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COUPLE FUNCTIONING AND CARDIOVASCULAR HEALTH: CURRENT
APPROACHES AND FINDINGS

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ABSTRACT

This analytic review of 46 empirical articles considers the body of research surrounding couple functioning and its effect on cardiovascular measures and cardiovascular health outcomes. Aspects of couple functioning are defined under relationship quality and include support behaviors, behaviors during conflict, perceptions of behavior, and other features specific to couple interaction. Measures of cardiovascular functioning include blood pressure, heart rate, cardiovascular reactivity, and instances of cardiovascular disease. Of particular consideration, methodological approaches, theoretical constructs, and contextual factors including gender, relationship duration, and health status were reviewed. The majority of articles were found to utilize experimental laboratory designs with healthy couples of a wide age range. To measure couple functioning, the majority of studies utilized both scales of quality/interaction and direct behavior observation in the lab. To measure cardiovascular functioning, the majority of studies utilized either blood pressure or cardiovascular reactivity measurements. Gender trends across studies include increased female reactivity to conflict or low relationship quality, decreased female reactivity to support behaviors or high relationship quality, and increased male reactivity when attempting to exert control in interaction. Quality trends across studies include greater overall significance of low quality in relation to cardiovascular functioning and decreased reactivity in couples reporting high relationship quality. Relationship duration trends and health status trends were ultimately mixed. Further research utilizing large, diverse samples, multi-dimensional ratings of relationship quality, and both short term and long term cardiovascular measures across multiple settings is necessary to obtain greater support for the conclusions offered in this body of research.

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Chapter 1

Perspectives on Relationship Quality and Health

The quality of a married or cohabitating couple's relationship has implications for health. While it is suggested that a committed, intimate relationship may indirectly buffer certain health risks (Berkman, 1995), it has been found in recent research that simply being married does not always associate with excellent health. Rather, relationship quality may provide more consistent connections to health (Wu et al., 2003). Thus, in terms of protection, a marriage or intimate relationship may not be enough to offer significant health benefits (Coyne et al., 2001).

Relationship quality may be defined by both positive and negative elements. In other words, the quality of an intimate relationship encompasses both matters of support and conflict (Fincham & Linfield, 1997). How these distinctive support and conflict behaviors may arise is likely from the unique allocation of living space, assets, and decisions that come with a committed, intimate relationship. That is, couples may share a home or make joint life decisions that set apart their relationship from other social relationships (Robles et al., 2014). Ultimately, whereas relationships of high quality may be associated with health benefits, lower quality relationships may be associated with health detriments (Kiecolt-Glaser & Newton, 2001).

When marital quality is high, relationship contentment and minimal feelings of negativity are generally reported (Robles et al., 2014). According to Holt-Lunstad et al. (2010), receiving high quality support can impact an individual's longevity to a degree similar to health behaviors like tobacco use and exercise. In other words, the impact of relationship quality on health has been suggested to match that of more common risk factors (House et al., 1988).

Interestingly, it is suggested that when a partner's behaviors are considered positive, health benefits may be observed for both members of a couple (Carmelli, Swan, & Rosenman, 1986). For example, higher quality relationships with greater partner support may urge greater participation in healthy behaviors together and less involvement in unhealthy practices, such as excessive cigarette smoking or drinking (Umberson, 1992). Overall, although the effect of certain aspects of marital quality on health can be small, it is suggested that even these small effects carry significance. As marital and couple interaction occurs every day, the effects on an individual's health can certainly accumulate (Robles et al., 2014).

Relationship Quality and Cardiovascular Functioning

It has been shown that high quality interactions with a partner are associated with enhanced cardiovascular functioning. This connection appears to be even stronger than common health behaviors and factors normally considered (Uchino et al., 1996). For example, it has been shown that higher marital quality is associated with lower daily blood pressure (Holt-Lunstad, Birmingham, & Jones, 2008). Even partners with pre-existing cardiovascular conditions have been found to live longer if they have positive marital interactions (Coyne et al., 2001).

On the other hand, couples that report less satisfaction in their relationship may have poorer cardiovascular functioning than those reporting greater satisfaction (Baker et al., 2000; Levenson & Gottman, 1983, 1985). Studies have shown that when relationship quality is lower, conflict between partners may result in higher cardiovascular reactivity (Robles et al., 2014). In fact it is suggested that cardiovascular reactivity to hostile interactions may mediate associations between relationship quality and cardiovascular outcomes (Robles et al., 2014).

Furthermore, negative approaches to conflict may particularly promote negative cardiovascular effects (Levenson & Gottman, 1985). For example, in male partners, conflict frequency was found to be associated with elevated blood pressure (Haynes, Levine, Scotch, Feinleib, & Kannel, 1978). Of great interest to many researchers, hostile behaviors in couple interaction may lead to potentially harmful cardiovascular arousal (Robles & Kiecolt-Glaser, 2003). Therefore, even when considered indirectly, relationship quality may be considered a significant feature to study in cardiovascular health. With low relationship quality can come feelings of depression and hostile attitudes (Rozanski, Blumenthal, & Kaplan, 1999).

It must be noted that although the stress related to negative interaction may heighten cardiovascular reactivity, support that allows for a more positive interaction may offset some reactivity for both the partner offering support and the partner receiving support (Kiecolt-Glaser et al., 1996; Uchino, 2006). Thus, although times of negative interaction may elevate cardiovascular measures such as blood pressure or heart rate, positive interaction, such as times of sincere affection, may act as a buffer. (Robles & Kiecolt-Glaser, 2003; Uchino, 2006).

Defining Couple Behavior

Support Behaviors

Marriage can provide one of the most potent forms of support (Burman & Margolin, 1992). In fact, it is argued in current literature that the support that may come from a romantic or intimate relationship is quite unique, and may be differentiated from other forms of support (Sarason et al., 1994).

Forms of support may be differentiated and defined as emotional support, informational support, or physical support (Cohen et al., 1985; Wills & Shinar, 2000). To further clarify, emotional support involves understanding and compassion that is meant to heighten the feeling of self-esteem in another. Informational support refers to support in the form of guidance and factual resources for better decision making. Physical support includes physical assistance or otherwise measurable forms of help (Cohen et al., 1985). Additionally, support may be apparent in signs of companionship such as a smile or as touch in the form of an embrace or hand squeeze. Even tone of voice and a willingness to listen thoughtfully during couple interaction offers further signs of support that may in turn affect cardiovascular functioning such as blood pressure (Uchino et al., 1996; Denton et al., 2001; Diamond, 2000)

Interestingly, health benefits may not be prevalent unless sufficient, appropriate support is offered in both times of trouble and contentment (Feeney et al., 2013). Taking time to really understand a significant other may impact how beneficial support can be for the partner, how constructive times of problem solving can be for the partner, and how harmonious a relationship is perceived to be by the partner (Neff & Karney, 2005).

Behaviors during Conflict

Conflict is commonly associated with features that may be deemed unfavorable. This could include disparagement, accusation, anger, and outright hostility. Times of conflict will arise when a couple is faced with differing opinions or even opposing life goals (Fincham & Beach, 1999). Nevertheless, conflict itself does not appear to be the problem, rather the way a couple carries out conflict may be where the problem lies. When conflicts are handled poorly,

health consequences can arise for both members of a pair (Eaker et al., 2007; Filsinger & Thoma, 1988).

Studies that have looked at satisfied and dissatisfied couples suggest that one of the most prevalent differences in interaction is the rate of occurrence of hostile behaviors. This holds true even when considering frequency of supportive, loving behavior (Margolin & Wampold, 1981). Thus, couples with lower satisfaction in their relationship may behave with greater hostility during conflict instead of constructive problem-solving (Gottman & Levenson, 1986). In this sense, conflict may not end with positive resolution and is suggested to encourage extended reactivity that can have harmful health consequences (Woodin, 2011).

Defining Cardiovascular Measures

Blood Pressure and Ambulatory Blood Pressure

Of all cardiovascular measures considered in research on couple interactions, blood pressure has been examined most often, followed by heart rate (e.g., Ewart et al., 1991; Miller, Dopp, Myers, Stevens, & Fahey, 1999; Smith & Brown, 1991). To understand blood pressure, two concepts must be defined: cardiac output and total peripheral resistance. Cardiac output refers to the volume of blood exiting the heart per minute. Total peripheral resistance then refers to the vasoconstriction of vessels throughout the body. An increase in blood pressure may result from an increase in cardiac output and/or an increase in total peripheral resistance (Sherwood et al., 1990).

Of particular interest in contemporary research is ambulatory blood pressure. Ambulatory blood pressure measurements hold high ecological validity as each measurement is taken at a

regular interval throughout an individual's working day or at home. Ambulatory blood pressure variability is a significant indicator of cardiovascular functioning and may predict future cardiovascular health concerns (Bjorklund et al., 2004).

Heart Rate

Heart rate is controlled by the autonomic nervous system with its two opposing branches, the sympathetic nervous system and parasympathetic nervous system. In times of stress, the sympathetic nervous system will become more active while the parasympathetic nervous system will become less active (Rajendra et al., 2006). As the sympathetic nervous system activates, increased amounts of norepinephrine are released by postganglionic neurons targeting the heart (Brotman et al., 2007). Heart rate will increase as the result of stronger contractions in the heart. As these contractions become more powerful, the overall time it takes to contract and release blood shortens. Thus, an increase in heart rate is referred to as an increase in beats per minute (Cacioppo, Uchino, & Bernston, 1994).

Cardiovascular Reactivity

Cardiovascular reactivity may be measured using multiple approaches. Commonly, however, cardiovascular reactivity has been defined as increases in heart rate and blood pressure (Kamarck et al., 1994). For further clarification, cardiovascular reactivity may be referred to as a change in cardiovascular functioning. The change itself is not generally a focus of concern, rather how much change occurs and for long. In other words, it is the volume of response that presents the greatest risk factor. When reactivity is sustained for long periods of time, the

homeostatic range of cardiovascular functioning may change. Inflammation throughout the system can increase and risk of cardiovascular disease and other cardiovascular health concerns arises (Kamarck et al., 1994).

Cardiovascular Disorders

In developed areas of the world, cardiovascular disease is the leading cause of death (Xu et al., 2010). It is because of this that research on couple functioning and cardiovascular outcomes holds immense importance. Although many factors may be related to the development of cardiovascular disorders, such as long-term stressors, feelings of depression, living status, and personal attributes (Strike & Steptoe, 2004), relationship quality is connected to various cardiovascular risk factors that can lead to disease, beyond these other risk factors (Robles et al., 2014).

In times of stress, cardiovascular arousal can be significant. If an individual's reactivity continues past the point of stressor resolution, an individual may be at risk for a multitude of other cardiovascular problems (Schwartz et al., 2003). For those with pre-existing cardiovascular conditions, relationship discordance has been suggested to contribute to the narrowing of arteries, increase in blood pressure, and overall worsening projections for longevity (Baker et al., 2000; Coyne et al., 2001; Gallo et al., 2003).

Chapter 2

Contextual Factors in the Link between Relationship Quality and Cardiovascular Functioning

Gender

Recent studies suggest that gender may play a large role in the connections between relationship quality or marital interaction and cardiovascular health (Ewart et al., 1991; Smith & Brown, 1991). Although marriage itself is beneficial to a man's health in terms of cardiovascular risk, the same is not true for women (Kiecolt-Glaser & Newton, 2001). It is suggested that men are not as affected by low quality couple interaction as women (Notarius et al., 1989). With considerable closeness in both space and relationship itself, conflicts certainly arise. Why these conflicts are more detrimental to women is not clear; however, it is suggested that the female gender role encourages a desire for relationship satisfaction stability (Cross & Madson, 1997). The gender differences in couple functioning and cardiovascular functioning may even be considered on a more biological level. In other words, the biological mechanisms of internal functioning during times of conflict or support may simply be different for men and women (Kiecolt-Glaser & Newton, 2001). The difference in effect may then lie in differences of concern. While women appear to be ultimately concerned with harmony and attachment, men seem to be more affected by the aspect of management or attempting to exert control in various interactions (Smith, Gallo, Goble, Ngu, & Stark, 1998).

Duration of Relationship

Another area of interest follows relationship duration differences, or how older and younger couples may differ in terms of couple functioning and cardiovascular health. On one hand, older couples may use more problem-solving skills in times of disagreement as a result of years of practice, whereas younger couples may still be developing skills. Along with this, it is suggested that couples of older age may use less hostile behaviors in interaction than those of younger ages, perhaps offering some cardiovascular protection (Carstensen, Gottman, & Levenson, 1995). On the other hand, older couples may see their share of interaction stressors, and as age increases, any marital strain that has been present over a long period of time could have additive health effects (Umberson et al., 2006). In addition, in older couples, a spouse often has to manage not only his or her failing health, but the failing health of his or her partner (Dixon & Gould, 1998).

Dimensions of Relationship Functioning

Dimensions of relationship quality have recently become a theoretical issue of concern. Commonly, relationship quality has been considered to be of a single dimension, or rather linear in focus. To measure the quality of one's relationship, research has focused primarily on qualitative surveys and personal self-reports to be indexed on a larger scale of total satisfaction (Fincham & Linfield, 1997). More recently, it is suggested that to determine more exact effects of quality, multiple dimensions must be considered (Thompson, Zanna, & Griffin, 1995). This would mean that relationship quality does not have a positive and negative extreme, but is rather

comprised of both positive and negative facets that may be considered separate dimensions rather than opposite ends of one dimension (Fincham & Linfield, 1997).

Setting Considerations

Laboratory Studies

For the most part, studies that look into couple and cardiovascular functioning primarily focus on a younger age range at a lab site (Uchino, Birmingham, & Berg, 2010). By utilizing this method, it can be difficult to determine how applicable laboratory results may be in the real world. In addition, although a few exceptions exist, little research has focused on populations with pre-existing health conditions and how such conditions may play a role in couple functioning and cardiovascular measures outside of the lab (Stephoe et al., 2003).

In many experimental studies, baseline measures are taken and couples are asked to interact while working on a task together or having a discussion, as they would in the home. Although it is claimed that these practices offer generalizable results, factors related to the laboratory setting or task may influence the reactivity that is recorded (Nealey-Moore et al., 2007). Even if recorded in a controlled lab setting, bias in true behavior and communication is a concern (Ochs et al., 2006). With this as a consideration, in-home studies are becoming more common.

In-Home Studies

To gain an understanding of social interaction effects in a more ecologically valid manner, researchers may utilize recording devices, video cameras and film, or even simple photography to log continuous daily social life. Essentially, these forms of recording (audio and video, specifically) allow for greater precision in capturing daily communication as they may be thoroughly analyzed in multiple play-backs of the recorded data and compared to participant self-reports. Instead of depending on fleeting senses and memory, researchers are offered the opportunity to replay audio or video scenarios for the coding of multiple areas that may not normally be assessed. This could include actual content of speech, tone or mood, expressions, body language, and more. In previous forms of study, on the other hand, cues such as tone of voice could not be assessed in simple surveys and note-taking methods (Ochs et al., 2006).

The Current Review

The goal of this review is to analyze the current body of research that surrounds couple functioning and cardiovascular health. Precisely, this review considers the associations between relationship quality, including behaviors during interaction and perceptions of conflict and support, and changes in cardiovascular functioning, including blood pressure, heart rate, cardiovascular reactivity, and long term cardiovascular outcomes. Of particular concern, the role of contextual factors such as gender, relationship duration, and health status in the association between couple functioning and cardiovascular functioning will be assessed. By further considering matters of design and theoretical construct, it is our hope to determine the best course for future studies in this area.

Chapter 3

Methods

Database Search

The focus of this literature search was studies that focused on couple functioning and cardiovascular functioning. Searches were completed using PsycINFO with final searches completed by August 2014. To complete the searches, keyword combinations for couples, their functioning, and cardiovascular measures were utilized.

Search terms relating to the couple consisted of couple OR dyadic OR marital OR marriage OR partner OR spousal OR spouse. Search terms relating to couple and marital functioning consisted of functioning OR communication OR conflict OR interaction OR quality OR satisfaction OR strain OR support. Finally, search terms relating to cardiovascular measures consisted of blood pressure OR cardiovascular functioning OR cardiovascular health OR cardiovascular reactivity OR cardiovascular risk OR heart rate OR heart rate variability.

All possible combinations were used and are displayed in Table 1:

Table 1. Search Terms

Couple-related Terms	Couple Functioning-related Terms	Cardiovascular Functioning-related Terms
couple	communication	blood pressure
dyadic	conflict	cardiovascular functioning
marital	functioning	cardiovascular health
marriage	interaction	cardiovascular reactivity
partner	quality	cardiovascular risk
spousal	satisfaction	heart rate
spouse	strain	heart rate variability
	support	

In conducting the search, each term was inserted individually with the separation “AND.” The searches were refined for terms found in the Abstract. An example search would resemble the following: ab(couple) AND ab(functioning) AND ab("blood pressure").

The literature search yielded 966 articles. Figure 1 illustrates the breakdown of these 966 results to 41 articles chosen for inclusion in this review.

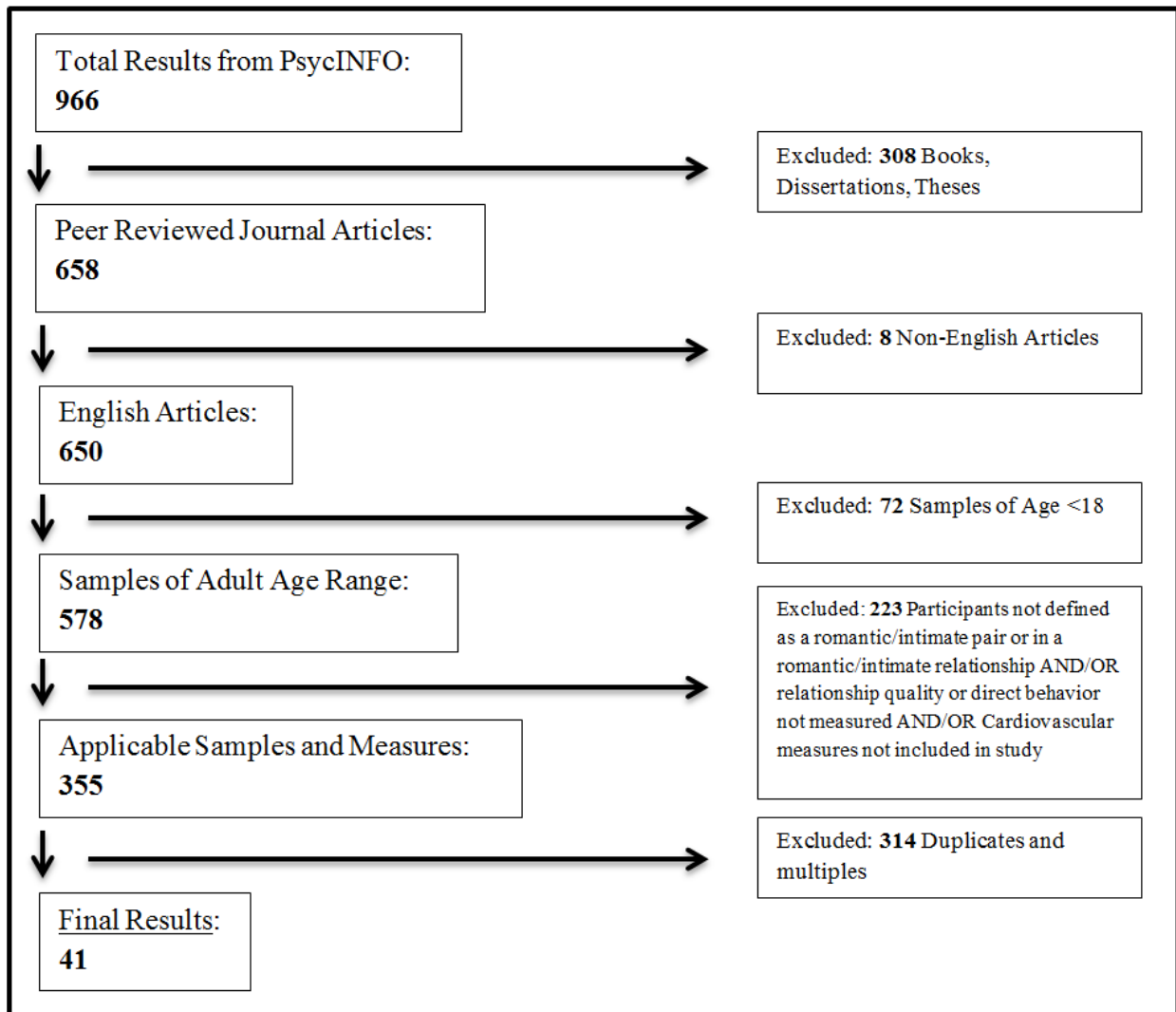


Figure 1. Search Results

A final search was completed using the references from a recent meta-analytic review of marriage and health (Robles et al., 2014). Five additional articles were obtained and deemed appropriate based on the inclusion and exclusion criteria, yielding a total of 46 articles.

Inclusion and Exclusion Criteria

To be considered for inclusion, each article abstract obtained in the search was reviewed. Each article had to meet the source criteria of peer-reviewed journal article. Books, dissertations, and theses were not included for the review. Additionally, articles that were not published in the English language were excluded. Upon meeting these criteria, samples and measures were further considered. To meet inclusion criteria, participants had to be defined as romantic or intimate pairs in the adult age range (18 years of age and older). Articles suggesting that participants were in a romantic relationship at the time of study, whether or not both members of the pair were studied, were as well included. Samples of single participants were not included for review unless they were noted as controls or comparisons for romantic pairs or individuals in the same study. Additional inclusion criteria centered on cardiovascular measures and outcomes. Broad terms were used in order to obtain studies examining either short term or long term cardiovascular health outcomes. Studies that did not focus on cardiovascular outcomes were not included.

Chapter 4

Results

Participants

All articles were categorized by age of participants, couple or single partner participation, and health status. Table 2 displays the age range of study participants with the majority being mixed (younger, middle, and/or older) followed closely by younger adults. The majority of studies collected data from both partners. The majority of studies utilized seemingly healthy participants.

Table 2. Age Range Divisions

Age Range	Article Count
Younger Adults (18-40)	14
Middle Aged Adults (40-60)	5
Older Adults (60 & up)	2
Mixed Age Range	25

Design

All articles were categorized by design categories. Table 3 displays these design categories and article counts for each. The majority of these studies had an experimental design set in a laboratory.

Table 3. Study Design Divisions

Design Category	Article Count
Experimental	30
Cross-Sectional Correlational	2
In Home	9
Longitudinal	5

Couple Functioning Measures

In consideration of the aspect of couple functioning, articles were organized and divided into three categories. Couple functioning may be measured through quality/interaction questionnaires, direct behavioral observation, or some combination of the two. Table 4 displays these couple functioning categories and article counts for each. The majority of studies utilized both scales and behavioral observation, though use of scales alone closely followed. For the studies utilizing direct behavior observation, the SASB, Structural Analysis of Social Behavior (Benjamin, 1974), and the MICS, Marital Interaction Coding System (Hops et al., 1972), were the most commonly used coding systems. For the studies utilizing a measure of relationship quality or interaction, the MAT, Marital Adjustment Test (Locke & Wallace, 1959), was the most commonly used scale.

Table 4. Couple Functioning Divisions

Couple Functioning Measure	Article Count
Measure of Quality or Interaction Features	18
Direct Behavior Measurement	5
Scale and Behavior Combination	23

Cardiovascular Measures

All articles were categorized according to type of cardiovascular measure. Table 5 displays these cardiovascular categories and article counts for each. The majority of these studies utilized either blood pressure measurements alone or cardiovascular reactivity measurements (generally a combination of blood pressure and heart rate).

Table 5. Cardiovascular Functioning Divisions

CV Measure	Article Count
Blood Pressure Outcome	18
Heart Rate Outcome	4
Cardiovascular Reactivity Outcome	18
Long Term Cardiovascular Outcome	6

Relationship Quality and Contextual Factor Trends for Healthy Couples

Gender Findings

Twenty studies included gender differences as a consideration in their designs. Certain trends were observed in fourteen studies. Liu & Waite (2014), Mayne et al. (1997), Menchaca & Dehle (2005), Smith et al. (2013), and Whisman (2010) found that female partners, as compared to male partners, displayed increased reactivity or cardiovascular risk during conflict and when low relationship quality was reported. In addition, Bowen et al. (2013), Grewen et al. (2005), and Mustante et al. (1990) found that female partners, as compared to male partners, displayed decreased reactivity when support behaviors were present or high relationship quality was reported. Brown & Smith (1992), Denton et al. (2001), and Smith & Brown (1991) found that reactivity in male partners increased when attempting to exert control or display dominance in interaction. To counter these findings, Barnett et al. (2005), Grewen et al. (2003), and Smith et al. (2009) found that the effects of couple functioning on cardiovascular outcomes did not vary by gender. The remaining six studies that included gender differences offered specific results falling outside of these general categories. Eaker et al. (2007) found that men with wives who often brought up work stress in interaction were 2.7 times more likely to develop Coronary Heart Disease. Holt-Lunstad, Birmingham, & Light (2008) found that husbands trained in “warm touch” had significantly lower ambulatory systolic blood pressure whereas wives saw no effect. Janicki et al. (2005) found that greater spousal interaction was associated with less intima medial thickening progression among men reporting high marital quality, whereas women saw greater intima medial thickening progression. Lorber et al. (2013) suggested that male aggression was associated with cardiovascular reactivity in female partners. Morell and Apple (1990) found that

neither reported marital distress nor positive affect was associated with cardiovascular functioning in women. Osgarby and Halford (2013) found that men reporting low marital quality had higher heart rates during problem solving and positive reminiscence tasks whereas women showed no difference in comparison to those reporting high quality.

Relationship Duration Findings

Three studies included duration of relationship differences as a consideration in their designs. From these articles, findings were mixed. Smith et al. (2009) found that older couples, as compared to younger couples, responded to conflict with smaller heart rate increases. However, Heffner et al. (2004) found that satisfied younger couples, as compared to older couples, displayed lower blood pressure responses following conflict. Liu & Waite (2014) then suggest that older couples, as compared to younger couples, display a closer relation between relationship quality and cardiovascular risk factors.

Overall Quality Findings

Fourteen studies included quality differences as a consideration in their designs. Several trends were observed from these studies. Barnett et al. (2005), Levenson & Gottman (1983), Morell & Apple (1990), Smith et al. (2012), Liu & Waite (2014), Carels et al. (2000), Carels et al. (1998), and Thomsen & Gilbert (1998) found that relationships of low quality, as compared to relationships of high quality, were more significantly related to cardiovascular functioning. In other words, negative interactions or reported low relationship quality was found to significantly associate with changes in cardiovascular functioning whereas positive interactions or reported

high relationship quality was not found to significantly associate with changes in cardiovascular functioning. On the other hand, Birditt et al. (2014), Gallo et al. (2003), Gallo, Troxel, Matthews, & Kuller (2003), and Holt-Lunstad, Birmingham, and Jones (2008) found that higher relationship quality was associated with lower reactivity and fewer cardiovascular risk factors. Gump et al. (2001) and Eaker et al. (2007) found that quality was not related to cardiovascular functioning.

Relationship Quality and Contextual Factor Trends for Unhealthy Couples

Studies utilizing samples of couples faced with some form of illness were separated from the general trends to determine if differences in couple functioning and cardiovascular functioning were present. Five studies used couples with pre-existing conditions (hypertension and lower back pain). Trends found were generally similar to those noted for healthy couples. Ewart et al. (1991) found that female partners, as compared to male partners, displayed increased blood pressure responses to conflict or low relationship quality. As well, Holt-Lunstad et al. (2009) found that greater blood pressure dipping at night in female partners was associated with low conflict. For both genders, Ewart et al. (1983) found that increased negative behavior in interaction was associated with increased blood pressure. Ewart et al. (1984) and Holt-Lunstad et al. (2009) then found that support and collaboration could be considered protective for health. Aside from these trends, Stampler et al. (1997) noted an interesting finding for unhealthy couples. In considering a patient describing lower back pain, Stampler et al. (1997) found that spouses reporting high satisfaction or quality actually displayed greater cardiovascular reactivity in interactions focused on partner pain.

Chapter 5

Discussion

In this analytic review of 46 empirical studies, several interesting trends in the body of research that surrounds couple functioning and cardiovascular health were uncovered. In terms of participant inclusion, the majority of studies utilized samples of healthy, mixed age couples. In considering design or how the study was conducted, the majority of studies were experimental and were conducted outside of the home. For measurement of couple functioning, the majority of studies used both self-report quality/interaction scales and observation of couple behavior. As a final consideration, the majority of studies used blood pressure or cardiovascular reactivity measurements to represent cardiovascular functioning.

Apart from these divisions, specific contextual findings were considered. Looking first to healthy couples, twenty studies included direct gender comparisons. Several studies supported that female partners displayed increased reactivity or cardiovascular risk during conflict and when low relationship quality was reported (Liu & Waite, 2014; Mayne et al., 1997; Menchaca & Dehle, 2005; Smith et al., 2013; Whisman, 2010). Others supported that female partners displayed decreased reactivity when support behaviors were present or high relationship quality was reported (Bowen et al., 2013; Grewen et al., 2005; Mustante et al., 1990). In addition, several studies found that reactivity in male partners increased when attempting to exert control or display dominance in interaction (Brown & Smith, 1992; Denton et al., 2001; and Smith & Brown, 1991). In contrast, other studies suggested that cardiovascular functioning did not vary by gender (Barnett et al., 2005; Grewen et al., 2003; Smith et al., 2009). In consideration of the three studies that included relationship duration comparisons, couple functioning and

cardiovascular functioning between age groups was ultimately mixed (Heffner et al., 2004; Liu & Waite, 2014; Smith et al., 2009). As a final consideration for healthy couples, fourteen studies included direct high and low relationship quality comparisons in their designs. Several studies found that overall relationships of low quality, as compared to relationships of high quality, were more significantly related to cardiovascular functioning (Barnett et al., 2005; Carels et al., 2000; Carels et al., 1998; Levenson & Gottman, 1983; Liu & Waite, 2014; Morell & Apple, 1990; Smith et al., 2012; Thomsen & Gilbert, 1998). Still, some studies found that higher relationship quality was associated with lower reactivity and fewer cardiovascular risk factors (Birditt et al., 2014; Gallo et al., 2003; Gallo, Troxel, Matthews, & Kuller, 2003; Holt-Lunstad, Birmingham, & Jones, 2008). Just as with gender, some studies suggested no relationship (Gump et al., 2001; Eaker et al., 2007). To finally consider unhealthy couples, contextual factor findings were generally similar in comparison to those for healthy couples (Ewart et al., 1991; Ewart et al., 1984; Ewart et al., 1983; Holt-Lunstad et al., 2009). However, one study suggested that spouses reporting high satisfaction or quality actually displayed greater cardiovascular reactivity during interactions surrounding patient pain (Stamper et al., 1997).

Strengths and Limitations in Overall Design

In considering overall design, strengths and weaknesses may be considered for each approach. For the studies that utilized an experimental design (Appendix A), whereas control over external variables was high, generalizability and ecological validity may be low. In the opposing case, for studies that utilized in-home designs (Appendix A), whereas some control

was forfeited, ecological validity was high. Thus, each method appears to hold strength where the other is weak.

Having said this, recent literature has begun to offer greater support for in-home, real time measures. According to Shiffman et al. (2008), heart rate assessments in the home, as compared to in the lab, may be more accurate in predicting carotid artery blockage. What's more, Shiffman et al. (2008) suggested that studies conducted in the home could generally reflect results obtained in a lab setting, but with greater clarity.

In further consideration of design, strengths and weaknesses may be determined for studies that utilized single measures in time, via interview or self-report, and studies that utilized several measures over time. For the studies specifically utilizing a cross-sectional correlation design (Appendix A), whereas few resources may have been necessary, the use of a single measure in time suggests lower validity. For the studies utilizing a longitudinal design (Appendix A), whereas long term effects of a certain condition may be supported, greater resources are necessary. Nevertheless, with the bias that may come with cross-sectional correlational designs, greater support may be offered for use of longitudinal designs. According to Rindfleisch et al. (2008), cross-sectional correlational studies may be particularly prone to bias centered on causal inference, or inferring causation with limited information, and overall method, or use of measures in a single point of time. To avoid these biases, longitudinal designs may be used. With time in between measurements, influences over responses may be more controlled, and inferences from a single point in time may be limited (Rindfleisch et al., 2008).

Looking to choice of measures, strengths and weaknesses may be further considered for studies utilizing either scales or direct behavior measurements alone. To first consider studies using a marital quality/interaction scale (Appendix A), whereas personal perception is

represented, actual behaviors may be misrepresented. In contrast, by measuring behaviors alone (Appendix A), perceived marital quality may be misrepresented. According to Sen (2002), although a rating of behavior may be more objective, self-perception has continually been shown to have various effects on an individual's health. Because of this, the best course may be inclusion of both scales and direct behavioral coding in assessment.

As further consideration under the use of scales, the theoretical framework surrounding the scales must be considered. Although many studies utilized established, common measures such as the DAS, Dyadic Adjustment Scale (Spanier, 1976) and most commonly MAT, Marital Adjustment Test (Locke & Wallace, 1959), others utilized either their own or less commonly used scales to measure marital quality or some factor of interaction. In considering the use of MAT, though this measure may generalize over many studies, the unidimensional design may interfere with accurate assessments of quality. On the other hand, by utilizing a less common measure, though being able to potentially look at multiple dimensions and closely match an individual study's design and measures of interest, generalizability may be lost. According to Johnson et al. (1986), the unidimensional view may cause more problems in the long run despite common use. By using scales such as DAS and MAT, positive and negative aspects of interaction overlap. This may interfere with a holistic view of marital quality as these components are reasonably separate, and may not appropriately fit on opposite ends of a spectrum (Johnson et al., 1986). Because of this, Johnson et al. (1986) recommends separating elements such as happiness, disagreements, and interaction to determine distinct measurements of separate matters of marital quality. In this sense, relationships that reflect either high negative and high positive factors or low negative and low positive factors may be appropriately represented and considered.

As a final consideration, the choice of measure for cardiovascular functioning may hold additional strengths and weaknesses. For the studies utilizing heart rate or blood pressure in the lab as the primary cardiovascular functioning measure (Appendix A), although supported as risk factors for cardiovascular mortality, contextual factors pose some concern. By taking measurements in a lab setting, though generally controlled for various factors, results run the risk of having a white coat bias (Dolan et al., 2005; Pickering et al., 2006). To avoid this, several studies utilized ambulatory measures (Appendix A). Although generally more expensive and potentially forfeiting some aspects of control, the strengths of utilizing ambulatory cardiovascular measures are notable. With multiple measures throughout normal daily life, the bias resulting from a lab or clinical setting may be avoided (Pickering et al., 2006). Of additional consideration, for the studies utilizing cardiovascular reactivity as the primary cardiovascular measure (Appendix A), further strengths and weaknesses are apparent. Although not studied in the home for this body of work, cardiovascular reactivity may be supported as not only a significant indicator for future cardiovascular risk, but also a trait closely linked to specific behavior such as conflict (Huber, 1999). As these studies are specifically concerned with couple behaviors, use of cardiovascular reactivity as opposed to blood pressure or heart rate alone may allow for stronger conclusions in the association of couple functioning and long term cardiovascular health.

Strengths and Limitations in Gender Findings for Healthy Couples

In considering the studies that supported increased cardiovascular risk for women during conflict or when low relationship quality was reported, methodologies were ultimately mixed.

Liu & Waite (2014), Mayne et al. (1997), and Whisman (2010) utilized mixed age range couples and Menchaca & Dehle (2005) and Smith et al. (2013) utilized younger couples. In terms of design, these studies utilized experimental designs with combination scale and behavioral measures (Mayne et al., 1997; Menchaca & Dehle, 2005; Smith et al., 2013) or cross-sectional correlational (Whisman, 2010) and longitudinal (Liu & Waite, 2014) designs with reported measures of quality/interaction. These studies included long term cardiovascular (Liu & Waite, 2014), blood pressure (Whisman, 2010), or cardiovascular reactivity (Mayne et al., 1997; Menchaca & Dehle, 2005; Smith et al., 2013) outcomes. Due to this variety in sample, design, and measures, the finding may be considered to have relatively high validity. While the experimental studies consisted of short term measures in a controlled setting, Liu & Waite's (2014) longitudinal design, coming to the same conclusion, may offer some external validity.

In considering the studies that supported decreased cardiovascular risk for women when support and high relationship quality was reported, methodologies were also mostly mixed. Grewen et al. (2005) and Mustante et al. (1990) utilized mixed age range couples and Bowen et al. (2013) utilized younger couples. In terms of design, each study was different. Grewen et al. (2005) utilized an experimental design with combination scale and behavioral measures. Bowen et al. (2013) utilized an in-home design with quality/interaction scale measures. Mustante et al. (1990) utilized a longitudinal design with quality/interaction scale measures. For the cardiovascular measure, all studies utilized blood pressure outcomes. Due to this variety in sample and design, it is likely that the finding can be strongly supported for blood pressure reactivity. Bowen et al.'s (2013) work with ambulatory blood pressure, though sacrificing control, offers external validity to Grewen et al.'s (2005) experimental study. Mustante et al.'s (1990) longitudinal design offered additional reliability as a control for short term inferences on

blood pressure reactivity. Still, with the absence of other cardiovascular measures, the finding may not be concluded for other measures of cardiovascular functioning.

In considering the studies that supported increased cardiovascular risk for men when attempting to exert control, methodologies were less variable. Brown & Smith (1992) and Smith & Brown (1991) utilized younger couples and Denton et al. (2001) utilized mixed age range couples. In terms of design, all studies utilized an experimental design with either scale and behavior (Brown & Smith, 1992; Denton et al., 2001) or direct behavior measures (Smith & Brown, 1991). All studies utilized cardiovascular reactivity outcomes. Although this finding is supported by previous research (Smith, Gallo, Goble, Ngu, & Stark, 1998) and appears relatively consistent for younger males in a lab setting, without representation in the home, external validity may be in question.

In considering the studies that supported no gender variance in couple functioning and cardiovascular outcomes, methodologies maintained some variability. Grewen et al. (2003) and Smith et al. (2009) utilized mixed age range couples and Barnett et al. (2005) utilized middle age couples. Studies utilized either experimental (Grewen et al., 2003; Smith et al., 2009) or in-home (Barnett et al., 2005) designs with mixed couple functioning measures. Studies as well utilized either blood pressure (Barnett et al., 2005) or cardiovascular reactivity (Grewen et al., 2003; Smith et al., 2009) outcomes. Barnett et al.'s (2005) work with ambulatory blood pressure, though sacrificing control, offers some external validity to Grewen et al. (2003) and Smith et al.'s (2009) experimental study designs (utilizing blood pressure as a component in cardiovascular reactivity). Still, this finding suggests that some women are less affected by marital quality than previously believed. This may be due to changing gender roles, with an

increase in the number of roles for modern women and decrease in the significance of marital quality for women (Barnett et al., 2005).

Strengths and Limitations in Relationship Duration Findings for Healthy Couples

As necessary for direct duration comparisons, these studies utilized mixed age range couples. In terms of design, studies utilized either experimental (Heffner et al., 2004; Smith et al., 2009) with scale and behavior measures or longitudinal (Liu & Waite, 2014) designs with relationship quality/interaction scales. For the cardiovascular measurement, all studies were different. Heffner et al. (2004) utilized blood pressure, Smith et al. (2009) utilized cardiovascular reactivity, and Liu & Waite (2014) utilized long term cardiovascular outcomes. Overall, as the research on couple functioning and cardiovascular outcomes between age groups is rather limited, further research in each specific area of couple functioning, satisfaction (Heffner et al., 2004), conflict (Smith et al., 2009), and overall quality (Liu & Waite, 2014), may be necessary to validate any conclusions.

Strengths and Limitations in High/Low Quality Comparisons for Healthy Couples

In considering the studies that supported low quality as more significantly related to cardiovascular functioning, methodologies were ultimately mixed. Carels et al. (2000), Carels et al. (1998), Levenson & Gottman (1983), and Liu & Waite (2014) utilized mixed age range couples, Barnett et al. (2005) and Morell & Apple (1990) utilized middle age couples, Smith et al. (2012) utilized older couples, and Thomsen & Gilbert (1998) utilized younger couples. Studies utilized experimental (Carels et al., 1998; Levenson & Gottman, 1983; Morell & Apple,

1990; Smith et al., 2012; Thomsen & Gilbert, 1998) in-home (Barnett et al., 2005; Carels et al., 2000), and longitudinal (Liu & Waite, 2014) designs with mixed couple functioning measures. Studies as well utilized blood pressure (Barnett et al., 2005; Carels et al., 2000), heart rate (Thomsen & Gilbert, 1998), cardiovascular reactivity (Carels et al., 1998; Levenson & Gottman, 1983; Morell & Apple, 1990), and long term cardiovascular (Liu & Waite, 2014; Smith et al., 2012) outcomes. Due to this considerable variety in sample, design, and measures across studies, the finding may have relatively high validity.

In considering the studies that supported higher relationship quality being associated with lower reactivity and fewer cardiovascular risk factors, methodologies were mostly mixed. Gallo et al. (2003) and Gallo, Troxel, Matthews, & Kuller, (2003) utilized middle age couples, Birditt et al. (2014) utilized older couples, and Holt-Lunstad, Birmingham, & Jones (2008) utilized younger couples. In terms of design, studies utilized cross-sectional correlational (Birditt et al., 2014), in-home (Holt-Lunstad, Birmingham, & Jones, 2008), and longitudinal (Gallo et al., 2003; Gallo, Troxel, Matthews, & Kuller, 2003) designs with quality/interaction scale measures. Studies as well utilized blood pressure (Birditt et al., 2014; Holt-Lunstad, Birmingham, & Jones, 2008) and long term cardiovascular (Gallo et al., 2003; Gallo, Troxel, Matthews, & Kuller, 2003) outcomes. Although it appears that a certain amount of diversity in design was present, each study only collected data from one partner, rather than complete couples. Additionally, Gallo et al. (2003) and Gallo, Troxel, Matthews, & Kuller, (2003) specifically measured only women. Because of this, the finding may not be as applicable to male partners.

The two studies supporting no effect of high/low quality on cardiovascular functioning have some notable strengths and weaknesses. Both studies utilized mixed age range couples. In terms of design, Gump et al. (2001) utilized an in-home design and Eaker et al. (2007) utilized a

longitudinal design with quality/interaction scale measures. Gump et al. (2001) utilized blood pressure measurements and Eaker et al. (2007) utilized long term cardiovascular outcomes. Although variation in design is present, data was only collected from one partner, rather than the couple as a whole. This brings into question how direct comparisons between partners may influence results.

Strengths and Limitations in Trends for Unhealthy Couples

The studies considering unhealthy couples generally matched findings reported for healthy couples. All studies utilized mixed age range couples. In terms of design, the majority of studies utilized experimental designs (Ewart et al., 1991; Ewart et al., 1984; Ewart et al., 1983; Stampler et al., 1997) with behavior and scale measures. Studies as well utilized blood pressure (Ewart et al., 1991; Ewart et al., 1984; Holt-Lunstad et al., 2009), heart rate (Stampler et al., 1997), and cardiovascular reactivity (Ewart et al., 1983) outcomes. With a limited number of studies, research in this area is certainly necessary to come to any conclusions. Only short term cardiovascular measures were utilized as outcomes, so no conclusions can be made about long term cardiovascular health. Still, Stampler et al. (1997) suggested that spouses reporting high satisfaction or quality actually displayed greater cardiovascular responses during interactions surrounding patient pain. This suggests that the added dimension of health status may indeed play a role in the association between couple functioning and cardiovascular health.

Summary and Implications for Future Directions

Overall, from the current literature, certain conclusions may hold greater validity than others. Although some findings were supported by a variety of methodologies, other conclusions were generally plagued with bias. Because of this, many conclusions across age groups, gender, and health status cannot yet be made. Ultimately, it is clear that continued research in this area of couple functioning and cardiovascular health is necessary. Having said this, the current literature offers excellent guidance for future studies. Based off of the strengths and weaknesses found in current designs, suggestions for future research may be presented.

To be able to generalize conclusions over various populations, future studies may need to utilize larger, more diverse samples. In these large samples, various age range, race, health status, and sexual orientation couples would require representation to determine how such contextual factors may moderate quality or interaction's effect on cardiovascular health. What's more, future research may benefit from directly comparing results in a controlled lab setting to results in the home. By utilizing both settings, researchers may be able to control for external variables in an initial assessment, and then offer proof of external validity. Along with this, multiple measures of couple functioning and cardiovascular functioning over time may offer greater insight into the effects of quality (whether stable or changing) on both short term cardiovascular functioning and long term cardiovascular outcomes. In terms of specific measurements, measuring quality on multiple dimensions as well as actual observed behavior would provide a complete view of couple functioning in both matters of perception and specific interaction. For cardiovascular measures, utilizing cardiovascular reactivity, encompassing both short term blood pressure and heart rate measurements, and overall cardiovascular outcomes may

allow for greater conclusions on how specific cardiovascular effects, accumulating over time, can have a larger impact on an individual's health.

Appendix A

Complete Article Lists by Category

Design	Article Count	Article List
Experimental	30	Brown and Smith (1992) Brown et al. (1998) Carels et al. (1998) Collins et al. (2014) Denton et al. (2001) Ditzen et al (2007) Ewart et al. (1991) Ewart et al. (1984) Ewart et al. (1983) Grewen et al. (2003) Grewen et al. (2005) Heffner et al. (2004) Holt-Lunstad, Birmingham, & Light (2008) Horan and Booth-Butterfield (2011) Levenson and Gottman (1983) Light et al. (2005) Lorber et al. (2013) Mayne et al. (1997) Menchaca and Dehle (2005) Morell and Apple (1990) Nealey-Moore et al. (2007) Newton and Sanford (2003) Osgarby and Halford (2013) Smith and Brown (1991) Smith et al. (2013) Smith et al. (2012) Smith et al. (2009) Stampler et al. (1997) Thomsen and Gilbert (1998) Weusthoff et al. (2013)
Cross-Sectional Correlational	2	Birditt et al. (2014) Whisman et al. (2010)
In-Home	9	Barnett et al. (2005) Bowen et al. (2013) Carels et al. (2000) Gump et al. (2001) Holt-Lunstad, Birmingham, & Jones (2008) Holt-Lunstad et al. (2009) Janicki et al. (2005) Sanbonmatsu et al. (2011) Uchino et al. (2013)
Longitudinal	5	Eaker et al. (2007) Gallo et al. (2003) Gallo, Troxel, Matthews, & Kuller (2003) Mustante et al. (1990) Liu and Waite (2014)

Couple Functioning Measure	Article Count	Article List
Measure of Quality or Interaction Features	18	Barnett et al. (2005) Birditt et al. (2014) Bowen et al. (2013) Carels et al. (2000) Carels et al. (1998) Eaker et al. (2007) Gallo et al. (2003) Gallo, Troxel, Matthews, & Kuller (2003) Gump et al. (2001) Holt-Lunstad, Birmingham, & Jones (2008) Holt-Lunstad et al. (2009) Horan and Booth-Butterfield (2011) Janicki et al. (2005) Liu and Waite (2014) Mustante et al. (1990) Sanbonmatsu et al. (2011) Uchino et al. (2013) Whisman et al. (2010)
Direct Behavior Measurement	5	Ditzen et al (2007) Grewen et al. (2003) Holt-Lunstad, Birmingham, & Light (2008) Smith and Brown (1991) Weusthoff et al. (2013)
Scale and Behavior combination	23	Brown and Smith (1992) Brown et al. (1998) Collins et al. (2014) Denton et al. (2001) Ewart et al. (1991) Ewart et al. (1984) Ewart et al. (1983) Grewen et al. (2005) Heffner et al. (2004) Levenson and Gottman (1983) Light et al. (2005) Lorber et al. (2013) Mayne et al. (1997) Menchaca and Dehle (2005) Morell and Apple (1990) Nealey-Moore et al. (2007) Newton and Sanford (2003) Osgarby and Halford (2013) Smith et al. (2012) Smith et al. (2009) Smith et al. (2013) Stampler et al. (1997) Thomsen and Gilbert (1998)

Cardiovascular Measure	Article Count	Article List
Blood Pressure Outcome	18	Barnett et al. (2005)* Birditt et al. (2014) Bowen et al. (2013)* Brown et al. (1998) Carels et al. (2000)* Collins et al. (2014) Ewart et al. (1991) Ewart et al. (1984) Grewen et al. (2005) Gump et al. (2001)* Heffner et al. (2004) Holt-Lunstad, Birmingham, & Jones (2008)* Holt-Lunstad et al. (2009)* Light et al. (2005) Mustante et al. (1990) Sanbonmatsu et al. (2011)* Uchino et al. (2013)* Whisman et al. (2010)
Heart Rate Outcome	4	Ditzen et al (2007) Osgarby and Halford (2013) Stampler et al. (1997) Thomsen and Gilbert (1998)
Cardiovascular Reactivity Outcome	18	Brown and Smith (1992) Carels et al. (1998) Denton et al. (2001) Ewart et al. (1983) Grewen et al. (2003) Holt-Lunstad, Birmingham, & Light (2008)** Horan and Booth-Butterfield (2011) Levenson and Gottman (1983) Lorber et al. (2013) Mayne et al. (1997) Menchaca and Dehle (2005) Morell and Apple (1990) Nealey-Moore et al. (2007) Newton and Sanford (2003) Smith and Brown (1991) Smith et al. (2013) Smith et al. (2009) Weusthoff et al. (2013)
Long Term Cardiovascular Outcome	6	Eaker et al. (2007) Gallo et al. (2003) Gallo, Troxel, Matthews, & Kuller (2003) Janicki et al. (2005)* Liu and Waite (2014) Smith et al. (2012)
*Studies utilizing ambulatory measures in-home **Ambulatory measures with intervention		

BIBLIOGRAPHY

References denoted with an asterisk (*) indicate studies utilized in review

- Baker, B., Paquette, M., Szalai, J. p., Driver, H., & al, e. (2000). The influence of marital adjustment on 3-year left ventricular mass and ambulatory blood pressure in mild hypertension. *Archives of Internal Medicine*, *160*(22), 3453-8. Retrieved from <http://search.proquest.com/docview/234250451?accountid=13158>
- *Barnett, R. C., Steptoe, A., & Gareis, K. C. (2005). Marital-role quality and stress-related psychobiological indicators. *Annals of Behavioral Medicine*, *30*(1), 36-43.
doi:http://dx.doi.org/10.1207/s15324796abm3001_5
- Benjamin, L. S. (1974). Structural analysis of social behavior. *Psychological Review*, *81*(5), 392-425. doi:10.1037/h0037024
- Berkman, L. F. (1995). The role of social relations in health promotion. *Psychosomatic Medicine*, *57*(3), 245-254. Retrieved from <http://search.proquest.com/docview/61595439?accountid=13158>
- *Birditt, K. S., Newton, N., & Hope, S. (2014). Implications of marital/partner relationship quality and perceived stress for blood pressure among older adults. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, *69B*(2), 188-198. Retrieved from <http://search.proquest.com/docview/1518033313?accountid=13158>
- Bjorklund, K., Lind, L., Zethelius, B., Berglund, L., Lithell, H., (2004). Prognostic significance of 24-h ambulatory blood pressure characteristics for cardiovascular morbidity in a population of elderly men. *Journal of Hypertension* *22* (9), 1691–1697.

- *Bowen, K. S., Birmingham, W., Uchino, B. N., Carlisle, M., Smith, T. W., & Light, K. C. (2013). Specific dimensions of perceived support and ambulatory blood pressure: Which support functions appear most beneficial and for whom? *International Journal of Psychophysiology*, 88(3), 317-324. doi:<http://dx.doi.org/10.1016/j.ijpsycho.2012.03.004>
- Brotman, D. J., Golden, S. H., & Wittstein, I. S. (2007). The cardiovascular toll of stress. *The Lancet*, 370(9592), 1089-1100. doi:10.1016/S0140-6736(07)61305-1
- *Brown, P. C., & Smith, T. W. (1992). Social influence, marriage, and the heart: Cardiovascular consequences of interpersonal control in husbands and wives. *Health Psychology*, 11(2), 88-96. doi:<http://dx.doi.org/10.1037/0278-6133.11.2.88>
- *Brown, P. C., Smith, T. W., & Benjamin, L. S. (1998). Perceptions of spouse dominance predict blood pressure reactivity during marital interactions. *Annals of Behavioral Medicine*, 20(4), 286-293. Retrieved from <http://search.proquest.com/docview/619431768?accountid=13158>
- Burman, B., & Margolin, G. (1992). Analysis of the association between marital relationships and health problems: An interactional perspective. *Psychological Bulletin*, 112(1), 39. Retrieved from <http://search.proquest.com/docview/1296875265?accountid=13158>
- Cacioppo, J. T., Uchino, B. N., & Berntson, G. G. (1994). Individual differences in the autonomic origins of heart rate reactivity: The psychometrics of respiratory sinus arrhythmia and preejection period. *Psychophysiology*, 31(4), 412-419. Retrieved from <http://search.proquest.com/docview/618577230?accountid=13158>
- *Carels, R. A., Sherwood, A., Szczepanski, R., & Blumenthal, J. A. (2000). Ambulatory blood pressure and marital distress in employed women. *Behavioral Medicine*, 26(2), 80-5. Retrieved from <http://search.proquest.com/docview/195224908?accountid=13158>

- *Carels, R. A., Szczepanski, R., Blumenthal, J. A., & Sherwood, A. (1998). Blood pressure reactivity and marital distress in employed women. *Psychosomatic Medicine*, 60(5), 639-643. Retrieved from <http://search.proquest.com/docview/619369401?accountid=13158>
- Carmelli, D., Swan, G. E., & Rosenman, R. H. (1986). Cross-family correlates of blood pressure in the western collaborative group study. *Journal of Behavioral Medicine*, 9(4), 325-340. Retrieved from <http://search.proquest.com/docview/617212566?accountid=13158>
- Carstensen, L. L., Levenson, R. W., & Gottman, J. M. (1995). Emotional behavior in long-term marriage. *Psychology and Aging*, 10(1), 140. Retrieved from <http://search.proquest.com/docview/215849107?accountid=13158>
- Cohen, S., & Syme, S. L. (1985). Issues in the Study and Application of Social Support. *Social Support and Health*.
- *Collins, N. L., Kane, H. S., Metz, M. A., Cleveland, C., Khan, C., Winczewski, L., . . . Prok, T. (2014). Psychological, physiological, and behavioral responses to a partner in need: The role of compassionate love. *Journal of Social and Personal Relationships*, 31(5), 601-629. Retrieved from <http://search.proquest.com/docview/1547268779?accountid=13158>
- Coyne, J. C., Rohrbaugh, M. J., Shoham, V., Sonnega, J. S., & al, e. (2001). Prognostic importance of marital quality for survival of congestive heart failure. *The American Journal of Cardiology*, 88(5), 526-9. Retrieved from <http://search.proquest.com/docview/230368783?accountid=13158>
- Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. *Psychological Bulletin*, 122(1), 5-37. Retrieved from <http://search.proquest.com/docview/203449220?accountid=13158>

- *Denton, W. H., Burleson, B. R., Hobbs, B. V., Von Stein, M., & Rodriguez, C. P. (2001). Cardiovascular reactivity and initiate/avoid patterns of marital communication: A test of gottman's psychophysiologic model of marital interaction. *Journal of Behavioral Medicine, 24*(5), 401-421. doi:<http://dx.doi.org/10.1023/A:1012278209577>
- Diamond, L. M. (2000). Passionate friendships among adolescent sexual-minority women. *Journal of Research on Adolescence, 10*(2), 191-209. Retrieved from <http://search.proquest.com/docview/57474461?accountid=13158>
- *Ditzen, B., Neumann, I. D., Bodenmann, G., von Dawans, B., Turner, R. A., Ehlert, U., & Heinrichs, M. (2007). Effects of different kinds of couple interaction on cortisol and heart rate responses to stress in women. *Psychoneuroendocrinology, 32*(5), 565-574. doi:<http://dx.doi.org/10.1016/j.psyneuen.2007.03.011>
- Dixon, R. A., & Gould, O. N. (1998). Younger and older adults collaborating on retelling everyday stories. *Applied Developmental Science, 2*(3), 160-171. Retrieved from <http://search.proquest.com/docview/619386789?accountid=13158>
- Dolan, E., Stanton, A., Thijs, L., Hinedi, K., Atkins, N., McClory, S., . . . O'Brien, E. (2005). Superiority of ambulatory over clinic blood pressure measurement in predicting mortality - the dublin outcome study. *Hypertension, 46*(1), 156-161. doi:10.1161/01.HYP.0000170138.56903.7a
- *Eaker, E. D., Sullivan, L. M., Kelly-Hayes, M., D'Agostino, R. B., & Benjamin, E. J. (2007). Marital status, marital strain, and risk of coronary heart disease or total mortality: The framingham offspring study. *Psychosomatic Medicine, 69*(6), 509-513. doi:<http://dx.doi.org/10.1097/PSY.0b013e3180f62357>

- *Ewart, C. K., Burnett, K. F., & Taylor, C. B. (1983). Communication behaviors that affect blood pressure: An A-B-A-B analysis of marital interaction. *Behavior Modification*, 7(3), 331-344. Retrieved from <http://search.proquest.com/docview/616863207?accountid=13158>
- *Ewart, C. K., Taylor, C. B., Kraemer, H. C., & Agras, W. S. (1984). Reducing blood pressure reactivity during interpersonal conflict: Effects of marital communication training. *Behavior Therapy*, 15(5), 473-484. Retrieved from <http://search.proquest.com/docview/616993869?accountid=13158>
- *Ewart, C. K., Taylor, C. B., Kraemer, H. C., & Agras, W. S. (1991). High blood pressure and marital discord: Not being nasty matters more than being nice. *Health Psychology*, 10(3), 155-163. doi:<http://dx.doi.org/10.1037/0278-6133.10.3.155>
- Feeney, B., Collins, N., Van Vleet, M., & Tomlinson, J. (2013). Motivations for providing a secure base: Links with attachment orientation and secure base support behavior. *Attachment & Human Development*, 15(3), 261-280. doi:10.1080/14616734.2013.782654
- Filsinger, E. E., & Thoma, S. J. (1988). Behavioral antecedents of relationship stability and adjustment: A five-year longitudinal study. *Journal of Marriage and the Family*, 50(3), 785. Retrieved from <http://search.proquest.com/docview/1296612204?accountid=13158>
- Fincham, F. D., & Beach, S. R. H. (1999). Conflict in marriage: Implications for working with couples. *Annual Review of Psychology*, 50, 47. Retrieved from <http://search.proquest.com/docview/1518370422?accountid=13158>
- Fincham, F. D., & Linfield, K. J. (1997). A new look at marital quality: Can spouses feel positive and negative about their marriage? *Journal of Family Psychology*, 11(4), 489-502. doi:<http://dx.doi.org/10.1037/0893-3200.11.4.489-502>

- *Gallo, L. C., Troxel, W. M., Kuller, L. H., Sutton-Tyrrell, K., Edmundowicz, D., & Matthews, K. A. (2003). Marital status, marital quality, and atherosclerotic burden in postmenopausal women. *Psychosomatic Medicine*, *65*(6), 952-962.
doi:<http://dx.doi.org/10.1097/01.PSY.0000097350.95305.FE>
- *Gallo, L. C., Troxel, W. M., Matthews, K. A., & Kuller, L. H. (2003). Marital status and quality in middle-aged women: Associations with levels and trajectories of cardiovascular risk factors. *Health Psychology*, *22*(5), 453-463. doi:<http://dx.doi.org/10.1037/0278-6133.22.5.453>
- Gottman, J. M., & Levenson, R. W. (1986). Assessing the role of emotion in marriage. *Behavioral Assessment*, *8*, 31-48.
- *Grewen, K. M., Anderson, B. J., Girdler, S. S., & Light, K. C. (2003). Warm partner contact is related to lower cardiovascular reactivity. *Behavioral Medicine*, *29*(3), 123-130.
doi:<http://dx.doi.org/10.1080/08964280309596065>
- *Grewen, K. M., Girdler, S. S., Amico, J., & Light, K. C. (2005). Effects of partner support on resting oxytocin, cortisol, norepinephrine, and blood pressure before and after warm partner contact. *Psychosomatic Medicine*, *67*(4), 531-538.
doi:<http://dx.doi.org/10.1097/01.psy.0000170341.88395.47>
- *Gump, B. B., Polk, D. E., Kamarck, T. W., & Shiffman, S. M. (2001). Partner interactions are associated with reduced blood pressure in the natural environment: Ambulatory monitoring evidence from a healthy, multiethnic adult sample. *Psychosomatic Medicine*, *63*(3), 423-433. Retrieved from <http://search.proquest.com/docview/619684343?accountid=13158>

- Haynes, S. G., Levine, S., Scotch, N., Feinleib, M., & Kannel, W. B. (1978). The relationship of psychosocial factors to coronary heart disease in the framingham study. I. methods and risk factors. *American Journal of Epidemiology*, *107*(5), 362. Retrieved from <http://search.proquest.com/docview/1306643190?accountid=13158>
- *Heffner, K. L., Kiecolt-Glaser, J., Loving, T. J., Glaser, R., & Malarkey, W. B. (2004). Spousal support satisfaction as a modifier of physiological responses to marital conflict in younger and older couples. *Journal of Behavioral Medicine*, *27*(3), 233-254.
doi:<http://dx.doi.org/10.1023/B:JOBM.0000028497.79129.ad>
- *Holt-Lunstad, J., Birmingham, W. A., & Light, K. C. (2008). Influence of a "warm touch" support enhancement intervention among married couples on ambulatory blood pressure, oxytocin, alpha amylase, and cortisol. *Psychosomatic Medicine*, *70*(9), 976-985.
doi:<http://dx.doi.org/10.1097/PSY.0b013e318187aef7>
- *Holt-Lunstad, J., Birmingham, W., & Jones, B. Q. (2008). Is there something unique about marriage? the relative impact of marital status, relationship quality, and network social support on ambulatory blood pressure and mental health. *Annals of Behavioral Medicine*, *35*(2), 239-244. doi:<http://dx.doi.org/10.1007/s12160-008-9018-y>
- *Holt-Lunstad, J., Jones, B. Q., & Birmingham, W. (2009). The influence of close relationships on nocturnal blood pressure dipping. *International Journal of Psychophysiology*, *71*(3), 211-217. doi:<http://dx.doi.org/10.1016/j.ijpsycho.2008.09.008>
- Holt-Lunstad, J., Smith, T.B., Layton, J.B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS Medicine* *7* (7), e1000316.
doi:[10.1371/journal.pmed.1000316](http://dx.doi.org/10.1371/journal.pmed.1000316).
- Hops, H., Wills, T. A., Patterson, G. R., & Weiss, R.L. (1972). *Marital Interaction Coding*

System (MICS). University of Oregon and Oregon Research Institute, NAPS Document #02077.

- *Horan, S. M., & Booth-Butterfield, M. (2011). Is it worth lying for? physiological and emotional implications of recalling deceptive affection. *Human Communication Research*, 37(1), 78-106. doi:<http://dx.doi.org/10.1111/j.1468-2958.2010.01394.x>
- House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, 241(4865), 540. Retrieved from <http://search.proquest.com/docview/213540393?accountid=13158>
- Huber, H. P. (1999). Cardiovascular reactivity and behavioral health. *International Journal of Group Tensions*, 28(1), 171-185. doi:10.1023/A:1021839522307
- *Janicki, D. L., Kamarck, T. W., Shiffman, S., Sutton-Tyrrell, K., & Gwaltney, C. J. (2005). Frequency of spousal interaction and 3-year progression of carotid artery intima medial thickness: The pittsburgh healthy heart project. *Psychosomatic Medicine*, 67(6), 889-896. doi:<http://dx.doi.org/10.1097/01.psy.0000188476.87869.88>
- Johnson, D. R., White, L. K., Edwards, J. N., & Booth, A. (1986). Dimensions of marital quality: Toward methodological and conceptual refinement. *Journal of Family Issues*, 7(1), 31-49. doi:10.1177/019251386007001003
- Kamarck, T. W., Jennings, J. R., Pogue-Geile, M., & Manuck, S. B. (1994). A multidimensional measurement model for cardiovascular reactivity: Stability and cross-validation in two adult samples. *Health Psychology*, 13(6), 471.
- Kiecolt-Glaser, J., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, 127(4), 472-503. doi:<http://dx.doi.org/10.1037/0033-2909.127.4.472>

Kiecolt-Glaser, J., Newton, T., Cacioppo, J. T., MacCallum, R. C., Glaser, R., & Malarkey, W.

B. (1996). Marital conflict and endocrine function: Are men really more physiologically affected than women? *Journal of Consulting and Clinical Psychology, 64*(2), 324-332.

doi:<http://dx.doi.org/10.1037/0022-006X.64.2.324>

*Levenson, R. W., & Gottman, J. M. (1983). Marital interaction: Physiological linkage and affective exchange. *Journal of Personality and Social Psychology, 45*(3), 587-597.

doi:<http://dx.doi.org/10.1037/0022-3514.45.3.587>

Levenson, R. W., & Gottman, J. M. (1985). Physiological and affective predictors of change in relationship satisfaction. *Journal of Personality and Social Psychology, 49*(1), 85.

Retrieved from <http://search.proquest.com/docview/1295953460?accountid=13158>

*Light, K. C., Grewen, K. M., & Amico, J. A. (2005). More frequent partner hugs and higher oxytocin levels are linked to lower blood pressure and heart rate in premenopausal women. *Biological Psychology, 69*(1), 5-21. doi:10.1016/j.biopsycho.2004.11.002

*Liu, H., & Waite, L. (2014). Bad marriage, broken heart? age and gender differences in the link between marital quality and cardiovascular risks among older adults. *Journal of Health and Social Behavior, 55*(4), 403-423. doi:10.1177/0022146514556893

Locke, H. J., & Wallace, K. M. (1959). Short marital-adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living, 21*(3), 251-255.

*Lorber, M. F., Erlanger, A. C. E., & Slep, A. M. S. (2013). Biological sensitivity to context in couples: Why partner aggression hurts some more than others. *Journal of Consulting and Clinical Psychology, 81*(1), 166-176. doi:<http://dx.doi.org/10.1037/a0030973>

- Margolin, G., & Wampold, B. E. (1981). Sequential analysis of conflict and accord in distressed and nondistressed marital partners. *Journal of Consulting and Clinical Psychology, 49*(4), 554-567. doi:<http://dx.doi.org/10.1037/0022-006X.49.4.554>
- *Mayne, T. J., O'Leary, A., McCrady, B., Contrada, R., & Labouvie, E. (1997). The differential effects of acute marital distress on emotional, physiological and immune functions in maritally distressed men and women. *Psychology & Health, 12*(2), 277-288. Retrieved from <http://search.proquest.com/docview/619104417?accountid=13158>
- *Menchaca, D., & Dehle, C. (2005). Marital quality and physiological arousal: How do I love thee? let my heartbeat count the ways. *The American Journal of Family Therapy, 33*(2), 117-130. doi:10.1080/01926180590915897
- Miller, G. E., Dopp, J. M., Myers, H. F., Stevens, S. Y., & Fahey, J. L. (1999). Psychosocial predictors of natural killer cell mobilization during marital conflict. *Health Psychology, 18*(3), 262-271. doi:<http://dx.doi.org/10.1037/0278-6133.18.3.262>
- *Morell, M. A., & Apple, R. F. (1990). Affect expression, marital satisfaction, and stress reactivity among premenopausal women during a conflictual marital discussion. *Psychology of Women Quarterly, 14*(3), 387-402. Retrieved from <http://search.proquest.com/docview/617906679?accountid=13158>
- *Musante, L., Treiber, F. A., Strong, W. B., & Levy, M. (1990). Individual and cross-spouse correlations of perceptions of family functioning, blood pressure and dimensions of anger. *Journal of Psychosomatic Research, 34*(4), 393-399. Retrieved from <http://search.proquest.com/docview/617882990?accountid=13158>

- *Nealey-Moore, J., Smith, T. W., Uchino, B. N., Hawkins, M. W., & Olson-Cerny, C. (2007). Cardiovascular reactivity during positive and negative marital interactions. *Journal of Behavioral Medicine, 30*(6), 505-519. doi:<http://dx.doi.org/10.1007/s10865-007-9124-5>
- Neff, L. A., & Karney, B. R. (2005). To know you is to love you: The implications of global adoration and specific accuracy for marital relationships. *Journal of Personality and Social Psychology, 88*(3), 480-497. doi:<http://dx.doi.org/10.1037/0022-3514.88.3.480>
- *Newton, T. L., & Sanford, J. M. (2003). Conflict structure moderates associations between cardiovascular reactivity and negative marital interaction. *Health Psychology, 22*(3), 270-278. doi:<http://dx.doi.org/10.1037/0278-6133.22.3.270>
- Notarius, C., Benson, P., Sloane, D., Vanzetti, N., & Hornyak, L. (1989). Exploring the interface between perception and behavior – An analysis of marital interaction in distressed and nondistressed couples. *Behavioral Assessment, 11*(1), 39-64.
- Ochs, E., Graesch, A., Mittmann, A., Bradbury, T., & Repetti, R. (2006). Video ethnography and ethnoarchaeological tracking. *The Work and Family Handbook: Multi-Disciplinary Perspectives, Methods, and Approaches*, 387-409.
- *Osgarby, S. M., & Halford, W. K. (2013). Couple relationship distress and observed expression of intimacy during reminiscence about positive relationship events. *Behavior Therapy, 44*(4), 686-700. doi:<http://dx.doi.org/10.1016/j.beth.2013.05.003>
- Pickering, T., Shimbo, D., & Haas, D. (2006). Current concepts: Ambulatory blood-pressure monitoring. *New England Journal of Medicine, 354*(22), 2368-2374.
- Rajendra Acharya, U., Paul Joseph, K., Kannathal, N., Lim, C. M., & Suri, J. S. (2006). Heart rate variability: A review. *Medical & Biological Engineering & Computing, 44*(12), 1031-1051. doi:10.1007/s11517-006-0119-0

- Rindfleisch, A., Malter, A. J., Ganesan, S., & Moorman, C. (2008). Cross-sectional versus longitudinal survey research: Concepts, findings, and guidelines. *Journal of Marketing Research*, 45(3), 261-279. doi:10.1509/jmkr.45.3.261
- Robles, T. F., & Kiecolt-Glaser, J. (2003). The physiology of marriage: Pathways to health. *Physiology & Behavior*, 79(3), 409-416. doi:http://dx.doi.org/10.1016/S0031-9384(03)00160-4
- Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin*, 140(1), 140-187. doi:http://dx.doi.org/10.1037/a0031859
- Rozanski, A., Blumenthal, J. A., & Kaplan, J. (1999). Impact of psychological factors on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation*, 99(16), 2192-2197. Retrieved from <http://search.proquest.com/docview/212729578?accountid=13158>
- *Sanbonmatsu, D. M., Uchino, B. N., & Birmingham, W. (2011). On the importance of knowing your partner's views: Attitude familiarity is associated with better interpersonal functioning and lower ambulatory blood pressure in daily life. *Annals of Behavioral Medicine*, 41(1), 131-137. doi:http://dx.doi.org/10.1007/s12160-010-9234-0
- Sarason, I.G., Sarason, B.R., Pierce, G.R. (1994). Relationship-Specific social support: toward a model for the analysis of supportive interactions. *Communication of Social Support: Messages, Interactions, Relationships, and Community*.
- Schwartz, A. R., Gerin, W., Davidson, K. W., Pickering, T. G., Brosschot, J. F., Thayer, J. F., . . . Linden, W. (2003). Toward a causal model of cardiovascular responses to stress and the

development of cardiovascular disease. *Psychosomatic Medicine*, 65(1), 22-35.

doi:<http://dx.doi.org/10.1097/01.PSY.0000046075.79922.61>

Sen, A. (2002). Health: Perception versus observation. *BMJ (Clinical Research Ed.)*, 324(7342), 860-861. doi:10.1136/bmj.324.7342.860

Sherwood, A., Allen, M. T., Fahrenberg, J., Kelsey, R. M., Lovallo, W. R., & van Doornen, L. J. (1990). Methodological guidelines for impedance cardiography. *Psychophysiology*, 27(1), 1-23. doi:10.1111/j.1469-8986.1990.tb02171.x

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, 4(1), 1-32. doi:10.1146/annurev.clinpsy.3.022806.091415

*Smith, T. W., & Brown, P. C. (1991). Cynical hostility, attempts to exert social control, and cardiovascular reactivity in married couples. *Journal of Behavioral Medicine*, 14(6), 581-592. doi:10.1007/BF00867172

Smith, T. W., Gallo, L. C., Goble, L., Ngu, L. Q., & Stark, K. A. (1998). Agency, communion, and cardiovascular reactivity during marital interaction. *Health Psychology*, 17(6), 537-545. doi:<http://dx.doi.org/10.1037/0278-6133.17.6.537>

*Smith, T. W., Uchino, B. N., Berg, C. A., & Florsheim, P. (2012; 2011). Marital discord and coronary artery disease: A comparison of behaviorally defined discrete groups. *Journal of Consulting and Clinical Psychology*, 80(1), 87. doi:10.1037/a0026561

*Smith, T. W., Uchino, B. N., Berg, C. A., Florsheim, P., Pearce, G., Hawkins, M., . . . Olsen-Cerny, C. (2009). Conflict and collaboration in middle-aged and older couples: II. cardiovascular reactivity during marital interaction. *Psychology and Aging*, 24(2), 274-286. doi:<http://dx.doi.org/10.1037/a0016067>

- *Smith, T. W., Uchino, B. N., MacKenzie, J., Hicks, A. M., Campo, R. A., Reblin, M., . . . Light, K. C. (2013). Effects of couple interactions and relationship quality on plasma oxytocin and cardiovascular reactivity: Empirical findings and methodological considerations. *International Journal of Psychophysiology*, *88*(3), 271-281.
doi:<http://dx.doi.org/10.1016/j.ijpsycho.2012.04.006>
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and Family*, *38*(1), 15-28.
- *Stamper, D. B., Wall, J. R., Cassisi, J. E., & Davis, H. (1997). Marital satisfaction and psychophysiological responsiveness in spouses of patients with chronic pain. *International Journal of Rehabilitation & Health*, *3*(3), 159-170. Retrieved from <http://search.proquest.com/docview/619347736?accountid=13158>
- Stephoe, A., Kunz-Ebrecht, S., Owen, N., Feldman, P. J., Willemsen, G., Kirschbaum, C., & Marmot, M. (2003). Socioeconomic status and stress-related biological responses over the working day. *Psychosomatic Medicine*, *65*(3), 461-470.
doi:<http://dx.doi.org/10.1097/01.PSY.0000035717.78650.A1>
- Strike, P. C., & Steptoe, A. (2004). Psychosocial factors in the development of coronary artery disease. *Progress in Cardiovascular Diseases*, *46*(4), 337-347.
doi:10.1016/j.pcad.2003.09.001
- *Thomsen, D. G., & Gilbert, D. G. (1998). Factors characterizing marital conflict states and traits: Physiological, affective, behavioral and neurotic variable contributions to marital conflict and satisfaction. *Personality and Individual Differences*, *25*(5), 833-855.
Retrieved from <http://search.proquest.com/docview/619362354?accountid=13158>

- Thompson, M. M., Zanna, M. P., & Griffin, D. W. (1995). Attitude Strength: Antecedents and consequences. Let's Not Be Indifferent About (Attitudinal) Ambivalence.
- Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine*, 29(4), 377-87. doi:<http://dx.doi.org/10.1007/s10865-006-9056-5>
- Uchino, B. N., Birmingham, W., & Berg, C. A. (2010). Are older adults less or more physiologically reactive? A meta-analysis of age-related differences in cardiovascular reactivity to laboratory tasks. *The Journals of Gerontology*, 65B(2), 154. Retrieved from <http://search.proquest.com/docview/210129783?accountid=13158>
- Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. (1996). The relationship between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin*, 119(3), 488. Retrieved from <http://search.proquest.com/docview/203480115?accountid=13158>
- *Uchino, B. N., Sanbonmatsu, D. M., & Birmingham, W. (2013). Knowing your partner is not enough: Spousal importance moderates the link between attitude familiarity and ambulatory blood pressure. *Journal of Behavioral Medicine*, 36(6), 549-555. doi:<http://dx.doi.org/10.1007/s10865-012-9437-x>
- Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science & Medicine*, 34(8), 907. Retrieved from <http://search.proquest.com/docview/230479737?accountid=13158>
- Umberson, D., Williams, K., Powers, D. A., Liu, H., & Needham, B. (2006). You make me sick: Marital quality and health over the life course. *Journal of Health and Social Behavior*, 47(1), 1-16. doi:10.1177/002214650604700101

- *Weusthoff, S., Baucom, B. R., & Hahlweg, K. (2013). Fundamental frequency during couple conflict: An analysis of physiological, behavioral, and sex-linked information encoded in vocal expression. *Journal of Family Psychology, 27*(2), 212-220.
doi:<http://dx.doi.org/10.1037/a0031887>
- *Whisman, M. A., Uebelacker, L. A., & Settles, T. D. (2010). Marital distress and the metabolic syndrome: Linking social functioning with physical health. *Journal of Family Psychology, 24*(3), 367-370. doi:<http://dx.doi.org/10.1037/a0019547>
- Wills, T. A., & Shinar, O. (2000). Measuring perceived and received social support. Social support measurement and intervention; A guide for health and social scientists.
- Woodin, E. M. (2011). A two-dimensional approach to relationship conflict: Meta-analytic findings. *Journal of Family Psychology, 25*(3), 325-335.
doi:<http://dx.doi.org/10.1037/a0023791>
- Wu, Z., Penning, M. J., Pollard, M. S., & Hart, R. (2003). In sickness and in health: Does cohabitation count? *Journal of Family Issues, 24*(6), 811-838.
doi:10.1177/0192513X03254519
- Xu, J., Kochanek, K. D., Murphy, S. L., & Tejada-Vera, B. (2010). Deaths: Final data for 2007. National Vital Statistics Reports : From the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, 58(19), 1.

ACADEMIC VITA

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<i>Education</i>	The Pennsylvania State University, Schreyer Honors College	<i>May 2015</i>
	Bachelor of Science with Honors in Biobehavioral Health Minor in Human Development and Family Studies	
	<i>Honors and Awards</i>	
	<ul style="list-style-type: none">• Schreyer Honors College Academic Excellence Scholarship• Elizabeth S. and William Henry Gaeckle Alumni Scholarship• Building Trades Scholarship Fund 2011-2012 Scholarship Award	<i>2011 – 2015</i> <i>2011 – 2015</i> <i>2011 – 2012</i>
<i>Work</i>	Lifeguard, Whitehall Borough Pool	<i>2010 – 2013</i>
	100 Borough Park Dr., Pittsburgh, PA 15236, (412) 881-3314	
	<ul style="list-style-type: none">• Obtained certification in Lifeguarding, First Aid, and CPR/AED• Provided attentive surveillance of water, enforced pool rules, maintained grounds, and cared for injuries• Exercised critical thinking in emergency situations and utilized related knowledge in social interactions	
<i>Skills</i>	Minitab Statistical Programming, CardioEdit	
<i>Research</i>	Research Assistant for the Couples Daily Lives Project	<i>2013 – 2015</i>
	<ul style="list-style-type: none">• Obtained CITI certification in Human Subjects Research and Responsible Conduct in Research• Aided in the coding of auditory data and the cleaning of cardiovascular measures• Maintained honors in research through individual thesis work related to the area of study	
<i>Service</i>	Mount Nittany Medical Center Volunteer	<i>2014 – 2015</i>
	<ul style="list-style-type: none">• Provided support to the staff of the Emergency Department through various safety-related and patient-related duties• Transported patients, maintained room cleanliness, and provided direct emotional support to families	
	THON Volunteer	<i>2011 – 2015</i>
	<ul style="list-style-type: none">• Acted as <u>Alternative Fundraising Chair</u> to Apollo, raising \$121,519.76 for the Four Diamonds Fund in 2013• Worked closely with three Four Diamonds Family who had been directly impacted by pediatric cancer	
<i>Involvement</i>	Health and Human Development Honor Society Biobehavioral Health Society Red Cross Club	<i>2013 – 2015</i> <i>2013 – 2015</i> <i>2013 – 2014</i>