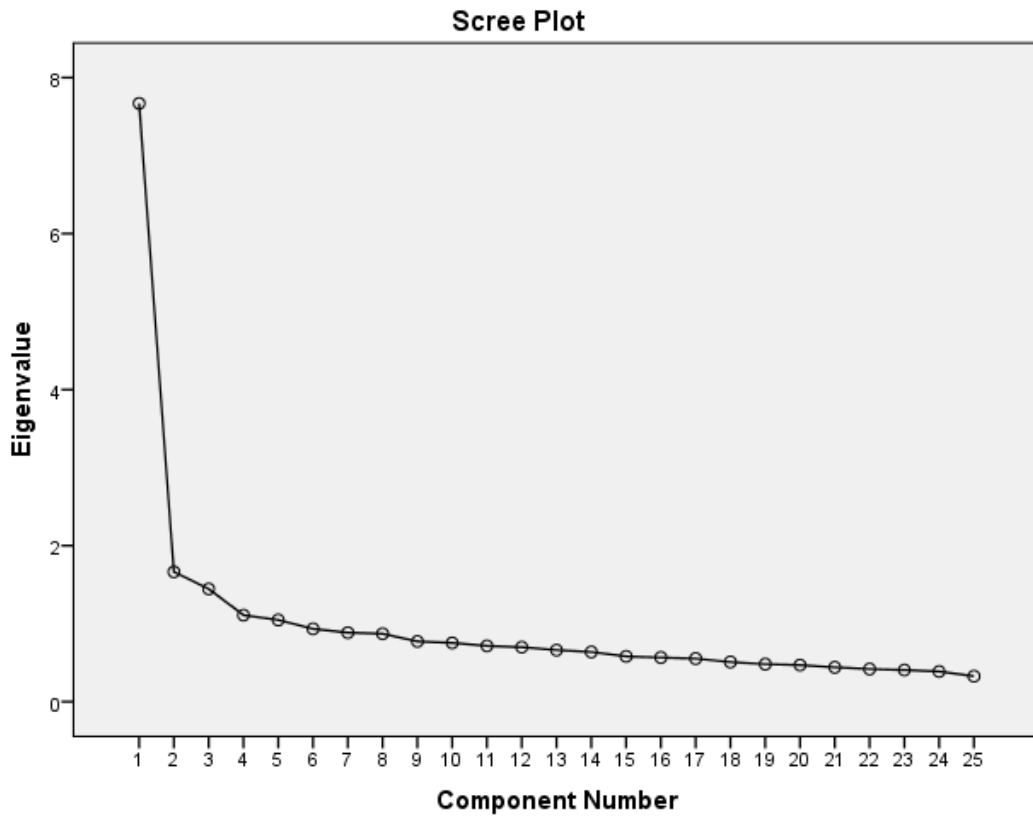


Figure 19 Scree Plot for Exploratory Factor Analysis of the 22- Items of the OQ45.2.

Table 4 Exploratory Factor Analysis and Parallel Analysis Eigenvalues for 22-Item OQ45.2

	Data-Derived Eigenvalues	Generated Eigenvalues
Component 1	6.87	1.29
Component 2	1.64	1.24
Component 3	1.38	1.20
Component 4	1.03	1.17

The three-factor solution was used in confirmatory factor analysis with the other half subsample ($n = 504$) of the data. The CFA resulted in $KMO = .92$ and a non-significant Bartlett's test. Total variance explained by three factors was 45.21%, slightly below the desired percentage (Beavers et al., 2013). All pattern matrix loadings were .3 or above (Pallant, 2010). The researcher examined the content of items loading together to name the three factors: (a) symptom distress, (b) substance abuse, and (c) life satisfaction (Table 5). Symptom distress (OQ-SD; 14 total symptom distress items: 3, 5, 6, 9, 10, 15, 19, 22, 23, 25, 33, 36, 40, 42) included items that pertained to symptoms associated with anxiety or depression such as: "I feel fearful," "I feel worthless," "I have no interest in things," or "Disturbing thoughts come into my mind that I cannot get rid of." Therefore, scores for symptom distress ranged from 0 to 56, where higher scores reflected greater experiences in the past week of symptoms associated with anxiety and depression. Life satisfaction (OQ-LS; 5 total life satisfaction items: 13, 21, 24, 31, 43) included items associated with a positive view of self and life such as: "I am satisfied with my life," "I enjoy my spare time," and "I am a happy person." All of these items were reverse-coded. Scores for the life satisfaction subscale ranged from 0 to 20 and higher scores suggested greater dissatisfaction with life. Substance abuse (OQ-SA; 3 total substance abuse items: 11, 26, 32) related to trouble at work/school or annoyance with criticism by others related to alcohol or drug use. Scores for substance abuse ranged from 0 to 12 and higher scores reflected greater challenges associated with substance use. The substance abuse subscale matched the results obtained in validation of the OQ-45.2 by Kim, Beretvas, and Sherry (2010) as well as Rice, Suh, and Ege (2014).

Table 5 *Pattern and Structure Matrix for PCA with Oblimin Rotation of Three Factor Solution of the 22 Retained OQ45.2 Items*

Item	Component Pattern Coefficients			Component Structure Coefficients			Comm- unality
	1	2	3	1	2	3	
10. I feel fearful	.790	-.118	-.094	.719	.035	.274	.538
33. I feel that something bad is going to happen	.767	.060	-.062	.749	.212	.318	.567
36. I feel nervous	.693	-.072	-.029	.664	.070	.298	.446
9. I feel weak	.678	-.159	.055	.671	-.010	.364	.477
25. Disturbing thoughts come into my mind that I cannot get rid of	.643	.178	-.210	.579	.285	.126	.397
40. I feel something is wrong with my mind	.609	.200	.053	.677	.334	.375	.500
6. I feel irritated	.566	.030	.159	.650	.170	.438	.443
5. I blame myself for things	.548	-.022	.224	.624	.127	.461	.42
42. I feel blue	.526	-.010	.206	.652	.122	.488	.464
22. I have difficulty concentrating	.496	-.041	.068	.520	.072	.303	.276
15. I feel worthless	.475	.077	.310	.641	.216	.551	.492
23. I feel hopeless about the future	.409	.122	.300	.580	.246	.515	.422
3. I feel no interest in things	.304	.087	.278	.457	.187	.437	.277
19. I have frequent arguments	.300	.187	.267	.469	.284	.437	.311
32. I have trouble at work/school because of drinking or drug use	-.117	.743	.030	.053	.723	.070	.533
26. I feel annoyed by people who criticize my drinking (or drug use)	.039	.737	.000	.193	.745	.115	.556
11. After heavy drinking, I need a drink the next morning to get going	.034	.685	-.028	.164	.689	.078	.475
21. I enjoy my spare time	-.073	-.061	.706	.258	.016	.663	.449
31. I am satisfied with my life	.021	.108	.703	.385	.204	.728	.542
43. I am satisfied with my relationships with others	-.050	.063	.685	.296	.142	.669	.453
13. I am a happy person	.112	-.061	.637	.409	.045	.684	.479
24. I like myself	.191	-.053	.499	.422	.052	.585	.370

Internal reliability for the 22-item version of the OQ45.2 assessment yielded a Cronbach alpha of .89, a high level of internal consistency for the scale items with this sample. The

Cronbach alpha if items were deleted was fairly consistent with the overall value which ranged from .88 to .89, and suggested no improvement to reliability if an item were removed.

Properties and Structure of Brief Medical History

Internal reliability for the 17-items of the Brief Medical History questionnaire yielded a Cronbach alpha of .52, a low level of internal consistency for the scale with these data. However, given the focus of the instrument on current physical health conditions, high correlations were not expected between items on the scale. For example, if a person identified as having emphysema, we would not assume a higher likelihood or correlation with another condition such as diabetes or a colon polyp. Additionally, the brief medical history questionnaire was designed to collect a count of current medical conditions. As such, the researcher determined that analysis for the factor structure would not provide information useful to the utilization or interpretation of the instrument. Half of respondents (50.3%) indicated at least one current health condition, consistent with national estimates for adult health (Ward et al., 2014). The average score on the instrument was 1.03 conditions ($SD = 1.40$) and the most common conditions reported by respondents included: depression/suicide/anxiety (19%), migraine headaches (18.2%), hypertension (13.6%), and obesity (11.3%). Other medical conditions identified by participants in the open response section included: asthma ($n = 13$), fibromyalgia ($n = 6$), thyroid issues ($n = 5$), kidney disease ($n = 4$), and stroke ($n = 3$). A full list of conditions denoted by respondents is presented in Table 6.

Table 6 *Frequency of Participants Indicating a Medical Condition*

Medical Condition	Frequency (n)	Percent
Depression/Suicide/Anxiety	191	19%
Migraine Headaches	183	18.20%
Hypertension	137	13.60%
Obesity	114	11.30%
High Cholesterol	100	9.90%
Other Health Condition	79	7.85%
Diabetes (adult onset)	60	6.00%
Alcoholism/Drug abuse	53	5.30%
Autoimmune Disease	30	3.00%
Colon Polyp	18	1.80%
Coronary Artery Disease	18	1.80%
Cancer, Other	12	1.20%
Emphysema (COPD)	7	0.70%
Diabetes (childhood onset)	5	0.50%
Cancer, Ovarian	3	0.30%
Cancer, Prostate	1	0.10%
Cancer, Breast	0	0
Cancer, Colon	0	0

Univariate Outliers

Outliers are variable values that exceed the expected range with an extreme score or response that can influence results of statistical analyses and contribute to Type I or Type II error. Moreover, the inclusion of outliers can impact generalizability of results to another sample that may not include the same outliers (Tabachnick & Fidell, 2013). Using the outlier labeling rule (Tukey, 1977) with a g value of 2.2 (Hoaglin, Iglewicz, & Tukey, 1987), the researcher found no outliers for ACE total, relationship satisfaction average score (RAS), self-regulation strategies (SRS), self-relationship effort (SRE), the revised OQ45.2 life satisfaction (OQ-LS) subscale, or the revised OQ45.2 substance abuse (OQ-SA) subscale. Total number of medical

conditions (TotMed) had an upper bound of 6.4 and 10 values were 7 or higher. Additionally, two cases were above the upper bound (47.4) for the new OQ45.2 subscale symptom distress. Meghani, Byun, and Chittams (2014) cautioned the removal of outliers in examinations of health disparities. We would expect the values for mental and physical health to be non-normal within the population of interest, which would suggest legitimacy of extreme values obtained (Osborne, 2013). Therefore, the researcher chose to maintain outliers in the data to retain the largest sample and because these outliers may be legitimate reports of physical and mental health status.

Normality and Multivariate Outliers

Normality is often difficult to obtain in large samples (i.e., non-significant Kolmogorov-Smirnov [K-S] or Shapiro-Wilk's [S-W] tests); yet large samples ($N > 200$ cases) are fairly robust to violations of normality (Osborne, 2013; Tabachnick & Fidell, 2013). Therefore, Osborne (2013) suggested researchers use discernment through examination of both the statistical information *and* visual inspection of the data.

As anticipated due to the large sample size, the K-S and S-W tests revealed significant values ($p < .001$) and violated the assumption of normality for all dependent variables. Variables with a positive skew included: ACE total score, OQ-SD, OQ-LS, OQ-SA, and total number of medical conditions. Variables with a negative skew included: RAS average score, SRE, and SRS. However, OQ-SA was the only variable with a value (4.12) that fell outside of the acceptable ranges for skewness (i.e. ± 2 ; Garson, 2012). Similarly, values of kurtosis for OQ-SA and total number of medical conditions (TotMed; 18.86 and 4.7 respectively) exceeded generally accepted ranges of between ± 3 (Garson, 2012).

Additionally, the OQ-SA subscale and TotMed variable were the only variables with non-linear Q-Q plots. Observation of the histograms for the two variables seeming non-normal

by the Q-Q plot revealed: (a) OQ-SA score was positively skewed and the majority of respondents clustered around zero (88.9% or $n = 894$), and (b) Total number of medical conditions was positively skewed and the majority of respondents reported no medical conditions.

To address issues of normality with the OQ-SA measure, the researcher conducted a square root transformation; however, transformation did not improve significance of the K-S and S-W tests ($p < .001$). The transformation did not improve the Q-Q plot and histogram. The researcher used a logarithm plus a constant of one transformation for OQ-SA to retain cases that reported an initial value of zero (Tabachnick & Fidell, 2013). However, although the Q-Q plot was an improved fit, the K-S and S-W tests were still significant and histogram revealed a non-normal distribution. Due to the extreme non-normality and low variance for the OQ-SA subscale, the researcher removed this variable from the model to maintain the most psychometrically sound manifest variables as a three-factor structure for the latent health construct (Crockett, 2012; Kline, 2016). Substance abuse may be related to physical and mental health, yet the remaining indicators included the strongest theoretical and empirical support. As a result, the health construct consisted of OQ-LS, OQ-SD, and total number of medical conditions.

‘Total medical conditions’ was a count variable of current conditions; therefore, the researcher anticipated a Poisson distribution with substantial skew. However, in examination of the Poisson distribution (University of California: Statistical Consulting Group, 2017), the goodness-of-fit chi-squared test was statistically significant ($\chi^2 [999] = 1777.99, p < .0001$). A significant result indicated that the data did not fit a Poisson model form. Next, to address the issue of non-normality for TotMed, the researcher conducted a logarithm plus a constant of one transformation (Tabachnick & Fidell, 2013). The transformation did not reduce significance of

the K-S and S-W tests of normality. Transformation also did not improve the histogram for number of conditions. However, the normal Q-Q plot slightly improved (Figures 18 and 19), as did values for skewness and kurtosis (i.e., originally 1.92 and 5.06 respectively, now .837 and .083). The transformed variable had no outliers; therefore, the researcher chose to retain the transformed variable for total number of medical conditions.

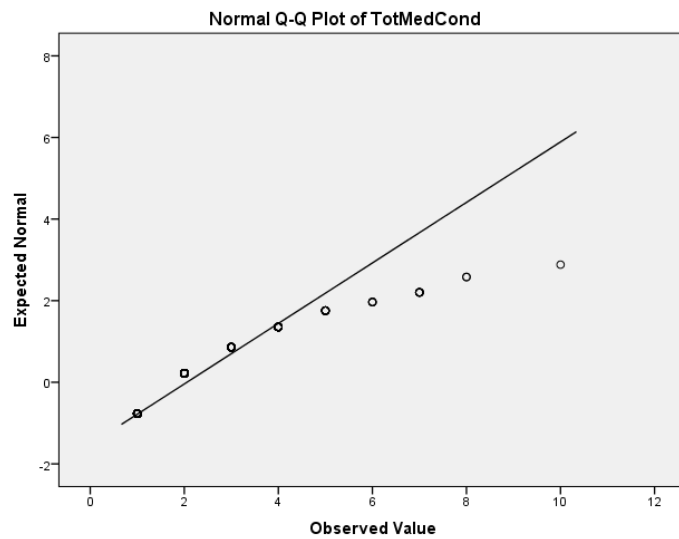


Figure 20 Q-Q Plot of Untransformed Number of Medical Conditions

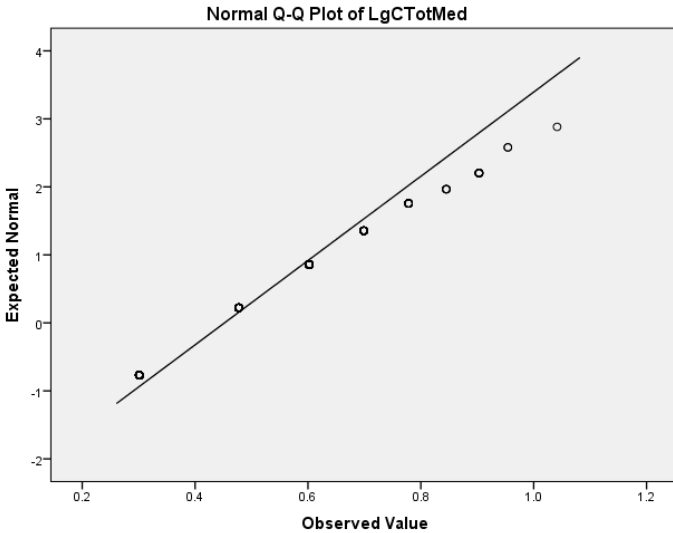


Figure 21 Q-Q Plot of Logarithm Plus a Constant of One Transformed Number of Medical Conditions.

The data departed from normality at the univariate level; therefore, we would assume multivariate non-normality as well (Hair et al., 2006). To test for multivariate normality, the researcher ran a linear regression for OQ-LS, OQ-SD, and Total number of medical conditions to predict the participant identification number (Pallant, 2012). The maximum value for Mahalanobis distance (43.331) exceeded the critical value recommended for three dependent variables (16.27; Tabachnick & Fidell, 2013), suggesting the presence of multivariate outliers. Further examination of the actual Mahalanobis values revealed 14 multivariate outlier cases that included 13 couples. The researcher created a dummy code to denote cases identified as multivariate outliers. Using a regression, multivariate outlier status could be predicted by the study variables (i.e., total medical conditions, SRS, OQ-SD, OQ-LS). The researcher examined a comparison of central tendency and demographic variables for multivariate outliers ($n = 14$) and non-outliers ($n = 992$). Multivariate outliers reported as significantly: (a) older in age, (b) longer relationship length, (c) greater number of total medical conditions, (d) greater life satisfaction,

(e) greater symptom distress, (f) lower relationship effort, and (g) lower relationship satisfaction. Individuals identified as multivariate outliers were also more likely to be a racial or ethnic minority ($\chi^2 [1] = 4.26, p = .04$) and report employment status as disabled ($\chi^2 [5] = 26.39, p < .001$). The current sample included a majority of respondents that identified as racial or ethnic minorities; overall, minorities are disproportionately represented among health and relationship disparities (Amato, 2010; CDC, 2013; Meghani, Byun, & Chittams, 2014). No significant differences existed between outliers and non-outliers for years of education, income, SRS, ACE, relationship status, or educational attainment. Tests of normality were re-run excluding multivariate outliers and neither statistics nor plots showed noticeable improvement. Therefore, based on the small percentage of the overall data, the researcher chose to retain multivariate outliers for further analysis.

In addition, Aguinis, Gottfredson, and Joo (2013) recommended the comparison of models that included and removed multivariate outliers by listwise deletion. Likewise, researchers cautioned the removal of outliers when such patterns of extreme values may actually exist among a subgroup and align with previously observed patterns for the phenomena under investigation (Meghani, Byun, & Chittams, 2014). The researcher determined two runs of the final model would be conducted – one with the outliers and one without – to explore potential bias from multivariate outliers. Additionally, the researcher addressed the impact of a non-normal distribution in the discussion of the results.

Heteroscedasticity and Multicollinearity

Given that the data are non-normally distributed; violations for the assumption of homoscedasticity were expected. However, according to Tabachnick and Fidell (2013) “heteroscedasticity is not fatal to an analysis” since analysis may be weakened, but not

invalidated (p.85). A visual inspection of the regression plot confirmed a problem with homoscedasticity given the cone-shape distribution (Tabachnick & Fidell, 2013).

Additionally, the researcher examined multicollinearity of the data. High correlations between variables ($r \geq .9$) can create challenges for statistical analysis (Tabachnick & Fidell, 2013). According to Pallant (2010), issues of multicollinearity can be detected by tolerance values less than .10 and variance inflation factors (VIF) values above 10 for each construct. Examination of the study variables demonstrated appropriate values for Tolerance and VIF (Table 7), suggesting no issue with multicollinearity. Similarly, using a criteria of values greater than .7, no values exceeded criteria for correlation between predictors. However, the correlation between a predictor and a dependent variable was low (below .3) for ACE total score and the total number of medical conditions with all other variables.

Table 7 *Collinearity Statistics*

Variable	Tolerance	VIF
OQ-LS	.722	1.386
Total Medical Conditions	.927	1.079
ACE total*	.896	1.116
RAS average*	.715	1.399
SRS*	.787	1.271
SRE*	.744	1.345

*denotes variables included as grand mean centered.

Linearity and Residuals

The assumption of linearity adds confidence to correlations and regression predictions obtained that require linearity (Tabachnick & Fidell, 2013). Similarly, a linear relationship is necessary for analysis with SEM (Kline, 2016). Review of the P-P plot suggested no violation to assumptions. Review of the bivariate scatterplots for regression standardized residuals and

predicted values showed several values that fell outside of ± 3 (standard residual Max = 4.1, Min = 0), with Cook's distance was less than one (Min = 0, Max = .031). The researcher tested the null hypothesis for non-linearity or a slope equal to zero. Results of the ANOVA were statistically significant ($p < .001$); therefore, we can reject the null hypothesis of non-linearity.

Preliminary Dyadic Analysis

Test of Distinguishability

The researcher chose to distinguish members of a dyad by sex. Non-independence can be measured for distinguishable dyads through computation of a canonical correlation and/or a Pearson correlation within a dyadic dataset. Therefore, the data was restructured for dyadic analysis to include one dyad couple per row and both analyses were run for comparison.

Canonical correlation. The researcher used the MANOVA method of obtaining a canonical correlation and utilized the female variables to evaluate the multivariate shared relationship to male variables (Garson, 2015; Sherry & Henson, 2005). A canonical correlation refers to the linear correlation between two latent variables constructed from two sets of data – in this case, one set of male responses and one set of female responses to the study variables (i.e., ACE, RAS, SRS, SRE, SD-OQ, LS-OQ, TotMed). Canonical correlations maximize the relationship between the two sets of data. Canonical variates represent a latent factor for the correlation between a set of variables with the variance accounted for by other variables removed. Each person in the dyad had seven variables; thus, the researcher extracted seven possible canonical variates for each set.

Analysis resulted in seven dimensions with squared canonical correlations (R_c^2) of .459, .206, .076, .039, .028, .011, and .003 for each successive dimension. In canonical correlation, a dimension refers to the number of variables or potential canonical variates (Garson, 2015). The

researcher used Pillai's test to examine the significance of the canonical correlation as a more conservative measure since the data violated the assumption of multivariate normality. Overall, the combination of all seven of the dimensions (i.e., TotMed, SD-OQ, LS-OQ, ACE, RAS, SRS, SRE) was statistically significant ($F [49] = 9.41, p < .001$; Pillai's trace = .82), as well as the first five dimensions. The combination of SRS and SRE or SRE alone are not significant dimensions. Therefore, the male and female sets of variables were significantly associated by canonical correlation, with the Pillai's trace value representing the unexplained variance. Examination of the redundancy analysis showed that the set of female scores explained about 12.45% of male scores for the first dimension (TotMed), a small overlap in variance. Overall, the correlation was at the level ($\geq .45$) indicated by Kenny, Kashy, and Cook (2006). The power for the test of r is greater than .995 for the study sample size ($n = 503$ couples) and absolute value of correlation. Thus, a high degree of confidence existed that the results were not the result of consequential non-independence. Further interpretation of the canonical correlation analysis was not warranted as these results supported the interdependent nature of male and female responses.

Pearson's correlation. The researcher also ran a bivariate correlation for all variables to examine the distinguishability and relationships among variables of interest. Each of the male-female correlations for a variable were statistically significant ($p \leq .01$; see Table 8.). The largest associations observed in the data (Cohen, 1988) existed between male-female RAS ($r = .64$) and male-female TotMed count ($r = .38$). Thus, a relationship existed between male-female RAS scores and a moderate relationship existed for male-female total medical conditions. The weakest associations existed between males and females for SRS ($r = .20$) and SRE ($r = .23$) – both small effects. Other correlations between male and female dyad scores were: OQ-LS ($r = .25$), OQ-SD ($r = .31$), and ACE ($r = .29$) – moderate effects.

Secondly, manifest variables for latent constructs were significantly correlated. Relationship quality as a latent construct was composed of RAS, SRE and SRS manifest variables. Correlations within sex and between partners (i.e., correlation among male RAS, SRE and SRS) were significant and ranged from moderate to high (See Table 8). Similarly, the manifest variables for health (TotMed, OQ-SD, OQ-LS) were significantly correlated within sex and between partners. The only exception to this pattern was the relationship between female symptom distress and male total medical condition count ($r = .09$), which was non-significant and low.

Correlations highest among indicators of the same construct demonstrate convergent and discriminant validity when compared to cross-factor correlations (Tabachnick & Fidell, 2013). However, the manifest variables of relationship quality correlated with manifest variables of mental health (i.e., OQ-SD and OQ-LS subscales); therefore, suggested potential overlap in the latent constructs assigned by the researcher. The cross-factor correlations ranged from $-.234$ (Male Symptom Distress and Male Self-Regulation Strategies) to $-.46$ (Male Life Satisfaction and Male Relationship Satisfaction), both small correlations. Yet, review of the literature provided strong theoretical support for the existence of associations between relationship quality and health (Orth-Gomer et al., 2000; Kiecolt-Glaser & Newton, 2001; Robles & Kiecolt-Glaser, 2003). The researcher elected to continue with the analysis based on the anticipated relationship between constructs and theoretical support for the content of constructs as defined by the researcher.

Table 8 *Bivariate Correlations for All Variables in the Model, With M Indicating Male and F Indicating Female*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ACE M	-												
2. ACE F	.29***												
3. RAS M	-.20***	-.13**											
4. RAS F	-.13**	-.21***	.66***										
5. SRS M	-.04	-.05	.30***	.22***									
6. SRS F	-.06	-.08	.24***	.30***	.20***								
7. SRE M	-.13**	-.05	.41***	.34***	.35***	.15**							
8. SRE F	-.10*	-.08	.32***	.39***	.18***	.45***	.23***						
9. TotMed M	.16***	.06	-.09*	-.08	-.07	-.01	-.13**	-.09*					
10. TotMed F	.21***	.27***	-.13**	-.17***	-.07	-.04	-.12**	-.10*	.38***				
11. OQSD M	.26***	.11*	-.42***	-.28***	-.23***	-.13**	-.43***	-.20***	.21***	.18***			
12. OQSD F	.14**	.26***	-.33***	-.39***	-.10*	-.25***	-.18***	-.37***	.09	.32***	.31***		
13. OQLS M	.21***	.11*	-.46***	-.29***	-.33***	-.09*	-.32***	-.17***	.18***	.13***	.56***	.20***	
14. OQLS F	.17***	.26***	-.31***	-.43***	-.18***	-.33***	-.20***	-.31***	.12**	.20***	.29***	.64***	.25***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Descriptive Statistics

The final study sample included 1,006 individuals or 503 heterosexual couples. The average age for participants was 36 years ($SD = 11.9$) and average years of education was 14.1 years ($SD = 2.74$). Less than half of participants identified as full-time employed (47.5%, $n = 478$). Most participants identified as married (61.9% or $n = 623$), followed by ‘committed relationship’ (30.2% or $n = 304$), and engaged (6% or $n = 60$). Similarly, approximately 89% of respondents ($n = 891$, missing 4 responses) indicated cohabitating with their partner. The average length of relationship was 9.5 years or 114 months ($SD = 9.75$ years or 117 months). The longest relationship was 53.1 years and the shortest was 1 month. The researcher inquired about race and ethnicity separately; however, respondents may have integrated the two as evidenced by some overlap in responses. Overall, racial minorities constituted a large percentage of the sample data including: other (35.8%), Black/African American (18.3%), Asian (2.2%), American Indian (1.3%), and Native Hawaiian/Other Pacific Islander (.4%). Responses for the open response ‘other’ category for racial identity included: Latina/o ($n = 99$), Hispanic ($n = 49$), Multiracial ($n = 34$), White ($n = 41$), and various other countries of origin (e.g., Puerto Rican [$n = 39$], Dominican [$n = 10$], Mexican [$n = 9$]). Additionally, over half (53.8%) of respondents identified a Hispanic ethnicity. Therefore, the majority of respondents (76.9%) identified as a racial or ethnic minority. The mode for total number of children was two, and number of children ranged from zero to eight kids. A complete list of participant demographic frequencies is provided in Table 9.

The average monthly income was \$1,501.85 ($SD = \$1,892.86$). One participant reported the maximum monthly income of \$30,000 and was verified in the participant’s chart since it was identified as an outlier and the mode for income was \$0.00 ($n = 256$ or 25.4%). Economic

disadvantage is an important component of the current research hypothesis not directly collected or assessed. Therefore, although poverty status was not collected, the researcher chose to explore rough estimates of poverty rates through extrapolation of data provided to contextualize participant income. The majority of couples reported cohabitation (89%) and mode for number of children as two (i.e., 55.5% of respondents reported 2 or more children). Thus, using the 2015 federal poverty guidelines (Office of the Assistant Secretary for Planning and Evaluation, 2015), the poverty guideline for a household of four family members was \$24,250 annually or \$2,020.83 per month. Although this provides a rough average estimate only, 75.5% of respondents reported income below the federal poverty rate at the time of the study. A complete list of participant demographic descriptive statistics is listed in Table 10.

Table 9 *Sample Demographic Frequencies*

Variables	Frequency (<i>n</i>)	Percent (%)
Race and Ethnicity		
Other Hispanic	280	27.8
White Hispanic	233	23.2
White Non-Hispanic	232	23.1
Black/African American Non-Hispanic	169	16.8
Other Non-Hispanic	36	3.6
Black/African American Hispanic	17	1.7
Asian Non-Hispanic	18	1.8
American Indian/Alaska Native and Hispanic	7	.7
American Indian/Alaska Native and Non-Hispanic	6	.6
Asian Hispanic	4	.4
Native Hawaiian/Other Pacific Islander Hispanic	3	.3
Native Hawaiian/Other Pacific Islander Non-Hispanic	1	.1
Educational Attainment		
High School Diploma/GED	301	29.9
Bachelor's Degree	247	24.6
Associate's Degree	161	16.0
Vocational/Technical Certification	114	11.3
Master's Degree/Advanced Degree	78	7.8
No Degree or Diploma	63	6.3
Other	42	4.2
Relationship Status		
Married	623	61.9
Committed Relationship	304	30.2
Engaged	60	6
Divorced	9	.9
Separated	5	.5
Single, Never Married	5	.5
Employment Status		
Full-Time	478	47.5
Unemployed	281	27.9
Part-Time	160	15.9
Retired	42	4.2
Disabled	37	3.7
Student	8	.8

Table 10 *Sample Demographic Descriptive Statistics*

Variable	M	SD	Min	Max	N
Age	36	11.9	18	80	1,006
Income	\$1,501.85	\$1,892.86	\$0.00	\$30,000.00	1,006
Relationship Length (months)	113.79	117.04	1.0	637.00	1,004

Exploration of Covariates

The researcher identified demographic variables theoretically related to the dependent variables of health and relationship quality – age, income, and length of relationship. The researcher examined these relationships empirically to determine the appropriateness of variable inclusion as covariates (Table 11). However, all of the potential covariates significantly correlated with the independent variable. According to Hair et al. (2010), the inclusion of a covariate that correlated with the predictor variable would reduce power and sensitivity of the overall analysis. Furthermore, the correlations with dependent variables were small and inconsistently significant. Therefore, the researcher chose not to include covariates in the analysis.

Table 11 *Correlation between variables and potential covariates*

	Age	Length of Relationship	Income
ACE	-.14**	-.132**	-.062*
RAS	-.019	-.005	-.040
SRS	.014	-.039	-.048
SRE	-.003	-.010	.010
TotMed	.237**	.161**	-.043
SD-OQ	-.032	-.026	-.091**
LS-OQ	-.097**	-.094**	-.025

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

Model Specification and Identification

The results of factor analyses for the study instruments with this sample resulted in: (a) moderate support and researcher determination to use a one-factor (instead of the initially proposed three-factors) ACE score; (b) evidence of a different three-factor structure for the OQ items including Substance Abuse, Life Satisfaction, and Symptom Distress; (c) researcher determination to use two subscales from the OQ (i.e., Life Satisfaction and Symptom Distress) due to median and mode of zero for Substance Abuse; and (d) researcher determination to use a transformed variable for total number of medical conditions. Overall, the sample data met statistical assumptions. Limitations may exist as a result of data non-normality, multivariate outliers, and heteroscedasticity that will be examined in post-hoc analysis and interpretation of results. Finally, male and female scores within a couple dyad were interdependent. In conclusion, the researcher modified the originally specified and identified model (see Figure 20) in accordance with the above preliminary findings. The researcher selected RAS and SD-OQ as reference indicators for the latent constructs due to their high reliability (Maruyama, 1998).

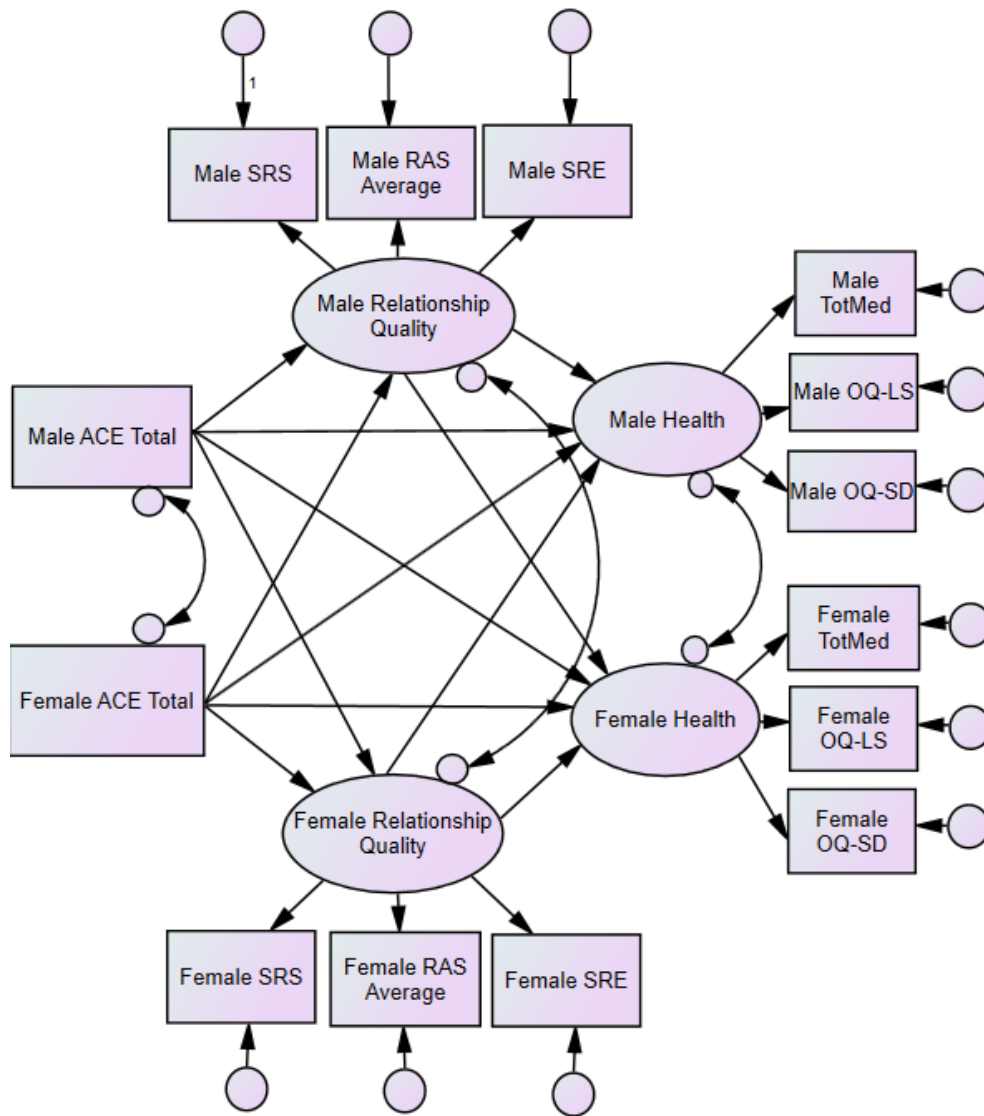


Figure 22 Revised APIMeM Model.

The researcher measured the latent construct of relationship quality by the grand mean centered subscale parcels of relationship satisfaction (RAS), relationship self-regulation strategies (BSRERS-SRS), and relationship effort (BSRERS-SRE). The researcher conducted a CFA on the originally theorized measurement model and obtained poor results (Table 12). The modification indices suggested cross-loading RAS scores between sexes (i.e., female RAS to male RAS). Modification indices demonstrate the effect of relaxed criterion for overall chi-

square fit as well as specific changes to the unstandardized parameter coefficients or expected parameter change (EPC; Kline, 2016). Cross-loaded male-female RAS scores associated with a substantial EPC. Therefore, the proposed modification was included in a modified version of the measurement model. However, the researcher chose to ignore a proposed modification for covariance between female SRE with male RAS due to lack of substantive meaning and low associated EPC values. The modification indices deemed theoretically substantive and impactful for model fit included the addition of covariance between manifest variables: (a) SRE with SRS for males and females and (b) RAS between males and females (Figure 21). Theoretically, these modifications made sense because SRE and SRS were subscales of the BSRERS. In addition, the researcher anticipated a relationship between the level of satisfaction for members of a dyad. The EPC was large for the SRS and SRE covariance (males: 7.54, females: 12.05). All factor loadings were sufficient with values between .41 and .74 (Tabachnick & Fidell, 2013). Model fit improved with the modified version of relationship quality to include these three covariance (Table 12).

Table 12 *Model Fit Indices for Relationship Quality*

	χ^2	<i>df</i>	<i>p</i>	CFI	RMSEA [90% CI]	TLI	SRMR
Original Model	102.9	8	.000	.861	.154 [.128, .181]	.740	.066
Modified Model	7.231	5	.204	.997	.03 [.000, .074]	.990	.016

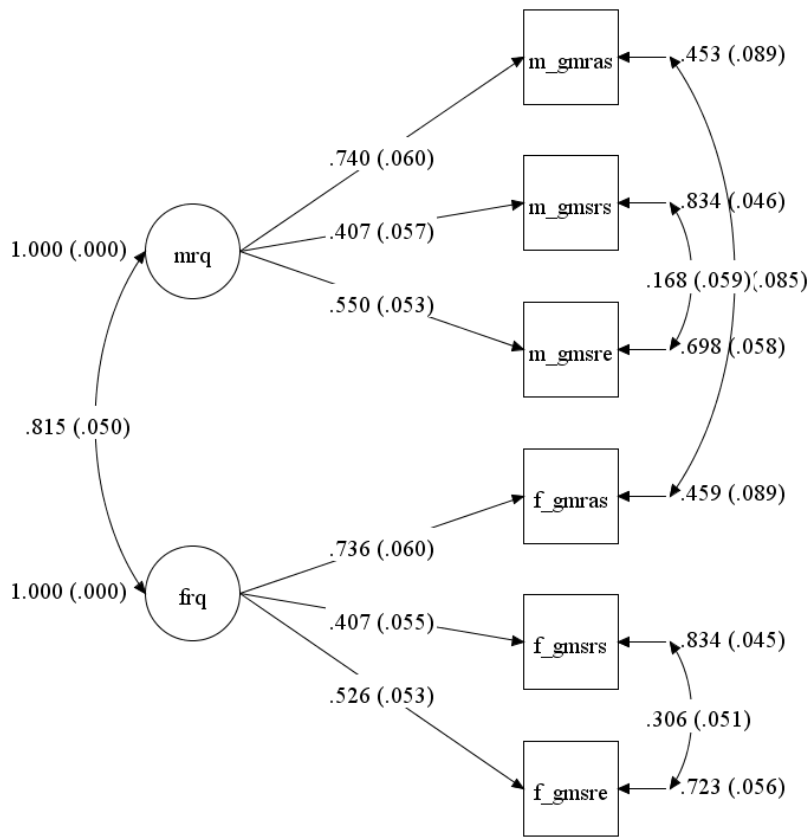


Figure 23 Confirmatory Factor Analysis: Relationship Quality

The researcher measured the latent construct of health by the subscale parcels of symptom distress (OQ-SD), life satisfaction (OQ-LS), and a composite score for the total number of medical conditions (TotMed). The researcher conducted a CFA on the measurement model and obtained moderate results (Table 13). The proposed modification indices included a covariance between male and female total medical conditions as well as covariance between female total medical conditions and female life satisfaction. The researcher chose to include the proposed modifications due to theoretical congruence as well as the improvement to model fit (Table 13). The factor loadings appeared sufficient (i.e., > .4; Tabachnick & Fidell, 2013) with the exception of male number of medical conditions (.25; Figure 22). However, due to the

theoretical congruence of this item to the latent construct of health, overall model fit, and high loading of all other factors, the researcher chose to retain the variable.

Table 13 *Model Fit Indices for Health*

	χ^2	<i>df</i>	<i>p</i>	CFI	RMSEA [90% CI]	TLI	SRMR
Original Model	83.614	8	.000	.885	.137 [.111, .164]	.784	.069
Modified Model	6.032	5	.3032	.998	.020 [.000, .068]	.995	.012

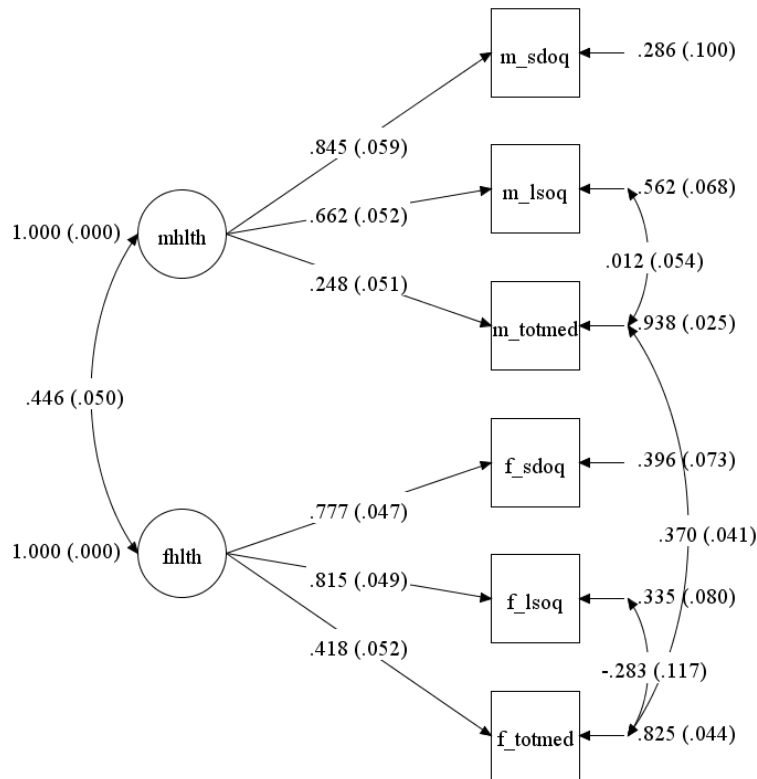


Figure 24 *Confirmatory Factor Analysis: Health*

The researcher then examined the complete measurement model to account for relationships between all factors and latent constructs (Byrne, 2012). The analysis of the measurement model resulted in the indication of a good fit to the sample data ($\chi^2[43] = 88.16, p$

< .0001, RMSEA = .046, CFI = .973, SRMR = .030)(See Figure 23). However, modification indices suggested a covariance for males and females between symptom distress (OQ-SD) and relationship effort (SRE), as well as a covariance between life satisfaction (OQ-LS) and relationship self-regulation strategies (SRS). The suggested modifications involved EPC values that ranged from -2.62 female LS-OQ with SRS to -6.17 for male OQ-SD with SRE. Although these were significant EPC values, the researcher did not have theoretical support for such a modification to the measurement model. Therefore, the researcher retained the originally specified measurement model.

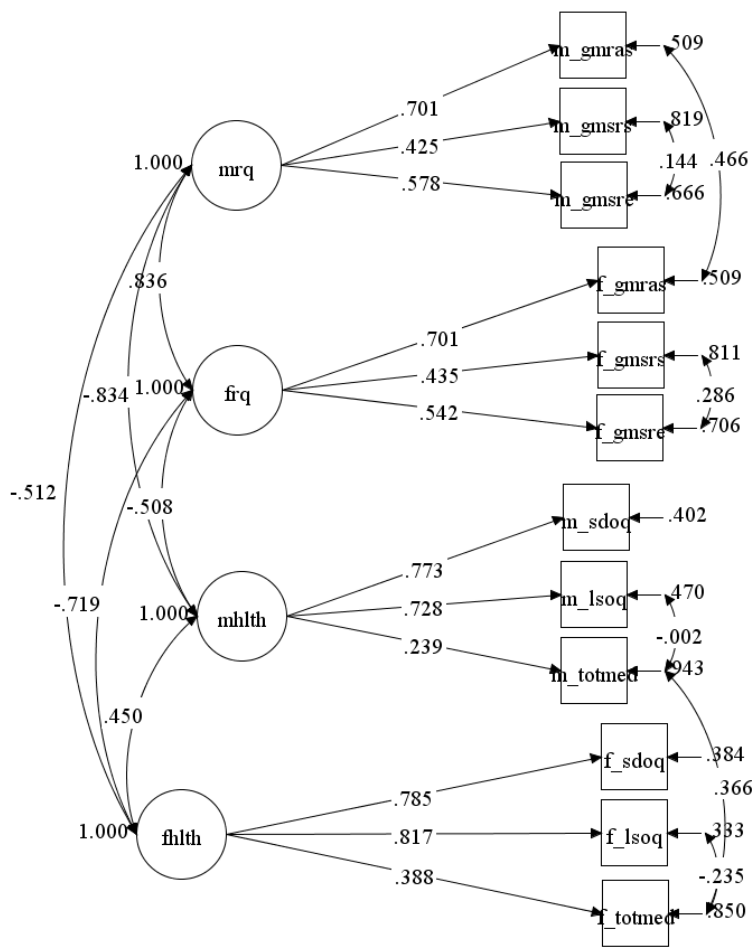


Figure 25 Confirmatory Analysis: Complete Measurement Model

Model Estimation

The researcher elected to use maximum likelihood estimation and anticipated poor χ^2 fit statistics. Maximum likelihood (ML) and generalized least squares (GLS) are the most common methods of SEM model estimation (Crockett, 2012). ML worked well with large samples in Monte Carlo simulation (Hu, Bentler, & Kano, 1992) and is the preferred method of SEM estimation (Tabachnick & Fidell, 2013). According to Finney and DiStefano (2013), SEM with non-normal continuous data results in accurate parameter estimates but biased χ^2 statistic, approximate fit indices, and standard errors. However, for moderately non-normal data (e.g., skew less than two and kurtosis less than seven), the researchers suggested use of ML estimation as it is fairly robust to such deviations from a normal distribution. Finally, Muthen and Muthen (2016) suggested comparison of models estimated with ML and ML with robust standard errors (MLR) to see if there is a difference in fit or if the standard error supports the existence of multivariate non-normality. Therefore, the researcher employed ML estimation and re-run the final model with MLR estimation to examine change to model fit and standard error values.

Model Testing and Modification

This study examined the primary research hypothesis for the fit of a model of ACE and health, with relationship quality as a dyadic mediator for a sample of couples with economic disadvantage. The initial model fit was good by most standards (Hu & Bentler, 1999; Kline, 2016; $\chi^2[58] = 117.764, p < .001$; RMSEA = .045; CFI = .97; TLI = .95; SRMR = .033) (See Figure 24). The R^2 value for the latent construct of health ranged from 82.3% of the variance explained for men and 56.5% of the variance explained for women, both large effects. The model explained less of the variance for the latent construct of relationship quality (men 6.4%, women 6.7%). Hayes (2013) suggested the inclusion of unstandardized results to allow for future

estimation comparison. Therefore, the unstandardized (Table 14, 16) and standardized effect estimates (Table 15, 17) of the unconstrained APIMeM for this study are presented below.

Additionally, the researcher used a bias corrected bootstrap of the data with 5,000 samples to obtain confidence intervals for the indirect effects and increase power of the results (Preacher & Hayes, 2008). Bootstrap procedures make no assumption about distribution of the data and are a non-parametric method for the estimation and test of mediation effects. Sample data are randomly resampled to provide a mean point estimate value (Preacher & Hayes, 2004).

Estimates and confidence intervals for indirect effects and bias-corrected bootstrap confidence intervals are presented in Tables 16 and 17.

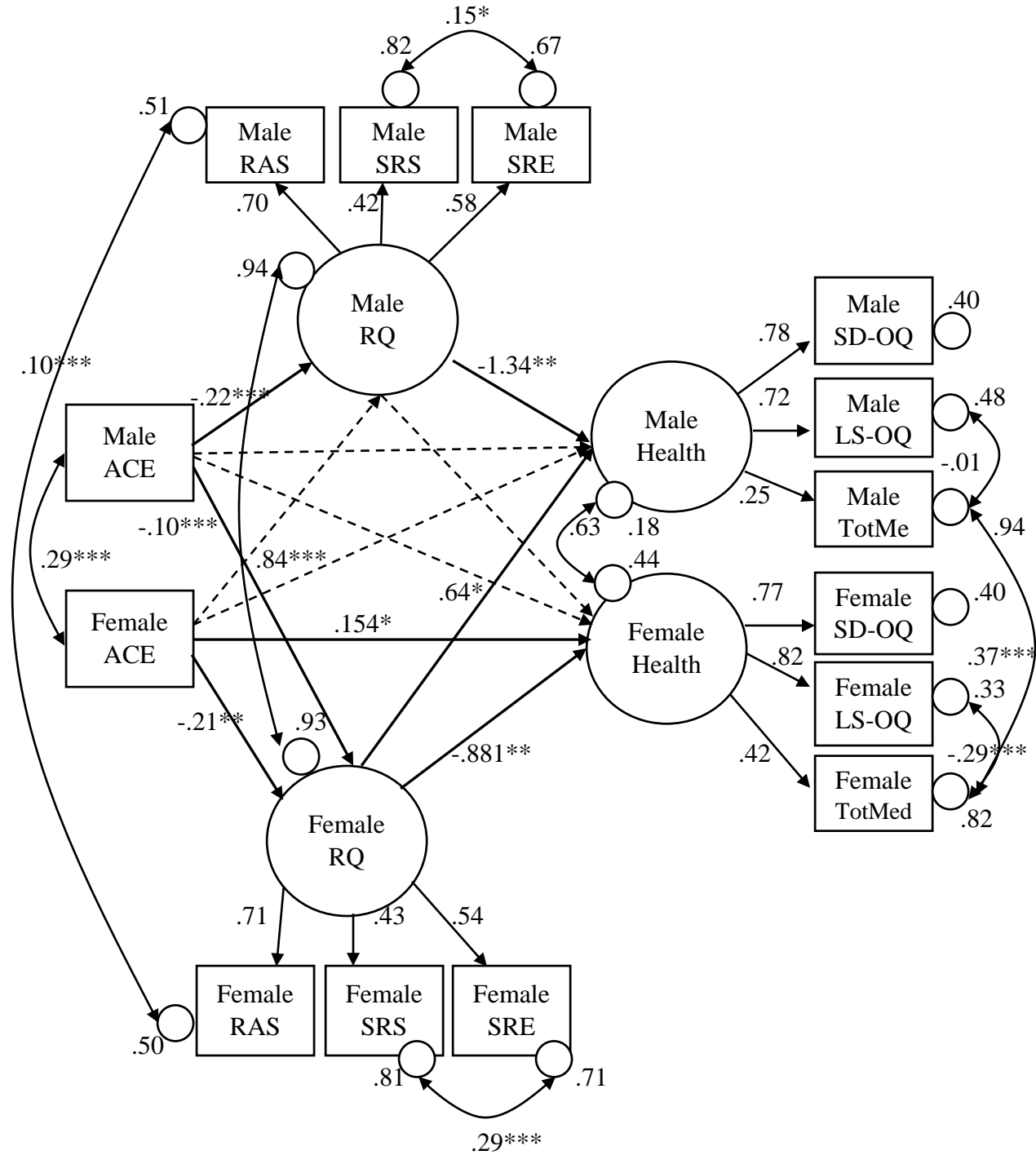


Figure 26 Unconstrained model standardized estimates (ML).

Note: Non-significant effects are indicated by a dashed line.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Direct Effects

Actor Effects. The actor and partner coefficients and standard errors are presented in Tables 14 (unstandardized) and 15 (standardized). As expected, results showed that higher ACE total scores had a negative relationship with relationship quality for men ($a = -.224, p < .001$) and for women ($a = -.21, p < .001$). The negative relationship suggested that the higher the ACE total score (e.g., the more forms of adversity experienced in childhood), the lower indicators of relationship quality. Likewise, relationship quality had a negative and significant direct effect to health for men ($b = -1.34, p < .001$) and women ($b = -.88, p < .001$). The lower a person's relationship quality, the worse their health condition. An estimate value greater than +1/-1 can occur in some cases, since this value represents a partial regression coefficient and not a correlation (Joreskog, 1999). However, a beta weight with a value less than -1 may suggest the presence of multicollinearity among predictors (Cohen, Cohen, West, & Aiken, 2003) or simply reflect differences in scaling for the unit of measurement between variables. The researcher decided to retain the value without re-specification of the model due to the large difference in manifest variable scaling for the latent variables and lack of multicollinearity determined in preliminary analysis (i.e., Table 7). Finally, the hypothesized direct relationship between ACE and health was significant only for women ($c' = .15, p = .01$). Kenny and Ledermann (2010) stated that an absolute standardized value for an effect less than .10 is relatively trivial. Thus, evidence was weak for a direct relationship between ACE and health for men ($c' = .07, p = .312$). In this case, ACE may indirectly influence health through the effect on relationship quality. Overall, participants with a high ACE total score were more likely to report less relationship quality and poorer health. For males, there was no evidence that ACE total score influenced health independent of its effect on relationship quality.

Partner Effects. The direct effects between a partner's ACE and actor's own relationship quality was only significant for women ($a = -.10, p < .0001$) but not men ($a = -.07, p < .24$). A partner's ACE score influenced relationship quality for women, whereas this influence of partner ACE was less influential for men. In other words, male ACE significantly influenced female relationship quality; however, female ACE influenced male relationship quality to a lesser degree. Childhood adversity of a partner mattered more for women than men. Conversely, the influence of a partner's relationship quality to health was only significant for men ($b = .64, p < .05$) and not women ($b = .27, p = .24$). Relationship quality influenced health for men, whereas the influence of a partner's perceived level relationship quality was less influential for women's health. In other words, female relationship quality significantly influenced male health; however, male relationship quality was not significantly influential to female health. Relationship quality of a partner mattered more for male health than female health. Finally, the effect of a partner's ACE to an individual's health was non-significant for both men and women. Contrary to the hypothesized associations, the importance of the partner influence to the study variables was inconsistent across sexes.

Table 14 *Unstandardized Effect Estimates for Distinguishable Dyads*

<i>Effect</i>	<i>Estimate</i>	<i>SE</i>	<i>Standard Estimate</i>	<i>p</i>
<i>a</i> effects (ACE → RQ)				
Male actor effect (a_{A1})	-.054	.014	-3.819	.000
Female actor effect (a_{A2})	-.052	.015	-3.491	.000
Male partner effect (a_{P1})	-.015	.013	-1.169	.242
Female partner effect (a_{P2})	-.028	.016	-1.761	.078
<i>b</i> effects (RQ → Health)				
Male actor effect (b_{A1})	-16.841	4.150	-4.057	.000
Female actor effect (b_{A2})	-10.520	3.021	-3.482	.000
Male partner effect (b_{P1})	7.166	3.552	2.017	.044
Female partner effect (b_{P2})	3.613	3.102	1.165	.244
<i>c'</i> effects (ACE → Health)				
Male actor effect (c'_{A1})	.218	.216	1.009	.313
Female actor effect (c'_{A2})	.460	.181	2.547	.011
Male partner effect (c'_{P1})	.268	.203	1.322	.186
Female partner effect (c'_{P2})	.316	.182	1.735	.083

Table 15 *Standardized Effect Estimates for Distinguishable Dyads*

<i>Effect</i>	<i>Estimate</i>	<i>SE</i>	<i>Standard Estimate</i>	<i>p</i>
<i>a</i> effects (ACE → RQ)				
Male actor effect (a_{A1})	-0.224	.057	-3.952	.000
Female actor effect (a_{A2})	-0.209	.058	-3.625	.000
Male partner effect (a_{P1})	-0.068	.058	-1.176	.240
Female partner effect (a_{P2})	-0.103	.058	-3.625	.000
<i>b</i> effects (RQ → Health)				
Male actor effect (b_{A1})	-1.335	.303	-4.408	.000
Female actor effect (b_{A2})	-0.881	.225	-3.913	.000
Male partner effect (b_{P1})	0.640	.314	2.039	.041
Female partner effect (b_{P2})	0.268	.230	1.168	.243
<i>c'</i> effects (ACE → Health)				
Male actor effect (c'_{A1})	.072	.071	1.010	.312
Female actor effect (c'_{A2})	.154	.060	2.559	.011
Male partner effect (c'_{P1})	.096	.073	1.322	.186
Female partner effect (c'_{P2})	.097	.056	1.736	.083

Indirect Effects

The researcher used a bias-corrected bootstrap procedure to compute estimates. The researcher examined the total effects, total indirect effects (IE), and simple IEs. A significant indirect effect suggests the amount of mediation in the model (Kenny, 2012). Results that include a non-significant relationship between the predictor and dependent variable and a significant indirect relationship may be interpreted as full mediation (Ledermann et al., 2011). The researcher examined unstandardized effects to determine mediation. However, according to Kenny (2012) standardized effects may be interpreted to suggest a small effect (.01), a medium effect (.09), or a large effect (.25). Yet, Hayes (2013) asserted that interpretation of effect sizes in mediation analysis is highly contextualized in interpretation and an evolving practice for estimation.

All of the IEs that involved one of the partner effects were weak and non-significant. Conversely, all of the IEs that involved actor effects were statistically significant. The results provided evidence for (a) a complete mediation of ACE and health for men at the actor level by relationship quality and (b) a partial mediation of ACE and health for women at the actor level by relationship quality. In other words, the effect of ACE on health was reduced to zero for men, when controlling for relationship quality. However, the direct effect of ACE to health for women remained significant after the researcher removed the influence of relationship quality (Baron & Kenny, 1986). Therefore, the relationship between ACE and health seemed largely influenced by relationship quality for men and women. Yet, women retained a significant influence from ACE for health independent of the influence of relationship quality. Furthermore, other factors may exist for women that also significantly contributed to the ACE-health association.

Actor-Actor Effects. Actor-actor effects refer to variables included for the same individual. Therefore, in this data, actor-actor effects refer to (a) female ACE, female relationship quality, and female health; and (b) male ACE, male relationship quality, and male health. Male and female actor-actor IEs were 98.05% and 57.40% of the actor total effects respectively. The observed IE values accounted for a large percentage of the total effect and inferred a strong influence of the individual's own factors. Both actor-actor IEs were significant with medium effect sizes (i.e., men: $\beta = .23, p = .013$; women: $\beta = .17, p = .010$). In sum, a person's own ACE significantly predicted his or her own relationship quality and health.

Partner-Partner Effects. Partner-partner effects refer to a partner predictor to an actor mediator followed by the partner outcome. In this data, partner-partner effects referred to (a) male ACE, female relationship quality, and male health; and (b) female ACE, male relationship quality, and female health. Both partner-partner effects were non-significant and small in size (i.e., $\beta < .1$). The female partner-partner effect accounted for only 5.67% of the total effect. The male partner-partner effect accounted for 21.57% of the total effect. Therefore, we can infer that a person's own ACE did not significantly predict the indirect path from their partner's relationship quality and their own health. Effect sizes determined by the ratio of indirect to total effects are not interpretable for partner effects given (a) inconsistent mediation observed and (b) the direct path from ACE to health (i.e., path *c*) is closer to zero than the indirect path (i.e., path *ab*; Hayes, 2013).

Actor-Partner Effects. Actor-partner effects refer to an actor predictor and mediating variable followed by a partner dependent variable. Therefore, in this data, actor-partner effects refer to (a) female ACE, female relationship quality, and male health; and (b) male ACE, male relationship quality, and female health. Both the male and female indirect actor-partner effects

were small (i.e., men: $\beta = -.13$, women: $\beta = -.06$) and non-significant. However, the female actor-partner IE was 47.10% of the female *partner* total effect ($\beta = .13$, $p = .02$), which was a small but significant total effect. The indirect path from a person's own ACE and relationship quality did not significantly predict partner's health.

Partner-Actor Effects. Partner-actor effects refer to a partner predictor followed by an actor's mediating and dependent variables. Therefore, in these data, partner-actor effects referred to (a) female ACE, male relationship quality, and male health; and (b) male ACE, female relationship quality, and female health. Both the male and female indirect actor-partner effects were small (i.e., men: $\beta = .09$, women: $\beta = .09$) and non-significant. The female partner-actor IE was 71.01% of the female partner total effect, which was a small but significant total effect. Thus, a person's own ACE did not significantly predict his or her partner's relationship quality and health.

Table 16 *Unstandardized Total, Total Indirect, Simple Indirect and Direct Effects*

Effect	Estimate	95% CI	<i>p</i>	Proportion Total Effect
Male Actor Effect				
(Male ACE → Male Health)				
Total Effect	.927	.616, 1.259	.000	
Total IE	.709	.322, 1.461	.016	76.48%
Actor-actor IE	.909	.398, 2.008	.029	98.05%
(Male ACE → Male RQ → Male Health)				
Partner-partner IE	-.200	-.850, .001	.324	21.57%
(Male ACE → Female RQ → Male Health)				
Direct Effect <i>c'</i>	.218	-.436, .642	.453	23.52%
Female Actor Effect				
(Female ACE → Female Health)				
Total Effect	.953	.667, 1.268	.000	
Total IE	.493	.222, .974	.012	51.73%
Actor-actor IE	.547	.224, 1.270	.009	57.40%
(Female ACE → Female RQ → Female Health)				
Partner-partner IE	-.054	-.468, .025	.470	5.67%
(Female ACE → Male RQ → Female Health)				
Direct Effect <i>c'</i>	.460	.011, .807	.028	48.27%
Male Partner Effect				
(Female ACE → Male Health)				
Total Effect	.149	-.123, .416	.278	
Total IE	-.119	-.720, .240	.632	79.87%
Actor-partner IE	-.373	-1.298, -.102	.229	
(Female ACE → Female RQ → Male Health)				
Partner-actor IE	.253	-.180, .869	.359	
(Female ACE → Male RQ → Male Health)				
Direct Effect <i>c'</i>	.268	-.097, .843	.272	
Female Partner Effect				
(Male ACE → Female Health)				
Total Effect	.414	.090, .746	.015	
Total IE	.099	-.370, .433	.641	
Actor-partner IE	-.195	-.935, .047	.426	
(Male ACE → Male RQ → Female Health)				
Partner-actor IE	.294	-.021, .860	.177	
(Male ACE → Female RQ → Female Health)				
Direct Effect <i>c'</i>	.316	-.051, .823	.156	

Note. IE = indirect effect. CI = bias-corrected bootstrap 95% confidence intervals using 5000 bootstrap samples.

Table 17 *Standardized Total, Total Indirect, Simple Indirect and Direct Effects*

Effect	Estimate	95% CI	<i>p</i>
Male Actor Effect			
(Male ACE → Male Health)			
Total Effect	.306	.208, .402	.000
Total IE	.234	.106, .473	.013
Actor-actor IE	.300	.136, .638	.026
(Male ACE → Male RQ → Male Health)			
Partner-partner IE	-.066	-.279, .000	.323
(Male ACE → Female RQ → Male Health)			
Direct Effect <i>c'</i>	.072	-.146, .211	.453
Female Actor Effect			
(Female ACE → Female Health)			
Total Effect	.320	-.150, .009	.000
Total IE	.165	.076, .421	.010
Actor-actor IE	.184	.076, .421	.036
(Female ACE → Female RQ → Female Health)			
Partner-partner IE	-.018	-.150, .009	.599
(Female ACE → Male RQ → Female Health)			
Direct Effect <i>c'</i>	.154	.004, .270	.029
Male Partner Effect			
(Female ACE → Male Health)			
Total Effect	.053	-.043, .153	.284
Total IE	-.043	-.259, .086	.634
Actor-partner IE	-.134	-.475, -.037	.229
(Female ACE → Female RQ → Male Health)			
Partner-actor IE	.091	-.067, .306	.360
(Female ACE → Male RQ → Male Health)			
Direct Effect <i>c'</i>	.096	-.035, .303	.276
Female Partner Effect			
(Male ACE → Female Health)			
Total Effect	.128	.028, .229	.014
Total IE	.031	-.115, .131	.642
Actor-partner IE	-.060	-.281, .015	.427
(Male ACE → Male RQ → Female Health)			
Partner-actor IE	.091	-.007, .264	.173
(Male ACE → Female RQ → Female Health)			
Direct Effect <i>c'</i>	.097	-.016, .249	.157

Note. IE = indirect effect. CI = bias-corrected bootstrap 95% confidence intervals using 5000 bootstrap samples.

Model Modifications

Muthen and Muthen (2016) suggested comparison of models estimated with ML and ML with robust standard errors (MLR) to see if there is a difference in fit or if the standard error supports the existence of multivariate non-normality. Therefore, the researcher re-ran the model using the MLR estimation method (Muthen & Muthen, 2016). There was no difference in fit (Table 18). Additionally, there seemed to be no large changes to the standard error with an MLR estimation (Tables 19, 20). Similarly, there was no change to goodness of fit for the model when the researcher removed multivariate outliers. All parameter estimates remained fairly consistent with the original model estimation that included multivariate outliers. Comparison of the BIC values indicated strong statistical support (i.e., BIC difference > 10; Muthen, 2010) to use the model *with* the multivariate outliers included. Yet, even with multivariate outliers removed, the model retained sufficient goodness of fit.

Table 18 *Model Fit Indices for the Hypothesized Model*

	χ^2	df	<i>P</i>	CFI	RMSEA [90% CI]	TLI	SRMR	BIC
Unconstrained, ML estimation	117.764	58	< .001	.966	.045 [.033, .057]	.948	.033	31444.908
Unconstrained, MLR estimation	109.207	58	< .001	.968	.042 [.030, .054]	.950	.033	31444.908
Unconstrained (ML), Multivariate Outliers Removed	120.562	58	< .001	.964	.047 [.035, .059]	.944	.034	30459.584

Table 19 Comparison of ML and MLR Unstandardized Effect Estimates for Distinguishable Dyads

<i>Effect</i>	<i>ML Estimate (SE)</i>	<i>MLR Estimate (SE)</i>
<i>a</i> effects (ACE → RQ)		
Male actor effect (a_{A1})	-.054 (.014)***	-.054 (.014)***
Female actor effect (a_{A2})	-.052 (.015)***	-.052 (.015)**
Male partner effect (a_{P1})	-.015 (.013)	-.015 (.013)
Female partner effect (a_{P2})	-.028 (.016)	-.028 (.016)
<i>b</i> effects (RQ → Health)		
Male actor effect (b_{A1})	-16.841 (4.150)***	-16.841 (4.04)***
Female actor effect (b_{A2})	-10.520 (3.021)***	-10.520 (2.96)***
Male partner effect (b_{P1})	7.166 (3.552)*	7.166 (3.499)*
Female partner effect (b_{P2})	3.613 (3.102)	3.613 (3.043)
<i>c'</i> effects (ACE → Health)		
Male actor effect (c'_{A1})	.218 (.216)	.218 (.232)
Female actor effect (c'_{A2})	.460 (.181)*	.460 (.180)*
Male partner effect (c'_{P1})	.268 (.203)	.268 (.194)
Female partner effect (c'_{P2})	.316 (.182)	.316 (.189)

Note. ML estimation results in parentheses. * $p < .05$; *** $p < .001$

Table 20 Comparison of ML and MLR Standardized Effect Estimates for Distinguishable Dyads

<i>Effect</i>	<i>ML Estimate (SE)</i>	<i>MLR Estimate (SE)</i>
<i>a</i> effects (ACE → RQ)		
Male actor effect (a_{A1})	-0.224 (.057)***	-.224 (.056)***
Female actor effect (a_{A2})	-0.209 (.058)***	-.209 (.058)***
Male partner effect (a_{P1})	-0.068 (.058)	-.068 (.058)
Female partner effect (a_{P2})	-0.103 (.058)***	-.103 (.059)
<i>b</i> effects (RQ → Health)		
Male actor effect (b_{A1})	-1.335 (.303)***	-1.335 (.300)***
Female actor effect (b_{A2})	-0.881 (.225)***	-.881 (.223)***
Male partner effect (b_{P1})	0.640 (.314)*	.640 (.311)*
Female partner effect (b_{P2})	0.268 (.230)	.097 (.058)
<i>c'</i> effects (ACE → Health)		
Male actor effect (c'_{A1})	.072 (.071)	.072 (.077)
Female actor effect (c'_{A2})	.154 (.060)*	.154 (.060)*
Male partner effect (c'_{P1})	.096 (.073)	.096 (.070)
Female partner effect (c'_{P2})	.097 (.056)	.097 (.058)

* $p < .05$; ** $p < .01$; *** $p < .001$

Detecting the Dyadic Pattern

Researchers may use the actor and partner effect estimates to determine the dyadic pattern present in the data. The parameter k is used to estimate and test the dyadic pattern. Ledermann, Macho, and Kenny (2011) define k as the partner effect divided by the actor effect. A nonzero actor effect and zero partner effect indicate an actor-only pattern. Conversely, a zero actor effect and nonzero partner effect indicate a partner-only pattern. Contrast or couple patterns are indicated by nonzero values with inverse or equivalent value signs respectively.

In these data, the k parameters for the a effects or the path from ACE to relationship quality was .28 for men and .54 for women. For both men and women, the results were non-significant (Table 21). The bias-corrected bootstrap 95% confidence interval (CI) for men ranged from -.17 to 1.14, which suggested that this parameter was between an actor-only and couple pattern (i.e., a CI value of k that included 0 suggests actor-only and a k value of 1 suggests a couple pattern). For women, the CI ranged from -.06 to 1.87, which also did not clearly indicate a dyadic pattern since it included both the actor-only and couple pattern. However, the difference in pattern CIs by sex was indicative of a potential different effect of ACE for relationship quality for men and women.

The k parameters for the b effects or the path from relationship quality to health was .426 for men and -.34 for women. For women, the results were non-significant and the bias-corrected bootstrap 95% confidence interval (CI) ranged from -.72 to .18 – between a contrast (i.e., a k value of -1) and a couple pattern. However, for men, the results were statistically significant and yielded a k value of .54 (CI: -.66, -.20). The value did not indicate a clear pattern and was between a contrast and couple pattern. None of the confidence intervals suggested a specific pattern, and therefore, the researcher determined that no values were appropriate to be fixed as a

constrained dyadic pattern. Finally, the *ks* for *a* and *b* were not statistically equal. As a result, the researcher was unable to set any of the corresponding *ks* to be equal or remove *k* paths from the model. In sum, the researcher concluded that the unconstrained model provided the best fit to the sample data. However, the researcher chose to further examine statistical distinguishability of the results with model constraints to ensure the most parsimonious model.

Table 21 *Unstandardized Estimates for k and Dyadic Patterns*

<i>Effect</i>	<i>k</i>	<i>SE</i>	<i>p</i>	<i>CI</i>
<i>a</i> effects (ACE → RQ)				
Male partner effect (<i>a_{P1}</i>)/ Male actor effect (<i>a_{A1}</i>)	.279	.359	.438	-.166, 1.137
Female partner effect (<i>a_{P1}</i>)/ Female actor effect (<i>a_{A1}</i>)	.537	.624	.390	-.063, 1.865
<i>b</i> effects (RQ → Health)				
Male partner effect (<i>b_{P1}</i>)/Male actor effect (<i>b_{A1}</i>)	-.426	.118	>.0001	-.657, -.197
Female partner effect (<i>b_{P2}</i>)/Female actor effect (<i>b_{A1}</i>)	-.343	.230	.135	-.724, .180

*CI refers to bias-corrected bootstrap 95% confidence intervals using 5000 bootstrap samples.

Model Constraints

Ledermann and colleagues (2011) suggested simplification of the APIMeM parameters through the application of equality constraints between groups to improve parsimony of the model. In this case, we could use equality constraints to test distinguishability between effects for males and females. There were six pairwise tests for each of the paths in the APIMeM model including: (a) $a_{am} = a_{af}$ (i.e., the actor path from ACE to RQ for men and women was equal), (b)

$a_{pm} = a_{pf}$ (i.e., the partner path from partner ACE to actor RQ for men and women was equal), (c) $b_{am} = b_{af}$ (i.e., the actor path from RQ to health for men and women was equal), (d) $b_{pm} = b_{pf}$ (i.e., the partner path from partner RQ to actor health for men and women was equal), (e) $c'_{am} = c'_{af}$ (i.e., the actor path from ACE to health for men and women was equal), and (f) $c'_{pm} = c'_{pf}$ (i.e., the partner path from partner ACE to actor health for men and women was equal). The fit of the model was then examined for each test to see if the change was significant. The researcher anticipated that the application of a constraint would contribute to a significant change in fit if male and female effects were statistically different from one another.

All of the six individual tests of equality constraints were non-significant. The tests of equality constraints were non-significant for: (a) $a_{am} = a_{af}$ (Wald χ^2 [1] = .01, $p = .93$), (b) $b_{am} = b_{af}$ (Wald χ^2 [1] = 2.64, $p = .10$), (c) $c_{am} = c_{af}$ (Wald χ^2 [1] = .86, $p = .36$), (d) $c_{pm} = c_{pf}$ (Wald χ^2 [1] = .04, $p = .85$), (e) $a_{pm} = a_{pf}$ (Wald χ^2 [1] = .34, $p = .56$), and (f) $b_{pm} = b_{pf}$ (Wald χ^2 [1] = 1.29, $p = .26$). Therefore, the hypothesized equality in male and female actor and partner paths between constructs were rejected. However, a final test that included all six of the equality constraints combined resulted in a significant chi-square change (Wald χ^2 [6] = 15.67, $p = .02$). The $b_{am} = b_{af}$ equality constraint approached significance the most; therefore, the researcher chose to run the other five constraints together. The result was non-significant (Wald χ^2 [5] = 5.42, $p = .37$). The results of this test indicated that although the majority of male and female paths were statistically indistinguishable, the actor coefficients for male and female paths from relationship quality to health differed.

Yet, when the researcher constrained parameters to zero with an iterative process, the overall model fit decreased (Table 22). Furthermore, the actor-level mediation models tested for males and females indicated differences in the degree of mediation. The observed difference in

mediation by sex may partially be due to the significant indirect female partner effect obtained previously since IEs were not independent of each other. Additionally, the confidence intervals obtained by the researcher from estimation of the k parameter yielded inconclusive patterns. As such, a constraint of zero may not have captured the true pattern of the IE. Thus, the results further supported the unconstrained model. Therefore, the researcher determined that the best fit and most parsimonious model was the unconstrained original model.

Table 22 *Model Fit Indices for the Constrained Models*

	χ^2	df	p	CFI	RMSEA [90% CI]	TLI	SRMR
Unconstrained	117.764	58	< .001	.966	.045 [.033, .057]	.948	.033
Constrained 10 coefficients (except b_{aM} , b_{aF})	222.286	68	< .001	.913	.067 [.057, .077]	.885	.078
Constrained 8 coefficients (except b_{aM} , b_{aF} , a_{aM} , a_{aF})	165.858	66	< .001	.944	.055 [.044, .065]	.923	.049
Constrained 7 (except b_{aM} , b_{aF} , a_{aM} , a_{aF} , c_{aF})	148.651	65	< .001	.953	.051 [.040, .061]	.935	.045
Constrained 6 paths (except b_{aM} , b_{aF} , a_{aM} , a_{aF} , c_{aF} , b_{pM})	137.859	64	< .001	.958	.048 [.037, .059]	.941	.045
Constrained 5 paths (except b_{aM} , b_{aF} , a_{aM} , a_{aF} , c_{aF} , b_{pM} , c_{aM})	133.906	63	< .001	.960	.047 [.036, .058]	.943	.043
Constrain 4 paths (except b_{aM} , b_{aF} , a_{aM} , a_{aF} , c_{aF} , b_{pM} , c_{aM} , b_{pF})	133.894	62	< .001	.959	.048 [.037, .059]	.941	.043
Constrain 2 paths	127.48	61	< .001	.963	.047 [.035, .058]	.945	.038

Chapter Summary

In chapter four, the researcher presented results related to (a) data screening and statistical assumptions for SEM, (b) preliminary dyadic analysis, (c) participant demographics, (d) model specification and identification, and (e) analysis of the research hypotheses. Participant demographics indicated a predominately low-income, racial and ethnic minority sample of couples. Additionally, couples represented both married and cohabitating unions with a large variance in length of relationship. Canonical correlation supported the interdependence of male and female responses, an indication for the appropriateness of dyadic analysis for this study. Violations to statistical assumptions included non-normality, the presence of multivariate outliers, and heteroscedasticity. Most instruments fell within acceptable ranges for skew and kurtosis. The researcher transformed the one skewed variable with a logarithm plus a constant of one for the total number of medical conditions. Additionally, the researcher tested the model with and without multivariate outliers included, as well as, with both ML and MLR estimation. Results showed no significant change to model fit with multivariate outliers included and no significant change to standard errors between ML and MLR estimation. The researcher utilized SEM and the APIMeM to analyze the fit of the hypothesized model for ACE, relationship quality, and health for a sample of couples with economic disadvantage. Results indicated strong empirical support for the theorized model of the dyadic associations for ACE, relationship quality and health with the sample data. Actor effects represented the largest observed statistical significance for direct effects. However, partner effects contributed to overall model fit. Furthermore, the model results demonstrated mediation of ACE and health by relationship quality with significant indirect actor effects for men and women that explained 98.05% and 57.40% of the total effects respectively. Finally, the model explained a large proportion of

variance in health, the endogenous construct, including 82.3% of the variance for health in men and 56.5% of the variance in health for women – both large effects. In chapter five, the researcher provides a discussion of the results that includes implications for counselors, counselor educators, and future research.

CHAPTER FIVE: DISCUSSION

Chapter five begins with an overview and summary of the current study and methodology. The researcher presents a thorough discussion of the results of the dyadic analysis, providing context and comparisons of results with existing literature for the constructs of interest. Similarly, the researcher explores implications from the results for policy and practice. In addition, chapter five includes: (a) limitations of the study design, (b) recommendations for future research, and (c) specific implications for counseling and counselor education.

Study Summary

This study investigated the hypothesized directional relationships between ACE, relationship quality, and health in couples with economic disadvantage within a dyadic mediational model. Upon receipt of approval from the university's IRB, the researcher utilized a secondary dataset of couples from a large, federally-funded program, Project TOGETHER. The final sample for this investigation included 503 heterosexual couples that enrolled in Project TOGETHER between 2014-2015 and completed the pre-intervention assessment data of interest. Participant data included: (a) a researcher-developed adult history and demographic form, (b) *the Adverse Childhood Experiences (ACE) survey* (Felitti et al., 1998), (c) *the Relationship Assessment Scale* (RAS; Hendrick, 1988), (d) *the Behavioral Self-Regulation for Effective Relationships Scale* (BSRERS; Wilson et al., 2005), (e) *the Outcomes Questionnaire 45.2* (OQ45.2; Lambert et al., 2004), and (f) *the Brief Medical History Questionnaire* (Daire, Wheeler, & Liekweg, 2014). The researcher used several quantitative procedures to analyze the interdependence of the data and justify use of a dyadic mediation model (i.e., APIMeM) including: (a) canonical correlations, (b) Pearson's correlations, and (c) Wald's chi-square

difference tests. The researcher conducted several preliminary and primary analyses including: (a) descriptive statistics, (b) exploratory factor analysis (EFA), (c) confirmatory factor analysis (CFA), and (d) structural equation modeling (SEM).

Descriptive Data Analysis

The researcher aimed to include adult couples with low-income as the target population. Staff from Project TOGETHER, the data source for the current study, employed recruitment strategies within the local community to target participants with low-income. The data supported the notion that the majority of respondents had low to moderate income (annual *individual* income: $M = \$18,022$, $SD = \$22,714$). Furthermore, the researcher used rough estimations to calculate the number of participants below the federal poverty guideline and determined about 75.5% of the respondents met criteria.

The current study contributed to existing literature, in part, due to the demographic characteristics of couples that participated. The majority of prior research for ACE (Felitti et al., 1998) and relationship quality (Conger et al., 1999; Kiecolt-Glaser & Newton, 2001) included predominately Caucasian, moderate-income, and married samples of respondents. In addition to the economic disadvantage reported by the majority of respondents, the sample for this study also included a majority of racial or ethnic minority respondents (76.9% overall, including 53.8% Hispanic) and representation of unmarried couples in a committed relationship (30.2%). Racial and ethnic minorities are often underrepresented in research as well as underserved in counseling and intervention services (American Journal of Managed Care, 2006). Therefore, this study bolstered understanding of the interrelated contextual factors (e.g., Karney et al., 2005) that influence low-income *and* racial/ethnic minority couples.

Finally, in prior examinations of adversity, relationship quality, and health, researchers focused on individual-level reports (Umberson et al., 2014). Analysis at the individual level provided preliminary support for associations that exist; yet, individual analysis did not address the contextual nature of relationship quality (Knapp et al., 2015) or the influence of dyadic stress between partners (Bodenmann et al., 2007). Therefore, a significant contribution of the current study was the inclusion of both members of the couple dyad. Furthermore, approximately 40% of participants identified as having a non-married relationship status. The number of non-married participants was an important characteristic of the data given national trends for couple cohabitation in lieu of marriage (Pew Research Center, 2010) and a paucity of research for committed unmarried couple unions.

Previous researchers (e.g., Conger et al., 1999; Conger et al., 2002; Neppl, Senia, & Donnellan, 2016) suggested that a low level of relationship quality may exist among low-income couples. Yet, among an urban, moderate- to low-income, and Hispanic population ($n = 54$ respondents), researchers found a relatively high degree of relationship satisfaction ($M = 4.25$) with the RAS instrument (Contreras, Hendrick, & Hendrick, 1996). In addition, the original BSRERS developers (Wilson et al., 2005) found relatively high levels of relationship self-regulation and relationship effort with high-income newlywed couples (Men: $M_{RSR} = 36.3$, $SD = 6.2$; $M_{SRE} = 22.9$, $SD = 4.0$; Women: $M_{RSR} = 38.1$, $SD = 6.1$; $M_{SRE} = 23.3$, $SD = 3.9$) and long-time married couples (Men: $M_{RSR} = 36.4$, $SD = 6.6$; $M_{SRE} = 23.3$, $SD = 4.5$; Women: $M_{RSR} = 35.4$, $SD = 6.5$; $M_{SRE} = 22.7$, $SD = 4.6$). Overall, participants in the current study reported a high level of each indicator for relationship quality including: relationship satisfaction ($M = 3.77$, $SD = .83$), relationship effort (SRE; $M = 19.77$, $SD = 5.45$) and relationship self-regulation (RSR) strategies ($M = 36.9$, $SD = 7.25$). In comparison to prior research, participants in this study

reported similar estimates for RSR. On the other hand, participants in this study reported lower levels of relationship effort and relationship satisfaction. The differences in SRS, SRE and RAS may relate to the recruitment source of data for this study, a relationship education program. By nature of voluntarily seeking out a psychoeducational relationship intervention, the sample of couples for the current study may represent a unique subset of couples with low-income.

Consistent with prior research, approximately 76% of respondents indicated one or more ACE. The number of participants exposed to at least one ACE exceeds figures obtained by Cronholm and colleagues (67%) who examined ACE in the urban areas of Philadelphia and matches figures obtain with an urban minority sample from Chicago (79.5%; Mersky, Topitzes, & Reynolds, 2013). Furthermore, the average participants' ACE score reported in this study ($M = 2.51$) exceeded averages obtained in prior research (e.g., $M_{ACE} = 1.54$ in Nurius et al., 2015; $M_{ACE} = .71$ [white men] and $.91$ [black men] in Umberson et al., 2014). Therefore, the average participant in this study reported greater exposure to adversity than obtained in prior studies; however, each study used a different measure of ACE that included some or all of the same indicators. Thus average ACE scores between studies are difficult to compare.

The most reported ACE was parental divorce (49.4%; consistent with national averages [Amato, 2010]), followed closely by emotional abuse (34.4%), and physical abuse (31.7%). The percentage of respondents that reported sexual abuse (27.7%) was higher than anticipated in comparison to national estimates (5% of boys, 26% of girls; Finkelhor, Shattuck, Turner, & Hamby, 2014) and included 9.5% of men and 29.4% of women in this study. Likewise, the percentage of participants that reported incarceration of a household member was higher than national estimates (i.e., 15% current sample, 2.3% nationally [Glaze & Maruschak, 2008]). Yet,

the researcher did not examine the model fit or variable associations among specific ACE indicators.

Finally, the original ACE study (Felitti et al., 1998) identified the greatest health risk among respondents that indicated ‘four or more’ ACE. Only 6.2% of the original sample reported ‘four or more’ ACE exposures. However, for this study, the ‘four or more’ ACE group represented the largest percentage of respondents among the ACE groups ($n = 299$, 29.72%). The large number of participants indicated in the ‘four or more’ ACE group was similar to estimates observed by Cronholm and colleagues (2015) in the Philadelphia study where approximately 21% reported four or more of the conventional ACE. The preponderance of participants in the highest health risk ACE group adds support to the notion that racial and ethnic minority and low-income individuals may be more likely to experience ACE and future ACE correlates; therefore, it may be logical to expect a higher likelihood of health concerns.

In addition to the high prevalence of ACE, about half of respondents (50.3%) indicated one or more health conditions, as expected from nationally observed estimates of the general population (Ward, Schiller, & Goodman, 2014). Of participants that reported a health condition, the majority reported the presence of only one condition (22.2%). Self-reported health condition may be related to the average age of respondents ($M = 36$, $SD = 11.9$ years) and the predictive relationship between age and health ($t = 7.68$, $p < .001$, $\beta = .235$) with these data. Age accounted for about 23.5% of the variance in reported health condition.

The most common condition reported by participants was ‘depression/suicide/anxiety’ (19% of the sample), consistent with prior estimates for overall mental illness (i.e., 18%; Center for Behavioral Health Statistics and Quality, 2015). According to the Chapman, Perry and Strine (2005), depressive disorders often precede chronic physical health conditions including diabetes,

cancer, cardiovascular disease, and obesity. Reciprocally, mental health influences the trajectory of chronic health conditions, in part due to associated changes in health behaviors such as physical activity, sleep quality, and substance use (Chapman, Perry, & Strine, 2005). In fact, mental illnesses are a contributor to disease burden worldwide. Initially, researchers estimated that by the year 2020, depression would be the *second* leading cause of chronic illness and disability (Murray & Lopez, 1996). The World Health Organization (2008) revised projections for disease burden and determined depression was already the lead contributor for women and would be the *first* leading cause of chronic illness worldwide by 2030. Indeed, more recent analysis determined that between 1990 and 2010, the burden of mental disorders increased by 37.6%. Furthermore, depressive and anxiety disorders accounted for 55.1% of the disability-adjusted life years or premature mortality associated with years lived with a disability (Whiteford et al., 2013). Moreover, income moderated the association between chronic physical illness and severe mental illness. In sum, depression is a significant contributor to chronic health that impacts a growing population of people worldwide. Additionally, individuals with low-income are most vulnerable to the association between mental and physical health. Participants in the current sample, therefore, may be more at risk of future chronic illness related to the existence of depression/suicide/anxiety. Furthermore, researchers recommended the integration of physical and mental health services in community settings, especially for those with low-income (Duong & Bradshaw, 2016). Thus, participants may benefit from integrative health services.

Furthermore, about one in five participants identified current depression/suicide/anxiety; yet, lei-professionals trained only in a specific curriculum often lead relationship education (RE) interventions (i.e., the source of the current data; Hawkins & Ooms, 2012). In fact, researchers noted an increase in the number of distressed couples attending RE programs (Bradford,

Hawkins, & Acker, 2015) and that distressed couples derived the most benefit from such intervention (Carlson et al., in press; Quirk et al., 2014). Karam, Antle, Stanley, and Rhoades (2015) suggested the integration of RE into educational training for couples and family therapists; although discrepant viewpoints on this recommendation exist (e.g., Markman & Ritchie, 2015). However, the majority of respondents reported low levels of symptom distress ($M = 15.96$, $SD = 9.08$) and low levels of life dissatisfaction ($M = 5.26$, $SD = 3.55$). The majority of participants seemed to experience little current symptomology related to depression/anxiety and a high degree of overall life satisfaction.

In sum, participants in the current investigation were predominantly low-income and from racial and ethnic minority backgrounds. The prevalence of ACE exceeded anticipated estimates overall and specifically a large percentage of participants identified a cumulative ACE score with the highest associated health risk. Related, half of the participants reported one or more current health conditions. Thus, prior research for the incidence of ACE and health among a marginalized group was substantiated. Yet, overall, couples reported relatively high levels of relationship quality and life satisfaction. Therefore, in spite of a higher incidence of ACE and health conditions, participants also reported lower levels of relational and individual distress. The discrepancy between high ACE and health with low reported distress may result from the self-report nature of indicators of distress or may perhaps also reflect the lower mean age ($M = 36$ years) of the sample compared to the average age of onset for many of the collected health conditions.

Preliminary Dyadic Analysis

The canonical correlation between male and female sets of data was $R_c^2 = .459$, an indication of inconsequential non-independence or interdependence in the data between men and

women partners (Kenny et al., 2006). In addition, when the researcher used the canonical correlation, female scores explained about 12.45% of male scores, a small but significant overlap in the variance between sexes. Pearson correlations further demonstrated non-independence of the dyad-responses given statistical significance for each of the male-female correlations for the variables. Thus, the data supported the appropriateness of dyadic analysis for the hypothesized associations.

Instrumentation and Measurement Models

The researcher conducted CFAs for each of the study instruments to determine psychometric properties of the data with these data. Several of the instruments maintained strong statistical support for the proposed measurement model (e.g., the BSRERS and RAS), while others demonstrated less of a fit from the data to the proposed models (e.g., the OQ45.2). The researcher did not anticipate strong factor structure for the ACE or Brief Medical History questionnaire, as both instruments were designed to collect a count of experiences or circumstances. However, the researcher chose to examine CFAs for the ACE survey since an exploration of possible factor structures did not exist in the literature.

The items of the RAS and BSRERS instruments with these data produced valid and reliable measures of relationship satisfaction, relationship self-regulation, and effort with the study data. The instrument items had a high level of internal consistency and confirmed the factor scales proposed in prior research (Hendrick, 1988; Wilson et al., 2005). Thus, the latent construct for relationship quality comprised of the RAS, SRE, and SRS fit the data well with the addition of covariance between SRS and SRE as well as between male-female RAS. The factor structure of the ACE survey and Brief Medical history questionnaire were less conclusive and substantively meaningful with this sample.

However, the factor structure of the OQ45.2 proposed by the instrument developers was not confirmed through preliminary analysis with the study data. Perhaps due to the large number of unemployed participants, items from the original ‘social role’ subscale did not fit as a factor. Similarly, the researcher removed several items and concluded with a total of 22-items and three factors – life satisfaction, symptom distress, and substance abuse. The new version of the OQ45.2 was similar to results obtained in prior validation of the instrument (Kim, Beretvas, & Sherry, 2010; Rice, Suh, & Ege, 2014). Therefore, although the OQ45.2 is commonly used in the field, further inquiry for appropriateness and interpretation among various sample demographics may be warranted.

Primary Research Hypothesis Results

The respecified model for the dyadic and mediation model for ACE, relationship quality, and health was a good fit to the sample data ($\chi^2[58] = 117.764, p < .001$; RMSEA = .045; CFI = .97; TLI = .95; SRMR = .033). Overall, the model established a cause for the demonstrated relationship between ACE and health (Felitti et al., 1998) – relationship quality – in a sample of individuals with low income and a racial or ethnic minority status. Moreover, the model provided support for the influence of a partner to an individual’s relationship quality and health. The model explained 82.3% of the variance in health for men, a large effect, and 56.5% of the variance in health for women, a large effect. The model fit did not significantly change when the researcher used Maximum Likelihood (ML) or ML with robust standard errors (MLR) estimation, or when the researcher removed or included multivariate outlier cases. Thus, the researcher determined overall the sample data fit the hypothesized model, indicating: (a) ACE exerted an effect on health indirectly through relationship quality; (b) ACE exerted a direct effect on health for women; (c) overall ACE, relationship quality, and health were significantly related;

and (d) a dyadic influence existed between male and female reports of ACE, relationship quality, and health. Findings of the current study augment ACE research to identify relationship quality (inclusive of self-reported relationship behaviors) as a component of health-risk influenced by early life adversity. Furthermore, results expand the Family Stress Model (Conger et al., 1992) to highlight (a) the systemic role of ACE for family relationships among couples with low-income and (b) sources of stress beyond economic pressure that influence mental health and relationship quality.

Actor Effects

The researcher hypothesized the presence of direct actor effects for the associations between an individual's own ACE, relationship quality, and health. Results supported the hypothesized direct actor effects. An individual's own ACE significantly related to his/her relationship quality and health. Thus, the findings suggested a statistically significant relationship among the variables for men and women.

ACE significantly and negatively related to relationship quality; yet, the association was small (i.e., around -0.2 for men and women). In other words, an individual with an ACE score one more than the mean for this sample associated with a parameter coefficient of -.2 on self-reported relationship quality. Prior research indicated significant correlations between a high ACE score and (a) lower relationship quality (Reyome, 2010), (b) being divorced in adulthood (Font & Maguire-Jack, 2016), and (c) an increased risk of intimate partner violence perpetration and victimization (Whitfield et al., 2013). Similarly, negative family-of-origin experiences predicted lower relationship effort and strategies (Knapp, Norton, et al., 2015) and predicted relationship satisfaction when moderated by dyadic coping (Costa-Ramalho, Marques-Pinto, & Ribeiro, 2016). Overall, these data align with prior research that indicated an inverse

relationship between ACE and relationship quality. Thus, a higher degree of experienced adversity in comparison to the mean suggested lower satisfaction, relationship effort, and relationship self-regulation strategies of the individual. ACE seem to exert an influence to relationship satisfaction, effort (SRE), and self-regulation strategies (SRS) in adulthood (i.e., ACE influence relationship behaviors). The CDC (2016) published the ACE pyramid as a conceptual framework for the original ACE research. Here, the researchers postulated that ACE: (a) disrupted neurodevelopment, (b) contributed to impairment in social, cognitive, and emotional domains, and, (c) influenced health behaviors that result in disease, disability, and early death. Health risk behavior included alcohol or drug use, risky sexual behavior (e.g., multiple sexual partners, sexually transmitted infections, unintended pregnancy), and school and work performance (Felitti et al., 1998). Researchers also examined risk of intimate partner violence as a relationship-based health risk behavior (Whitfield et al., 2013); however, researchers did not collect any other relationship outcomes or correlates. Thus, the association found in this study between ACE and self-reported satisfaction, effort and regulation strategies adds to existing ACE literature for the connection between ACE and relationship behaviors as contributors to health risk. Moreover, although ACE are fixed factors outside of the control of the individual, the association to relationship behavior highlights a potential area of future intervention within an individual's capacity to change. In fact, prior studies identified the effect of relationship stress as a chronic stressor influential to illness and disease trajectory (Kiecolt-Glaser et al., 2003; Kiecolt-Glaser & Newton, 2001; Mayou et al., 2000). Furthermore, relationship quality (Jaremka et al., 2013; Robles et al., 2014) and social support (Nurius et al., 2015) exert protective effects for health. In this study, the direction and significance of relationships among the constructs demonstrated that high ACE resulted in low relationship

quality and low relationship quality resulted in poorer health. In sum, relationship quality, inclusive of relationship behaviors and impacted by ACE, is influential to overall health. Thus, the results of this study support the notion that relationship strengthening intervention may be an important public health response to develop positive relationship behaviors with the potential to influence health outcomes and trajectories.

ACE negatively related to health for women only; however, the association for female ACE and health was small ($\beta = .154$). Women that reported an equal level of relationship quality, but an ACE total one above the mean are estimated to have poorer mental and physical health. In other words, controlling for current relationship quality, ACE still made a unique contribution to health for women. ACE influenced health beyond the causal explanation provided by relationship quality for women. Thus, in addition to relationship behaviors, other health risk behaviors may be more influential for women. However, the ACE-health relationship was not significant for male respondents. The initial study (Felitti et al., 1998) included a predominately male sample and concluded the existence of a statistically significant relationship between ACE and specific health conditions and behaviors. It is unclear why this study produced a different result for the relationship between ACE and health for men, aside from the large mediating effect of relationship quality. The researcher anticipated a greater association with the inclusion of a more diverse sample from the original study. However, the difference in ACE-health associations for men may be related to: (a) the younger average age of respondents ($M = 36$ years, $SD = 11.9$), for conditions which may have a later age of onset, (b) the low-income status of most respondents ($M = \$1,502$ monthly income, $SD = \$1,893$), that may or may not attend annual health check-ups to receive a medical diagnosis, or (c) lack of instrumentation to assess other health habits and behavior. Researchers conducted the original ACE study (Felitti

et al., 1998) in collaboration with an insurance company and thus improved accuracy and objectivity of the detection, diagnosis, and documentation of health conditions. However, the original study only examined individuals and did not account for the influence of a partner. Kiecolt-Glaser and Newton (2001) reviewed evidence that although marriage offered protective effects for health overall, men derived greater health benefits from marriage than women.

The researcher ran a separate analysis to explore ACE and health with an APIM dyadic structure (i.e., mediator removed). Here, not only was the relationship from ACE to health significant for both men and women ($p < .001$), but the female partner effect was also significant. A significant and dyadic relationship existed between ACE and health for both sexes when the researcher removed relationship quality as a mediator. A woman's health also associated with her partner's ACE ($\beta = .134, p < .01$); however, the strength of this relationship was at least partially explained by the addition of relationship quality as a mediating variable since the female partner effect (i.e., the influence of male ACE to female health) only approached significance ($p = .08$) in the APIMeM. So, although a man's ACE score did not significantly predict his own health in the APIMeM, his ACE score predicted health in the APIM and also influenced his partner's health. The observed change in significance for the male ACE to health path between the APIM and APIMeM underscores the importance of relationship quality as a mediator of the ACE-health association for men. Indeed, never-married/cohabitated men produced the strongest negative associations between relationship status and several biomarkers of health in longitudinal analysis (Ploubidis, Silverwood, DeStavola, & Grundy, 2015). Ploubidis and colleagues also found the strongest results for the longitudinal model among individuals with good early-life health and socioeconomic position. In other words, men that experienced early life stability benefited most from marriage. However, results reflect the social context of the

U.K. birth cohort and did not account for other forms of adversity in early life or the dyadic associations for health within couples. Thus, the change in significance observed in the current study between male ACE and health adds to support for the protective health-benefits from marriage/cohabitation for men and further underscores the need for further research for the contributions from ACE to relationship quality and health in couples with low-income. Related, in the current study the researcher did not anticipate a significant partner effect from male ACE to female health, due to a lack of couples or dyadic analysis in the ACE or health benefits of marriage research. Likewise, partner effects from ACE to health also warrant further examination.

Relationship quality negatively related to health, where the association was strong ($\beta_{\text{women}} = -.881$, $\beta_{\text{men}} = -1.335$, $p < .001$). Individuals with an equal ACE score but relationship quality one unit above the sample mean reported better mental and physical health. In other words, controlling for ACE, high relationship quality made a unique contribution to better health. Similarly, researchers examined longitudinal data from a British cohort study and eliminated differences in midlife mental well-being between individuals that indicated cohabitation versus married status when they used propensity score matching for the childhood background of participants (i.e., parental SES, marital status, education and housing; Perelli-Harris & Styrc, 2016). Thus, childhood experiences contributed to individual relationship status and mental well-being. The current study expands these findings through consideration for other forms of childhood adversity from the ACE survey. Furthermore, the contribution of relationship quality to health in the current study, independent from ACE score, reiterates the protective nature of relationship quality in adulthood (Jaremka et al., 2013; Kiecolt-Glaser & Newton, 2001; Ploubidis et al., 2015; Robles et al., 2014). The estimate value larger than one may have

suggested multicollinearity or reflected the different scaling in manifest variables (Cohen et al., 2003; Joreskog, 1999). In this case, scaling varied for the manifest variables of relationship quality (i.e., minimum and maximum score distribution varied: RAS 1.14 to 5, SRS 15 to 50, SRE 6 to 30) and health (i.e., minimum and maximum score distribution: TotMed logarithm of 0 to 10, OQ-SD 0 to 50, OQ-LS 0 to 19). Regardless, the findings underscored the significant contribution of relationship quality to health, controlling for the influence of ACE. Researchers documented the influence of relationship stress as a chronic stressor influential to health (Orth-Gomer et al., 2000; Kiecolt-Glaser & Newton, 2001; Robles & Kiecolt-Glaser, 2003). Moreover, in a 20-year longitudinal study of married couples, researchers differentiated health implications from the type of emotional behaviors observed during a 15-minute couple conflict. Most prominently, a strong relationship existed for anger behavior in conflict and cardiovascular symptoms that emerged over the 20 years ($B = .31$, $SE = .11$, $\beta = .23$, $p = .005$). In addition, stonewalling behavior in conflict related to musculoskeletal symptoms ($B = .14$, $SE = .06$, $\beta = .21$, $p = .024$; Haase, Holley, Bloch, Verstaen, & Levenson, 2016). Thus, relationship behaviors and stress have physiological correlations that are predictive of future health. Yet, similar analysis is needed among low-income, ethnic or racial minority couples who may experience greater early life adversity influential to stress and health trajectories. Therefore, the researcher's findings for the correlation between relationship quality and health support the associations revealed in prior research and preliminary longitudinal analysis.

Partner Effects

The researcher initially hypothesized that partner effects would be present in the associations between ACE, relationship quality, and health. However, the confidence intervals for the *indirect* partner effects included zero, resulting in the inability to rule out zero as a

plausible value for partner effects (Hayes, 2013). Similarly, results indicated no significant indirect partner effect paths. The absence of significant indirect partner paths suggested that an individual's ACE was more strongly related to his or her own relationship strategies, effort, and satisfaction in contrast to their partner's ACE. Likewise, an individual's relationship quality was more strongly related to his or her own health than that of their partner. The absence of indirect partner effects in this model is an interesting finding given prior research that indicated dyadic associations for most of the study constructs. For example, prior research found significant direct partner effects for men and women's level of stress and relationship satisfaction (Bodenmann et al., 2007). Additionally, dyadic coping more strongly predicted relationship satisfaction when compared to individual coping in a sample of middle-income, well-educated German couples (Herzberg, 2013). Similarly, researchers established that attachment behaviors (e.g., accessibility, responsiveness, engagement) between members of a couple mediated the association between depressive symptoms and health for well-educated and highly religious couples. In this case, relationship behaviors influenced the depression-chronic health association (Sandberg, Novak, & Bates, 2016). Therefore, although unanticipated, the non-significance of indirect partner effects may reflect the difference in demographics of the current sample (i.e., low income, low education, and minority status) to prior dyadic research.

However, two significant *direct* partner effects occurred. A significant female partner direct effect existed from male ACE to female health ($\beta = -.103, p < .001$) and a male partner direct effect existed from female relationship quality to male health ($\beta = .640, p < .05$). In this study, female relationship quality seemed to be influenced by the female's own report of ACE as well as by male ACE. Likewise, male health seemed to be influenced by the male's own variables as well as by female relationship quality. Prior research supported the significance of

male early life experiences for female relationship quality. Topham, Larson, and Holman (2005) found that family-of-origin dynamics from both the husband and wife predicted *female* perceptions of hostile conflict with their spouse. Thus, women indicated greater vulnerability to family-of-origin dynamics including a partner's family-of-origin dynamics for relationship quality. For men, only wives' reported quality of parental discipline mattered for perceived marital hostility. Similarly, researchers found that only women experienced partner effects from a male partner's level of external stress to the female's level of internally experienced stress and relationship satisfaction (Bodenmann et al., 2007). In addition, given the health benefits derived from marriage for men (e.g., Kiecolt-Glaser & Newton, 2001), it would make sense that men may also be more susceptible to health implications from low relationship quality of their female partner. Furthermore, although independently non-significant, the partner paths contributed to the overall goodness of fit for the model and total effects obtained. Thus, although not a significant finding of the study, partner effects seem important for the dyadic associations between ACE, relationship quality, and health.

Indirect Effects

The researcher hypothesized that relationship quality would mediate the relationship between ACE and health. Results confirmed this hypothesis for men and women to different degrees. Generally, the results identified that ACE negatively influenced health in part because of changes to relationship quality in adulthood. An individual that reported one additional ACE exposure above the mean had worse health as a result of the effect of ACE on relationship quality. In other words, high ACE related to low relationship quality and low relationship quality related to poor health. This is not surprising given the reported prevalence of contextual and relational stressors experienced by individuals and families with low-income (Conger et al.,

1992; Conger et al., 2000; Cronholm et al., 2015; Mansfield et al., 2013; Stanford Center on Poverty and Inequality, 2016) as well as disparities in health among the poor (Braveman & Gottlieb, 2014; CDC, 2013; Hicken et al., 2014). Given that individuals with low-income are: (a) more likely to experience ACE (Child and Adolescent Health Measurement Initiative, 2013; Cronholm et al., 2015), (b) more likely to report strained relationships and limited social support (Barajas-Gonzalez & Brooks-Gunn, 2014; Conger et al., 1992; Karney, Story, & Bradbury, 2005), and (c) more likely to report poor health (CDC, 2013; Stanford Center on Poverty and Inequality, 2016). Similarly, prior studies that examined early-life adversity, relationship quality and health in *individuals* found similar results for the mediating role of relationships and persistent role of continued adversity across the lifespan to health (Umberson et al., 2014). Furthermore, Umberson and colleagues identified racial differences observed in the mediated pathway, where black respondents reported greater strain and less support in their relationships. Thus, the current findings bolster understanding for the dyadic influence of the constructs among a low-income *and* racial/ethnic minority sample with a high percentage of Hispanic participants.

The indirect effects found in this study further expand the original ACE research (Felitti et al., 1998) through the inclusion of the systemic influences for individual health and relationship quality as a mediator of the ACE-health association. Specifically, the indirect effect for males explained 98.05% of the total male actor effect, indicating a large effect. Thus, approximately 98% of the effect of ACE on health for men occurred indirectly through relationship quality, whereas, the indirect effect for females explained 57.4% of the total female actor effect, a medium effect. In other words, for women in the sample, approximately 57% of the effect of ACE on health occurred indirectly through relationship quality. Therefore, relationship quality seemed to explain a large majority of how ACE related to health for men and

the relationship between ACE and health for women seemed to be influenced by other factors that could account for the remaining observed variance in health.

The total female partner effect (i.e., the sum of the direct and indirect effects from Male ACE to Female Health) was statistically significant ($p = .015$) although none of the specified direct or indirect paths were significant on their own. Thus, overall, a male partner's ACE and relationship quality significantly influenced female health in addition to the direct effect of female ACE on female health. Yet, the female partner indirect effect still only accounted for 24% of the total female partner effect; therefore, other factors from a male partner are influential to female health. Some potential areas influential to relationship quality and health for women include: work-to-family spillover of stress (Sandberg, Harper, Hill, Miller, Yorgason, & Day, 2013; Symoens & Bracke, 2015), transition to parenthood (Doss, Rhoades, Stanley, & Markman, 2009; Mulsow, Caldera, Pursley, Reifman, & Huston, 2004), and minority stress (Corwin et al., 2013; Nomaguchi & House, 2013). Each of these factors demonstrated significance among females for individual and relational stress. Therefore, future exploration of the study factors among women may benefit from inclusion additional sources of stress related to relationship stress.

However, no significant indirect partner effects existed in the current study (i.e., actor-partner effects: Male ACE, Male relationship quality, Female Health and Female ACE, Female relationship quality, Male health; partner-actor effects: Male ACE, Female relationship quality, Female Health and Female ACE, Male relationship quality, Male health). Thus, although male ACE influenced female relationship quality and female relationship quality influenced male health as direct partner paths, neither contributed to a full indirect partner path from ACE to health. In other words, the absence of partner *indirect* effects indicated that each person's ACE

and relationship quality minimally contributed to his or her partner's subsequent health; yet the presence of significant partner *direct* effects indicated that a partner's contribution is not inconsequential. Therefore, further examination is needed to determine influential partner factors that may augment variance in health explained.

The evidence for the actor-level mediating role of relationship quality in this study adds to existing research for the influence of socio-emotional and relationship support (Logan-Greene et al., 2014; Nurius et al., 2015; Umberson et al., 2014). In addition to replication of relationship quality as a mediator of ACE and health, the current study included more rigorous and psychometrically sound instrumentation. Further, the results are confirmed for the mediating role of relationships between ACE and health among a sample of diverse couples with low-income.

Study Limitations

The current study included several limitations that influence interpretation of the results. Specifically, limitations existed for research design including sampling, instrumentation, and analysis. Thus, the researcher cautions careful interpretation of the results by the reader.

A primary limitation to this study is the use of a nonprobability, correlational design. Correlational designs establish relationships that exist between variables; however, correlational studies do not support the determination of causality (Campbell & Stanley, 1963). The design of the study thus limits assertions of causality and further support caution in the interpretation of causal hypotheses due to limited control for the conditions related to causal statements. Yet, a well-defined SEM model based on causal assumptions may be tentatively interpreted for estimated causal expressions (Bullock, Harlow, & Mulaik, 1994; Pearl, 2012). Additionally, the analysis provided estimates for causal effects and supported these findings with prior research.

However, due to the limitations to the research design, this study does not make more global claims of causality.

Similarly, the study respondents voluntarily enrolled in Project TOGETHER, a relationship education intervention, which may have introduced selection bias in the sample. Selection bias may be a contributor to the issues with normality and heteroscedasticity of the data, especially given the relatively high degree of relationship quality, low level of medical issues reported, and low levels of symptom distress. Yet, the original study employed community recruitment efforts in the Central Florida area and the study sample included couples with economic disadvantage many of whom also identified as a racial or ethnic minority – an underrepresented demographic in the literature on ACE, relationship quality, and health. Similarly, the study analyzed data from a sizeable sample that adds statistical power and confidence in the results obtained. Still, the results of this investigation may not be generalizable to couples with economic disadvantage throughout the U.S. or even couples with low-income *not* participating in RE intervention.

Next, all of the data collection instruments relied upon participant self-report. Therefore, responses may be biased and influence outcomes of the proposed study. Specifically, self-report for the ACE survey includes potentially traumatic experiences of childhood abuse or neglect which may result in underreported or biased estimates of ACE (Reuben et al., 2016). Additionally, couples attended the RE workshop together and answered questions about relationship quality within close proximity to their partner, which may have influenced self-reports. Finally, all instruments include measurement error that can threaten validity of results produced. In this case, several of the measures required modification to attain appropriate psychometric properties. Specifically, the OQ45.2 did not fit the data well using the three-factors

identified by the developers of the instrument. However, the researcher conducted an EFA and CFA with a reduced number of items for this sample with mixed results for model fit of measurement models. Similarly, the use of SEM for analysis allowed the researcher to account for error estimates inherent in measurement and instrumentation. In addition to threats from measurement error, the researcher used a secondary dataset and could not add variables that may have been associated with the constructs (e.g., other forms of exposure to adversity, relationship conflict tactics, economic stress, physical health performance or physiological markers of stress). Overall, the study sample size, dyadic structure, and SEM analysis mitigate many of the inherent limitations and provide unique contributions to the literature. Yet, the aforementioned limitations contribute to recommendations for future research.

Recommendations for Future Research

Future research may be augmented through consideration of the limitations and results of the current study. Recommendations therefore are provided related to research design, sampling, and results. Each of these areas may improve upon aspects of the current study and add to existing knowledge for the associations among the study variables.

The current study defined adversity using the indicators of the ACE survey; yet, other forms of childhood adversity influential to health and development are supported in the literature. For instance, Finkelhor and colleagues (2015) identified additional ACE to include: family-of-origin low SES, peer victimization, peer isolation, and exposure to community violence. Similarly, Cronholm and colleagues (2015) found preliminary support for ACE such as: witnessed violence, perceived experiences of discrimination, lived in an unsafe neighborhood, experienced bullying, and lived in foster care. Thus, the inclusion of other forms of early life adversity may be an important addition through future research.

Additionally, other direct measures of stress (e.g., economic stress and hardship, relationship conflict behaviors, health indicators including physiological responses, employment, parenting or minority stress) may strengthen the analysis and understanding for the multifaceted components of stress for couples with economic disadvantage. Likewise, the low factor loadings for the total number of medical conditions may suggest the importance of including additional measures of physical health such as health behaviors (e.g., exercise, diet, time elapsed since last physical examination). Similarly, proposed modification indices not applied by the researcher between latent factors for health and relationship quality included correlations between SRE and OQ-SD, SRS and OQ-LS. Inclusion of correlations would have further improved fit of the overall measurement model. These associations may reflect potential areas for further exploration of constructs that could contribute to relationship quality and health. The addition of these measures may be beneficial to explore in future research to determine their influence to results and interpretation.

Furthermore, this study examined the constructs among heterosexual couples only. The researcher removed 11 same-sex couples from the dataset to be able to use sex as the distinguishing variable for dyadic analysis. Therefore, further exploration of the study constructs with same-sex couples may be an important consideration for future research. Additionally, the study sample included participants enrolled in a relationship education (RE) intervention. Therefore, the results provided vital information for characteristics of participants in federal RE programs. Overall, participants reported high exposure to ACE, high relationship quality, and good health. However, participants that reported greater forms of ACE exposure also reported poorer relationship quality and health. Therefore, RE participants that present with higher ACE scores may necessitate greater engagement strategies to address their multifaceted needs

(Carlson et al., 2017). The contribution of ACE to relationship quality and distress suggests potential value in RE practice that employs strategies that are ACE-informed from recruitment to engagement. Moreover, ACE may contribute to relational distress and warrant further investigation as a mediator or moderator of change following RE intervention, given evidence that higher distressed couples benefit most from RE (Carlson et al., in press; Quirk et al., 2014). Thus, additional researcher is warranted to examine the potential moderating role of ACE for change from RE.

Finally, the final model supported the mediating role of relationship quality between ACE and health. Mediation by relationship quality establishes context for how ACE exerts an effect on health. Thus, the results support further inquiry for the influence of relationship strengthening intervention to health and health trajectories. Therefore, next steps to further understand the theory of associations among ACE, relationships, and health include: (a) the addition of observed and physiological measures of stress and conflict, (b) longitudinal examination of variables with couples, and (c) investigation for health and stress related outcomes from relationship-focused intervention.

Implications

Disparities in health exist for individuals with low-income. Furthermore, racial and ethnic minorities are disproportionately represented among the low-income (DeNavas-Walt & Proctor, 2015) and chronically ill (CDC, 2013; Hicken et al., 2014; Mulia & Zemore, 2012). Therefore, ‘upstream’ interventions or health prevention efforts that target anticipated adverse outcomes focused on children and families are needed for historically marginalized populations (Thornton et al., 2016). Research indicates that disparities in health begin in early childhood through exposure to adversity, persist across a person’s life (Felitti et al., 1998; Umberson et al.,

2014), and perpetuate patterns of continued adversity inter-generationally (Conger et al., 2010).

The current study adds to existing support for the associations among ACE, relationship quality in adulthood, and health, contributing to the counseling and counselor education literature among couples with economic disadvantage.

Overall, identification of the associations between ACE, relationship quality, and health underscore the importance of interpersonal relationships to lifelong health and well-being. Health seems to be inclusive of both systemic and interpersonal components (Siegel, 2012). In other words, health is not encapsulated within one individual but an interpersonal and dynamic process influenced by relationships and relational stressors. Developments in psychoneuroimmunology provide further evidence for family and social relationships as protective factors for both ‘mind health’ as well as more traditional notions of physical health (Richman, 2016). Results support further inquiry for the influence of relationship strengthening interventions as a component of health prevention or intervention. Moreover, the results provide greater understanding for factors influential to health for an understudied population, individuals and couples with low-income and a racial or ethnic minority background.

Implications for Practice

The field of counseling distinguishes itself from other forms of social service and intervention through an emphasis on prevention and wellness. Counselors advocate for social justice through the empowerment of diverse individuals to lead *healthy* and meaningful lives (Kaplan, Tarvydas, & Gladding, 2014). Thus, the results of the current study connect to the principles and practices espoused by the field of counseling and counselor education through the focus on health (i.e., relational, mental, and physical) among a marginalized population. The results of the current study provide insight for dynamics pertinent to individuals with low income

and racial or ethnic minority backgrounds that present to counseling including: (a) the prevalence of ACE, (b) the influence of ACE to relationship quality, (c) the influence of ACE and relationship quality to health, and (d) the mediating role of relationship quality between ACE and health. Therefore, counselors may benefit from the assessment of ACE exposure, relationship quality, and health condition for clients of all ages and incorporate this information in client conceptualization, clinical intervention, and advocacy.

Client conceptualization. Social class and income are important to the conceptualization of a client's intersecting identities (Ratts et al., 2016); however, counselors often do not account for these factors (Liu et al., 2007; West-Olatunji & Gibson, 2012) or may hold biases that can influence conceptualization and intervention (Clark, 2016). The current study adds to knowledge for the chronic and contextual stressors experienced by individuals and couples with low income, specifically ACE and relationship stress. As such, the results further contribute to counselor multicultural competence for conceptualization of clients with economic disadvantage and a racial/ethnic minority background.

Greater adversity exposure related to poorer relationship quality and health. In general, participants reported higher ACE exposure and lower levels of relationship effort and satisfaction in comparison to prior research with higher-income groups, an indication for some potential effect from economic stress. Likewise, the most common health condition reported was depression/suicide/anxiety. So, counselors working with this population would be well-advised to understand the dynamics of ACE and relationship quality as potentially chronic contextual stressors and contributors to health conditions (especially depression as a correlate of future disease burden) within the couple dyad. Therefore, the descriptive data analysis and model

effects inform a culturally competent approach to practice with individuals and couples with low-income *and* a racial or ethnic minority background.

Descriptive data identified a higher incidence of ACE overall within this sample and specifically, higher rates of exposure to sexual abuse and household member incarceration. Therefore, counselors that seek to intervene with individuals with low-income and a racial/ethnic minority background should be informed of the prevalence and longitudinal health risks associated with cumulative ACE scores. Counselors would benefit from assessment of a client's ACE and a response informed by an understanding of ACE correlates (i.e., relational and health). For instance, the observed effects from ACE and relationship quality to health provide further support for the inclusion of family-of-origin and early life experiences in counselor exploration of relationship behaviors and health.

Barden, Conley, and Young (2015) proposed the necessity of counselor preparation that included a wellness orientation and biopsychosocial conceptualization of clients. The researchers also asserted the importance of counselor knowledge regarding (a) the intersection of physical and mental health as well as (b) social and environmental stressors that influence health. In the current study, the researcher used a definition for health based on the existing literature that included both mental and physical components. The sample data fit the specified measurement model for health well – meaning the selected indicators of psychological and physical distress adequately measured the same underlying construct of health with this sample. Additionally, the current study explored several relational sources of stress (i.e., ACE that occur within the family-of-origin and relationship quality that occurs within an intimate partner relationship) where prior research identified the existence of income-based disparities (e.g., Conger et al., 1992; Cronholm et al., 2015; Mansfield et al., 2013). Thus, this study adds to

areas of counselor competence for wellness counseling through exploration of ACE, relationships, and a dyadic influence for factors associated with health. Related, the early identification of ACE exposure may also provide unique opportunities for counselor intervention with children to strengthen understanding for critical periods of intervention related to healthy relationship dynamics and future health.

Marriage, couple and family therapy (MCFT) counselors may also benefit from the inclusion of ACE assessment to better understand the role of ACE in the presenting problems of a couple. The dyadic structure of the model supports the systemic or interpersonal influence of the study factors for individual health and relationship quality. In other words, partner reports of ACE and relationship quality matter for an individual's perceived relationship quality and health. Furthermore, the prevalence of ACE overall suggests a high likelihood that one or both members of a couple that presents to counseling may have experienced at least one ACE (Felitti et al., 1998); that likelihood increases among couples with low income and a racial/ethnic minority background (Cronholm et al., 2015; Mersky et al., 2013). MCFT counselors are likely to encounter clients whose presenting couple or family problems relate to ACE. MCFT counselors that provide service with socioeconomically and racially diverse clients are even more likely to encounter ACE-related issues. Yet, in spite of a high average ACE score and low-income status, the majority of couples in this study also reported a high degree of relationship quality and life satisfaction. Therefore, the high amount of satisfaction (relational and individual) within this sample may be contrary to social stigma or bias that individuals cannot be happy without money. Indeed, the majority of couples reported as satisfied in their relationships and with their life overall. Yet, counselors are urged to not ignore the potential influence of early life adversity and

family-of-origin dynamics as they seem to play a critical role in the development of relationship quality, including relationship behaviors, into adulthood.

Related, Johnson (2002) recommended MCFT counselor assessment for the occurrence and severity of trauma. Further, she recommended assessment for the degree of integration of the trauma at the level of the individual and the relationship. Johnson theorized that past traumas could impact secure bonding and attachment; in turn, early attachment relationships may influence adult couple interaction and conflict. In fact, scientific discovery in neuroscience with animal specimen confirmed the lasting impact of secure attachments and early life stress for social intelligence and brain development (Cozolino, 2014). Therefore, the assessment of ACE aligns with prior theory for MCFT counselors and current principles of neuroscience.

Counselors should examine ACE to determine the degree of influence to current relationship functioning. MCFT counselors can also apply ACE assessment as a component of a systemic client conceptualization and informed treatment response. In sum, the assessment of ACE and health is a practical way counselors can begin to apply findings from the current study to practice.

Clinical intervention. Although ACE and trauma are not synonymous, the response and approach to client care may share similarities. Trauma-informed care is best practice and an interdisciplinary approach to client response and treatment (Greenwald et al., 2012; Morrissey et al., 2005; SAMHSA, 2012). A trauma-informed approach to client care includes: (a) awareness of the impact of trauma, (b) recognition of the symptoms of trauma, (c) individual and organizational responses grounded in knowledge of trauma, and (d) active efforts to avoid re-traumatization (SAMHSA, 2012). In this case, a counselor who is ACE-informed would be aware of the impact of ACE, recognize the associations with ACE correlates into adulthood, and

respond in accordance with this knowledge. Thus, due to the significant and dyadic contribution from ACE to both relationship quality and health, ACE-informed approaches may be an important consideration that warrant further investigation.

Gottman and Gottman (2015) identified the assessment of family of origin relationships and childhood experiences as an essential practice for effective MCFT intervention. They suggested the inclusion of individual sessions with each member of a couple, conducted with sensitivity and caution so as to not re-traumatize the individual or damage the developing therapeutic relationship. As a result, the counselor would be better able to evaluate the dynamics and experiences identified in this study as influential to health and relationship functioning. Similarly, Long and Young (2007) discussed counselor assessment of ‘vertical stressors’ or family of origin influences that subconsciously effect every individual and their relationships.

In this study, a high ACE related to low relationship quality, comprised of relationship effort, self-regulation strategies, and satisfaction. It seemed that ACE exposure related to relationship behaviors including the degree of perseverance in relational challenges (i.e., effort or SRE) and overall strategies employed to maintain the relationship over time (i.e., SRS). Therefore, the MCFT counselor may seek to understand the influence of ACE exposure as defined by the individual to relationship behaviors such as effort and relationship self-regulation strategies. In some cases, relationship education (RE) interventions may be helpful to augment potential relational strategies and skills. Thus, counselors may benefit from potential psychoeducation with a couple for the impact of ACE to current relational concerns and behavior. Additionally, couples may benefit from psychoeducation regarding the potential influence of chronic, contextual, and relational stressors.

MCFT counselors should also take into account partner influences from ACE, relationship quality and health since the final model included significant direct partner effects and non-significant partner paths that contributed to the overall model fit. Consistent with prior research (i.e., Topham et al., 2005), women seemed more vulnerable to the influence of both their own and a partner's reported ACE for perceived relationship quality. In response, counselors can assess and explore negative family dynamics from childhood that may influence current relationship interaction and conflict behaviors. Specifically, female clients may benefit from identification and modification of maladaptive interaction patterns that originated in early life. Couples may benefit from a developed understanding of their effect on their partner and a shared definition of the couple problem (Long & Young, 2007). While ACE exposure may be out of the control of the individual, awareness of and behaviors related to relationship self-regulation and effort in healthy relationships may not. For example, couples are influenced within the dyad for coping strategies and health behaviors (Bodenmann et al., 2007). Moreover, in this study, relationship quality as a dyadic process influenced health as evidenced by the significant indirect effects (i.e., mediation) and the high percentage of explained variance for health.

The direct effect from relationship quality to health underscores the significance of a holistic view of the client health and contextual understanding for influences and longitudinal outcomes of relationship behavior. The influence of relationship quality to health was especially apparent for men, where a total mediation effect existed. Thus, relationship quality explained a large majority for how ACE and health are related. Efforts to increase awareness for the importance of healthy relationships to overall health may be another significant contribution to practice. In much the same way that public health education reinforces the value of exercise and

nutrition (Robles et al., 2014), counseling professionals could underscore the importance of relationship behaviors for health.

An ACE-informed approach and ACE assessment may be important areas of practice for MCFT, especially for culturally competent practice with couples with low-income and a minority background. Therefore, it is important for counselor intervention to address the presence of ACE events, perceived influence to the individual/couple, and how the individual overcame such adversity to develop healthy relationship behaviors or the presence of unhealthy relationship behaviors to target. Finally, the current study also revealed an area for potential intervention to disrupt the negative patterns established from high ACE that often result in poor health. As the mediating variable in this study, relationship effort, strategies, and satisfaction may be an important area of intervention and prevention with the potential to improve positive health overall.

Advocacy and public policy. In the context of this study, the researcher found relationship quality is an important contributor to health that may also be an area of intervention for health problems. Use of an integrated and family approach to health for individuals with low-income could be effective due to the dyadic nature of the model and the influence of relationship quality to health. Pietromonaco, Uchino and Schetter (2013) suggested interventions aimed to reduce overall *relationship stress* as a “primary prevention for healthy individuals to enhance overall health and well-being, and to prevent mental and physical health problems” (p.507). As such, MCFT counselors may serve an important role in addressing health inequities through preventative relationship-focused interventions. Public health researchers also recommended the integration of community-based physical and mental health services for those with low-income to improve outcomes (Duong & Bradshaw, 2016). Therefore, MCFT

counselors may also be advocates for integrative care for populations most vulnerable and susceptible to these negative relationship-health trajectories. Yet, more information is needed for the influence of relational interventions to health trajectories over time. In sum, MCFT counselors are uniquely positioned to influence health on a systemic level through the amelioration of relationship behaviors among couples with low income.

In addition, integrative health services are recommended to be applied among this population (Duong & Bradshaw, 2016). Given the mediating role of relationship quality, couples and relationship interventions may be an important focus within this community to affect change. Counselors that seek to take action for social justice should therefore understand the chronic and contextual nature of stressors associated with health. Furthermore, effective intervention with individuals with low-income should seek to apply lessons learned from RE intervention such as considerations for: participant accessibility, cultural relevance of services provided, active engagement, as well as addressing holistic needs (Ooms & Wilson, 2004). In so doing, counselors may be better positioned to assess and address desired outcomes of health, well-being, and ultimately, social justice. Furthermore, the current findings reveal potential implications for public policy, such as health insurance reform and reimbursable services, that warrant additional attention.

President Obama enacted the Affordable Care Act in 2010, which resulted in increased health insurance coverage for over 20 million adults by 2016 (Uberoi, Finegold, & Gee, 2016) and improved access to behavioral health care from primary medical care settings (Mechanic & Olfson, 2016). For those newly covered by insurance, use of mental health treatment significantly increased (Saloner & Cook, 2014). Yet, limited options exist for insurance coverage of treatment for less severe forms of mental health disorders or couples and family

intervention. Marriage, couple, and family therapy (MCFT) is a cost-efficient and effective intervention for a broad range of conditions that may co-occur within healthcare settings (Crane & Christenson, 2014), including depression, substance abuse, or anxiety. Likewise, the dyadic nature of the current study implies the value of a systemic approach to health intervention.

Therefore, counselors hold an important perspective and skill-set that should be integrated into health promotion and health intervention services and care among couples and families with low-income. First, counselors should take a more active role in discussions related to approaches to health disparities and health care reform that include relational health.

In sum, based on the findings of the current study, clinicians should seek to integrate five key recommendations for practice. First, biopsychosocial assessment for all clients is integral for effective client conceptualization and intervention planning. Physical and mental health are closely related and influenced by internal and relational factors. Therefore, assessment should include the evaluation of (a) ACE, (b) current physical and mental health condition, (c) contextual stressors influential to current health and relational functioning (e.g., employment and income), as well as (d) influential systemic factors such as partner reports for ACE, relationship quality, and health. Second, counselors should assess for the meaning attributed by the individual and couple for family-of-origin influences and intergenerational patterns of stress and relationship behavior. Likewise, couples should examine family-of-origin dynamics of their partner, especially for women. Third, counselors should be able to articulate and promote the connection between relationship quality and overall health. Early life experiences influence relationship behaviors and relationship quality can explain how the past influences adult health, especially for men.

Fourth, counselors should be aware of limited accessibility to counseling and relational interventions by couples with low-income as a component of multiculturally competent practice and social justice for underserved groups. Counselors may seek work in integrated health settings to address the interrelated relational and health problems experienced by individuals and couples with low-income. Finally, given the large percentage of respondents in the highest health-risk ACE group (i.e., four or more ACE), populations with low-income may benefit most from relationship-focused prevention and intervention services. Additional research is needed; counselors should actively pursue research among couples with low-income to better understand the potential role of counseling intervention to address significant social issues such as disparities in health and family fragmentation. In so doing, counselors would be equipped to advocate for the health prevention-potential of relationship strengthening services for individuals that experience high ACE and low relationship quality.

Implications for Instrumentation

The current investigation used several assessments including: *the adverse childhood experiences (ACE) survey* (Felitti et al., 1998), (c) the *Relationship Assessment Scale* (RAS; Hendrick, 1988), (d) the *Behavioral Self-Regulation for Effective Relationships Scale* (BSRERS; Wilson et al., 2005), (e) the *Outcomes Questionnaire 45.2* (OQ45.2; Lambert et al., 2004), and (f) the *Brief Medical History Questionnaire* (Daire, Wheeler, & Liekweg, 2014). Several of the instruments are well-established in the literature; yet, the psychometric properties of most instruments had not been examined among individuals with low-income. Items from the BSRERS and RAS demonstrated good reliability and validity as measures of relationship effort, self-regulation strategies, and satisfaction. The remaining study instruments required some modification to appropriately reflect the constructs of interest with this sample data. Therefore,

this study contributed to understanding for the appropriateness of each measure for use with future similar samples – couples with economic disadvantage.

The Centers for Disease Control (2016) identified three categories of ACE to include abuse, neglect and household dysfunction. However, a three-factor solution did not fit the sample data. The factorability of the ACE survey was not supported in a consistent or theoretically meaningful way; therefore, a one-factor solution or ACE total score was employed by the researcher. Additionally, the inclusion of additional ACE indicators suggested in the literature may better support the three-factor structure to capture ACE specific outcomes by group (i.e. abuse, neglect, household dysfunction).

Researchers that employ the OQ45.2 with a low-income population should consider the use of an EFA to identify the correct factor loading for this group. The data from this study revealed a large number of items (e.g., 23 items removed) that did not contribute to the factors. Specifically, items from the ‘social role subscale’ may not be appropriate with this population due to the large number of participants who identified an employment status as unemployed, retired, or disabled. Furthermore, the subscales originally identified by the instrument developers (i.e. interpersonal relationships, social role) were not supported with this data. Prior studies found similar challenges with factor structure of the OQ45.2 with a college student population (Kim, Beretvas, & Sherry, 2010; Rice, Suh, & Ege, 2014). However, the revised version of the OQ45.2 provided relevant data for measures of symptom distress and life satisfaction as indicators of health.

Chapter Summary

In chapter five, the researcher provided a review of the current investigation and compared results to prior research. The results of the study supported the theorized model for

the dyadic and mediation influences of relationship quality for ACE and health in a sample of heterosexual couples with economic disadvantage and racial or ethnic minority background ($\chi^2[58] = 117.764, p < .001$; RMSEA = .045; CFI = .97; TLI = .95; SRMR = .033). The individual-level and dyadic relationships between male and female ACE and relationship quality explained a significant portion of variance in health (i.e., 82.3% for men [a large effect], 56.5% for women [a large effect]). ACE significantly contributed to relationship quality and health, including a significant partner effect from male ACE to female relationship quality and from female relationship quality to male health. Early life experiences from the family of origin (i.e., ACE) mattered both for how an individual engaged in his or her adult relationships and overall health. This study provided a novel perspective for relationship behavior as a health-risk behavior associated with ACE. Additionally, members of a couple influenced one another for relational, mental, and physical health. Thus, the current study also expanded understanding for family-level stressors differentially reported by couples with low-income (i.e., high ACE scores) and influential to relationship dynamics and health.

Finally, the ACE-health association observed in the literature (Felitti et al., 1998) can at least in part be explained by how an individual engaged in his or her intimate relationships. Women also experienced unique contributions from ACE to health aside from the mediating role of relationship quality. Yet, overall, relationship quality provided a causal explanation for how ACE influenced health (i.e., mediation) for both men and women. Therefore, integrative approaches to health and health services for individuals with low-income that incorporate family-of-origin and couple relationship quality are important considerations for practitioners and policymakers alike.

**APPENDIX A: UNIVERSITY OF CENTRAL FLORIDA INSTITUTIONAL
REVIEW BOARD APPROVAL LETTER**



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Naomi Joy Wheeler

Date: December 15, 2016

Dear Researcher:

On 12/15/2016, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: Exploring Dyadic Mediators of Adverse Childhood Experiences,
Health, and Relationship Quality for Economically Disadvantaged
Couples
Investigator: Naomi Joy Wheeler
IRB Number: SBE-16-12713
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

A handwritten signature in black ink, appearing to read "Naomi Joy Wheeler".

IRB Chair

APPENDIX B: INTAKE DEMOGRAPHIC QUESTIONNAIRE



Marriage and Family Research Institute
Adult History Form Part A

Today's Date: _____

Please answer ALL questions.

1. Your name:	_____
2. Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
3. Your Date of Birth (MM/DD/YYYY):	____/____/____
4. Age:	_____
5. Home street address: City, State & Zip	_____
6. Phone Numbers:	
Home:	(____)____-_____ Ok to leave a message? <input type="checkbox"/> Yes <input type="checkbox"/> No
Work:	(____)____-_____ Ok to leave a message? <input type="checkbox"/> Yes <input type="checkbox"/> No
Cell/other:	(____)____-_____ Ok to leave a message? <input type="checkbox"/> Yes <input type="checkbox"/> No
7. Preferred contact number:	<input type="checkbox"/> Home <input type="checkbox"/> Work <input type="checkbox"/> Cell/Other
8. Email Address:	_____
9. Person and number to call in case of emergency:	_____ _____ _____
Demographic Information- About you	
10. Ethnicity:	<input type="checkbox"/> Hispanic <input type="checkbox"/> Non-Hispanic
11. Race:	<input type="checkbox"/> American Indian/Alaskan Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Other: _____
Educational Attainment:	
12. Highest Education Completed:	<input type="checkbox"/> No degree or diploma earned <input type="checkbox"/> High school diploma/GED <input type="checkbox"/> Vocational/Technical Certification <input type="checkbox"/> Associate's Degree <input type="checkbox"/> Bachelor's Degree <input type="checkbox"/> Master's degree/Advance degree <input type="checkbox"/> Other: _____
13. Years of Education completed (e.g. 12 th grade would be '12', A.A. Degree would be '14')?	_____ years

APPENDIX C: ADVERSE CHILDHOOD EXPERIENCES (ACE) SURVEY

Finding Your ACE Score

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household often or very often...
Swear at you, insult you, put you down, or humiliate you?
or
Act in a way that made you afraid that you might be physically hurt?
Yes No If yes enter 1 _____
2. Did a parent or other adult in the household often or very often...
Push, grab, slap, or throw something at you?
or
Ever hit you so hard that you had marks or were injured?
Yes No If yes enter 1 _____
3. Did an adult or person at least 5 years older than you ever...
Touch or fondle you or have you touch their body in a sexual way?
or
Attempt or actually have oral, anal, or vaginal intercourse with you?
Yes No If yes enter 1 _____
4. Did you often or very often feel that ...
No one in your family loved you or thought you were important or special?
or
Your family didn't look out for each other, feel close to each other, or support each other?
Yes No If yes enter 1 _____
5. Did you often or very often feel that ...
You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
or
Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Yes No If yes enter 1 _____
6. Were your parents ever separated or divorced?
Yes No If yes enter 1 _____
7. Was your mother or stepmother:
Often or very often pushed, grabbed, slapped, or had something thrown at her?
or
Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard?
or
Ever repeatedly hit at least a few minutes or threatened with a gun or knife?
Yes No If yes enter 1 _____
8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
Yes No If yes enter 1 _____
9. Was a household member depressed or mentally ill, or did a household member attempt suicide?
Yes No If yes enter 1 _____
10. Did a household member go to prison?
Yes No If yes enter 1 _____

Now add up your "Yes" answers: _____ This is your ACE Score.

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APPENDIX D: RELATIONSHIP ASSESSMENT SCALE (RAS)

RELATIONSHIP ASSESSMENT SCALE
Susan S. Hendrick, Ph.D.

Name: _____

Date: _____

Client ID #: _____

Please circle the answer that best matches what you think or feel.

How well does your partner meet your needs?

A	B	C	D	E
Poorly	Below Average	Average	Above Average	Extremely Well

In general, how satisfied are you with your relationship?

A	B	C	D	E
Unsatisfied	Slightly Satisfied	Average	More Satisfied	Extremely Satisfied

How good is your relationship compared to most?

A	B	C	D	E
Poor	Below Average	Average	Above Average	Excellent

How often do you wish you had not gotten in this relationship?

A	B	C	D	E
Never	Rarely	Sometimes	Often	Very Often

To what extent has your relationship met your original expectations?

A	B	C	D	E
Hardly at all	Slightly	Average	Reasonably	Completely

How much do you love your partner?

A	B	C	D	E
Not Much	A Little	Average	Moderately	Very Much

How many problems are there in your relationship?

A	B	C	D	E
Very Few	Few	Average	Many	Very Many

Hendrick, S. (1988). A generic measure of relationship satisfaction. *Journal of Marriage & the Family*, 50(1), 93-98. doi:10.2307/352430.

**APPENDIX E: BEHAVIORAL SELF-REGULATION FOR EFFECTIVE
RELATIONSHIPS SURVEY (BSRERS)**

ID: _____

Self-Report BSRERS

Please report the extent to which the below statements are true of your own behavior in the relationship.

	(1) Not True at All	(2)	(3)	(4)	(5) Very True
1	I make an effort to seek out ideas about what makes for an effective relationship.				
2	I try to apply ideas about effective relationships to improving our relationship.				
3	I discuss the appropriateness of my goals for our relationship with my partner.				
4	If things go wrong in our relationship, I tend to feel powerless.				
5	I tend to put off doing anything about problems in our relationship in the hope that things will get better by themselves.				
6	I tend to fall back on what is comfortable for me in relationships, rather than trying new ways of relating.				
7	I work out practical ways or strategies to achieve the goals I set for myself.				
8	I actually put my intentions or plans for personal change into practice.				
9	Even when I know what I could do differently to improve things in our relationship, I cannot seem to change my behavior.				
10	I persist with plans for personal change even in the face of difficulties.				
11	If my partner does not appreciate the change efforts I am making, I tend to give up.				
12	I give my partner helpful feedback on the ways they can help me achieve my goals.				
13	When I have difficulty making a change, I tend not to ask for support from my partner.				
14	I adjust my goals or strategies for personal change in the light of feedback from my partner.				
15	If the way I'm approaching change does not work, I can usually think of something else different to try.				
16	When things are not going so well in our relationship, I can usually think of something I can do to make it better.				

APPENDIX F: OUTCOMES QUESTIONNAIRE 45.2 (OQ 45.2)

Outcome Questionnaire (OQ®-45.2)

Instructions: Looking back over the last week, including today, help us understand how you have been feeling. Read each item carefully and mark the box under the category which best describes your current situation. For this questionnaire, work is defined as employment, school, housework, volunteer work, and so forth. Please do not make any marks in the shaded areas.

Name: _____ Age: _____ yrs.
 Sex: M F
 ID#: _____

Session # _____ Date: ____/____/____

	Always					SD	IR	SR
	Never	Rarely	Sometimes	Frequently	Always			
1. I get along well with others.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
2. I rise quickly.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
3. I feel no interest in things.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
4. I feel stressed at work/school.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
5. I blame myself for things.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
6. I feel irritable.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
7. I feel unhappy in my marriage/significant relationship.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
8. I have thoughts of ending my life.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
9. I feel weak.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
10. I feel fearful.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
11. After heavy drinking, I need a drink the next morning to get going. (If you do not drink, mark "never")	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
12. I find my work/school satisfying.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
13. I am a happy person.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
14. I work/study too much.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
15. I feel worthless.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
16. I am concerned about family troubles.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
17. I have an unfulfilling sex life.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
18. I feel lonely.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
19. I have frequent arguments.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
20. I feel loved and wanted.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
21. I enjoy my spare time.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
22. I have difficulty concentrating.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
23. I feel hopeless about the future.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
24. I like myself.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
25. Disturbing thoughts come into my mind that I cannot get rid of.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
26. I feel annoyed by people who criticize my thinking (or drug use). (If not applicable, mark "never")	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
27. I have an upset stomach.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
28. I am not working/studying as well as I used to.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
29. My heart pounds too much.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
30. I have trouble getting along with friends and close acquaintances.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
31. I am satisfied with my life.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
32. I have trouble at work/school because of drinking or drug use. (If not applicable, mark "never")	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
33. I feel that something bad is going to happen.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
34. I have sore muscles.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
35. I feel afraid of open spaces, of driving, or being on buses, subways, and so forth.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
36. I feel nervous.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
37. I feel my love relationships are full and complete.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
38. I feel that I am not doing well at work/school.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
39. I have too many disagreements at work/school.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
40. I feel something is wrong with my mind.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
41. I have trouble falling asleep or staying asleep.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
42. I feel blue.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
43. I am satisfied with my relationships with others.	<input type="checkbox"/> 4	<input type="checkbox"/> 3	<input type="checkbox"/> 2	<input type="checkbox"/> 1	<input type="checkbox"/> 0			
44. I feel angry enough at work/school to do something I might regret.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
45. I have headaches.	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4			
Total=								

Developed by Michael J. Lambert, Ph.D. and Gary M. Burlingame, Ph.D.
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 TOLL-FREE: 1-888-AME SCORE (1-888-441-2473)
 FAX: 91-744-6990

APPENDIX G: BRIEF MEDICATION HISTORY QUESTIONNAIRE



Name: _____

Participant #: _____

Brief Family Medical History

Please indicate ('X') if you or your child(dren) has had any of the following diseases or conditions.

Disease/Condition	Self	Child(ren)
Alcoholism / Drug abuse		
Autoimmune Disease		
Cancer Breast		
Cancer Colon		
Cancer Other Type		
Cancer Ovarian		
Cancer Prostate		
Colon Polyp		
Coronary Artery Disease (e.g. heart attack, angina)		
Depression / Suicide / Anxiety		
Diabetes (childhood onset)		
Diabetes (adult onset)		
Emphysema (COPD)		
High Blood Pressure – Hypertension		
High Cholesterol		
Migraine Headaches		
Obesity		
Other (list):		
N/A (None Apply):		

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