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Examining the effects of gender attitudes and beliefs in the BBFM

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EXAMINING THE EFFECTS OF GENDER ATTITUDES AND BELIEFS IN THE

BBFM

by

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CERTIFICATE OF APPROVAL

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PH.D. THESIS

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ABSTRACT

Romantic relationship factors have been linked to both physical and mental health outcomes. Previous research has lacked attention not only on associations among these constructs, but on ways by which gender attitudes and beliefs impact romantic heterosexual relationships. The Biobehavioral Family Model (BBFM) is a biopsychosocial approach to health that integrates couple/family emotional climate, biobehavioral reactivity (emotion regulation), and physical health outcomes into one comprehensive model. Utilizing a feminist framework, the present study was conducted to examine the ability of the BBFM to explain connections between couple processes and health while integrating an additional construct of gender attitudes and beliefs. The sample consisted of 595 adults (age range 18-65+ years) who have been in committed romantic relationships for at least two years. Data were collected through online surveys that asked participants about their relationship satisfaction, mental health symptoms, physical health, and attitudes and beliefs about gender in relationships. Confirmatory factor analyses were used to test measures of romantic partner emotional climate, gender attitudes and beliefs, biobehavioral reactivity, and disease activity. Structural equation modeling was used to test associations among all constructs. Results demonstrated some support for the BBFM in explaining health quality for the sample. Specifically, romantic partner emotional climate was positively associated with biobehavioral reactivity, and gender attitudes and beliefs were significantly associated with both biobehavioral reactivity and disease activity. Applying the BBFM while incorporating gender attitudes and beliefs through a feminist lens demonstrates ways by which couple processes affect the mental and physical health of these individuations. Recommendations for future research and clinical implications are discussed.

PUBLIC ABSTRACT

Romantic relationship factors have been linked to both physical and mental health outcomes. Previous research has lacked attention not only on associations among these constructs, but on ways by which gender attitudes and beliefs impact romantic heterosexual relationships. The Biobehavioral Family Model (BBFM) is a biopsychosocial approach to health that integrates couple/family emotional climate, biobehavioral reactivity (emotion regulation), and physical health outcomes into one comprehensive model. Utilizing a feminist framework, the present study was conducted to examine the ability of the BBFM to explain connections between couple processes and health while integrating an additional construct of gender attitudes and beliefs. The sample consisted of 595 adults (age range 18-65+ years) who have been in committed romantic relationships for at least two years. Data were collected through online surveys that asked participants about their relationship satisfaction, mental health symptoms, physical health, and attitudes and beliefs about gender in relationships. Results demonstrated some support for the BBFM in explaining health quality for the sample. Specifically, romantic partner emotional climate was positively associated with biobehavioral reactivity, and gender attitudes and beliefs were significantly associated with both biobehavioral reactivity and disease activity. Applying the BBFM while incorporating gender attitudes and beliefs through a feminist lens demonstrates ways by which couple processes affect the mental and physical health of these individuations. Recommendations for future research and clinical implications are discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure

LIST OF ABBREVIATIONS

1. BBFM – Biobehavioral Family Model

2. RPEC – Romantic Partner Emotional Climate

3. GAB – Gender Attitudes and Beliefs

4. BBR – Biobehavioral Reactivity

5. DA – Disease Activity

6. CSI – Couple Satisfaction Index

7. CES-D – Center for Epidemiologic Studies Depression Scale

8. RMSEA – Root Mean Square Error of Approximation

9. SRMR – Standardized Root Mean Square Residual

10. CFI – Comparative Fit Index

11. CFA – Confirmatory Factor Analysis

12. CI – Confidence Interval

13. C/MFT – Couple/Marriage and Family Therapist

CHAPTER 1: INTRODUCTION

The treatment of mental and physical illness of American adults comprises a large sector of the rising health care costs, with the gross domestic product of these illnesses nearing 20% of the nation's economy (World Health Organization, 2011). Currently, mental illness and physical disease are the leading cause of death and disability in the United States, with over 117 million adults affected annually (Center for Disease Control and Prevention, 2014). These disorders are often associated with compromised functioning and lower quality of health and well-being across the life course (Joffe et al., 2012). Moreover, the impairment of chronic and physical illness has led to growing concern in personal healthcare expenditures, which has doubled in recent years and contributed to dramatic disparities in healthcare quality and overall health outcomes (USDHHS, 2014).

Given the large burden of mental and physical illness on American adults and rising health disparities, considerable effort has gone into identifying mechanisms that underlie these disparities and adverse health outcomes to inform future research and treatments. Increased focus in research has attempted to combine relational and contextual variables (e.g., age, gender) to health outcomes on pathways by which these effects occur (Carr & Springer, 2010; Ridgeway & Correll, 2007). A growing body of research has linked the mental and physical health of American adults to relationship quality with family and heterosexual romantic partners (Carr & Springer; Overbeek et al., 2006). Specifically, close relationships can impact risk factors related to health in both positive and negative ways. For instance, research shows that poor marital quality reported by heterosexual couples affects health trajectories over time (Proulx & Snyder, 2009) and can contribute to exacerbated mental health symptoms such as depression and anxiety (Whisman, 2007). Greater marital quality among heterosexual couples, in contrast, has been shown to help

ameliorate mental and physical health symptoms and lead to higher life quality (Umberson, Williams, Powers, Chen, & Campbell, 2005). These close relationships can impact risk factors related to health in both positive and negative ways. Further, it is important to note that this study focused on the self-rated health, satisfaction, and attitudes of heterosexual couples and that generalizations to other romantic partner pairings may not be appropriate.

Although research on romantic relationships and health has increased in the past decade, a bulk of this research has focused on *either* mental (e.g., Afifi, Boman, Flisher, & Sareen, 2009; Priest, 2013; Whisman, 2007) *or* physical health (e.g., Friedmann, Thomas, Liu, Morton, Chapa, & Gottlieb, 2006; Uchino, 2004; Zhang, Norris, Gregg, & Beckles, 2007). The Centers for Disease Control and Prevention (CDC) describe the treatment of mental and physical health as a holistic approach to disease prevention that integrates both the mind (mental health) and body (physical health) to encompass overall well-being (2011). Global reports on either mental health or physical illness continue to underrate the complexity and overlap of these two functions, despite evidence supporting links between physical health conditions and mental health concerns (Prince et al., 2007). For instance, a study of adults in primary care for chronic illnesses found that half of all patients reported some type of distressed family relationship and approximately one-third reported distressed romantic relationships (Woods, Priest, Denton, & Rodriguez, 2014). In another nationally represented sample of adults, over half reported one or more mental or physical health conditions, which can be accounted for by comorbid symptoms and conditions (Merikangas et al., 2007).

Additionally, chronic diseases such as heart disease and diabetes, along with mental disorders such as depression and anxiety are prevalent (CDC, 2014) and frequently interact with one another (Goodall, Druss, & Walker, 2011). Research on the interplay between mental and

physical illness support the need for continued studies using comprehensive models (Prince et al., 2007), such as the BBFM, in addition to identifying modifiable and contextual characteristics (e.g., gender attitudes and beliefs) through which mental and physical health are linked. Additionally, this research has focused on relationship satisfaction in marital (heterosexual) relationships based on couples' subjective experiences. While marital satisfaction is often the focus of research on romantic relationships and health, neglecting to study integrative effects of mental health (e.g., depression, anxiety) and physical health (e.g., heart disease, diabetes) ignores potentially powerful influences on overall health and relationship quality among couples. The next section will review the importance of considering romantic heterosexual relationships in overall mental and physical health outcomes.

Couples and Health

In general, marriage is associated with more health-enhancing behaviors than risky health behaviors (Umberson, Williams, Powers, Liu, & Needham, 2006; Waite & Gallagher, 2000). An existing body of research studying heterosexual couples has demonstrated links between close, interpersonal relationships and overall health outcomes (Carr & Springer, 2010; Robles & Kiecolt-Glaser, 2003). Two major trends have emerged in the literature; namely the identification of specific characteristics in relationships that are linked to disease management and the design and implementation of targeted, relationship-based interventions (Umberson et al., 2006). Research continues to demonstrate that close, interpersonal relationships can both buffer or exacerbate risk factors and health symptoms (Wood & Miller, 2002). Safe, supportive relationships that are maintained over time can help regulate emotional distress related to chronic disease (Weihs et al., 2002), while difficult, stressful relationships that contain conflict can lead to dysregulation which may impact the course and maintenance of disease and immune functioning (Carrere, Mittman,

Tabares, Yoshimoto, 2005, Robles & Kiecolt-Glaser, 2003). When relationships are distressed, for example, these interactions have been shown to reduce relationship quality (Overbeek et al., 2006), impair physiological functioning (Chida & Hamer, 2008; Robles & Kiecolt-Glaser, 2003), and increase symptoms of specific mental disorders such as anxiety and depression (Carrere et al., 2005; Whisman, 2007). Further, while marriage has advantages for both spouses, the idea has been proposed that men generally derive more health benefits from marriage (Kiecolt-Glaser & Newton, 2001) and live longer than never-married, divorced, and widowed men (Harvard Health Publications, 2010). One possible explanation for this finding is that women are socialized to often be the emotional and physical caretakers in relationships and that married men are, in many ways, emotionally and physically accounted for by their female spouses (Rousdari et al., 2001).

In addition to findings that demonstrate how men benefit more in marriage with regard to health outcomes, it is important to consider ways in which attitudes and beliefs about men and women in marriage potentially influence health outcomes as measured in the existing model for this study (e.g., The Biobehavioral Family Model). Thus, the purpose of this present study is to investigate the interaction of mental health, physical health, and gender attitudes and beliefs on adult (heterosexual) romantic relationship outcomes using a comprehensive, biopsychosocial model of health: The Biobehavioral Family Model (BBFM; Wood, 1993). The following sections will (a) discuss the background of the BBFM, (b) introduce an expansion of the BBFM, (c) discuss the importance of adding gender attitudes and beliefs as an exogenous variable, and (d) review the study's overall purpose to investigate the interactive effects of mental health, physical health, and the ways by which attitudes and beliefs regarding gender function/socialization impact adult heterosexual romantic relationships.

The Biobehavioral Family Model

The Biobehavioral Family Model (BBFM; Wood, 1993) is a biopsychosocial approach to health that integrates the effects of relationship functioning on psychological factors and physical health outcomes into one comprehensive model. The BBFM theorizes the reciprocal, mutual influences of social, emotional, and physical factors on facets of illness and health and posits that close relationships play a critical role in overall health outcomes (Wood & Miller, 2002). Specifically, these relationships can serve as a protective mechanism against disease and illness, especially when these relationships are built around a sense of support and cohesion. Conversely, negative family relationships can act to exacerbate symptoms and other risks factors related to health (Wood, Miller, Zwetsch, & Simmens, 2008). Further, the emotional processes and relationship quality within close relationships are crucial to understanding health, in part because these relationships enact close bonds and emotional intensity that takes place over time (Weihs et al., 2002). Only in establishing pathways between these close relationships and health can efforts be directed toward investigating which biopsychosocial variables influence health outcomes and well-being. See Figure 1 for a visual of the model.
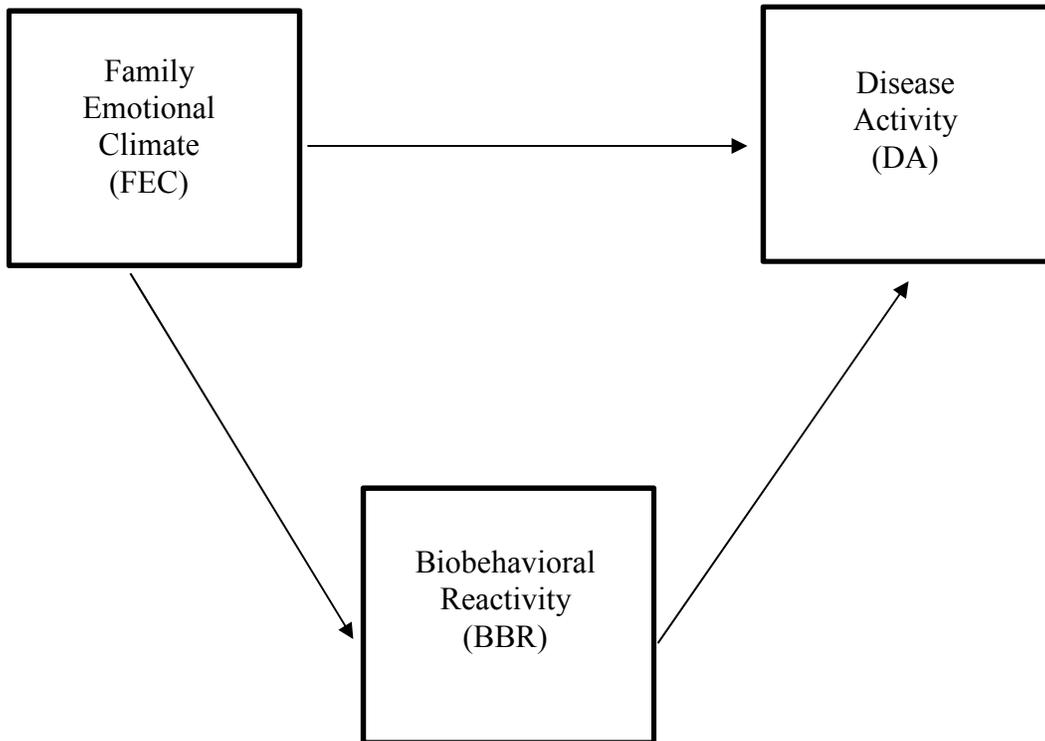
Figure 1. The Biobehavioral Family Model (Wood, 1993)

The BBFM has been tested with adult family members (Woods & Denton, 2013; Woods, Priest, & Rousch, 2015), adult romantic partners (Priest, Woods, Maier, Parker, Benoit, & Rousch, 2015), and with racially diverse samples (e.g., Latino Americans; Priest & Woods, 2015). Although the model was originally used to study the effects of children with asthma and family functioning (Wood, Klebba, & Miller, 2000), the BBFM has been expanded and is well-suited to test the effects of romantic relationships on biobehavioral reactivity and physical health. Including gender beliefs and attitudes as a potential predictor of romantic partner emotional climate can further the understanding of ways this construct impacts romantic relationships. The theoretical framework that will be used to test the impact of gender attitudes and beliefs on the BBFM is feminism. While there are several definitions and schools of feminism, I was guided by definitions from hooks (2000) and Enns (2004), who describe feminism as "a movement to end sexism, sexist exploitation, and oppression" (p. 1). Additionally, I was also guided by an expansion of this definition which defines feminism as the impact of social structure based on gender role ideology and sex-typed behavior (Enns, 2004). For the purpose of this paper, gender attitudes and beliefs are defined as the ways by which men and women interact according to traditional gender socialization scripts within their romantic relationship. These gender socialization scripts comprise a social relational context that maintain beliefs about gender function and social relations of inequality based on that difference (Enns, 2004; Ridgeway & Correll, 2007). Further, a theoretical framework of feminism will allow for a critique of the BBFM as this model has not previously considered ways in which gender attitudes and beliefs may impact the constructs within the model (e.g., romantic partner emotional climate, biobehavioral reactivity, and disease activity). Thus, feminism will inform each aspect of this proposed study from the review of literature to the interpretation and reporting of data.

Gender and Health

Although the existing body of research on martial quality suggests only minor gender differences in marital satisfaction (Jackson, Miller, Oka, & Henry, 2014) and similar health trajectories for men and women (Rogers & Amato, 2000), other studies have found that wives' reports of marital quality are significantly lower when compared to husbands' (Kamp Dush, Taylor, & Kroeger, 2008; Myers & Booth, 1999; Stevenson & Wolfers, 2009; Whiteman, McHale, & Crouter, 2007). Due to inconsistent findings based on gender and marital quality, it is possible that additional considerations should be made to account for these ambiguous results. It has been argued that the social relational contexts that maintain beliefs about gender and functioning comprise a core component in couple relationships (Ridgeway & Correll, 2008). Feminist family therapists have long studied the impact of how larger social context influence health and well-being in couples and families (e.g., Knudson-Martin) and specifically, how gender is linked to relationship quality and health. Divisions of unpaid household labor, for instance, continue to fall on the shoulders of women in dual-earner couples, which, in turn, has been shown in some studies to be linked to heightened anxiety and poor relationship satisfaction (Grzela & Bouchard, 2009). Although research evaluating the BBFM with heterosexual couples has accounted for various relationship dynamics, the impact of gender attitudes and beliefs has not been tested, thereby limiting the measurement of the romantic partner emotional climate construct within the BBFM. Thus, two separate arguments can be made for the inclusion of gender attitudes and beliefs in the BBFM: (a) a gender socialization from a feminist perspective lens and (b) a physiological difference perspective. Each of the arguments are presented below.

Gender socialization theory from a feminist perspective and in the context of couple relationships would suggest that the societal inequalities and disparities women experience from the workplace are perpetrated in their romantic relationships (Enns, 2004). Given the high prevalence rates of intimate partner violence (CDC, 2014) and the emotional and physical strain related to

caregiving which both disproportionately affect women (Berg & Woods, 2009), it is no surprise that women are often at a disadvantage in relationships. Gender socialization from a feminist perspective also states that men and women are constrained by gender norms in relationships, which often limit and define what constitutes acceptable behaviors for them within familial and societal systems (Baber & Allen, 1992). Research argues that these gender role constraints (e.g., gender attitudes and beliefs) as shaped by context and culture, play a role in relationship satisfaction (McGeorge, Carlson, & Guttormson, 2009). I further argue that these gender role constraints affect not only relationship satisfaction, but eventual health outcomes and thus, need to be considered in the larger BBFM.

Health is an important component within the BBFM, and consequently, it is important to note the current status of both women's and men's mental and physical health specifically, the gap between reported health outcomes. As noted in the NIH Office of Research on Women's Health's Strategic Plan (2014), there is a strong link between gender imbalances in differential disease risk and effects on women's health, in addition to health outcomes for women in committed, heterosexual romantic relationships (Ridgeway & Correll, 2007). Additionally, women are 60-70% more likely than men to experience chronic mental illness such as depression and anxiety (NIMH, 2014) and report additional risk factors for physical health outcomes, such as coronary heart disease (NIH, 2014) and inpatient heart attacks compared to males (USDHHS, 2011). Further, research has documented differences in physiological stress response systems for men and women, suggesting that women may experience higher cortisol output and greater reactivity to social and relational stressors than men (Laurent, Powers, & Granger, 2013; Rodriguez & Margolin, 2013; Stroud, Salovey, & Epel, 2002). From a feminist perspective, these findings may highlight the documented inequalities that are present in heterosexual relationships in context to physiological health. Specifically, women experience and undergo higher levels of stress due to the socialization that relationship success (or failure) resides within their power (Enns, 2004); thus, women must maintain

relationship harmony and within the family (Enns, 2004). Additionally, the construct of minority stress may be particularly relevant here, as previous studies have shown that specific marginalized populations (for example, gay men) are at risk for adverse mental health outcomes when they perceive higher frequencies of inequalities, discriminatory events and internalized homonegativity (or in this case, sexism; Burns, Kamen, Lehman, & Beach, 2012). Similarly, feminist scholars have argued that while married women are more likely to be diagnosed with depression and anxiety disorders, oftentimes these symptoms are a result of living in relationships where women feel a sense of unfairness reflected in the gendered inequities of power, privilege, and entitlement in their relationships (Russo & Landrine, 2009). Moreover, women's health issues have long been a central concern in the women's movement and feminist psychology (Travis, Grassley, & Crumpler, 1991), as feminist scholars have been on the forefront of challenging traditional biomedical, disease-oriented models and expanding discussion to incorporate social and behavioral factors that influence treatment and prevention (Gallant, Keita, & Royak-Schaler, 1997; Travis & Meltzer, 2009; Worrell & Goodheart, 2006). Thus, whether gender attitudes and beliefs are linked to any of the findings in this study is something this paper hopes to answer.

Although the constructs of attitudes and beliefs can be complex and difficult to measure, they are an important methodological tool used often in the social sciences (Page-Bucci, 2003). *Attitudes* are an essential component to understanding human interaction in relational contexts, as they can exert a behavior or dynamic and influence an individual's response to an environmental stimuli. *Beliefs* are often organized through experience and are oftentimes used to further understand and predict people's reactions to certain objects, events, and other stimuli (Fishbein & Ajzen, 1975). Further, attitudes and beliefs related to gender function are important to understand, especially when those attitudes have the potential to impact relationship satisfaction levels and the overall health outcomes of partnered men and women.

Historically, shared expectations, attitudes and beliefs have been linked to more stable relationships for married couples (Coltrane, 2000; Hohmann-Marriott, 2006; Kurdek, 1993). Within heterosexual couple relationships, studies have typically analyzed the discrepancies between men's and women's beliefs and focused on the shared belief systems between one another on various topics such as parenting (Chinitz & Brown, 2001), natural family planning (Choi, Chan, & Wiebe, 2010), household division of labor (Coltrane, 2000; Hohmann-Marriott, 2006), time spent together (Gager & Sanchez, 2003), and socio-cultural, religious beliefs (Roudsari, Jafari, Taghipour, & Ebrahimzadah, 2011). Although this study will not focus on dyadic data (e.g., interaction between husbands and wives), it is important to study attitudes and beliefs among couples nonetheless for several reasons.

First, research has shown direct correlations between cultural beliefs and attitudes toward health behaviors such as reproductive donation (Rousdari et al., 2001). Additionally, research has also demonstrated that beliefs associated with more sexist attitudes toward women (i.e., gender-ideological belief systems rooted in patriarchy) have been linked to motivations for female partners to change their appearance through cosmetic surgery (Swami, Pietschnig, Stewart, Nader, Stieger, Shannon, & Voracek, 2013). Other reports have demonstrated that dual-earner couple's beliefs about one's self-satisfaction have been linked to overall life satisfaction (Maintier, Joulain, & La Floc'h, 2011). Thus, implications for measuring attitudes and beliefs should not be underestimated when analyzing health trajectories for couples.

Study Purpose

The purpose of this study is to expand the BBFM by investigating the interaction of gender attitudes and beliefs, mental health, and physical health while building upon the existing body of knowledge on heterosexual romantic relationships and mental and physical health. Specifically, this study tests the inclusion of gender attitudes and beliefs as they relate to romantic relationships as a

distinct variable in the BBFM. Additionally, this study seeks to address the shortcomings in the literature regarding pathways and specific outcomes on couple relationships, attitudes and perceptions of gender roles, and health. Testing gender attitudes and beliefs related to couple relationships would provide an additional understanding of how the perceptions related to gender roles within couple relationships affect mental and physical health. Thus, the following questions will be asked utilizing a feminist theoretical lens:

1) How do gender attitudes and beliefs impact the Biobehavioral Family Model (BBFM)?

   a. How do gender attitudes and beliefs impact romantic partner emotional climate (RPEC)?

   b. How do gender attitudes and beliefs impact biobehavioral reactivity (BBR)?

   c. How do gender attitudes and beliefs impact disease activity (DA)?

Hypotheses

Thus, the four hypotheses are:

(1) There will be a direct, significant pathway between gender beliefs and attitudes and biobehavioral reactivity,

(2) There will be a direct, significant pathway between romantic partner emotional climate and biobehavioral reactivity,

(3) There will be a direct, significant pathway between biobehavioral reactivity and disease activity,

(4) Biobheavioral reactivity will mediate the relationships between romantic partner emotional climate and disease activity, and gender attitudes and beliefs and disease activity.

Summary

The goal of this study was to test the integrative effects of gender attitudes and beliefs on couple relationships and health within the Biobehavioral Family Model. Although the BBFM has

tested associations using different populations (e.g., Latino Americans, Priest & Woods, 2015) and couple relationships (Priest et al., in press), it has yet to be tested using gender attitudes and beliefs as an outside variable. Neglecting to study the effects of this construct on romantic relationships ignores potentially powerful influences on physical health and well-being. Additionally, a feminist framework helped to situate this study in a social context of patriarchy which posits that gender attitudes and beliefs impact health and relationship satisfaction.

Definition of Terms

Family Emotional Climate. The intensity and positivity or negativity of emotional process within the family (Wood et al., 2008).

Biobehavioral Reactivity. The degree of emotion regulation or dysregulation; the manner in which individual family members respond to emotional stimuli. This construct is typically measured as anxiety or depression.

Disease Activity. Physical health outcomes, such as asthma, heart disease, and diabetes. This study uses self-report questions to measure overall health of participants.

Romantic
Partner
Emotional
Climate

BBR
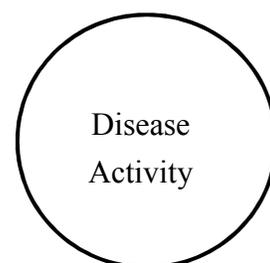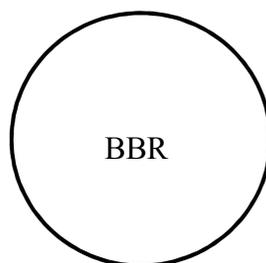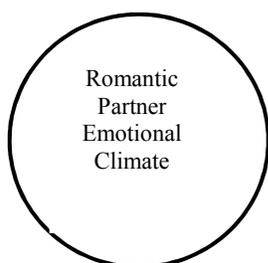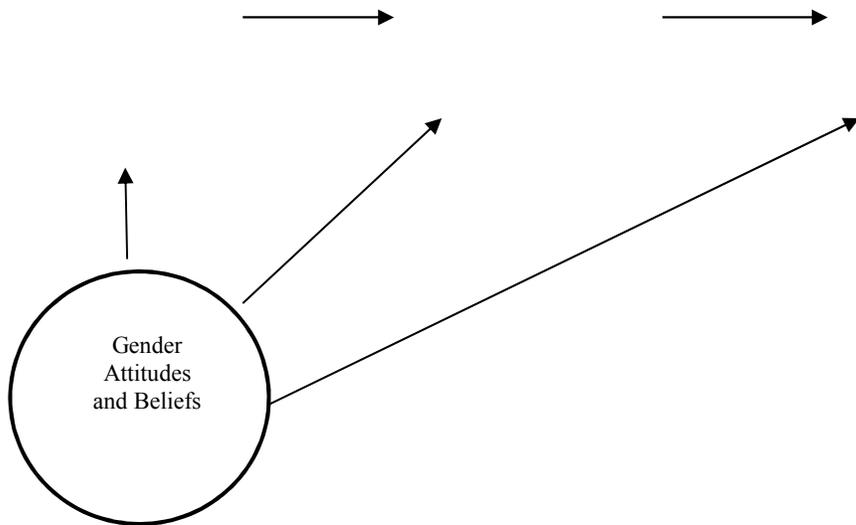
Disease
Activity

Figure 2. Hypothesized Model: Relationships among Romantic Partner Emotional Climate, Gender Attitudes and Beliefs, Biobehavioral Reactivity, and Disease Activity

CHAPTER 2: LITERATURE REVIEW

In this section, I will begin by discussing the theoretical framework used to guide this study: feminism. Next, I will discuss the Biobehavioral Family Model and the importance of incorporating gender attitudes and beliefs into the BBFM. Last, I will discuss the constructs and theoretical background of the BBFM.

Feminist Theory

The theoretical framework I used in my study to test effects of mental health, physical health, and gender attitudes and beliefs in the BBFM is feminism. While there are several definitions and schools of feminism, I used a definition by hooks (2000), which defines feminism as, "a movement to end sexism, sexist exploitation, and oppression" (p. 1). In order to expand on this definition of feminism, I also used three tenets of feminism to guide this study: 1) both women and men are constrained by gender norms, which often define and limit attitudes and behaviors within a relational context, 2) women are oppressed by powerful socializing institutions, which construct the way society views couple relationships and women's role in both society and in the family, 3) women have diverse, valuable experiences that are important to consider when viewing long-term health outcomes in relationships (Baber & Allen, 1992; hooks, 2000).

Furthermore, the definition of feminism that I used is based on the notion that women and men are shaped by individual daily decisions and are affected by the actual and perceived options that are available to them (Baber & Allen, 1992). Baber and Allen argue that a feminist perspective aims to "make explicit the social forces, often invisible, that influence women's day-to-day experiences" (p. 5). Moreover, a feminist perspective allowed for the critique of the roles that women and men perform based on socially constructed gender norms as well as the critique of the ways in which women and men are perceived in society (e.g., attitudes and beliefs). A feminist

framework provides opportunities to view gender attitudes and beliefs through the lens of a patriarchal society and how these attitudes and beliefs impact health and relationship satisfaction for couples within the BBFM (Barber & Allen, 2004; hooks, 2000). The next section discusses this model and its individual constructs to be tested in this study.

The BBFM: An Organizing Framework

The BBFM (Wood, 1993) is a comprehensive, biopsychosocial approach to understanding the reciprocal nature of interpersonal family relationships and physiological processes on physical health outcomes. This model will serve as the guiding framework for this overall study, while integrating aspects from feminist theory to hypothesize the importance of gender attitudes and beliefs. The BBFM maintains several tenets that are found in family systems theory (von Bertalanffy, 1969) as well as Minuchin's psychosomatic family model (Minuchin, Rosman, & Baker, 1978). These theoretical backings provide a context for the BBFM but will not be used separately to guide the methods, results, or discussion provided in this study.

The BBFM includes three separate variables: family (romantic partner) emotional climate, biobehavioral reactivity, and disease activity (Wood, 1993). As described above, family emotional climate encompasses the positive and negative emotional processes within the family, the intensity of those processes, and the overall quality of the relationship (Wood et al., 2008). Biobehavioral reactivity is a pivotal construct that links family relationships to health and can be described as the physiological responses of individual family members to emotional stimuli that activate the autonomic nervous system (Boyce, 1992, Wood, 1993). Biobehavioral reactivity reflects an individual's ability to manage and regulate emotion and is influenced by both the nervous system and external stimuli in one's environment (Wood, Klebba, & Miller, 2000). When ongoing conflict or chaos are present in the family, these processes are reflected in biobehavioral reactivity.

Depending on the activation or deactivation of particular emotional family patterns, the BBFM posits that certain physiological processes may impact one's physical health symptoms. This remaining construct in the BBFM (e.g., disease activity) encompasses the "mutual contribution of psychological and biological factors to both physically and psychologically manifested disease (Wood et al., 2000, p. 322). Wood et al. (2008) proposes that these symptoms can manifest as cardiovascular or immune function deficiencies, infectious disease, cancer, or diabetes.

Theoretically, the BBFM is rooted in a systemic framework that utilizes a medical approach to working with families and is well-suited to address the contextual variables as they relate to family processes (Wood & Miller, 2002). Additionally, the BBFM addresses limitations in the literature that are important in understanding illness and disease by highlighting relevant factors that contribute to physiological pathways in families. Further, the model also applies to a broad spectrum of age ranges to address the health of all family members (Wood, Klebba, & Miller, 2000). The original BBFM posited that relational patterns in families and biobehavioral reactivity interact so as to influence the mental and physical health of children, while the revised model (1999) incorporated the parent-child attachment as a key construct. Additional studies have tested this model with adult samples (Priest & Woods, 2014; Woods, Priest, & Roush, 2014; Woods & Denton, 2014) and found support for the model's hypotheses, which propose that biobehavioral reactivity (e.g., anxiety and depression symptoms) mediate the relationship between family emotional climate and disease activity.

The three distinct constructs within the BBFM (e.g., family (romantic partner) emotional climate, biobehavioral reactivity, and disease activity) have been operationalized in various ways. Family (romantic partner) emotional climate includes relationship quality with family and emotional processes that occur within these relationships (Wood et al., 2008). One previous study

(Woods et al., 2014) has expanded this construct to include social supports of friends and relatives; however, these supports were not found to have a significant association with biobehavioral reactivity and disease activity. Thus, it may be that spousal/family relationships are more detrimental in explaining long term health outcomes.

The BBFM expands upon several of Minuchin's (1974) foundational tenets found in the structural family model, the "psychosomatic family model." This model was used to explain the interlocking effects of family and couple relationships and illness. The first being that the family is a system that maintains a general equilibrium (von Bertalanffy, 1969). Specifically, general systems theory provides a unifying method for integrating biological psychological, and social approaches to health and illness (Schwartz, 1982) that underlies the BBFM through its principles of structure and processes linked to biological and social systems (Wood, 1994).

The second premise of the BBFM is built upon the notion that individual functioning and relational patterns have reciprocal effects and mutually influence one another. Third, the biobehavioral processes of an individual interact between the self and other, or between the individual and interpersonal (Wood & Miller, 2002). Taken together, the authors of the BBFM state that all three areas of functioning coexist and mutually impact each other and thus, need to be considered conjointly when understanding health (Wood & Miller, 2002). Further, the BBFM helps to explain family and couple relationship patterns which influence the biological, psychosocial, and social processes of individuals within the context of relationship (Wood, 1993; Wood et al., 2000).

Constructs

In this section, the following constructs will be defined and discussed: family emotional

climate (defined as romantic partner emotional climate for this study), biobehavioral reactivity, disease outcome, and gender attitudes and beliefs.

Family emotional climate is used in the BBFM to explain the intensity of emotional processes occurring within close relationships (Wood et al., 2008). Specifically, the model posits that the degree of positive and negative emotional processes including the proximity, relationship quality, and interpersonal responsiveness are all part of the larger family emotional climate—or in this study's case, the romantic partner relationship climate. These processes interact with individual partners' psychological and emotional processes. These processes are defined as mutual support, respectful agreement and disagreement, and responsiveness between partners (Wood & Miller, 2002). The BBFM hypothesizes a direct relationship between this construct and biobehavioral reactivity. Specifically, the model's authors stated that a direct relationship would be noted between a negative emotional climate (e.g., criticism, hostility) and emotional dysregulation (as typically measured by anxiety or depression symptoms) (Wood et al., 2007).

Research has tested the effects of family emotional climate within the BBFM in several ways. Wood et al. (2000) studied the effects of asthma in pediatric populations and measured both children's and parents' perceptions of conflict to represent negative emotional climates. These authors found that children's beliefs of conflict (e.g., self-blame) was significantly related to their feelings of hopelessness and cranial nerve activation. Additional studies found significant pathways between negative family emotional climate and child symptoms of depression and anxiety (Wood et al., 2006), including exposure to violence (Woods & McWey, 2011) and negative emotional expressiveness (Wood et al., 2007).

Additional studies have tested family emotional climate on adult populations. For instance, studies investigating the relationships between quality of life and well-being have found family

emotional climate to be a highly relevant construct (Carr & Springers, 2010; Weihs et al., 2002). Social support, for instance, has been found to be a primary source of support for individual family members (Fiscella et al., 1997) and is linked to quality of life and higher healthcare utilization (Parkerson, Broadhead, & Tse, 1995). Other studies have found that perceived family hostility and criticism is linked to an increase in primary care visits (Fiscella et al.) as well as an exacerbation of symptoms and other risk factors related to health (Wood, Miller, Zwetsch, & Simmens, 2008).

For couples, a growing body of research suggests that the degree of support or hostility received in romantic relationships is associated with relationship quality. Those who report poor relationship quality, for instance, are more likely to meet diagnostic criteria for anxiety and depressive disorders (Overbeek et al., 2006; Whisman, 2007). Further, romantic relationships can serve as a protective mechanism against disease and illness, especially when these relationships are built around a sense of support and cohesion. Thus, the emotional processes and relationship quality within close relationships are crucial to understanding health, in part because these relationships enact close bonds and emotional intensity that takes place over time (Weihs et al., 2002).

Biobehavioral reactivity is the pivotal link in the BBFM that connects family (romantic partner) emotional climate with disease activity, that is typically measured as disease-related physiological processes (Wood & Miller, 2002). Biobehavioral reactivity, connected with physiological dysregulation, is defined as a way that an individual family member responds to environmental stimuli and is assessed based on one's ability to regulate emotions (Wood et al., 2007). Several biological systems, including the hypothalamic-pituitary-adrenal axis and the autonomic nervous system not only influence the development and course of physiological diseases (Wood et al., 2008; Wood & Miller, 2005) but affect the neuroendocrine activity of the

body through emotional interpretations. Further, this construct encompasses both emotional and behavioral responses, such as heighted states of fear and arousal (Seeman, 2001) which are especially relevant in close relationships.

This highly relevant construct in understanding health and well-being in couples reflects the common links between relationships, anxiety/depression, and physical illness. For instance, prevalence rates of anxiety and depression in primary care are rising (Uebelacker, Smith, Lewis, Sasaki, & Miller, 2009) and often are reported with other medical illnesses (Robbins, Kirmayer, Cathebras, Yagge, & Dworkind, 1994). Further, biobehavioral reactivity can be measured through emotional dysregulation, anxiety and depression symptoms (Wood et al., 2007; Wood et al., 2008). Emotion dysregulation can exacerbate the effect of stress and manifest itself in disorders such as specific phobias, anxiety, and depression (Wood et al., 2008) as well as comorbid psychosomatic medication conditions (Poleshuk, Giles, & Tu, 2006).

For couples, a growing body of research suggests that the degree of support or hostility received in romantic relationships is associated with relationship quality. Those who report poor relationship quality, for instance, are more likely to meet diagnostic criteria for anxiety and depressive disorders (Overbeek et al., 2006; Whisman, 2007). Researchers testing the BBFM with couples have also found that negative martial interactions can predict biobehavioral reactivity (Woods, Priest, & Roush, 2015). These studies speak to the importance of romantic relationships. Specifically, the emotional climates of romantic relationships can serve as a protective mechanism against disease and illness, especially when these relationships are built around a sense of support and cohesion. Thus, the emotional processes and relationship quality within close relationships are crucial to understanding health, in part because these relationships enact close bonds and emotional intensity that takes place over time (Weihs et al., 2002).

The BBFM uses the outcome variable of *disease activity* to predict physical health outcomes for families and couples. However, it is important to note that the model theoretically hypothesizes that couples and families are affected in a reciprocal fashion by individual family members' illnesses (Wood, 1993). Due the historical use of this construct in pediatric populations, disease activity has been measured by health outcomes related to asthma severity (Wood et al., 2006). For instance, Wood et al. used criteria from the National Health, Lung, and Blood Institute to diagnose asthma and severity type of illness for children. These measures included pulmonary functioning, heart rate fluctuations, respiratory sinus arrhythmia, and daytime and nighttime symptom frequency. Other researchers have measured this construct through number of chronic conditions and number of medications (Priest, Woods, Maier, Parker, Benoit, & Roush, 2015).

Gender attitudes and beliefs are measured in this study as the attitudes and beliefs about gender function (e.g., the ways that men and women interact according to traditional gender socialization scripts within their romantic relationship) that comprise a social relational context which, therefore, maintains these beliefs about gender function and social relations of inequality based on that difference (Enns, 2004). While all components of gender attitudes and beliefs shape and influence behavior as well as differentiate men and women (Eagly, Wood, & Diekman, 2000), I argue that the hierarchical (e.g., hegemonic) beliefs do so in a manner that has consequences for gender inequality (Enns, 2004).

In addition, the theoretical conceptualization of gender as a social phenomenon has grown in the past two decades among gender scholars (Ridgeway & Correll, 2000) and has been used to describe institutionalized systems of social practices for constituting or organizing the social relations of people (Ridgeway & Correll, 2004). Similar to other multilevel systems of difference, gender as a social phenomenon involves cultural beliefs and resource distribution at both the macro

(institutional) and micro (personal interactional) level (Chafetz, 1999; Enns, 2004). In order to more fully describe the implications of gender attitudes and beliefs, researchers have identified key components of the gender system which impact behaviors and interactions at institutional levels.

Gender Attitudes and Beliefs

Though the influence of marriage on health is becoming increasingly viewed as an important factor in public health, with programs such as Healthy People 2010 (U.S. DHHS, 2000) and Change4Life (British DH, 2010), research has shown that spouses' health conditions are not equally enacted for husbands and wives. Specifically, studies have shown that women in relationships attend to the bulk of "health behavioral work"—activities done to promote health behaviors within the couple relationship (Recek & Umberson, 2011). This gender divide is identified as a primary reason for married men's healthier profile statuses when compared to never-married, divorced, or widowed men (Harvard Health Publications, 2010). This well-documented and consistent gap has been explained through different lenses, which place emphasis on gender socialization and attitudes. Specifically, girls are raised from a young age to care more for others' health than boys (Enns, 2004), which translates into adulthood and couple relationships (Reczek & Umberson, 2011). While unprecedented changes in work and family roles in North America has increased women's work lives outside the home (Sayer et al., 2004), studies have indicated that women continue to perform a bulk of unpaid, domestic labor both inside and outside the home (Lachance-Grzela & Bouchard, 2010). While the biasing in gendered allocations of work and the impact of gender attitudes and beliefs may seem slight in any one instance, the consequences accumulate over the life course and can result in different outcomes for men and women (Enns, 2004). For instance, women who are not only employed full time outside the home, yet also

perform a majority of unpaid household labor are more likely to report elevated feelings of stress and anxiety (Lachance-Grzela & Bouchard, 2010). The lack of research connecting the findings of both mental and physical health outcomes for both men and women, in particular the different physiological health profiles and increased depression rates, is in part because mental and physical health outcomes are often studied separately.

Research has also documented differences in distress and dysregulation between husbands and wives, with wives exhibiting additional symptoms related to distinct profiles of mental and physical health (Reczek & Umberson, 2011; Rodriguez & Margolin, 2013; Umberson & Williams, 2005). Women are more likely to meet the diagnostic criteria for depression and comprise up to 70% of all those diagnosed with this disorder (NIMH, 2014). In addition, studies have reported that married women are at increased risk for high cortisol output during conflict with their romantic partner (Laurent, Powers, & Granger, 2013; Rodriguez & Margolin, 2013; Stroud, Salovey, & Epel, 2001) and exhibit different profiles of physiological reactivity to relationships stress (Kiecolg-Glaser & Newton, 2001). Though both women and men in heterosexual relationships suffer from prolonged symptoms when under distress (Overbeek et al., 2006; Yonkers et al., 2000), women appear to have additional risk factors that may be generated and maintained by an underlying core component of relationships related to attitudes and beliefs about gender function, in addition to minority stress.

Summary

The goal of this study is to test the effects of gender attitudes and beliefs on couple relationships and health within the Biobehavioral Family Model. Although the BBFM has tested associations using different populations (e.g., Latino Americans, Priest & Woods, 2015) and couple relationships (Priest et al., in press), it has yet to be tested using gender attitudes and beliefs

as an outside variable. Neglecting to study the effects of this construct on romantic relationships ignores potentially powerful influences on physical health and well-being. Thus, the purpose of this study is to investigate the integrative effects of mental health, physical health, and gender attitudes and beliefs on adult romantic relationships in the BBFM (Wood, 1993). Utilizing a feminist theoretical background to guide this study, the research questions and hypotheses for this study are as follows:

(1) How do gender attitudes and beliefs impact the Biobehavioral Family Model (BBFM)?

    a. How do gender attitudes and beliefs impact romantic partner emotional climate (RPEC)?

    b. How do gender attitudes and beliefs impact biobehavioral reactivity?

    c. How do gender attitudes and beliefs impact disease activity?

Thus, the four hypotheses are:

1. There will be a direct, significant pathway between gender beliefs and attitudes and biobehavioral reactivity,

2. There will be a direct, significant pathway between romantic partner emotional climate and biobehavioral reactivity,

3. There will be a direct, significant pathway between biobehavioral reactivity and disease activity,

4. Biobheavioral reactivity will mediate the relationships between romantic partner emotional climate and disease activity, and gender attitudes and beliefs and disease activity.

CHAPTER 3: DATA AND METHODOLOGY

In this chapter, the data and methods used to test the hypothesis of this study are presented. First, a description of the data used in the analyses is given. Then, the process of recruiting the sample is provided. Next, a description of the statistical methods used to test the proposed hypothesis is presented. These methods include a confirmatory factor analysis to construct and compare measures of romantic partner relationship satisfaction, gender attitudes and beliefs, biobehavioral reactivity, and disease activity. Additionally, structural equation modeling will be presented and explain how the BBFM fits the data and specifically how associations between romantic partner emotional climate, gender attitudes and beliefs, biobehavioral reactivity, and disease activity are linked.

Sample

The sample included 595 adult participants in committed romantic relationships (Table 1). Overall, the sample was largely White, college-educated females in the 22-34 age range who were married and living together with their partners. Individuals included 76.3% females (n = 454) and 23.5% males (n = 140). One person (n = 1) identified as transgender (.2%). The majority of participants were in the 22-34 years age range (41.2%; n = 245), followed by 22.9% in the 35-44 years range (n = 136), 14.8% in the 45-54 age range (n = 88), 15.6% in the 55-64 age range (n = 93), 4.2% were 65 years and older (n = 25), and 1.3% (n = 8) in the 18-21 year age range. Additionally, a majority of participants identified as White (93.6%, n = 557), while other races identified as Black or African American (1.3%, n = 8), Asian (2.4%, n = 14), American Indian or Alaska Native (0.2%, n = 1), biracial (1.8%, n = 11), two participants identified more than two races (0.3%), and two participants did not specify their race (0.3%). Regarding marital status, 82.9% reported their current marital status as married or living together (n = 493), 2.5% reported they were divorced (n = 15), 13.4% reported they were never married (n = 80), 0.5% reported they were married but separated (not currently living together) (n = 3), 0.3% were widowed (n = 2), and two participants did not

respond (0.3%). Participants also reported the number of times they were both married and divorced, with 72.4% married once ($n = 431$), 11.3% married two times ($n = 67$), and 1.5% married three times ($n = 9$). The remaining participants were either never-married ($n = 80$) and or did not respond to this question ($n = 8$). Further, a majority of participants reported never being divorced (85.4%, $n = 508$), 12.4% reported being divorced once ($n = 74$), and 1.5% reported being divorced two times ($n = 9$), and 0.7% did not respond ($n = 4$).

Participants also reported household income in the past year: the majority (59.7%, $n = 355$) reported a household income of $80,000 or above, while 17.3% reported $60,000 - $79,999 ($n = 103$), 12.1% reported $40,000 - $59,999 ($n = 72$), 5.9% reported $20,000-$39,000 ($n = 35$), 3.4% reported $10,000 - $19,999 (n = 20), and 1.5% reported an approximate household income of less than $10,000 ($n = 9$) (1 participant did not report). Participants most often reported their highest level of education as having a Bachelor's degree (28.1%, $n = 167$), followed by 24.5% reporting having a Master's degree ($n = 146$), 31.9% with a Doctoral or Professional degree ($n = 190$), 5.9% ($n = 35$) with an Associate's degree, 7.6% with some college/no degree (n = 45), and 2.0% having graduated high school or obtained a GED ($n = 12$). Finally, a majority of the participants were employed full-time (77.8%, $n = 463$), 16.8% part-time ($n = 100$), and 5.4% not currently employed ($n = 32$).

Because the present sample included a full range of adults ranging from 18 to over 65 years, it is important to consider the age effect on the measures and questions asked. For instance, participants in early to middle adulthood may experience attitudes, beliefs, and changes in response to predictable events and contextual changes (Franz, 1997) that are maturational and normative (Hewstone, Fincham, & Foster, 2005). Moreover, older and younger adults' attitudes and beliefs toward gender roles may be influenced by other factors not accounted for in this study, such as religiosity, political orientation, gender education and family (Bettencourt, Vacha-Haase, & Byrne, 2011).

Participants were recruited through email messages distributed by the principal investigator's university email, in addition to a professional email listserv (National Council on Family Relations) and social media (i.e., Facebook) (see Appendix A). Quick-R was used to conduct power analysis on the data. Given that the data analyzed was not dyadic, power analysis only needed to be conducted for a one-level cluster randomization trial. Based on previous research (e.g., Westland, 2010) demonstrating sample size thresholds for structural equation modeling to yield medium effect sizes, an effect size of 0.50 is desirable. Results of the power analysis show that to achieve power = 0.80 with an alpha level of 0.05, approximately 350 individuals in committed romantic relationships needed to be recruited. The sample size for this study (n = 595) was sufficient for analyses.

To be included in the study, participants had to be living together or married with their partner for at least two years. Participants were also asked if (a) they were older than 18 years, and (b), are proficient in English. The data was collected through university, professional and community email listservs. Specifically, the mass email listserv at The University of Iowa, as well as within the Human Development and Family Science Department at North Dakota State University available to students, faculty, and staff, were utilized. Additionally, an affiliating professional organization listserv (e.g., NCFR's family therapy section listserv) as well as social media (e.g., Facebook) were utilized to recruit participants. Information in the emails explained the process of providing informed consent. A special recruitment for Facebook was created with approval from the Institutional Review Board at this university. Participants who met the inclusion criteria were given further details of the study and provided with a link for the survey. The link explicitly explained that the survey was confidential and that participants can choose to withdraw from the survey at any time. Participants who chose to participate were provided with a link and presented with an informed consent document followed by self-report survey instruments that asked about (1) their attitudes and beliefs about gender, (2) romantic relationship interactions, (3) depression and anxiety symptoms, and (4) their self-reported

overall health status. Data were collected electronically with Qualtrics, a survey software. All procedures were approved by The University of Iowa's Institutional Review Board (IRB).

Measures

The study measures were completed electronically. All measures were offered in English. The measures for Romantic Partner Emotional Climate, Gender Attitudes and Beliefs, Biobehavioral Reactivity, and Disease Activity are described below.

Participants completed the Couples Satisfaction Index (CSI; Funk & Rogge, 2007). The CSI is a 25-item scale that is designed to measure one's satisfaction in a relationship and has strong convergent and construct validity (Funk & Rogge, 2007). The measure includes items rated on a 6-point Likert scale ("Not at all true" to "Completely true;" "Extremely unhappy" to "Perfect;" "Always agree" to "Always disagree;" "All of the time" to "Never;" "Worse than all others;" to "Better than all others;" and "Never" to "More often.") and includes statements and questions like, "I still feel a strong connection with my partner," "I feel I can confide in my partner about virtually anything," and "How well does your partner meet your needs?" Items are consistent with the BBFM in that they measure the positivity and negativity of emotional processes within romantic relationships, which is how the originator of the model initially used these concepts to measure these processes for families (Wood et al., 2008). Three items (shown in Table 3) were recoded to reflect similar directionality and two items were excluded from the final analysis due to poor model fit (see Table 2). Higher scores represent higher satisfaction. This scale has been used in other studies and has demonstrated high validity and internal consistency (Cui, Fincham, Pasley, 2008; Fincham & Bradbury, 1987). Chronbach alpha for this sample was 0.96. Included items are listed in Appendix D.

Gender attitudes and beliefs were measured using The Gender Roles Beliefs Scale (Kerr & Holden, 1996) which assessed the attitudes and beliefs about gender function in relationships.

This shortened 9-item measure demonstrated strong internal consistency and test-retest reliability (Kerr & Holden, 1996). Participants responded to items using the scale's 7-point Likert scale ("Strongly agree" to "Strongly disagree"). Sample items include, "Women should be concerned with their duties of childbearing and house tending, rather than with the desires for professional and business careers," "Women should have as much more freedom as men," and "The husband should be regarded as the legal representative of the family group in all matters of law." Higher total scores indicate more "feminist responding" (Kerr & Holden, 1996) or progressive attitudes and less prescriptive ideas regarding gender role ideology and distinction. In the final analysis, four items were removed to improve model fit (see Table 3). It is important to note that both the short and long versions of this scale have been used in other studies and demonstrated high validity and internal consistency (Jacobs & Eccles, 1992; Sprecher & Metts, 1989). Chronbach alpha for this sample was 0.75 (five items). A full summary of measure items are included in Appendix D.

Biobehavioral reactivy was measured using one scale to assess participants' depression symptoms. This 20-item measure is based on participants' responses to symptoms of depression.

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). This short self-report scale is designed to measure depressive symptoms for the general population (Radloff, 1977). Items used for this study asked husbands and wives to identify the number of days using an 8-point scale (0 = *None*, 7 = *seven days per week*) during the past week they encountered the following: "feel bothered by things that usually don't bother you," "not feel like eating," "feel that you could not shake off the blues even with help from your family and friends," "having trouble keeping your mind on what you were doing," "feel depressed," "feel that everything you did was an effort," "feel fearful," "slept restlessly," "talk less than usual," "feel lonely," "feel sad," and "feel like you could not get going." Three items were excluded from final analysis due to poor model fit (See Table 3). All items were added together and higher scores reflected a higher level of depression. Similar to the

Romantic Partner Emotional Climate and Gender Attitudes and Beliefs constructs, Chronbach alpha for this sample was good when run with items used in the CFA, 0.92 (17 items). This scale has long been used as a screening tool for adult depression and consistently shown to demonstrate high validity and internal consistency (Anderson, Malmgree, & Carter, 1994),

To assess the impact of romantic relationships and emotion dysregulation on the physical health of participants, two self-report questions were used to collect information. The first question asked participants to rate their general health status using a Likert scale (1 = Excellent, 2 = Very Good, 3 = Good, 4 = Fair, and 5 = Poor). The second question asked participants to rate their general health now compared to one year ago using a similar scale (1 = Much better now than one year ago, 2 = Somewhat better now than one year ago, 3 = About the same, 4 = Somewhat worse now than one year ago, and 5 = Much worse now than one year ago). Although this construct was not measured using an existing health measure, efficacy research on self-reported health care visits has shown that these reports are significantly positively correlated to patient medical charts (Crane & Morgan, 2007). In other words, individual self-reports on their own health tend to be quite accurate. Items on these items are scored so that lower scores demonstrate perception of better overall health status. Chronbach alpha for this sample was low, 0.32 (two items). One reason for the low Chronbach alpha may be due to poor item quality. In other words, a vast majority of participants (e.g., everyone or almost everyone) may have given the same answer to the two items (Muthen & Muthen, 2012). Additionally, although the internal consistency did not demonstrate a high value for this study, other studies have shown that self-reports on one's own physical health are significantly positively correlated to patient medical charts (Crane & Morgan, 2007). This point is further addressed in the Discussion section.

Analysis

Data analysis was conducted in four steps. First, data were exported from the online survey

software, Qualtrics, and downloaded to IBM Statistical Package for the Social Sciences (SPSS) Version 23.0. Data from 888 participants were then cleaned and all variables were screened for missing data and recoded to accommodate variations in the data and determine agreement in scale item values. Regarding data cleaning, individuals who responded "no" to the first question (i.e., Are you currently living together or married to your romantic partner for at least 2 years?) were not included in the final analysis. The total number of individuals who clicked on the email survey link but selected "no" to this question was 108. Next, all individuals who responded "yes" to the first question (i.e., Are you currently living together or married to your romantic partner for at least 2 years?") but who did not respond to any of the survey questions beyond the first question were deleted ($n = 81$). Last, individuals who responded to some questions (range 2-6), but who did not continue onto the next and subsequent pages were also deleted ($n = 104$), resulting in a total sample of 595 participants.

Second, descriptive statistics on age, gender, education status, marital status, and income were run on the final sample of 595 individuals. Means, standard deviations, and ranges were run on demographics of the sample. T-tests were also run comparing gender on all four measures. While gender was shown to not be significant measure of romantic partner emotional climate, biobehavioral reactivity, and disease activity, gender did show to be significant for gender attitudes and beliefs. Specifically, men tended to endorse slightly less progressive attitudes related to gender role ideology and stereotypes (Table 8). From a feminist theoretical lens, this finding makes sense given that men would endorse attitudes that support a social structure based on more traditional gender role ideology. T-tests were also run for age, with no results showing to be significant. Further, the sample included 454 (76.3%) females and 140 males (23.5%). One person ($n = 1$) in the sample identified as transgender. All individuals reported they were in committed romantic relationships for a minimum of two years, as required for inclusion in the study. The two-year requirement stems from a study

conducted by Overbeek et al. (2006) and colleagues demonstrating that marital quality is best assessed for depression and anxiety symptoms at a two-year follow-up. Participants ranged in age from 18 to 65, with the majority in the 22-34 age range. Most participants were White (93.6%), with the second highest racial group identifying as Asian. Participants were largely educated, with 503 (85%) reporting at least a four-year college degree, married or living together with their partner (n = 493; 83%) (approximately 85%), employed full time (*n* = 463, 78%) and a household income of $80,000 or above (*n* = 355, 60%). In addition to descriptives (Tables 2-5), correlations (Table 7) and Chronbach alphas (Table 6) were run for internal consistency on measure items for romantic partner emotional climate, gender attitudes and beliefs, biobehavioral reactivity, and disease activity.

Third, confirmatory factor analysis (CFA) were utilized to demonstrate the validity of measures for gender attitudes and beliefs, romantic partner emotional climate, biobehavioral reactivity, and disease activity. The fourth and final step in the analysis was structural equation modeling to test associations between gender attitudes and beliefs, romantic partner emotional climate, biobehavioral reactivity, and disease activity. Goodness-of-model-fit indices used to test the model with the sample include: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA).

The following research questions and hypotheses were addressed using a feminist theoretical framework:

 (1) How do gender attitudes and beliefs impact the Biobehavioral Family Model (BBFM)?

    d.   How do gender attitudes and beliefs impact romantic partner emotional climate (RPEC)?

    e.   How do gender attitudes and beliefs impact biobehavioral reactivity?

    f.   How do gender attitudes and beliefs impact disease activity?

Thus, the four hypotheses are:

1	There will be a direct, significant pathway between gender beliefs and attitudes and biobehavioral reactivity,

2	There will be a direct, significant pathway between romantic partner emotional climate and biobehavioral reactivity,

3	There will be a direct, significant pathway between biobehavioral reactivity and disease activity,

4	Biobheavioral reactivity will mediate the relationships between romantic partner emotional climate and disease activity, and gender attitudes and beliefs and disease activity.
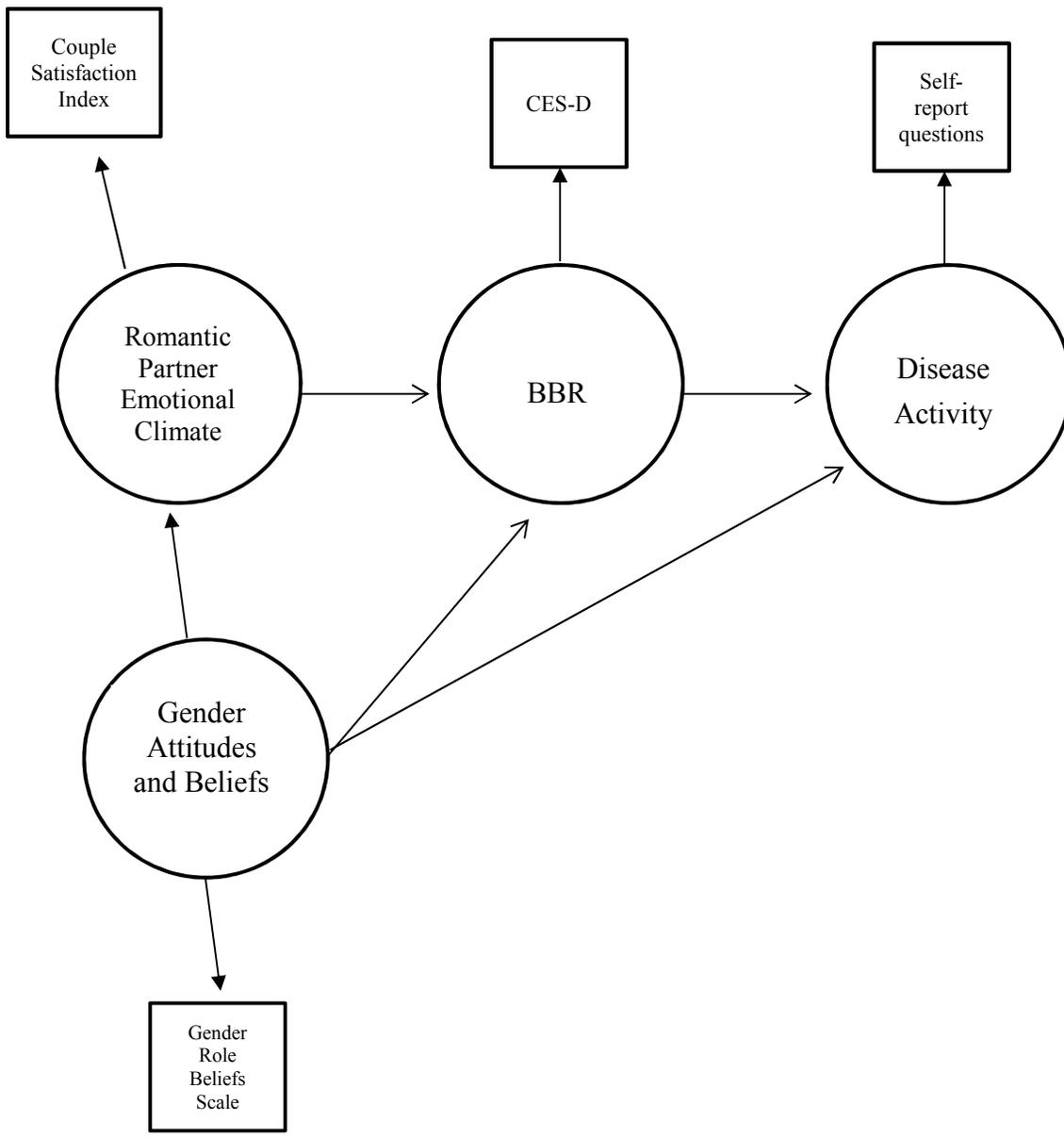
Figure 3. Hypothesized model. BBFM with Romantic Partner Emotional Climate, Gender Attitudes and Beliefs, Biobehavioral Reactivity as mediating variable, and Disease Activity

Initial confirmatory factor analyses were run on all latent variables in the BBFM before the primary analysis (e.g., SEM). Specifically, CFAs were run for romantic partner emotional climate (RPEC), gender attitudes and beliefs (GAB), biobehavioral reactivity (BBR), and disease activity (DA) to verify the factor structure of each set of variables for each measure (Bryne, 2010). Initial analyses were run on all item loadings onto constructs of RPEC, GAB, BBR, and DA. Of the four models, only one demonstrated good fit (e.g., good fitting models normally have a small, non-significant χ^2, SRMR and RMSEA values less than .05, and a CFI and TLI with values near 1.00). The model that demonstrated good fit prior to any modifications was disease activity (DA). To remedy the poor model fits, fit indices specified items to remove from the measures to improve model fit. Specifically, four items were removed from the Gender Role and Beliefs Scale (GAB), two items were removed from the Couple Satisfaction Index (RPEC), and two items were removed from the depression scale (BBR). When this was done, all four constructs fell within appropriate ranges to be considered good fitting models.

To test the BBFM as proposed in the above hypothesized model, path analysis was used in the form of structural equation modeling. Specifically, I was interested in how the constructs in the BBFM influence one another, and how (if) gender attitudes and beliefs affected the overall model (Baron & Kenny, 1986). By investigating these processes, I hoped to clarify how gender attitudes and beliefs impact the three components of the BBFM (i.e., romantic partner emotional climate, biobehavioral reactivity, and disease activity) and therefore, further the understanding of gender attitudes and beliefs on health outcomes and relationship satisfaction within the model. Thus, structural equation modeling is a good fit for this study because SEM allows for both endogenous and exogenous variables (Gunzler, Chen, Wu, & Zhang, 2013) and I was, therefore, able to test the BBFM.

Using the results from the CFAs, latent variables were created for each of the constructs and

all pathways were tested. Model fit was assessed using the chi-square, standardized root mean square residual (SRMSR), the comparative fit index (CFI), and Tucker-Lewis index (TLI) and the root mean square of error approximation (RMSEA). The CFI and RMSEA fit statistics are less sensitive to sample size (Kline, 2011) and are based on non-central chi-square distributions. Good fitting models normally have a small, non-significant χ^2, SRMR and RMSEA values less than .05, and a CFI and TLI with values near 1.00.

All analyses were conducted in IBM Statistical Package for the Social Sciences (SPSS) Version 23.0 and M*plus7 (*Muthen & Muthen, 2012). Specifically, descriptives were run in SPSS and all modeling was conducted using M*plus7*. Missing data was accounted for using the maximum likelihood with robust standard errors (MLR).

CHAPTER IV: RESULTS

As outlined above, analyses were conducted in four steps. First, data was cleaned and descriptives were run on the total sample (N = 595) participants. Next, all variables were screened for missing data and recoded to accommodate variations in the data and determine agreement in scale item values. Third, confirmatory factor analysis (CFA) were utilized to demonstrate the validity of measures for gender attitudes and beliefs, romantic partner emotional climate, biobehavioral reactivity, and disease activity. The last step in the analysis used structural equation modeling to test associations between gender attitudes and beliefs, romantic partner emotional climate, biobehavioral reactivity, and disease activity.

To assess the best fitting measurement model for each analyses run, the following criterion were used to make decisions: the chi-square test, the comparative fit index (CFI), the Tucker-Lewis index test (TLI), the root mean square of error approximation (RMSEA), and the standardized root mean square residual (SRMR) were evaluated. Based on these statistics, the best fitting measurement model for our variables should have a small, non-significant chi-square, a CFI and TLI greater than 0.95, a RMSEA less than 0.05, and a SRMR values less than 1. It should be noted that the $\chi2$ statistic tends to perform poorly with large sample sizes and non-normally distributed variables. Additionally, missing data was accounted for using the maximum likelihood with robust standard errors (MLR).

Confirmatory Factor Analysis

The items from The Gender Roles Beliefs Scale (Kerr & Holden, 1996) were first tested on the latent variable GAB (gender attitudes and beliefs) constructed.

The first CFA for this construct demonstrated poor fit $\chi2$ = 838.363, p = .000, SRMR = .051, CFI = .879, TLI = .838, RMSEA = .149. Specifically, although the SRMR fit statistic fell within a good fitting model, the other statistics (e.g., CFI, TLI, and RMSEA) all demonstrated poor fit. After examination of the factor loadings, one item (e.g., "The initiative should usually come from the

man") was removed and analyses were run again, yielding slightly better fit statistics $\chi2 = 783.412$, $p = .000$, SRMR = .047, CFI = .896, TLI = .855, RMSEA = .081. From a feminist perspective the removal of this item makes sense as it is possible that although participants responded in a relatively progressive manner to this measure, the notion that men should initiate in relationships still exists (Enns, 2004).

For this model, the CFI and TLI are higher, and the SRMR and RMSEA are lower. However, the CFI, TLI, and RMSEA still fell out of range of what would be considered a good fitting model. After another examination of the factor loadings, I then tested a third model constructed of the unique items of gender attitudes and beliefs, which yielded a vastly improved model fit $\chi2 = 443.95$, $p = .000$, SRMR = .01, CFI = 1.000, TLI = 1.003, RMSEA = .000. For this model, all fit statistics fell into appropriate ranges to be considered a good fitting model. Specifically, the CFI and TLI are greater than 0.95, the RMSEA is less than 0.05, and the SRMR is less than 1. Thus, the analysis and fit statistics all indicated that a five-factor model best fit the data. In total, four items were removed (e.g., "It is disrespectful to swear in the presence of a woman," "The initiative in dating should usually come from the man," "Men should continue to show courtesies to women," and "Women should be concerned with their duties of childbearing and homemaking, rather than with the desires for professional and business careers"). From a feminist theoretical lens, it is possible that, while traditional gender role ideologies persist, that some of these items (e.g., "Women should be concerned with their duties of childbearing and homemaking") are sociohistorical context-specific. In other words, the domains of attitudes and beliefs about gender roles are viewed across temporal and cultural boundaries. Items removed from analysis are noted with a double asterisk (**) in Table 3.

Couple satisfaction items from the Couple Satisfaction Index (Funk & Rogge, 2007) were loaded on the latent variable RPEC (romantic partner emotional climate). This CFA for this construct

demonstrated poor fit χ2 = 6578.58, p = .000, SRMR = .071, CFI = .870, TLI = .858, RMSEA = .127. Again, although the SRMR fit statistic fell within a good fitting model and the TLI was closer to 0.95 than the previous CFA, the other statistics demonstrated poor fit. However, after removal of two items that were not loading well onto the model (e.g., "Indicate degree of happiness in relationship," and "Amount of time spent together"), the model demonstrated greatly improved fit χ2 = 9547.560, p = .000, SRMR = .032, CFI = .952, TLI = .948, RMSEA = .057. Theoretically, it is possible that although participants responded favorably to other items, that their overall degree of happiness in the relationship was lower or that participants had higher standards for their relationship. Additionally, it is possible that "amount of time spent together" is not a good measure of one's overall satisfaction, as a majority of the participants in this study were employed full-time and thus, this item may not be a realistic measure of one's relationship satisfaction. Specifically, the SRMR, CFI, TLI, and RMSEA fit statistics all indicated that an 18-factor model best fit the data. Items removed from analysis are noted with a double asterisk (**) in Table 2.

Third, I tested all depression items loading on the latent variable biobehavioral reactivity (BBR). Using items from the *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977), this CFA demonstrated mixed fit χ2 = 3259.041, p = .000, SRMR = .064, CFI = .815, TLI = .793, RMSEA = .081. Although the RMSEA demonstrated appropriate fit statistics of less than 1, the CFI, TLI, and SRMR demonstrated poor fit. After examination of the model results and estimates, two items were removed (e.g. "I was bothered by things that usually bother me," and "I did not feel like eating") and a second CFA was run with these items. This analysis yielded slightly better fit statistics χ2 = 2763.470, p = .000, SRMR = .046, CFI = .898, TLI = .888, RMSEA = .064, yet still demonstrated overall poor fit. Specifically, the CFI and TLI were both less than 0.95 and the RMSEA was greater than 0.05. A final model was run to improve model fit by removing a third item (e.g., "I could not get 'going'), resulting in an improved model fit which was used in the final analysis and

full model $\chi2$ = 1883.40, p = .000, SRMR = .047, CFI = .91, TLI = .89, RMSEA = .05. Similar to items removed in the romantic partner emotional climate construct, it is possible that although participants were, overall, asymptomatic in depression scores that they admitted to still being bothered or not being able to remain motivated in their life and thus, held a higher life standard. Secondly, it is possible that appetite was not a good measure of one's overall biobehavioral reactivity. Items removed from analysis are noted with a double asterisk (**) in Table 3.

The final CFA was conducted using two self-report questions asking participants about their health. This model demonstrated good fit $\chi2$ = 30.850, p = .000, SRMR = .000, CFI = .966, TLI = .1.034, RMSEA = .000. Specifically, the SRMR, CFI, TLI, and RMSEA fit statistics all indicated good fit, with a CFI and TLI greater than 0.95, a RMSEA less than 0.05, and a SRMR values less than 1.00.

Table 1. Characteristics of the Sample (N = 595)	n	%
Gender		
Females	454	76.3
Males	140	23.5
Transgender	1	.2
Age Range (in years)		
18-21	8	1.3
22-34	245	41.2
35-44	136	22.9
45-54	88	14.8
55-64	93	15.6
65+	25	4.2
Race		
White	557	93.6
Black	8	1.3
Asian	14	2.4
American Indian/Alaska Native	1	.2
Bi-racial	11	1.8
Multi-racial	2	.3
Did not respond	2	.3
Relationship Status		
Married or living together	493	89.3
Divorced	15	2.5

Table 1. Characteristics of the Sample (N = 595), cont.	n	%
Never married	80	13.4
Married but separated	3	.5
Widowed	2	.3
Did not respond	2	.3
Household Income		
Less than $10,000	9	1.5
$10,000-$19,999	20	3.4
$20,000-$39,999	35	5.9
$40,000-$59,999	72	12.1
$60,000-$79,000	103	17.3
More than $80,000	355	59.7
Highest Level of Education		
Associate's Degree	35	5.9
Bachelor's Degree	167	28.1
Master's Degree	146	24.5
Doctoral or Professional Degree	190	31.9
Some College/No Degree	45	7.6
High School/GED	12	2.0
Employment Status		
Full-time	463	77.8
Part-time	100	16.8
Not currently employed	32	5.4

Table 2. Descriptive Statistics of Gender Role Beliefs Scale Index (N = 595)

Variables	*M*	*SD*	Min.	Max.	*n*
Swearing disrespectful**	2.38	1.21	1	5	594
Men should take initiative**	2.27	1.08	1	5	593
Women no sexual freedom*	2.54	0.82	1	5	594
Women work inside home	1.58	0.91	1	5	593
Husband legal representative	1.36	0.73	1	5	593
Men pay dinner check	1.67	0.90	1	5	593
Men show courtesy**	3.63	1.07	1	5	594
Women childrearing/house**	1.39	0.74	1	5	593
Swearing worse for women	1.91	1.11	1	5	593

Note. Higher total scores indicate more less prescriptive ideas regarding gender role ideology. Range 1-5.
Note. Single asterisked items were reverse coded.
Note. Double asterisked (**) items were removed.

Table 3. Descriptive Statistics of Couple Satisfaction Index (N = 595)

Variables	*M*	*SD*	Min.	Max.	*n*
Couple Satisfaction Index (RPEC)					
Degree of happiness**	5.02	1.26	1	7	594
Time spent together**	4.62	0.83	1	6	595
Making decisions	4.73	0.73	2	6	594
Affection	4.50	0.98	1	6	593
Going well overall	4.79	0.76	2	6	595
Regret relationship*	5.23	0.93	1	6	595
Feel a strong connection	5.18	1.11	1	6	595
Would marry again	5.03	1.34	1	6	594
Our relationship is strong	5.12	1.18	1	6	594
Wonder if there is someone else*	5.01	1.35	1	6	593
Relationship makes me happy	4.99	1.16	1	6	595
Warm and comfortable	5.11	1.23	1	6	595
Cannot imagine life w/o	5.13	1.33	1	6	595
Can confide	4.94	1.31	1	6	595

Table 3. Descriptive Statistics of Couple Satisfaction Index (N = 595), cont.

Variables	*M*	*SD*	Min.	Max.	*n*
Second thoughts*	5.17	1.38	1	6	594
Romance	4.23	1.45	1	6	593
Part of a team	4.90	1.35	1	6	592
Cannot imagine another	4.49	1.56	1	6	593
Rewarding	4.75	1.13	1	6	594
Meet needs	4.51	1.05	1	6	595
Met expectations	4.55	1.25	1	6	593
Overall satisfaction	4.87	1.14	1	6	595
Good compared to others	4.95	0.94	2	6	594
Enjoy company	5.52	0.86	2	6	595
Fun together	4.78	1.19	1	6	595

Note. Higher mean scores represent higher relationship satisfaction. Range 1-6 for questions 2 – 24. Range 1-7 for question 1.
Note. Single asterisked items were reverse coded.
Note. Double asterisked (**) items were removed.

Table 4. Descriptive Statistics of Depression Scale (N = 595)

Variables	M	SD	Min.	Max.	n
Bothered**	2.24	0.91	1	4	592
Poor appetite**	1.18	0.50	1	4	593
Could not shake off blues	1.39	0.75	1	4	595
Felt just as good as others*	1.59	0.89	1	4	593
Trouble keeping mind on task	1.87	0.90	1	4	594
Felt depressed	1.42	0.75	1	4	594
Everything was an effort	1.64	0.85	1	4	592
Felt hopeful*	1.65	0.86	1	4	594
Thought life had been a failure	1.18	0.55	1	4	595
Felt fearful	1.32	0.64	1	4	593
Sleep restless	1.90	0.94	1	4	595
Felt happy*	1.54	0.72	1	4	594
Talked less than usual	1.43	0.72	1	4	595
Felt lonely	1.42	0.78	1	4	593
People were unfriendly	1.27	0.56	1	4	595

Table 4. Descriptive Statistics of Depression Scale (N = 595), cont.

Variables	M	SD	Min.	Max.	n
Enjoyed life*	1.56	0.72	1	4	595
Had crying spells	1.23	0.56	1	4	593
Felt sad	1.50	0.69	1	4	594
Felt people disliked me	1.32	0.64	1	4	594
Could not get going**	1.57	0.83	1	4	594

Note. Higher total scores indicated higher symptomology. Lower means indicate fewer depressive symptoms. Range 1-4.
Note. Single asterisked items were reverse coded.
Note. Double asterisked (**) items were removed.

Table 5. Descriptive Statistics of Health Scale Items (N = 595)

Variables	M	SD	Min.	Max.	n
Current health	2.32	0.86	1	5	594
Health one year ago	2.68	0.84	1	5	595

Note. Lower means indicated higher self-rated health. Range 1-5.

Table 6. Means, Standard Deviations, Ranges, and Alpha Coefficients for Study Measures (N = 595)

Variables	*M*	*SD*	Range	α (# of items)	n
CSI	4.34	0.79	1-6	0.96(22)	578
GRB	2.29	0.56	1-5	0.75(5)	590
CES-D	1.87	0.29	1-4	0.91(17)	579
Health Questions	2.50	0.65	1-5	0.32(2)	594

Table 7. Correlations of Study Variables (N = 595)

Variables	1	2	3	4
1. Physical Health	---			
2. CSI	-.19**	---		
3. GAB	.04	-.09**	---	
4. CES-D	.32**	-.46**	.028	---

Note: CSI = Couple Satisfaction Index; GAB = Gender Attitudes and Belief Scale; CES-D = Center for Epidemiologic Studies Depression Scale

p < .10. ∗*p* < .05. ∗∗*p* < .01. (two-tailed).

Table 8. T-test Results Comparing Gender and Age on Romantic Partner Emotional Climate, Gender Attitudes and Beliefs,

Biobehavioral Reactivity, and Disease Activity

Variable	Male	Female	*t*
Gender			
RPEC	4.25	4.35	-.898
GAB	2.00*	1.75*	3.91*
BBR	1.92	1.90	.365
DA	5.05	4.97	.585

Note. Asterisked denote significance

Note. RPEC = Romantic Partner Emotional Climate; GAB = Gender Attitudes and Beliefs; BBR = Biobehavioral Reactivity; DA = Disease Activity

Structural Equation Model

Goodness-of-fit indices for the model indicated the proposed model fits the data ($\chi 2$ = 15551.01, p = .000, SRMR = .057, CFI = .920, TLI = .916, RMSEA = .043, 90% CI = .041, .046). Overall, significant pathways were found between variables of romantic partner emotional climate, gender attitudes and beliefs, biobehavioral reactivity, and disease activity. In testing the BBFM with gender attitudes and beliefs, findings substantiated three of the four hypotheses proposed for this study. More specifically, the higher satisfaction participants reported in their committed relationships (i.e., the more positive relationship dynamics they experienced), the less biobehavioral reactivity (depression) they experienced. In other words, happier couples reported fewer depressive symptoms. In addition, the more progressive participants were in their gender attitudes and beliefs, the less biobehavioral reactivity and higher reported physical health (disease activity). Pathways examining mediation of biobehavioral reactivity between romantic partner emotional climate and disease activity and disease activity were nonsignificant (See Figure 4).

The first hypothesis examined, there will be a direct, significant pathways between gender attitudes and beliefs and biobehavioral reactivity, was significant at the p < .01 level (Figure 4). In other words, individuals reporting higher means on gender attitudes and beliefs (less prescriptive ideas regarding gender role ideology) reported lower biobehavioral reactivity (fewer reported depressive symptoms). From a feminist theoretical lens, this finding makes sense given that couples who endorse less prescriptive and more progressive notions about gender function would experience more equality in their relationship and that more equality would be associated with fewer mental health symptoms (Enns, 2004). The second hypothesis, "there will be a direct, significant pathway between romantic partner emotional climate and biobehavioral

reactivity," was also substantiated by the findings and found to be significant at the p < .001 level (Figure 4). In other words, individuals reporting higher means on the Couple Satisfaction Index reported lower biobehavioral reactivity (fewer reported depressive symptoms). The third hypothesis, there will be a direct, significant pathway between biobehavioral reactivity and disease activity was not substantiated by the findings and not shown to be significant. Finally, the fourth and final hypothesis of this study, biobheavioral reactivity will mediate the relationships between romantic partner emotional climate and disease activity, and gender attitudes and beliefs and disease activity, was found to be significant. Specifically, nonsignificant pathways were found between the predictor variable of romantic partner emotional climate and the outcome variable of disease activity; however, a significant pathway was documented between gender attitudes and beliefs and disease activity. Thus, there was some support for the fourth hypothesis of this study.

The overall research question of this study was: How do gender attitudes and beliefs (GAB) impact the Biobehavioral Family Model (BBFM)? Specifically, (1) how do GAB impact romantic partner emotional climate? (2) how do GAB impact biobehavioral reactivity? and (3) how do GAB impact disease activity? Significant associations were found for all (Figure 4). Specifically, a significant, direct effect was documented between GAB and romantic partner emotional climate; a second significant, direct effect was documented between GAB and biobehavioral reactivity, and a final significant, direct effect was documented between GAB and disease activity.

Conclusion

Romantic partner emotional climate (couple satisfaction) was significantly related to biobehavioral reactivity (depression), and gender attitudes and beliefs were significantly related

to both disease activity (physical health) and biobehavioral reactivity. The latter finding lends support to the feminist framework that guided this study; specifically, gender attitudes and beliefs are linked to one's self-rated mental and physical health as documented in prior studies (Coltrane, 2000; Enns, 2004; Kiecolt-Glaser & Newton, 2001. Athough romantic partner emotional climate and biobehavioral reactivity were not directly linked to disease activity, goodness-of-fit statistics were good for all constructs used in the study. In addition, correlation findings suggested romantic partner emotional climate was significantly associated with the measure of disease activity, gender attitudes and beliefs were significantly associated with romantic partner emotional climate, and biobehavioral reactivity was significantly associated with both disease activity and romantic partner emotional climate (See Table 2). The feminist theoretical framework used to guide this study allowed for a critique of the BBFM to incorporate gender attitudes and beliefs and its impact on the constructs within the model. Feminist family therapists have long studied the impact of how larger social context influence health and well-being in couples and families (e.g., Knudson-Martin) and specifically, how gender is linked to relationship quality and health. Finally, the theoretical lens supports the research question and findings of this study in such that gender attitudes and beliefs impact the health and satisfaction of heterosexual couple relationships.
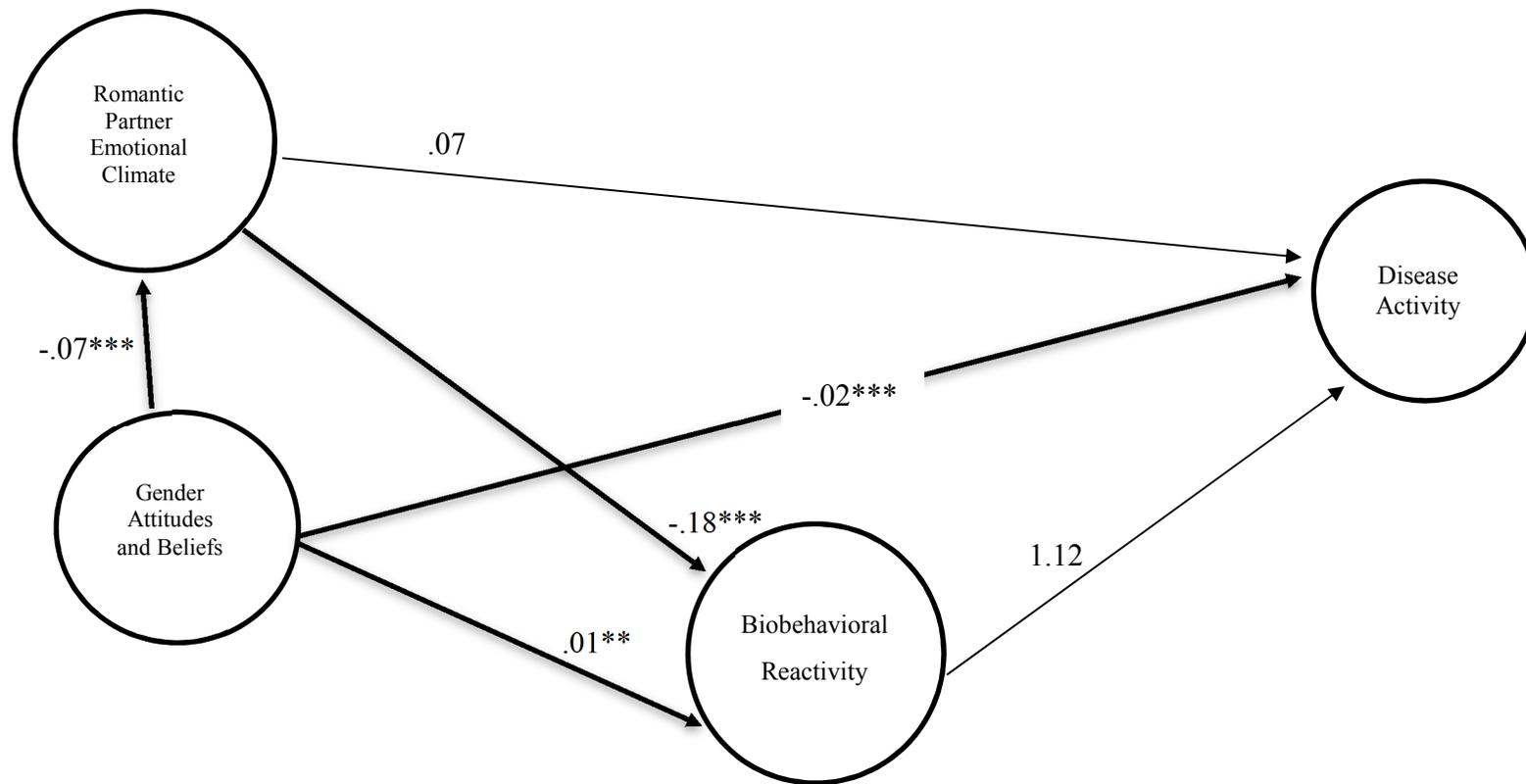
Figure 4. Full Model (*N*=595) in M*plus*7, with romantic partner emotional climate, gender attitudes and beliefs, biobehavioral reactivity as mediating variable, and disease activity *p<.05, **p<.01, ***p<.001. Significant paths are indicated in bold

CHAPTER V: DISCUSSION

This study was conducted to test the Biobehavioral Family Model with a sample of adults in committed romantic relationships in order to understand the effects couple relationships and gender attitudes and beliefs have on mental and physical health. A feminist lens was used to guide all aspects of this study and make a case for the notion that gender ideology impact heterosexual couples' relationship and health. Further, the goals of this study included using the BBFM to integrate effects of romantic partner emotional climate on both mental and physical health, as well as examine the effects of gender attitudes and beliefs on mental and physical health. Lastly, the purpose of the study was to address limitations in the relationships and gender literature by using self-report measures as indicators of couple satisfaction, gender attitudes and beliefs, depression, and physical health. Although the BBFM has a broad developmental application (Wood et al., 2000; Wood & Miller, 2005), it had not yet been tested with adults in romantic relationships using an additional construct to incorporate the effects of gender beliefs and attitudes. Additionally, feminist theory was used to expand the BBFM and address potential biases against women in the treatment of depression, anxiety, and chronic illness. Feminist family therapists have long studied the effects of gender on couple relationships and consistently found that perceived equality is linked to higher relationship satisfaction (Knudson-Martin, 2013). In testing the BBFM's ability to explain health outcomes for adults in romantic relationships using gender beliefs and attitudes as an additional construct, findings substantiated three of the four hypotheses outlined in Chapters 1 and 2. Multiple implications for future research and clinical practice are highlighted by the results of this study.

Summary of Hypotheses

This study tested the BBFM with adults in romantic relationships and added a gender beliefs and attitudes component to expand the model. Further, a feminist theoretical framework allowed for a critique of the BBFM as this model has not previously considered ways in which gender attitudes

and beliefs impact the constructs within the model (e.g., romantic partner emotional climate, biobehavioral reactivity, and disease activity).

To test romantic partner emotional climate (RPEC), I used a measure of couple relationship satisfaction to test the concept within the entire sample. To test gender attitudes and beliefs (GAB), I used a measure of gender roles that described gender role ideology and gender stereotypes. To test biobehavioral reactivity (BBR), I used a screening test for depression and depressive disorder, and for disease activity, I used two items which assessed participants' overall perception of health now, and overall perception of health compared to one year ago. The hypotheses for the full SEM model that examined gender attitude and beliefs with the BBFM included: (1) a direct, significant pathway between gender beliefs and attitudes and biobehavioral reactivity, (2) a direct, significant pathway between romantic partner emotional climate and biobehavioral reactivity, (3) a direct, significant pathway between biobehavioral reactivity and disease activity, and (4) biobehavioral reactivity would mediate two associations (a) romantic partner emotional climate and disease activity, and (b) gender attitudes and beliefs and disease activity. Three of the four hypotheses were supported for in the full SEM model.

Preliminary analyses included confirmatory factor analyses for all measures and means, standard deviations, ranges, alphas, and correlations. Analyses indicated goodness-of-fit and high internal consistency with the exception of the disease activity measure ($\alpha = .032$). Although the fit statistics for this measure were high ($\chi2 = 30.850$, p = .000, SRMR = .000, CFI = .966, TLI = .1.034, RMSEA = .000) the internal consistency was low. One reason may be due to poor item quality. In other words, a vast majority of participants (e.g., everyone or almost everyone) were giving the same answer to the two items (Muthen & Muthen, 2012). Additionally, although the internal consistency did not demonstrate a high value for this study, other studies have shown that self-reports on one's own physical health are significantly positively correlated to patient medical charts (Crane & Morgan,

2007). Overall, the sample reported high relationship satisfaction, progressive gender attitudes and beliefs, low depression symptoms, and positive self-reports of physical health, it is important to interpret this study's findings in light of its homogenous sample. From a feminist perspective, the underreporting of depressive symptoms from women in particular is interesting to note, as the majority of participants were women (76.3%) and also reported low depression symptomology (Laurent et al., 2013).

Results from this study indicate that using gender attitudes and beliefs as an additional construct within the BBFM was able to explain some mental and physical health outcomes for adults in committed relationships. Self-reports of couple relationship functioning, including romantic partner emotional climate and gender attitudes and beliefs affects partnered adults' mental health. In other words, the less problematic (or more positive) adults viewed their romantic relationship, the less likely they were to report depression. Adults' attitudes toward gender roles and ideology also predicted their disease activity: self-reported physical health now and self-reported physical health compared to one year ago, in addition to their biobehavioral reactivity (depression). These findings demonstrate that not only is the BBFM valuable in predicting the effects of romantic partner functioning, but also that gender attitudes and beliefs impact the health of adults in committed romantic relationships.

Limitations and Future Research

While this study addressed a number of shortcomings in the literature related to testing the integrated effects of both mental and physical health on romantic relationships, there were some limitations. First, the generalizability of this study is limited to a homogenous sample of married, highly educated, high socioeconomic status, White women. Thus, the interpretation of findings presented in this study must be understood within this context. Second, this study utilized online data collection procedures and thus, follow-up questions were not asked. Additionally, while online data

surveying is able to collect from more geographical diverse samples, there are a number of limitations associated with them, such as limiting samples for studies to individuals with computer access and mistrust issues stemming from unfamiliarity with the researchers (Dillman, Smyth, & Christian, 2009).

Moreover, self-rated relationship satisfaction and health measures were used to collect information from participants. Although efficacy research on self-reported health care visits has shown that these reports are significantly positively correlated to patient medical charts (Crane & Morgan, 2007), dependence on participants' self-reported data is prone to under- and over-reporting of gender attitudes and beliefs, relationship satisfaction and mental health symptoms. Thus, another limitation of this study was the self-selecting sample. It is possible that individuals participating in the study will have strong views (either positive or negative) about their relationship, gender roles, and mental and physical health, in addition to not responding honestly to some of the scales such as depression and anxiety items.

Third, although this was an exploratory study testing the associations of the BBFM with a new exogenous variable, confounding factors may play a role in the findings. For instance, couples' religiosity or spirituality identity, number of children, and number of times previously married were not controlled in this study. Additionally, it is a limitation of this study that data were collected in a cross-sectional design. It is possible that potential associations found in the analyses occur in opposite directions even though the BBFM supports the notion of reciprocal influences. Although the BBFM theorizes the reciprocal, mutual influences of social, emotional, and physical factors on facets of illness and health (Wood & Miller, 2002), it should be noted, however, that directional paths may be implied when the reciprocal processes inherent in the model are not made explicit. This study hypothesized specific direct paths from the romantic relationship climate to disease activity through the biobehavioral reactivity concept and did not account for preexisting health concerns or

disabilities that may influence the study's findings. Future studies should examine the model in couples that have a preexisting health concern or disability to gain a greater understanding of the model's application to these couples.

Future research should test the application of the BBFM longitudinally and from both partners to ascertain how romantic partner emotional climate and gender attitudes and beliefs have causal, long-term effects on mental and physical health of couples. This examination would clarify how both perspectives of relational processes mutually affect family members' biobehavioral reactivity and disease activity throughout the course of their relationship. This research would then have the potential to highlight how interventions can be best targeted for romantic relationships. Finally, although researchers have tested the BBFM with diverse racial populations such as Latino Americans (Priest & Woods, 2015) future research could also consider additional background factors and contextual variables of adult romantic relationships (e.g., socioeconomic status, age, same-sex partners, etc.) to better understand how demographic characteristics of specific populations and individuals affect the processes of the BBFM and its associations.

Implications for Clinical Practice

The results of this study have several implications for clinical practice. The findings documenting relationships between romantic partner emotional climate and biobehavioral activity, as well as gender attitudes and beliefs and disease activity and gender attitudes and beliefs and biobehavioral reactivity provides a prospective opportunity for clinical intervention and improved health outcomes. The BBFM is based in several theoretical assumptions of Minuchin's structural family therapy psychosomatic family model (Minuchin et al., 1978). This may mean that interventions targeted at couples should include a deeper analysis of how family-of-origin experiences impact the couple's present relationship. For instance, how does one's early life experiences affect how they view gender roles? How does this early gender role socialization from

one's family-of-origin impact future romantic relationships? Studies have shown that gender role attitudes inform parenting decisions and have an intergenerational effect on what roles and behaviors are appropriate for women and men (Katz-Wise, Priess, & Hyde, 2010). While few longitudinal studies have examined trajectories of gender role attitudes and beliefs in transition to adulthood in the context of romantic relationships, it is important for clinicians to be mindful of the ways in which gender has influenced men and women in their own families-of-origin and how beliefs about gender roles impact their romantic relationships (either negatively or positively). The feminist theory that guides this study would posit that couples who embrace more egalitarian gender role ideologies would also report higher relationship satisfaction and mental and physical health compared to couples in more traditional gender roles schemas. Although family-of-origin experiences were not tested in this study, feminist-informed structural family therapy would focus on assessing clients' family interactions and structuring family patterns in order to actively create changes in family systems (Goldberg & Goldberg, 2008) while also keeping in mind ways that couples and families remain "stuck" in gender-rigid schemas that negatively impact their relationships with one another. Feminist family therapists have long studied the impact of how gender roles and schemas influence health and well-being in couples and families (e.g., Knudson-Martin) and specifically, how gender is linked to relationship quality and health. Feminist family therapist have developed approaches specifically focused on these issues as it relates to relationship power and division of household labor (Goldner, 1985; Hare-Mustin, 1978). Further, these therapists are uniquely situated to work with these couples through the use of scales that measure feminist practices used with heterosexual couples (McGeorge, Carlson, & Toomey, 2013).For instance, McGeorge and colleagues (2013) developed the Feminist Couple Therapy Scale (FaCTS) to assess for relationship power in areas of violence and control and gender-based power differentials in heterosexual relationships. These practices promote egalitarian relationships when working with heterosexual couples.

Additionally, because this study included the use of gender attitudes and beliefs, it is important for clinicians to consider the ways in which gender ideology and stereotypes affects a couple's relationship and health. For instance, this study demonstrated that more progressive attitudes of gender were linked to lower reports of disease activity and biobehavioral reactivity. While this study is not suggesting that individuals who ascribe to more traditional ideas of gender attitudes and beliefs would have poorer health outcomes, it is suggesting that clinicians pay attention to gender attitudes and beliefs in general, especially given the documented research that suggests couples who embrace notions around equality are generally more satisfied in their relationships and report higher mental health outcomes (Claffey & Mickelson, 2009; Frisco & Williams, 2003; Van Willigen & Drentea, 2001). Further, the feminist theoretical framework that guides this study would support clinical applications that make gender and equality relevant within the context of treatment.

Although the statistical results from the present study are not causal and further research to determine the longitudinal nature of the effects of gender attitudes and beliefs and romantic partner emotional climate on adult heath is necessary, it may be that intervening therapeutically in couples' functioning while assessing gender attitudes and beliefs benefits their mental and physical health. It has been demonstrated that negative couple relationships have a stronger influence on health than positive relationships (Campbell, McDaniel, & Cole-Kelly, 2005). In other words, couples who report poorer relationship satisfaction are more likely to endorse poor mental and physical health outcomes. Couples therapy is likely to provide benefits to couples experiencing distress and can be tailored to include specific ways in which gender attitudes and beliefs structure the couple's life together. M/CFTs who are educated in the ways by which gender impacts couple relationships are uniquely situated to provide this type of care (i.e., couple relational interventions) as indicated by the BBFM's pathways (Wood et al., 2008) and should be included in health care teams in order to offer a critical systemic understanding of partnered adult functioning.

Conclusion

Evidence supporting links between adult heterosexual romantic relationships to health outcomes has been documented (Carr & Springer, 2010) and researchers are increasingly recognizing the importance between these associations. Despite this increased focus, tests between relationship satisfaction and mental and physical health continue to neglect the ways by which gender attitudes and beliefs may impact these pathways and other specific indicators of health (Carr & Springer, 2010); Wood, 2005). The Biobehavioral Family Model (Engel, 1977) is a biopsychosocial approach to health that has successfully integrated couple and family functioning, mental health, and physical health into one comprehensive model (Wood, 1993). Although this model has been tested with asthmatic pediatric samples, Latino Americans, and couples, this study addresses limitations in the literature while testing the BBFM with an exogenous variable of gender attitudes and beliefs. This study explained paths through which gender attitudes and beliefs, couple relationship satisfaction, and couples' reported mental health further affected physical health (disease activity). Through the use of structural equation modeling, the results of this study indicated some support for this study's proposed model; specifically, romantic partner emotional climate was positively associated with biobehavioral reactivity, and gender attitudes and beliefs were significantly associated with both biobehavioral reactivity and disease activity. Additional research is necessary to test objective indicators of physical health and gender attitudes and beliefs to determine whether the BBFM's pathways are significant longitudinally. Further, interventions can be tailored to incorporate gender attitudes and beliefs and fit the relational needs of individuals and may be especially effective when delivered by a feminist-informed couple/marriage and family therapist.

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APPENDIX A

THE UNIVERSITY OF IOWA

IRB ID #:   201510740

To: Candice Maier

From: IRB-02   DHHS Registration # IRB00000100,
            Univ of Iowa,   DHHS Federalwide Assurance # FWA00003007

Re: Examining The Effects of Gender Attitudes and Beliefs On Couple Relationships and Health Within the Biobehavioral Family Model

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Approval Date: 06/03/16

Next IRB Approval
Due Before: N/A

Type of Application:	**Type of Application Review:**	**Approved for Populations:**
☐ New Project	☐ Full Board:	☐ Children
☐ Continuing Review	Meeting Date:	☐ Prisoners
☒ Modification	☐ Expedited	☐ Pregnant Women, Fetuses, Neonates
	☒ Exempt	

Source of Support:

This approval has been electronically signed by IRB Chair:
Brian Bishop, CIP, MA
06/03/16 1420

APPENDIX B

Email Message to Recruit Participants

Body:

Dear Student, Staff, or Faculty:

I invite you to participate in a confidential online survey about couple relationships, health, and gender attitudes and beliefs. My goal is to understand the effect of gender attitudes and beliefs on the mental and physical health and relationship satisfaction on individuals in romantic relationships. The survey should take between 7-10 minutes. To be eligible for the study, you must:

      1. Be living together or married to your partner for at least two years

      2. At least 18 years old

      3. Be proficient in English

To participate in this study please click on the internet link below. The link will take you to the web site that houses the survey.

https://uiowa.qualtrics.com/SE/?SID=SV_3BCRcUda30dbYy1

Should you have any questions or concerns about this research, its conduct, research participant rights, and/or in the event of a research-related injury, please contact:

Candice A. Maier, MS
Doctoral Candidate in the Couple and Family Therapy Program
Department of Rehabilitation and Counselor Education
N360 Lindquist Center
Iowa City, IA 52242
608-770-3960 (phone)
candice-maier@uiowa.edu

Informed Consent

Project Title: Examining the Effects of Gender Attitudes and Beliefs on Couple Relationships and Health within the Biobehavioral Family Model

Principal Investigator: Candice Maier

Research Team Contact: Candice A. Maier, MS
                                Doctoral Candidate in the Couple and Family Therapy Program
                                Department of Rehabilitation and Counselor Education
                                N360 Lindquist Center
                                Iowa City, IA 52242
                                608-770-3960 (phone)
                                candice-maier@uiowa.edu

This consent form describes the research study to help you decide if you want to participate. This form provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research subject.
   • If you have any questions about or do not understand something in this form, you should ask the research team for more information.
   • You should discuss your participation with anyone you choose such as family or friends.
   • Do not agree to participate in this study unless the research team has answered your questions and you decide that you want to be part of this study.

WHAT IS THE PURPOSE OF THIS STUDY?

This is a research study. We are inviting you to participate in this research study because you are a student, faculty, or staff at the University of Iowa and North Dakota State University.

The purpose of this research study is to further understand links between gender attitudes and beliefs, mental and physical health, and relationship satisfaction within a biopsychosocial model (e.g., The Biobehavioral Family Model; BBFM, Wood, 1993).

HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 300 people will take part in this study at the University of Iowa and North Dakota State University. Another 50 people will participate through an affiliating professional organization listserv (National Council on Family Relations) and via Facebook postings.

HOW LONG WILL I BE IN THIS STUDY?

If you agree to take part in this study, your involvement will last for:

- Approximately 7-10 minutes

WHAT WILL HAPPEN DURING THIS STUDY?
- Subjects will receive an email asking them to participate in the survey.
  - The recruitment email will include a link to the online survey.
  - If subjects choose to click on the provided link, they will be presented with an informed consent document.
- Subjects will then be asked to complete the self-report survey instrument.
  - During this time the subject is free to skip any questions that s/he would prefer not to answer.
- If subjects choose to submit their electronic survey, then informed consent will be implied.

WHAT ARE THE RISKS OF THIS STUDY?

You may experience one or more of the risks indicated below from being in this study. In addition to these, there may be other unknown risks, or risks that we did not anticipate, associated with being in this study.

There are no foreseeable risks to participating in this study.

It is possible that for respondents with pre-existing emotional vulnerabilities, these individuals may experience some emotional distress which may enhance or alleviate the effects after the survey. Participants are encouraged to contact the Mental Health Association Hotline and Helpline Center at 211 for more information and referral services.

WHAT ARE THE BENEFITS OF THIS STUDY?

We don't know if you will benefit from being in this study.

However, we hope that this study will make a contribution to couple relationships and health by further understanding the ways in which gender attitudes and beliefs impact couple relationships.

It is important to note that compensation is not a benefit from taking part of this study.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any costs for being in this research study.

WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

WHO IS FUNDING THIS STUDY?

The University and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

WHAT ABOUT CONFIDENTIALITY?

We will keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people such as those indicated below may become aware of your participation in this study and may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you.
- federal government regulatory agencies,
- auditing departments of the University of Iowa and North Dakota State University, and
- the University of Iowa Institutional Review Board (a committee that reviews and approves research studies)

To help protect your confidentiality, we will assure that no names will be included on any documents. Each survey will be secured on the online survey instrument Qualtrics. This survey instrument will enable us to access the survey results only through a login and password code. Upon completion of the data analysis, survey data will be destroyed. If we write a report or article about this study or share the study data set with others, we will do so in such a way that you cannot be directly identified.

IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part at all. If you decide to be in this study, you may stop participating at any time. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

WHAT IF I HAVE QUESTIONS?

We encourage you to ask questions. If you have any questions about the research study itself, please contact:

Principal Investigator
Candice A. Maier
608-770-3960
candice-maier@uiowa.edu

Advisors
Volker Thomas   Armeda Stevenson Wojciak
319-335-5284   319-335-5288
volker-thomas@uiowa.edu   armeda-wojciak@uiowa.edu

If you have questions, concerns, or complaints about your rights as a research subject or about

research related injury, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail irb@uiowa.edu. General information about being a research subject can be found by clicking "Info for Public" on the Human Subjects Office web site, http://hso.research.uiowa.edu/. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

Couples Satisfaction Index

1. Please indicate the degree of happiness, all things considered, of your relationship.

Extremely Unhappy	Fairly Unhappy	A Little Unhappy	Happy	Very Happy	Extremely Happy	Perfect
0	1	2	3	4	5	6

5. In general, how often do you think that things between you and your partner are going well?

All the time	Most of the time	More often than not	Occasionally	Rarely	Never
5	4	3	2	1	0

9. Our relationship is strong.

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

11. My relationship with my partner makes me happy.

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

12. I have a warm and comfortable relationship with my partner.

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

17. I really feel like a part of a team with my partner.

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

19. How rewarding is your relationship with your partner?

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

20. How well does your partner meet your needs?

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

21. To what extend has your relationship met your original expectations?

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

22. In general, how satisfied are you with your relationship?

Not at all True	A little True	Somewhat True	Mostly True	Almost Completely True	Completely True
0	1	2	3	4	5

23. How good is your relationship compared to others? (Please rate on scale from 1 – 6)

     1 = Worse than all others (extremely bad)
     2 = 1
     3 = 2
     4 = 3
     5 = 4
     6 = Better than all others (extremely good)

24. Do you enjoy your partner's company?

1 = Never   2 = Less than once a month   3 = Once or twice a month
4 = Once or twice a week   5 = Once a day   6 = More often

25. How often do you and your partner have fun together?

1 = Never   2 = Less than once a month   3 = Once or twice a month
4 = Once or twice a week   5 = Once a day   6 = More often

Gender Role Beliefs Scale (GBRS; Kerr & Holden)

1. It is disrespectful to swear in the presence of a woman.

2. The initiative in courtship should usually come from the man.

3. Women should have as much sexual freedom as men.

4. Women with children should not work outside the home if they don't have to financially.

5. The husband should be regarded as the legal representative of the family group in all matters of law.

6. When on dates, a man should never allow a woman to pay the check.

7. Men should continue to show courtesies to women such as holding open the door or helping them on with their coats.

8. Women should be concerned with their duties of childbearing and homemaking, rather than with the desires for professional and business careers.

9. Swearing and obscenity is more repulsive in the speech of woman than a man.

Center for Epidemiologic Studies Depression Scale (CES-D), NIMH

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day.)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people dislike me.	☐	☐	☐	☐
20. I could not get "going."	☐	☐	☐	☐

SCORING: zero for answers in the first column, 1 for answers in the second column, 2 for answers in the third column, 3 for answers in the fourth column. The scoring of positive items is reversed. Possible range of scores is zero to 60, with the higher scores indicating the presence of more symptomatology.