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Married Mothers' Multiple Roles: Implications for Cardiovascular Health

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ABSTRACT

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In recent years, the traditional nuclear family, as defined by social role theory with mother at home and father in the workplace, is no longer the norm. Nearly three out of every four women with children under the age of 18 are part of the workforce. Mothers are frequently juggling multiple roles as well as most of the responsibilities that are inherent in these roles. The current project examined diurnal ambulatory blood pressure influences associated with the responsibility of having a greater number of roles. We investigate differences between a self-reported healthy population of 112 married stay-at-home and 112 married employed mothers, all of whom have children under the age of 18 currently living in the home. Using a mixed multilevel model analysis, we found that the perception of equity in the division of childcare responsibilities between mothers and their husbands significantly contributed to lower systolic ambulatory blood pressure. We also found that married couples in relationships containing high positivity and low negativity had lower systolic ambulatory blood pressure than those which contained simultaneously high positivity and negativity. Additionally, there was a crossover interaction between these variables such that effect of relationship quality on both systolic and diastolic ambulatory blood pressure was moderated by the perception of equity in the division of childcare responsibilities between spouses. Lastly, we found that there were no ambulatory blood pressure differences between the employed and SAH mother conditions. These findings have applicable implications regarding dynamics and processes within marital relationships. These results demonstrate important social and relational influences on mothers' cardiovascular health.

Keywords: mothers, ambulatory blood pressure, multiple roles, relationship quality, childcare, household work

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In recent years, the societal construct and composition of the family has undergone change and revision including changes in the conventional roles of the family members (U.S. Bureau of Labor Statistics, 2017). The traditional nuclear family, as defined by social role theory (Eagly & Wood, 1991), with mother at home and father in the workplace, is no longer the norm. The U.S. Bureau of Labor Statistics (2017) reported that in 2017, 71.1% of women with children under 18 participated in the labor force and the rate for mothers with children under age 6 was 65.1%. This rise in maternal employment has been documented for all racial and ethnic groups (Spain & Bianchi, 1996). Indeed, Mosisa and Hipple (2006) expect this rate to continue to rise. Whereas paid maternal employment can be beneficial and even essential for individuals and families by providing greater financial security (Mattingly & Smith, 2010), it also has the potential to add increased stress from overburden (Dugan & Barnes-Farrell, 2018), which can increase likelihood of marital relationship issues (Helms et al., 2010), and harmful health effects such as cardiovascular health issues (Aboa-Éboulé et al., 2007).

Women in the Workforce

An important aspect of these recent societal changes is that family households have evolved from a single-income family, or a family unit in which one spouse (typically the father) is responsible for the family income, to a dual income family, or a family unit in which both spouses generate income. For example, in 1967, 30% of married-couples with children were dual-income families where both the father and the mother worked (Pew Research Center, 2015). In 2017, that number has more than doubled to 62% (U.S. Bureau of Labor Statistics, 2018). Literature from behavioral economics, using historical population data to identify trends in the female labor force participation, found two macro reasons in particular account for this increase:

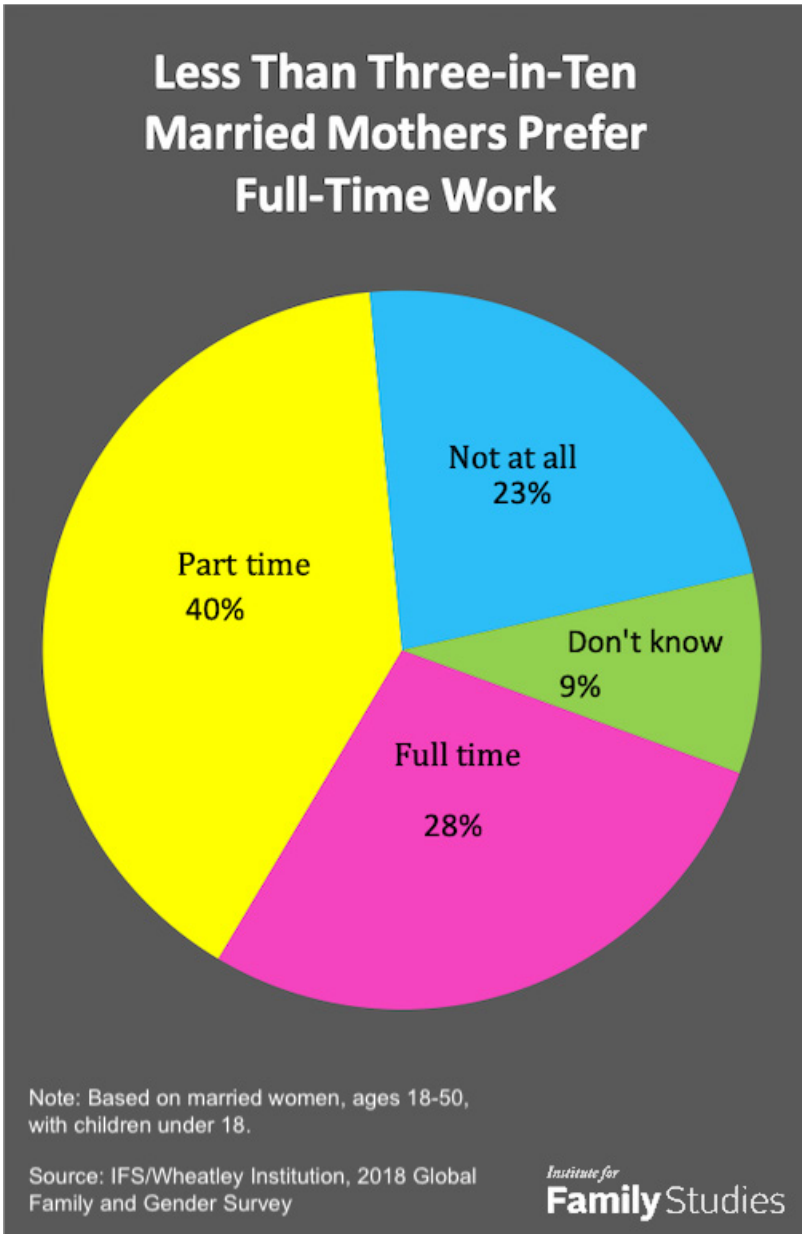
women's increased secondary education, and the economic development of the country, which increases the demand for non-manufacturing and non-labor type work which is generally considered female work (Goldin, 1994; Mammen & Paxson, 2000).

In line with this, the U.S. Bureau of Labor Statistics (2018) reported women who held a college degree and participated in the labor force jumped from 11% in 1970 to 43% in 2017. Additionally, this report indicated that women over the age of 25 who held a college degree in 1970 was only 8% compared to 35% in 2018. Thus, at a more general level, women are increasingly more educated making them more qualified for the growing job market demand. This documented rise in women's participation rates in the workforce is historically and cross-culturally attributed to economic reasons (Goldin, 1994; Heath & Jayachandran, 2016). Research investigating these workforce participation rates at an individual level has added more insight into predictors that might influence women to enter full-time employment. Buttner and Moore (1997) note the influence of "push" and "pull" factors. Push factors are based out of necessity such as insufficient family income, inflation, and husbands' job loss (Moehling, 2001). For example, Mattingly and Smith (2010) showed that during the economic recession of 2008, women were pushed into the workforce more than in previous years of general prosperity. Pull factors relate to independence, self-fulfillment, and desire for social status (Dai, 2016). Accordingly, married mothers may then autonomously choose to enter the workforce, or they may be constrained to enter the workforce out of necessity. From their national longitudinal study, Patrick et al. (2016) concluded that married women in particular are more likely to be "pushed", rather than "pulled", into employment largely because of family constraints, and this can be problematic for the mother. The stress of being pushed into employment, rather than entering employment by choice can be magnified by having children under the age of three in the

home as this stage of childhood is enormously time consuming for parents and it is expensive to outsource this type of childcare (VerBruggen & Wang, 2019). VerBruggen and Wang (2019) report that from a nationally representative sample of 2,025 adults ages 18–50 in the U.S., only 28% of married mothers preferred full-time work, whereas 40% of married mothers considered working part-time or less to be their ideal situation, and 23% preferred not to work at all (See Figure 1). From these data, it is evident that many—even the majority—of mothers are working outside the home when they would prefer to either work less outside the home or stay at home full-time.

Figure 1

Married Mothers' Employment Preferences



Note. Figure used from VerBruggen and Wang (2019)

Damaske and Frech (2016) explored female workforce participation rates, whether through push or pull factors, with over 30 years of data. In their work with the National Longitudinal Survey of Youth with over 4,500 women, they confirmed prior empirical evidence that indicated

women were more likely to enter full-time work if they: grew up in poverty (Frech & Damaske, 2012), had a mother with low education, had themselves attained less education (Willson et al., 2007), held more liberal gender ideologies (Correll, 2004; Patrick et al., 2016), or were able to overcome a variety of barriers to quality work (transportation, race, language, age). Additionally, contrary to previous research which found that wives were more likely to quit their job if their husband worked long hours (Cha, 2010; Stone, 2008), Damaske and Frech (2016) actually found being married to a spouse who worked long hours predicted full-time work for the women, although simply being married did not. The researchers contributed the inconsistency between findings to homogamy, the idea that individuals tend to be similar in education, profession, and other traits to those whom they marry (Becker, 1974; Chiswick & Houseworth, 2011). Using this reasoning, if one spouse works long hours, there is a higher chance that the other spouse will be on a similar employment track.

Multiple Roles and Health

Of interest for the present study is the influence that multiple roles (wife, mother, employee, etc.) may have on women's health outcomes—particularly cardiovascular health outcomes. Blood pressure is an indicator of a multitude of cardiovascular health complications. Having high blood pressure (hypertension) is the leading cause of disability worldwide (Strandberg, 2019). Hypertension increases one's risk for heart attack, stroke, and organ failure (Benjamin et al., 2018), all of which contribute to coronary heart disease, morbidity, and mortality (Benjamin et al., 2018; Perloff et al., 1983). Importantly, clinical blood pressure readings taken at a single time-point may not necessarily be representative of an individual's true cardiovascular functioning. Ambulatory blood pressure (ABP) measures, however, offer a large number of readings across the day while participants carry out their normal activities. This

allows for the chronicling of daily fluctuations and provides a more complete picture of cardiovascular functioning (Perloff et al., 1983; Pickering et al., 2006). ABP monitoring is an essential measure in determining cardiovascular risk as ABP can predict complications of hypertension above and beyond what is possible to determine with resting or clinical blood pressure measures alone (Marler et al., 1988; Pickering et al., 2006).

Different theories have been put forward and applied in attempts to account for the potential physical and psychological health effects working may have for women. Role accumulation theory (Gove & Tudor, 1973; Sieber, 1974) posits that greater and more diverse social roles enhance self-esteem, prestige, sympathy, and general network support. In support of this theory, a large body of work has suggested that multiple roles and employment for women are associated with positive health outcomes (Carson et al., 2009; Lahelma et al., 2002). For example, in one study with over 1,600 women, Kostiainen et al. (2009) found that women with a greater number of roles such as provider, mother, and wife had the highest levels of self-reported health and lowest psychological distress. However, it has been argued that these effects could be due to the healthy worker effect; that is, those who choose to work are in better health initially than those who do not, and employers are more likely to hire those in good health over those with illnesses (La Rosa, 1988; Waldron & Herold, 1986).

In direct opposition to role accumulation theory, role strain theory (Goode, 1960) suggests that trying to juggle multiple social domains limits time and energy available to spend in those roles and thus contributes to role overload and role conflict which is hypothesized to be detrimental to physical and psychological health (Marks, 1977). Haynes and Feinleib (1980) conducted a study that found support for this theory. They found that women who worked outside the home and raised more than two children had significantly increased risk for coronary

heart disease compared to stay-at-home mothers. Another study comparing health differences between employed women and stay-at-home women found full-time employed women had the highest risk for coronary heart disease (Waldron, 1978). In the National Health Examination Survey (Rose et al., 1999) employed women had an increased risk of hypertension compared with non-employed women. These studies support the theory that the multiple roles from employment and family/home are associated with worse health outcomes (Lahelma et al., 2002; McMunn et al., 2006) and may specifically influence heart disease risk (Brezinka & Kittel, 1996; Theorell, 1991).

Overall, studies specifically investigating cardiovascular health differences in women holding multiple roles, including mother and employee, are mixed. A research synthesis by Klumb and Lampert (2004) investigated the effects of women's employment on cardiovascular health from 1950–2000. They found three longitudinal and fifteen cross-sectional studies with cardiovascular health as the primary dependent variable. Of these eighteen studies, twelve found women's employment to have either beneficial or null effects and the other six found negative effects. Longitudinal research on cardiovascular health outcomes for women in the workplace compared to non-employed women have also been investigated. In their longitudinal study, Ebi-Kryston et al. (1990) looked at both self-reported and objective cardiovascular outcomes and found prevalence rates of self-reported cardiovascular issues were slightly higher for women who stayed at home full-time compared to employed women. However, the majority of self-report and objective measures in their study found no statistically significant differences between employed and stay-at-home women. Another longitudinal study (which used prior medical records and subsequent interviews) investigated health differences between working and non-working women and found having more roles (e.g., homemaker, mother, provider) was

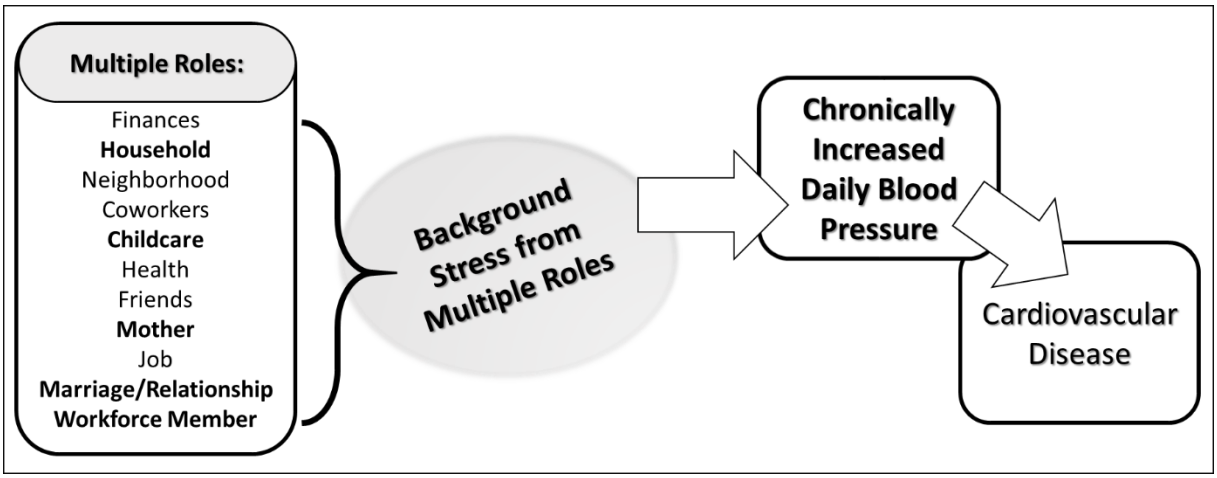
potentially a protective factor for risk of death and morbidity (Hibbard & Pope, 1991). Additionally, in a longitudinal study on employment and marital status, Reviere and Eberstein (1992) found that at follow-up (about 10 years) women who were married but not employed at both time points had a higher risk for heart disease.

More recently, the background stress model (see Figure 2) has been put forward as a model to extend role strain theory to describe how multiple role stress could specifically lead to cardiovascular health issues (Terrill et al., 2012). In this theory, the demands of women's multiple roles contribute to overburden and accumulated stress (Dugan & Barnes-Farrell, 2018; Gump & Matthews, 1999). Chronic stress has been shown to increase blood pressure (Landsbergis et al., 2013) and cardiac events which directly influence heart disease risk (Kivimäki et al., 2012). In a sample of 102 female college students, Terrill (2012) tested the hypothesis that women's multiple roles would lead to higher ABP through increased stress. She divided her sample of women into two different categorizations: students who were not mothers, and students who were mothers. Terrill et al. (2012) found support for the background stress model, finding that women who held multiple roles (student and mother) had higher self-reported stress than those holding a single role of student. However, findings did not indicate significant differences in the form of higher ABP. One of the main reasons for this lack of evidence for ABP alterations could be contributed to the analysis of the ambulatory data. All ambulatory readings were aggregated to create an average blood pressure reading. In doing this, it is possible the study lost the detailed nature for the purpose of ABP. Many different analytical techniques such as multilevel mixed modeling (Snijders & Bosker, 2011) have been put forward which provide a more accurate understanding of this type of data, and specifically ABP data (Parati et al., 2008).

As the present study will investigate multiple roles and their influence on health, we used this background stress model as the theoretical structure for our hypotheses.

Figure 2

Background stress model



Note. Conceptual model detailing a path in which women's multiple roles contribute to chronic stress and increase her risk of heart disease adapted from (Terrill et al., 2012).

Division of Childcare and Household Work: Effects of the Inequity

Mothers are increasingly part of the workforce and yet, the shared provider responsibility does not necessarily translate to equally shared division of childcare (CC) and household (HH) labor. Typically, CC and HH labor has been conceptualized as "the set of unpaid tasks performed to satisfy the needs of family members or to maintain the home and the family's possessions" (Lachance-grzela & Bouchard, 2010). CC includes tasks such as helping with homework, taking the children to routine appointments, putting them to bed, arranging for daycare, disciplining, etc. (Deutsch et al., 1993; Mannino & Deutsch, 2007). HH tasks consist of routine house cleaning and repairs, paying bills, grocery shopping, car and lawn care, planning and making

meals, etc. (Mederer, 1993). Working mothers often come home to a "second shift" of parental, home, and family responsibilities (Hochschild & Machung, 1990; Hochschild & Machung, 2012). In fact, married women spend about twice as much time on CC and HH responsibilities than their husbands (Bianchi et al., 2012; Coltrane, 2000; Mannino & Deutsch, 2007; Poortman & Van Der Lippe, 2009), even when working outside the home (Dempsey, 2000). Specifically, Bianchi et al. (2012) report that in 2010 married women (working and non-working) spent about 13.7 hours on CC and 18.5 hours on HH work versus 7.2 and 9.5 for married men. In a longitudinal study spanning 14 years, Grunow et al. (2012) found that over the course of a marriage, husbands decrease their contribution and time to CC and HH work even when their wives work longer hours and earn a higher income than them. This effect was especially strong after having children. In their review, Coltrane (2000) noted that the amount of time women spent on CC and HH work increased after marriage and again after the birth of a child, whereas the amount of time men participated decreased after each of these occurrences. Thus, as the roles and responsibilities increase for women (wife, mother, provider), the shared responsibilities become disproportionately less shared (Sayer, 2016).

The division of CC and HH labor is a popular topic of study (Davis & Greenstein, 2013). A search of published research articles on Web of Science for topic terms *childcare, housework*, *household labor*, or *household chores* revealed that, on average, from 1963 to 1990 less than 15 articles were published a year. From 1991 to 2005, that number increased to about 100 per year. From 2006 to present, there were about 400 articles published a year. Much of the research on the division of CC and HH labor has been aimed at why there is such an inequality (Baxter, 1993; Coltrane, 2000). Research has generally supported three different theories for how time is spent in regard to CC and HH tasks: (a) the individual who earns the most income will do less

(Baxter et al., 2005; Bianchi et al., 2000), (b) those who hold more traditional gender ideals (especially gender-segregated family roles) will conform to those beliefs (Gunter & Gunter, 1990; Mederer, 1993), and (c) those who spend more time in paid work will perform less at home (Chesters et al., 2009; Stone, 2008).

Childcare and Household Work: Effects on Health

There has been a significant amount of research regarding *why* there is a second shift and an inequality in the division of CC and HH labor, with much less research focused on the effects these may have on the mother's physical health (Coltrane, 2000; Perry-Jenkins et al., 2013; Tao et al., 2010). The research that has been done on working mothers' health has found that this second shift for working mothers (Hill, 2005) is associated with increased chronic stress (Dugan & Barnes-Farrell, 2018; Goldstein et al., 1999), respiratory illness (Bratberg et al., 2002; Gjerdingen et al., 1993), and depressive symptoms (Bird, 1999; Tao et al., 2010). However, among this research, much of it has used self-report measures of health (Waldron et al., 1982) rather than objective measures. Another limitation of the second shift literature is that much of it has operationally defined it merely as housework and either excluded measures of childcare altogether (Barnett & Shen, 1997; Coltrane, 2000) or included items with insufficient detail. For example Almeida et al. (1993) use a 17 item questionnaire for HH chores and only three items for CC, despite CC contributing a significant amount of hours. They note that more specified definitions and measures of family work would be necessary in future studies. Using measures of both CC and HH work can more accurately and robustly explicate their influences.

Of the research that has used objective measures for physical health, many have explored similar research questions but with important differences regarding one or more components involved with the current research questions. For example, one study investigated urinary

catecholamines and cortisol (an indicator of stress) and the association with role overload. They found that in 109 employed married mothers, cortisol excretion levels were higher for employed mothers with children in the home than those who did not have children living in the home. However, they did not investigate the contribution of CC or HH work; simply if there were demands in their home and work environments (Luecken et al., 1997). Thurston et al. (2011) looked at employed hypertensive males and females and ABP. They found that higher perceived responsibility of CC and HH tasks was associated with higher diurnal blood pressure. However, the study used insufficient measurements regarding CC and HH labor and confounded the construct by lumping the two categories into one measure of household responsibilities which conflates the concept. Brisson et al. (1999) investigated ABP in women specifically and found that high job strain coupled with high CC and HH work contributed to higher blood pressure. These researchers did not collect data on marital status.

In several studies, researchers explore job stress models and combine CC and HH labor to investigate physical health issues. These studies used the model of double burden of effort-reward imbalance at work (job stress) and family responsibilities (CC and HH work), a model that is conceptually similar to the second shift. In one study, researchers assessed the association between resting blood pressure and the double burden model (i.e., the second shift). These researchers found higher systolic (but not diastolic) blood pressure in women who experienced both effort-reward imbalance and family stress compared with women who did not report these second shift issues (Trudel et al., 2013). In another longitudinal study, Gilbert-Ouimet et al. (2017) investigated this same second shift effect—the double burden of adverse psychosocial work factors and high family responsibilities—and how these influence ABP. They found women with both an effort-reward imbalance at work and high family responsibilities had

significantly higher ABP at baseline, 3-, and 5-year follow-up than women who did not report these circumstances.

The research that has prioritized the contributions of CC and HH labor influences on health typically examine the variables of equity and fairness. This is based on the notion (termed relational ethics) that unequal sharing of CC and HH responsibilities, due to lack of accountability or attention within relationships, leads to mental and physical health problems (Grames et al., 2008). Perceived unfairness of division of HH work has been associated with greater distress, poorer mental health, and poorer well-being for women (Claffey & Mickelson, 2009; Harryson et al., 2012; Sperlich & Geyer, 2015; Voydanoff & Donnelly, 1999). Much of the work in this area has focused specifically on mental health with much less investigating physical health (Polachek & Wallace, 2015). The work that has been done has found mixed findings. One study found married couples who believed the division of HH labor was unfair reported poorer overall self-reported physical health compared with those who perceived it to be fair (Ren, 1997). Conversely, Polachek and Wallace (2015) surveyed over 1,200 lawyers regarding HH labor equity and did not find perceptions of unequal HH labor to be associated with poorer self-reported physical health. However, this may be because their measure of physical health was a single question that asked "compared with other people your age, how would you describe your health" on a scale of poor to excellent. Thomas et al. (2018) found that when women worked longer hours, they had poorer self-reported physical health. However, they did not find perceived unfairness in HH labor to exacerbate this effect as hypothesized.

Childcare and Household Work: Effects on Marital Relationship Quality

Unequal CC and HH burden also negatively affects the relationship between husbands and wives (Barstad, 2014; Frisco & Williams, 2003; Newkirk et al., 2017) with marital

satisfaction being higher when the load is more equally shared between partners (Helms et al., 2010; Hoffman et al., 1999; Lye & Biblarz, 1993; Orbuch & Eyster, 1997). Barstad (2014) found that women whose partners did little or no routine housework had more marital relationship problems than women whose partners participated more equally. In a longitudinal study with a nationally representative sample of over 750 participants, Frisco and Williams (2003) found that married women who performed "more than their fair share of the work" were more likely to divorce than those who perceived it to be fair. Likewise, Mencarini and Vignoli (2017) found that divorce was only related to women's employment when their husbands contributed less than 30% of the HH work.

The division of CC and HH labor is one of the most prevalent topics of marital discord (Gottman & Silver, 2015; Stohs, 2000; Tai & Baxter, 2018) and those who perceive their spouse as argumentative report being less satisfied with their marriage (Schoenfeld et al., 2017). Stohs (2000) showed that arguments and conflict, specifically regarding the division of CC and HH labor, occurred up to 40 times a week in approximately 60–70% of marriages (Stohs, 1995). This high amount of conflict negatively contributes to various aspects of the relationship. In a longitudinal study using data from the National Survey of Families and Households, Choi and Marks (2008) specifically investigated the affect that marital disagreement had on depressive symptoms. Their marital conflict scale included disagreements on HH work, sex, money, and time together. From their nationally representative sample of over 1,800 adults, they found greater conflict in these areas directly increased depressive symptoms.

Marital conflict also has a direct association to sexual frequency and satisfaction (Haning et al., 2007). The correlation between sex and marital satisfaction is well-understood (Impett et al., 2014); couples who are most satisfied with their marriages tend to have more and higher

quality sex (Sprecher et al., 2004). When the division of CC and HH labor are equitable and fair, couples are most satisfied with their sex lives (Amato et al., 2003; Frisco & Williams, 2003). Maas et al. (2015) found specifically for new mothers (one year postpartum), the more they were satisfied with the division of CC and HH tasks, the more satisfied they were with overall sex life, cuddling, and the amount of passion in their marital relationship. Thus, there is likely a cyclical aspect to relationship processes and outcomes (McNulty et al., 2016); equity in CC and HH work contributes to a better relationship which leads to more intimacy, and less conflict. This, in turn, leads to a better marital relationship.

Marriage and Health Outcomes

For many adults, marriage plays a principle role in their lives. In general, marriage as a construct has been shown to be beneficial to one's health. Those who are married have lower rates of morbidity and mortality than those who are not (Berkman et al., 2000; Johnson et al., 2000; Rendall et al., 2011). Married individuals also have lower risk for depression, greater life satisfaction, and happiness (Gove et al., 1983; Robles et al., 2014).

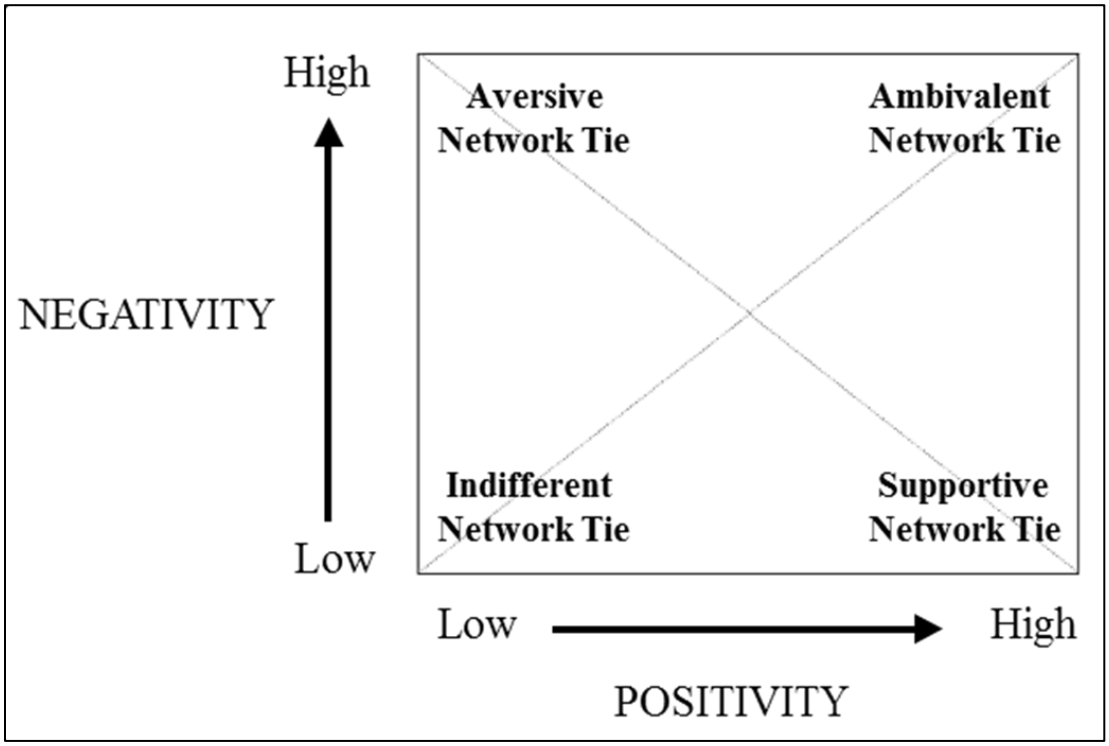
Beyond that of marital status, being satisfied in marriage has been shown to provide numerous health benefits. Those in satisfied marital relationships show decreases in cardiovascular risk factors such as physical inactivity (Knoll et al., 2017), uncontrolled diabetes (Trief et al., 2017), smoking (Roski et al., 1996), weight issues (Clark et al., 2014) and blood pressure (Birmingham et al., 2015; Holt-Lunstad et al., 2008). Moreover, couples who report decreased marital satisfaction have worse cardiovascular function (Smith et al., 2009), poorer self-rated health, and increased health problems (Newsom et al., 2008). For mothers specifically, a recent study by Henriksen et al. (2015) showed that satisfaction in marriage helped protect the mother against viral infections during pregnancy. From this body of literature, researchers have

suggested that for a marriage to be advantageous (i.e., salubrious), it must be high quality, or the individual is better off single (Holt-Lunstad et al., 2008).

While marital partners provide positive support such as care and acceptance, they can also be sources of negativity in the form of insensitivity, conflict, interference, and jealousy (Brooks & Dunkel Schetter, 2011; Burg & Seeman, 1994; Rook, 2015). Despite research showing that unsatisfactory marital relationships may have detrimental physical and mental effects, many marriages remain intact (Rusbult & Martz, 1995). This could be because these marriages simultaneously contain varying degrees of both positivity and negativity (i.e., ambivalence) (Campo et al., 2009; Uchino, Holt-Lunstad et al., 2001), with the positivity keeping individuals invested in maintaining the relationship (see Figure 3). Much of the research on health and marriage has conceptualized marital quality in a unidimensional way, with high levels of *either* positivity or negativity (Fincham & Linfield, 1997). A recent meta-analysis found that most standard unidimensional measures of marital quality did not adequately distinguish between positive and negative aspects of marital behavior (Robles et al., 2014), and may not fully capture the nuances of marital relationships (Uchino et al., 2014).

Figure 3

Multidimensional Relationship Quality Framework



Note. Depiction of conceptual framework for incorporating both positive and negative relationship aspects simultaneously from (Uchino, Holt-Lunstad et al., 2001)

In a study evaluating 183 couples, Reblin et al. (2020) showed that the inclusion of multiple dimensions of relationship quality improved prediction of marital functioning over that of unidimensional scales. To understand if the positivity in ambivalent marriages provides the same cardiovascular-protective benefits as the positivity in supportive marriages, Birmingham et al. (2015) examined interpersonal marital functioning and ABP in 94 couples. They found that despite the positivity in these ambivalent relationships, individuals whose spouses' or own behavior was ambivalent, did not receive the same cardiovascular protection in the form of lower blood pressure as supportive marriages.

Specifically for women, having a supportive marriage offers emotional support and is salubrious for both her mental and physical health (Uchino, 2004). Relationship conflict influences her health more than his (Kiecolt-Glaser et al., 1996) and is more detrimental than emotional support is protective for her health (Umberson et al., 2006). Thus, simply being married has particular benefits for men but is more nuanced for women (Kiecolt-Glaser & Newton, 2001; Kostiainen et al., 2009; Shumaker & Hill, 1991; Umberson, 1992); with women being specifically more influenced by the marital relationship quality. To demonstrate, in a study by Reese et al. (2010), women in non-distressed marriages rated their physical and psychological health better than unmarried women. However, this effect was moderated by marital distress, such that, women in distressed marriages reported worse physical and psychological disability than unmarried women. Clearly it is not simply marital status that is important but the quality of the marital relationship provides specific health benefits (Gove et al., 1983; Grewen et al., 2005; Robles, 2014), especially for women. Theoretical explanations for these gender differences are attributed both to wives providing better monitoring of health-promoting behaviors for their husbands (Umberson, 1992) and providing better social support than they receive in return (Umberson, 1987). Taken together, the research on marriage and health appears to benefit women, but only when marital satisfaction is high (Gallo et al., 2003).

Parenthood

Overall, studies investigating health outcomes of motherhood have been mixed. Some studies have reported positive health benefits associated with the mother role (Fokkema, 2002; Kostiainen et al., 2009). For example, in a study by Light et al. (2000) investigating breast feeding mothers, all participants showed lower systolic blood pressure reactivity to a stressor after contact with their baby versus the no-baby-contact control group. Similarly, in a study of

women with eldercare and childcare responsibilities, Stull et al. (1994) found a positive relation between the presence of children and the well-being of women. They also found that working mothers with children experienced less depression and greater positive affect than those without children. Becoming a parent is also associated with protective health behaviors (less smoking and alcohol consumption, and increased physical exercise) for the individual (Kendig et al., 2007). A study by Holt-Lunstad et al. (2009) found that mothers were more likely than non-mothers to have better blood pressure regardless of children's ages or number of children.

However, other research has found motherhood related to increased strain and psychological distress (Arendell, 2000) and negative health outcomes (Ross et al., 1990). Being a parent has been associated with less nocturnal dipping of diastolic blood pressure (Ituarte et al., 1999), more depressive symptoms (Bures et al., 2009), and worse self-reported mental and physical health (Simon & Caputo, 2018). Additionally, number of children is positively associated with systolic and diastolic blood pressure for working women (Brisson et al., 1999). Since women are usually the primary caretaker of the children in the family, it may be that the stress-inducing conditions inherent in caregiving play a role in a women's greater health risks following parenthood (Nomaguchi & Milkie, 2003). Lahelma et al. (2002) showed that married women with no children generally reported the best self-reported health compared to married mothers with children, single mothers, or single women without children. The physical health effects of parenting, whether positive or negative, vary across parenting stages, that is, parents whose children are still in the home (i.e., less than 18 years of age) compared to non-parents and parents whose children are over 30 years of age, show greater incidences of depression and anxiety, less life satisfaction, and worse physical health (Simon & Caputo, 2018). Thus, it is

important to distinguish between parenting stages—especially whether parents' children are living in the home or not—when addressing the effects of parenthood on health.

Parenthood can change the dynamics of the marital relationship. A meta-analysis by Twenge et al. (2003) found that children have an impact on the quality of the marital relationship that can be detrimental to the relationship. Specifically, parents have reported that marital satisfaction diminishes significantly after the first year of parenthood (Meijer & van den Wittenboer, 2007; Perren et al., 2005). This marital diminishing, in part, could be contributed by parents' decreased leisure time, recreational enjoyment, and downtime spent as a couple (Nomaguchi & Milkie, 2003; Offer & Schneider, 2011). Parents report that after the arrival of their first child, disagreements and marital conflict increase and is a source of strain on the relationship (Nomaguchi & Milkie, 2003). Additionally, parents with more children report greater marital dissatisfaction than parents with fewer children (Twenge et al., 2003). Using nationally representative data, Cáceres-Delpiano and Simonsen (2012) found that greater number of children increases the likelihood of marital breakdown. The greater dissatisfaction in marriage found in the early years of parenthood may have a detrimental impact on the mother's health.

Research Questions and Hypotheses

With the contemporary familial changes in society, and the reported research findings noted, it is clear that working mothers are frequently juggling multiple roles and the vast majority of the responsibilities that are inherent in these roles (e.g., mother, wife, employee, dual- or sole-provider). This could potentially lead to to the detriment of their own health, and the health of their marital relationship. Additionally, gaps in the literature exist. The background stress theory infers that the stress and burden of being responsible for multiple domains will increase a mother's blood pressure (Terrill et al., 2012), yet there is a paucity of research

focusing specifically on more accurate assessments of blood pressure—ABP—and aspects of multiple roles, second shift, and health (Perry-Jenkins et al., 2013). Prior study's findings have also been mixed (Carson et al., 2009; Klumb & Lampert, 2004) and much has used subjective measurement of self-report (Waldron et al., 1982) rather than objective measures. The current study will address these gaps by examining (1) diurnal blood pressure associated with holding a more roles, assessed with more objective and concrete methods (ABP); (2) blood pressure differences in mothers who stay-at-home full time and thus experience fewer roles, and mothers employed outside of the home with more roles; (3) the influence of perceived equality of CC and HH labor for both employed and stay-at-home (SAH) mothers, and (4) the influence of a supportive marital relationship versus an ambivalent marital relationship on these health outcomes. This project adds to the literature as it includes key constructs such as detailed CC and HH measures, multidimensional assessment of marital quality, and objective health measures (ABP). We investigate these research questions on a self-reported healthy population of 112 married SAH and 112 married employed mothers, all of whom have children under the age of 18 currently living in the home. Based on the literature reviewed, we hypothesize the following:

- *H1*: Mothers who are employed will have higher systolic and diastolic ABP compared to stay-at-home mothers due to a greater number of roles.
    - *H1a&b*: This effect will be moderated by the perceived CC and HH work their husbands contribute and their marital relationship quality.
    - *H1c*: A three-way interaction of multiple roles, equity in CC and HH work, and marital relationship quality. In other words, the effect of being an employed mother on ABP will be less for those who perceive more equity in CC and HH work from their husbands and who report better marital relationship quality.

- *H2a&b*: Mothers who perceive more equity in the amount of CC (H2a) and HH work (H2b) their husband contributes will have better systolic and diastolic ABP.
- *H3*: Mothers who report an ambivalent marital relationship will have worse systolic and diastolic ABP compared to those who report a supportive relationship.
- *H4*: The relation between ABP and marital relationship quality will be moderated by the perceived equity in CC and HH work.

Method

Recruitment

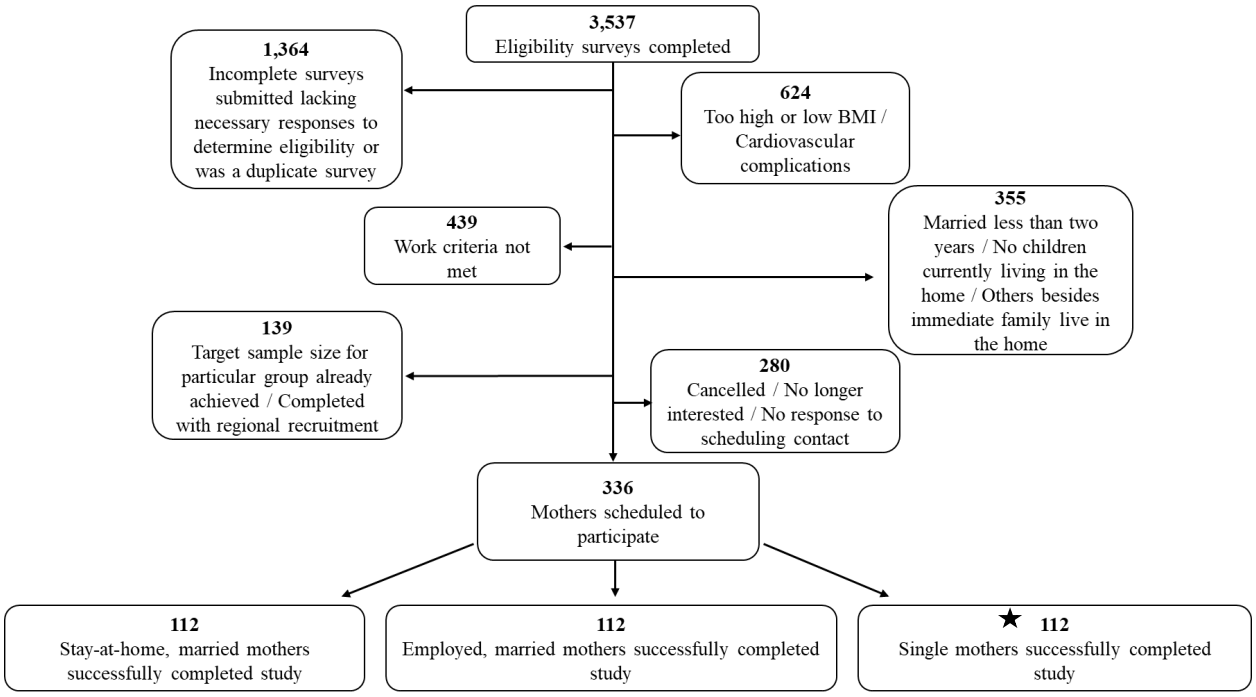
This study used purposive and some snowball sampling methods to recruit participants. Digital flyers were posted to social media sites such as Facebook, Twitter, and Instagram. Physical flyers were posted around Brigham Young University and the surrounding Utah County and Salt Lake County communities including public areas such as libraries, city centers, daycares, and grocery stores. Similar methods were also used to recruit participants for specific dates from Clark County, Nevada, and Lexington County, South Carolina. Additionally, a referral bonus ($10) was offered for referring participants who fully completed the study.

To determine eligibility, all potential participants completed a screening survey. The survey contained demographic, health, work, living-situation, and marriage information (see Participants section for exclusion criteria). Upon completion of this survey, we contacted each participant by email informing them if they had qualified. If eligible, we provided them with scheduling instructions and set up their appointment. Data collection for this project took two years (Oct. 2017 – Oct. 2019). A participant eligibility flow chart is shown in Figure 4. In response to recruitment efforts, there were 3,537 submitted eligibility surveys. Of the fully

completed surveys, 755 participants (35%) met the inclusion criteria and 336 (16%) fully completed the study.

Figure 4

Participant Eligibility Flow Chart



Note. The largest category depicted (39%) is for surveys submitted without completing the necessary screening questions to determine eligibility. Additionally, although categorically depicted, many excluded participants did not meet criteria for several listed categories (e.g., BMI and did not fit working criteria). *Single mother participants were collected as part of a separate project. This information is relevant to the participant eligibility flow data but otherwise is not part of the present project.

Participants

For purposes of this study, eligible mothers had at least one child living in the home full-time who was under the age of 18. We stratified qualifying mothers into two conditions: SAH and employed mothers. Because cardiovascular measures are the main dependent variables, exclusion criteria included those who had medical conditions with cardiovascular components (e.g., hypertension, or psychological problems for which they are being medically treated; see

Cacioppo et al. (1995), those who were currently pregnant (Thompson et al., 2009), and those with a Body Mass Index (BMI) below 18.5 and above 29.9 (Czernichow et al., 2012; Shihab et al., 2012). Participant information is located in Table 1.

Table 1

Demographics

	Mean	*SD*	Range	N	%
Age in years	32.28	6.73	22 – 57	226	100
Marriage length (years)	9.55	5.85	2 – 31	226	100
Body Mass Index*	24	4.1	17.27 – 41.63	226	100
Stress	21.1	2.99	10 – 31	225	99.56
Ethnicity:					
White				198	88
Hispanic				19	8.44
Asian/Other				8	3.55
Education status:					
High School				9	4
Partial/completed college				182	80.88
Partial/completed graduate school				34	15.11
Self-reported health:					
Poor/Fair				29	12.89
Good/Excellent				196	87.11
Annual income (self only):					
< 15,000				107	47.79
15 – 29,000				36	15.93
30 – 49,000				39	17.26
50 – 69,000				17	7.52
>= 70,000				26	11.50
Child(ren) age(s):					
< 6 years old				182	80.83
6 – 12 years old				111	49.12
12 – 18 years old				49	21.68

Note. BMI is reported from lab measurements. Our recruitment protocol screened participants based on self-reported height and weight. *A priori,* we determined that, on the few occasions when there would be discrepancy between self-report and lab results (self-report is within target range but lab measurement indicates a score outside of the range), we would allow participation with the plan to control for BMI in our main analyses. There were 11 instances of BMI < 18.5, and 19 instances of BMI > 29.9.

We conducted power analysis through G*Power Software (Faul et al., 2007). Results from this analysis including a repeated measures design with seven tested predictors, 22 total predictors, and a sample size of 224 participants (112 per group), indicate that this study achieves .94 power with a .05 alpha to detect a small effect size of .10. Two mothers removed the ABP cuff prior to study completion resulting in only partial data. Thus, to ensure we reached our target sample size we recruited a total of 226 participants of which 224 adhered to the study protocol and were included in the final analyses. This study was approved by the Brigham Young University Institutional Review Board.

Distinguishing Between Conditions

The SAH mother category included mothers who were not employed. However, as many mothers perform jobs or work for which they earn money (e.g., multilevel marketing, photography, etc.) we considered mothers working less than 10 hours a week on average to be a SAH mother. Employment for working mothers was operationalized as working at least 20 hours a week on average, outside the home. These working stipulations ensured that there was a considerable amount of outside-the-home-time dividing the SAH and employed-mother conditions. Additionally, we wanted to be inclusive of the many potentially diverse working mothers' situations while still having a definitive difference between mothers in the employed condition and mothers in the SAH condition. Attending school was not included in the operationalization of outside-the-home employment for mothers.

As much of this study was conducted at a large university, it had the potential to attract many newly married couples. Thus, to ensure a diverse sample, mothers had to have been married for more than two years. The married mothers' spouses were required to be currently living in the home so relationship quality variables (see Measures below) were current and

accurate. Only the immediate family (mother, husband, and children) were living at the residence allowing us to conduct between-participant comparisons and decrease the potential for various confounding home-living situations.

Procedures

All participating mothers wore an ABP monitor during a typical day for approximately 12 hours. Blood pressure was measured for each mother approximately 24 times within the 12-hour period (once every 30 min). For employed mothers, they participated on a day they were working their normal schedule. Additionally, part of the 12-hour study period was spent at home with their family. This stipulation was implemented to control for location (home and work) during blood pressure readings (e.g., late night partying with friends, theme parks, or other situations which could confound BP readings). Participants also refrained from exercise for the duration of the study to control for possible blood pressure inflation due to exertion.

Participating mothers were scheduled for appointments in the mornings, prior to the start of a typical day. In the case where a mother had an atypical work schedule (e.g., graveyard shift) they were scheduled for appointments at times that were convenient for them to participate while still meeting the study criteria. Upon arriving to the lab, participants received paper consent forms. Following informed consent, each mother was fitted with a blood pressure cuff and rested for approximately five minutes, after which we obtained three baseline readings, each one minute apart. Participant height and weight were collected for assessment of BMI and married participants then completed relevant relationship surveys (for a detailed assessment of these surveys, see Measures below). Participant mothers were then fitted with the ABP monitor, and we provided a personalized link to their specific ambulatory diary record (ADR) which they accessed on their phone or other electronic device for the duration of the study and which needed

to be completed at each blood pressure assessment throughout the day. Monitors were set to obtain readings every 30 minutes (following the completion of the previous reading) from the time of fitting until participant-designated bedtime. An appointment was set for the following day for mothers to return the equipment and to receive $75 compensation. Some mothers brought their children to these appointments and we did not discourage this; we provided coloring books and toys for the children to play with while the appointment was taking place.

Measures

Childcare Equity

This measure was adapted from Mannino and Deutsch (2007). The questionnaire is comprised of 12 statements regarding various childcare tasks. All participants in this study were asked to specify the degree to which the tasks are divided between themselves and their spouse. The five response choices include: I do it all (spouse rarely), I do most (spouse sometimes), equal division, spouse does most (sometimes me), and spouse does it all (rarely me). Deutsch et al. (1993) reported a Cronbach's alpha of .85. Indeed, this measure evidenced good internal consistency in our study (Cronbach's $\alpha = .80$). Each participant's score on this measure was calculated by the 12 responses coded 1–5 for a total combined range of 12–60. Higher scores indicated more childcare done by spouse. A median score of 36 indicated equal sharing of the CC responsibilities between the couple.

Household Work Equity

The measures of division of tasks and household management were adapted from Mederer (1993). The original measure was developed and tested on a sample of 652 working individuals. The questionnaire is comprised of 19 statements regarding various household maintenance tasks. In prior studies the scale has demonstrated adequate internal consistency

(Cronbach's alpha ranging from .67–.69; Mederer (1993)). The Household work equity instrument evidenced good internal consistency in the present study (Cronbach's α = .85). All participants were asked to specify the degree to which the tasks are divided between themselves and their spouse. The five response choices include: I do it all (spouse rarely), I do most (spouse sometimes), equal division, spouse does most (sometimes me), and spouse does it all (rarely me). This measure was calculated by each of the 19 responses coded 1–5 for a total combined range of 19–95. Higher scores indicated more housework done by spouse. A median score of 57 would indicate equal sharing of the HH responsibilities between the couple.

Social Relationships Index (SRI)

We used the SRI to measure participants' relationship quality dimensions of positivity and negativity (Campo et al., 2009). Participants rated their spouse's behavior in terms of how helpful, upsetting, mixed or conflicted, and unpredictable their spouse is on a 1 = not at all to 6 = extremely scale during support seeking behavior, when they are excited or happy, and during daily interactions. Campo et al. (2009) found good convergent validity (r = .60) and discriminant validity (r = .06) with established relationship measures (Quality of Relationship Inventory) and personality measures. The SRI generalizes well to different contexts, and has significant two-week test-retest reliability of r = .61 for the number of supportive ties and r = .68 for the number of ambivalent ties (Campo et al., 2009; Uchino, Bernston et al., 2001). For the current study, the SRI evidenced acceptable internal consistency for positivity (Cronbach's α = .76) and negativity (Cronbach's α = .72).

The relationship quality dimensions on the SRI were calculated into dummy codes of supportive (dummy code 0) or ambivalent (dummy code 1) for each participant. An average score of all three areas (i.e., in support seeking contexts, during daily interactions, and when they

are happy, excited or proud) were used to create the categories of supportive and ambivalent. A spouse was coded as supportive if they were rated as a "2" or greater on positivity and only a "1" on upsetting, whereas a spouse was coded as ambivalent if they are rated a "2" or greater on both positivity and upsetting. This coding framework is in line with the definition of ambivalent relationships simultaneously containing high positivity and high upsetting aspects. This technique allowed us to examine the dimensionality of relationship quality, specifically narrowing in on the upsetting aspects of relationships and how they influence cardiovascular health. Additionally, these cut-off points have been used consistently in prior work and are based on a broad relationship framework (Uchino, Holt-Lunstad et al., 2001). The other two dimensions of the SRI, namely, aversive and indifferent, were not used in the present study as these dimensions are more typical for non-marital relationship ties and do not contain the behaviors/affect which are presently of interest. In the present study there were 113 mothers (50%) classified as having an Ambivalent marital relationship (55 SAH mothers and 59 employed mothers) and 112 mothers (49.5%) classified as having a Supportive marital relationship (58 SAH mothers and 54 employed mothers).

Baseline Blood Pressure

We used a Dinamap Model 100 Pro monitor to measure baseline (resting) systolic blood pressure (SBP) and diastolic blood pressure (DBP). Assessments were obtained via a properly sized occluding cuff positioned on the non-dominant upper arm. Three readings were taken, each spaced one minute apart. These three readings were averaged together to create a baseline to increase reliability (Kamarck et al., 1992).

Ambulatory Blood Pressure

To assess ABP, we used the Oscar 2 (Suntech Medical Instruments, Raleigh, NC). The Oscar 2 was designed specifically for ABP assessment and has been validated for both systolic and diastolic blood pressure by international guidelines (Goodwin et al., 2007). The participant wore a properly sized occluding cuff positioned on their non-dominant upper arm. The Oscar 2 monitor was attached by a belt on the participant's waist to allow for mobility. Participants removed the monitor and cuff at the end of the day in which they participated and returned to our lab the following day to return the equipment and receive compensation.

Stress

To account for stress, we used the Perceived Stress Scale. This measure contains 10 items on a 0 = Never to 4 = Very often scale to measure perceptions of stress within the last month. It produces a range of 10 – 40 with higher scores indicating more stress. Example items include "in the last month how often have felt nervous or stressed?" and "in the last month, how often have you felt you were unable to control the important things in your life?" This scale has demonstrated acceptable Cronbach's alpha at .75 (Cohen & Williamson, 1988) and evidenced good internal reliability in the present study (Cronbach's $\alpha = .87$). As evidence for the validity of the PSS, Cohen and Williamson (1988) found that individuals relatively high in perceived stress evidence poorer physical health and higher scores on health service utilization than individuals relatively low in perceived stress.

Ambulatory Diary Record (ADR)

The ADR was completed via electronic device (i.e., computer, smart phone, etc.) by all mothers in the study following each ABP assessment. We used Qualtrics survey software to administer the ADR. Each mother received a unique Qualtrics link where they accessed and completed their surveys for the duration of the study. The ADR was relatively easy to complete

(about 2 minutes) in order to maximize participants' adherence to study requirements. We encouraged mothers to complete the survey as soon as possible after each ambulatory blood pressure assessment. Surveys that were not completed within 10 minutes of the ABP time stamp were discarded. The time and date stamp of each completed survey allowed us to verify and match up each of the ADR surveys with the appropriate blood pressure assessments.

The ADR was designed to measure behavioral, psychological, and physiological states that may influence cardiovascular activity and was adapted from the diary developed by Hedges et al. (1990) for monitoring physiological states and mood. It is divided into three general sections. The first part of the diary assessed information on basic behavioral variables that could influence cardiovascular function (Guyll & Contrada, 1998; Kamarck et al., 1998). These include items such as posture (lying down, sitting, standing), activity level (1 = no activity, 4 = strenuous activity), location (work, home, other), talking (no, yes), temperature (too cold, comfortable, too hot); prior consumption of nicotine, caffeine, alcohol, or a meal; and prior exercise (no, yes). The second part of the ADR assessed within-participant factors such as state positive affect, state negative affect, perceived control, state self-esteem, as well as whether or not participants were directly interacting with their spouse, coworker, or supervisor. The third part assessed factors related to social interactions, including perceived responsiveness, intimacy, disclosure, and influence (Laurenceau et al., 2005). Only the first section was used for the current study's analyses.

Demographic Questionnaire

A demographic questionnaire was used to assess standard variables including age, child(ren) age(s), income, education, and occupational status for all participants. We tested a number of variables prior to conducting primary analyses in order to determine if they

significantly contributed to our statistical model fit. The variables that were significant (*p's* <.05) were included in our primary analyses. We accounted for a number of variables which were evaluated as fixed effects. These variables were derived from prior research which have indicated significant effect on blood pressure and include BMI, age, education, income, ethnicity, self-reported health, and previous night's sleep. Additionally, we included random effects control variables in our analyses. Each of these variables are obtained from the diary survey participants completed in conjunction with each individual ABP reading. Thus, each of these variables were linked, via timestamp, to a corresponding ABP reading. These variables included current location (work, home, transit), temperature (cold, comfortable, hot), consumption (alcohol, nicotine, caffeine, meal), exercise (yes, no), talking (yes, no), activity level (no activity, some, moderate, strenuous), position (lying down, sitting, standing).

Data Analysis Plan

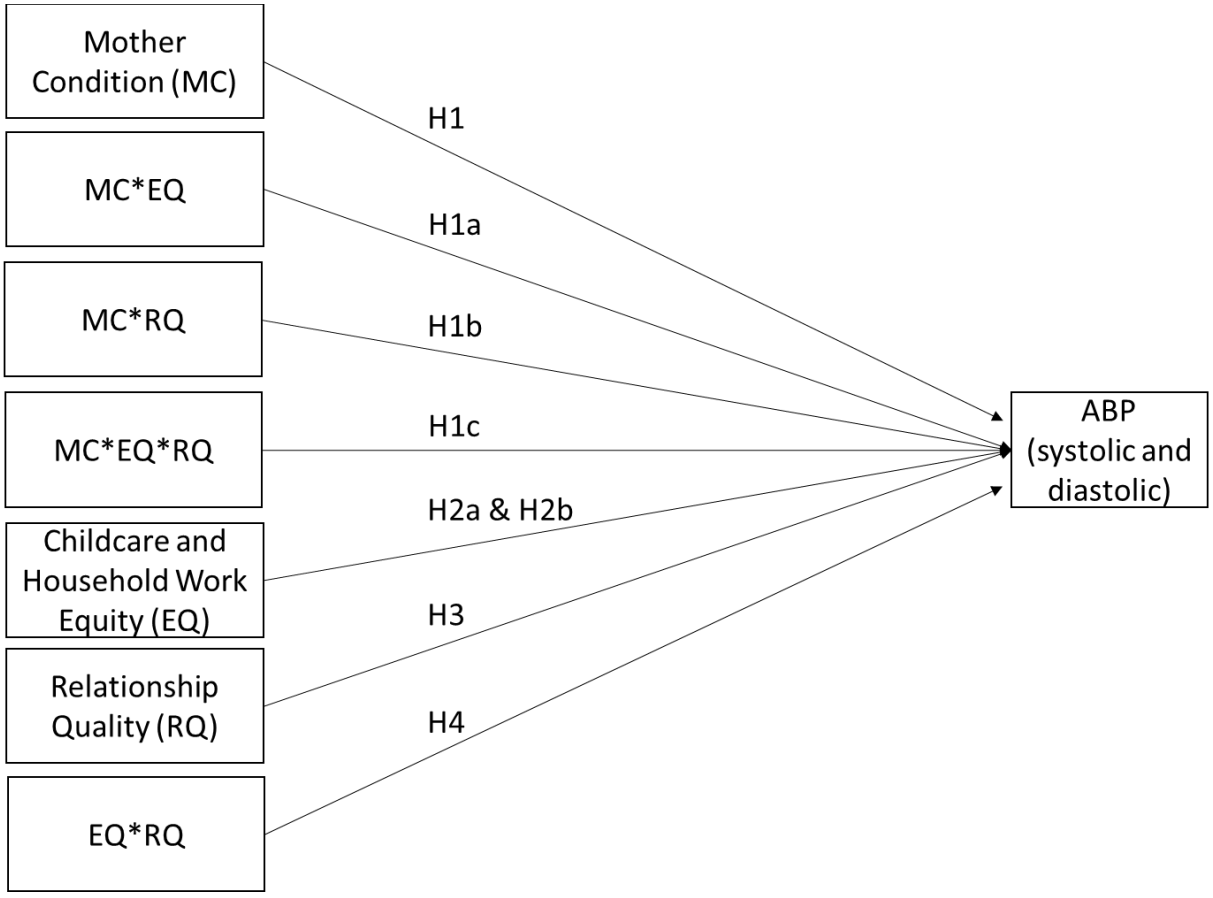
Data preprocessing included matching up each participants' ADR survey responses with their corresponding ambulatory readings. To do this, we merged the data files by key unique indicators of participant ID, month, day, hour, and minute. This allowed us to keep the integrity of each specific instance of ambulatory systolic and diastolic blood pressure while including within-participant factors from the diary survey. As part of our *a priori* plan, any ADR survey that was not completed within 10 minutes of the ambulatory reading was discarded. Additionally, the Oscar 2 reports on possible confounded readings with error codes. These error codes indicated unreliable artifact readings and there were 29 total error coded scores that were removed. In total 437 of the 5,425 readings (12.4%) of matched ambulatory and ADR survey data were discarded due to these reasons. Additionally, we removed participant data for those who did not comply with study protocols to the extent that the data was confounded. There were

two participants who fit this removal criteria. We fenced outlier data to be within the range of two inter-quartile scores. Systolic high and low scores were fenced to 188 and 69 respectively (n = 52, .68%) and diastolic high and low scores were fenced to 113 and 36 respectively (n = 201, 3.25%). All dependent variable residuals were normally distributed and multicollinearity tests indicated no variance inflation issues with the model's predictor variables (all VIF's < 2.6).

To assess the hypotheses in this study, we conducted multilevel mixed model analyses. Importantly, due to the correlational nature of our repeated measures dependent variables (i.e., systolic and diastolic ABP), we accounted for the temporal correlations between each blood pressure reading. We used the MIXED command (Stata) in order to examine both fixed and random effects on ABP across the day. The MIXED command allowed us to model the unstructured covariance for repeated measures factor of measurement occasion (i.e., ABP reading and diary entry) using the direct (Kronecker) product (Park & Lee, 2002). Each model contained all predictor variables and their interactions in a single model thus controlling for increased Type I error due to multiple tests. We ran one model (See Figure 5) for each of our two dependent variables (systolic and diastolic ABP). In the two multilevel mixed model analyses we additionally included control variables of perceived stress, significant demographic, and diary covariance variables. All variables were included in the final reported models unless they prevented model convergence, or they detracted from model fit. Statistical significance was determined by field standard p-values ($p < .05$) and confidence intervals (95%).

Figure 5

Theoretical and Analytical Model



Note. Model depicting hypothesized effects of mother condition, childcare, housework equity, and relationship quality on systolic and diastolic ABP. Model includes moderated effects of childcare, household work equity, and marital relationship quality as well as the three-way interaction.

Results

Descriptive

Lab assessed baseline blood pressure for all mothers in the study was M_{SBP} = 115.30 (*SD* = 11.56) mmHg / M_{DBP} = 71.47 (*SD* = 7.35) mmHg. Combining all ABP readings into one composite score yielded M_{SBP} = 128.71 (*SD* = 21.88) mmHg / M_{DBP} = 76.13 (*SD* = 15.36) mmHg. Table 2 displays baseline blood pressure and ABP by mother condition and Figure 6 displays the baseline blood pressure by mother condition.

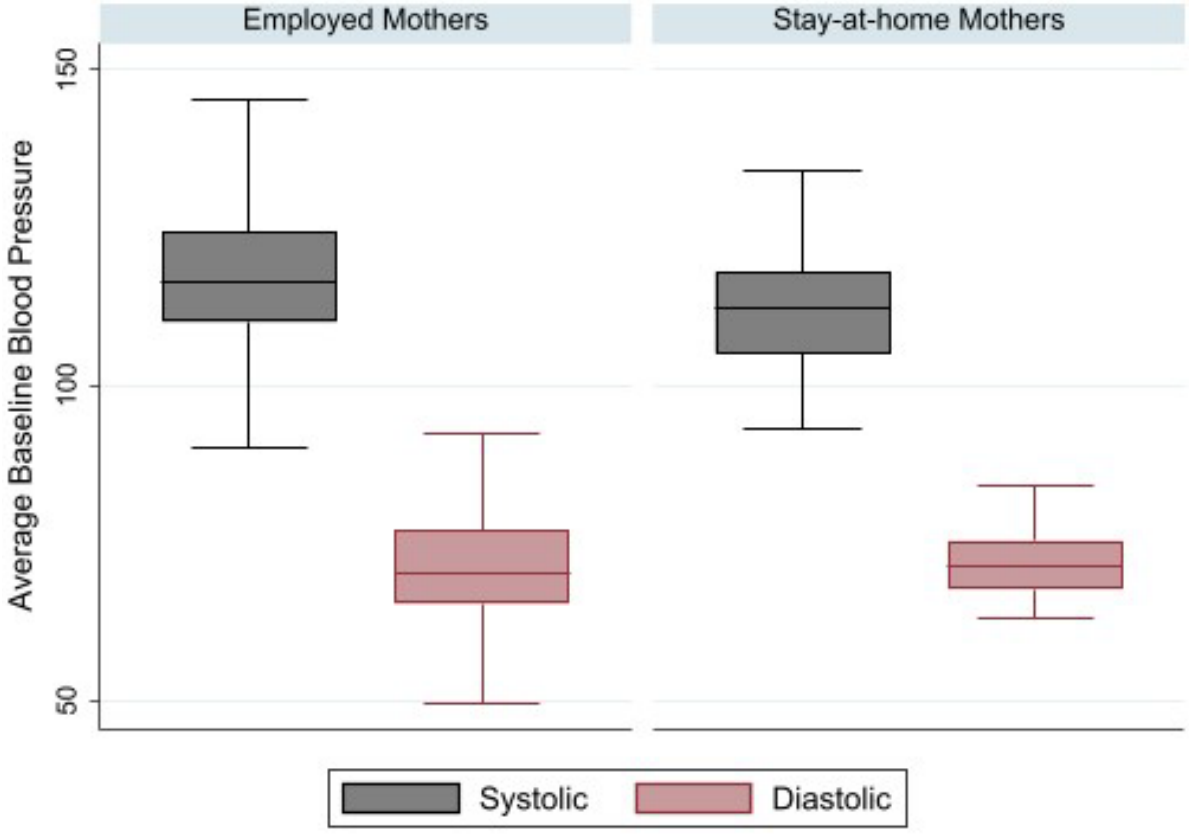
Table 2

Baseline and Ambulatory Blood Pressure by Mother Condition

	Mean	***SD***	**Range**	**N**
Baseline Systolic Blood Pressure				
Employed Working Mothers	117.78	12.86	90 – 163.33	113
Stay-at-home Mothers	112.81	9.51	93 – 147	113
Baseline Diastolic Blood Pressure				
Employed Working Mothers	71.29	9.04	49.67 – 99	113
Stay-at-home Mothers	71.65	5.16	63 – 89.67	113
Ambulatory Systolic Blood Pressure				
Employed Working Mothers	130.51	22.22	69 – 188	2,607
Stay-at-home Mothers	127.04	21.43	69 – 188	2,818
Ambulatory Diastolic Blood Pressure				
Employed Working Mothers	77.75	15.63	36 – 113	2,607
Stay-at-home Mothers	74.64	14.94	36 – 113	2,818

Figure 6

Baseline Blood Pressure by Mother Condition



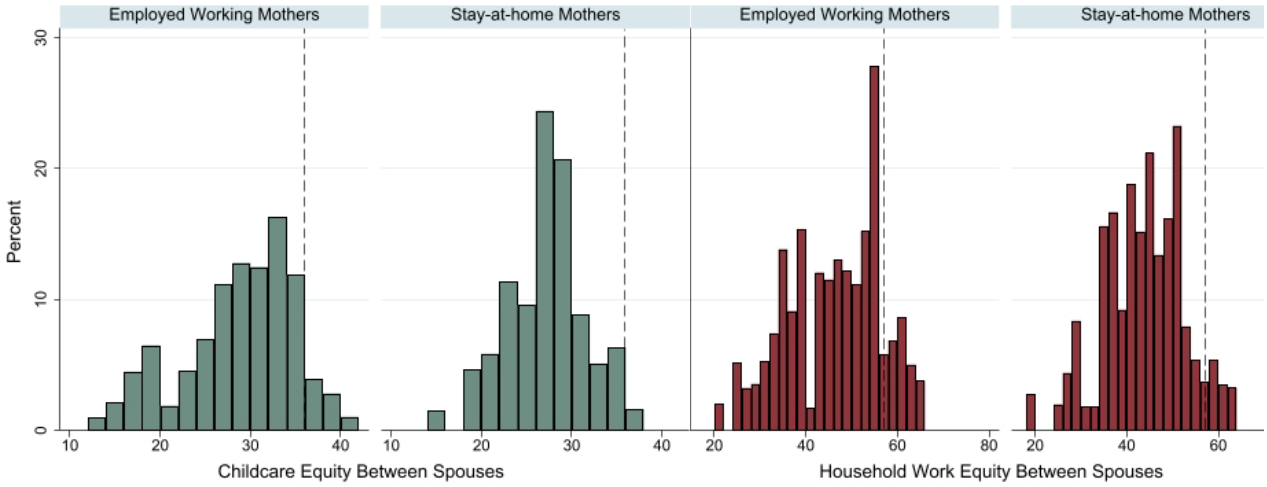
Note. Figure depicts the dispersion of data for baseline systolic/diastolic blood pressure by mother condition.

Evaluating mothers' perceived CC and HH work equity with their husbands indicated that mothers are doing the majority of the CC and HH work even those mothers who are employed and working outside the home (see Figure 7). The mean of all mothers for Childcare was 27.49 (*SD* = 5.39) and for Household work was 44.33 (*SD* = 9.93). Both these mean scores are well below the median of equal sharing between spouses for their respective scales (36 for

CC and 57 for HH). Separating by mother condition indicates employed mother's M_{cc} = 28.22 (SD = 6.17) and SAH mother's M_{cc} = 26.8 (SD = 4.4), with employed mother's M_{hh} = 45.57 (*SD* = 10.51) and SAH mother's M_{hh} = 43.11 (*SD* = 9.21). CC and HH work were moderately positively correlated (Pearson's r = .502, p < .05).

Figure 7

Childcare and Household Equity by Mother Condition



Note. Figure shows the mother's perceived equity between spouses for both Childcare and Household Work. CC scale ranges from 12 – 60, HH work scale ranges from 19 – 95. The dotted vertical lines represent the median of 36 for CC and 57 for HH work, which indicates equal sharing of responsibilities between spouses.

Primary Analyses

The average number of ABP readings per participant was 24.84 (*SD* = 3.85, *Range* = 6 - 39) which provided our multilevel mixed model analysis with enough power to detect true differences. Models were conducted according to our data analysis plan above. Predictor and

control variables were removed that did not significantly contribute to model fit. The final models included random intercepts for each participant, as well as nested, random by-participant slopes for within-participant variables (Reading, Activity Level, and Posture). The fixed effects included each of the hypotheses variables (Mother Condition, CC, HH, and Relationship Quality) and control variables (Reading, BMI, Baseline Blood Pressure, Stress, Income; as well as all ADR variables: Posture, Activity, Talking, Location, Temperature, Exercise, Everyday Problem, and Difficult/Unique Problem).

To ensure that removing variables that were not statistically significant resulted in the best model fit, we conducted post estimation commands of each model comparing Akaike's and Bayesian information criteria. Final models indicated the smallest values for each and were thus retained as the most appropriate model for the data (Systolic model output AIC = 43,585.47, BIC = 43,829.18; Diastolic model output AIC = 41,404.32, BIC = 41,601.99). Additionally, we used the likelihood ratio test to justify removing the interaction terms for Household work and to test if the more parsimonious model fit the data better (final models still included Household work as a main effect for statistical control). Similar to the above post estimation tests, the likelihood ratio test compares two models (one nested in the other) with the null hypothesis that the smaller model is better. Results indicated that we could not reject the null ($\chi^2(1) = 1.34$, $p = .248$), thus, the smaller of the two compared models was more parsimonious and fit our data better. The final model's intraclass correlation was calculated providing significant evidence that it was necessary to nest by participant as it accounts for approximately 63% of the total residual variance (ICC = .63, *SE* = .04, 95% CI [.55, .69]).

Investigating our first hypothesis we found that, compared to SAH mothers, employed mothers did not have higher systolic (b = -1.85, *SE* = 11.1, $p = .87$) or diastolic (b = -4.14, *SE* =

6.23, p = .51) ABP. Additionally, each of the moderation hypotheses regarding mother condition were not supported. This included interactions between equity of CC and HH responsibilities that the husband contributes (*H1a* and *H1b*) as well as the marital relationship quality (*H1c*) and the hypothesized three-way interaction (*H1d*). Full model output is located in Table 3. In order to determine that this analysis was, in fact, powered sufficiently to detect a true difference between SAH and employed mothers, we conducted a post hoc power analysis again in G*power. Results indicated that with a sample size of 224, an alpha level of .05 with an average number of repeated measurement occasions of 24. This study achieved .99 power to detect a small (.10) effect size between two groups. This power estimate is reasonable considering the study procedures—It is probable that many of readings within a single day will be highly similar. With an average of 24 ABP readings per participant we are confident that the null findings between mother conditions is accurate.

Mothers who reported more equity in the amount of CC (but not HH) responsibilities their husband contributes (*H2a & H2b*) demonstrated better (lower) systolic ABP (b = -.57, SE = .26, p = .03) but not diastolic ABP (b = -.26, SE = .15, p = .08). Additionally, mothers who reported having a more Ambivalent marital relationship (*H3*) had worse systolic (b = -34.31, SE = 12.26, p = .005) but not diastolic blood pressure (b = -12.56, SE = 6.92, p = .07).

Table 3

Ambulatory Blood Pressure Multilevel Mixed Model Output

	Systolic			**Diastolic**		
Fixed Effects	**Coef.**	***SE***	**95% CI**	**Coef.**	***SE***	**95% CI**
(Intercept)	10.24	13.79	-16.81, 37.29	-2.76	7.80	-18.06, 12.54
Group	-1.85	11.08	-23.57, 19.87	-4.14	6.23	-16.35, 8.07
Childcare	-.57 *	.26	-1.08, -.05	-.26	.15	-.55, .03

Group X Childcare	.23	.41	-.58, 1.03	.11	.23	-.35, .56
Relationship Quality	-34.31 *	12.26	-58.34, -10.28	-12.56	6.92	-26.12, 1.00
Group X Relationship Quality	20.88	19.96	-18.25, 60.00	-.87	11.24	-22.9, 21.16
Relationship Quality X Childcare	1.21 *	.42	.39, 2.03	.47 *	.24	.01, .93
Group X Relationship Quality X Childcare	-.69	.71	-2.09, .70	-.01	.40	-.79, .77
Household work	-.04	.09	-.23, .16	-.02	.06	-.13, .09
Control Variables						
Reading	.09 *	.035	.017, .154	-.10 *	.02	-.14, -.05
BMI	.92 *	.244	.44, 1.40	.68 *	.12	.43, .92
Baseline Blood Pressure	.77 *	.084	.61, .94	.81 *	.07	.68, .94
Stress	.35	.29	-.21, .91	.11	.16	-.20, .43
Income	1.47 *	.67	.15, 2.79	.44	.38	-.30, 1.16
Position	4.77 *	.47	3.84, 5.69	5.76 *	.42	4.94, 6.60
Activity	1.37 *	.418	.55, 2.19	.46	.30	-.14, 1.04
Talking	-1.21 *	.396	-1.99, -.434	-1.45 *	.32	-.21, -.08
Location	.30	.28	-.25, .84	.54 *	.22	.10, .98
Temperature	.10	.60	-1.08, 1.27	-1.04 *	.49	-2.0, -.08
Exercise	.44	2.79	-5.03, 5.91	3.66	2.27	-.79, 8.11
Everyday Problem	.24	.45	-.63, 1.12	-.31	.36	-1.03, .40
Difficult/unique Problem	1.77 *	.64	.51, 3.02	.91	9.0	-27.58, 7.84

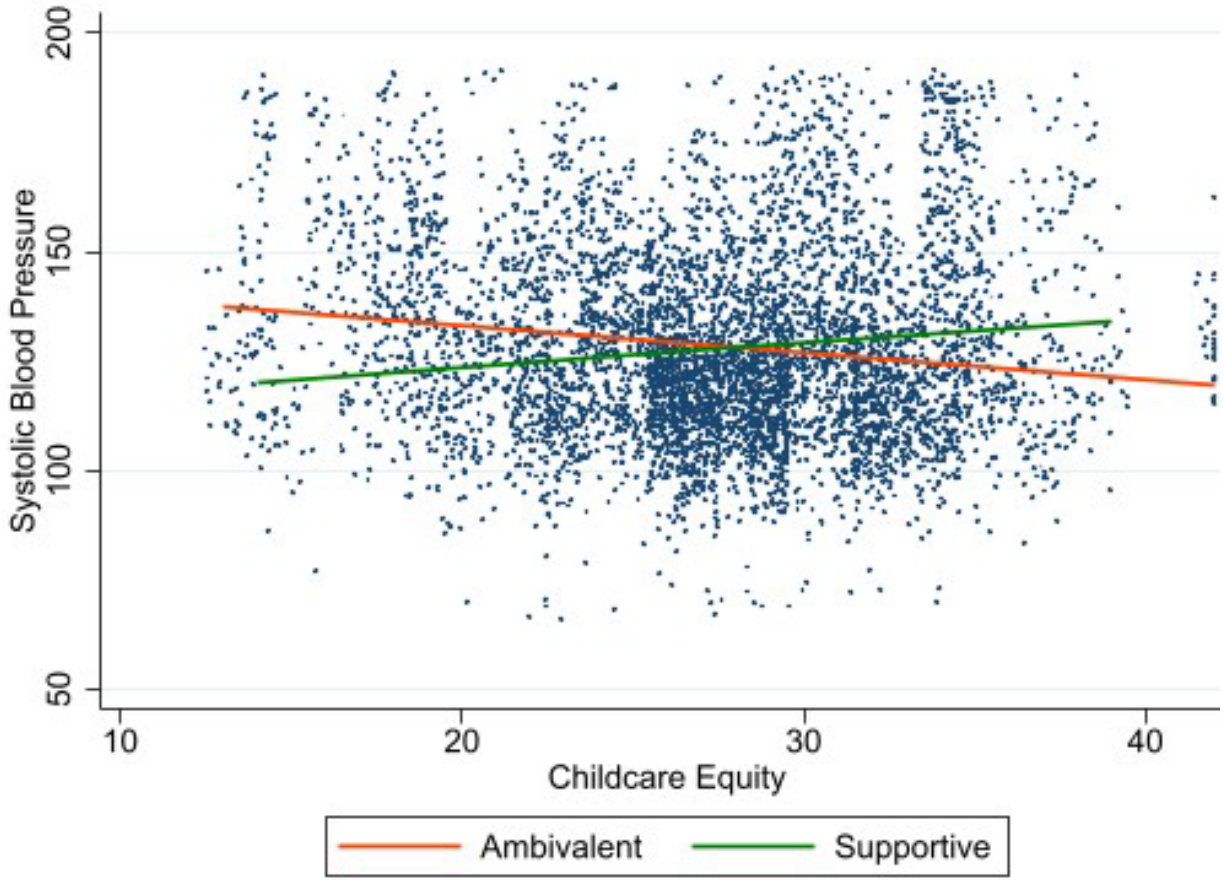
Note. Model output showing statistical significance for hypothesized predictor variables including all control, fixed effects variables. Additionally, this model output includes random effects of Reading, Activity, and Posture.

* = $p < .05$

Our final hypothesis, that there would be a significant interaction between equity of CC work and marital relationship quality on ABP (*H4*), was supported in a crossover interaction for both systolic (b = 1.21, SE = .42, p = .004) and diastolic (b = .47, SE = .23, p = .046) ABP (HH work equity was not significant). The interaction is depicted graphically in Figure 8 (only systolic is represented graphically as diastolic is nearly identical in form). The difference between Ambivalent and Supportive may or may not be significantly different for varying values of CC equity. Thus, we investigated the marginal means for the Ambivalent-Supportive difference for various values of CC equity. We varied CC between the range of our responses (12 and 48) in increments of four. Results indicated that the difference between mothers in Supportive and Ambivalent relationships is significant for scores below 20 and above 33. For scores between 21 and 32 the effect is not significant. The systolic value for Ambivalent at CC equity = 12 (meaning the mother does all the work) was 134.55 mmHg whereas the same value for Supportive was 120.28 mmHg (similar results were found for diastolic, see Table 4). The systolic score for Ambivalent at CC equity = 48 (meaning the husband contributes slightly more CC work) was 119.16 mmHg whereas the same value for Supportive was 137.87 mmHg. Demonstrating that when a mother does all the CC work but has a Supportive marital relationship her systolic is 14.27 mmHg lower than if she had an Ambivalent marital relationship. And when there is more equity (with slightly more CC work done by the husband) her Systolic ABP is -18.71 mmHg lower if she has an Ambivalent marital relationship compared to a Supportive marital relationship. Marginal mean differences at all levels of CC equity for both systolic and diastolic can be found in Table 4 and systolic is represented graphically in Figure 9.

Figure 8

Crossover Interaction



Note. This figure depicts the crossover interaction of Relationship Quality and Childcare Equity. At lower levels of CC work performed by the husband, the effect on ABP is worse for mothers in an Ambivalent compared to a Supportive relationship. However, at higher levels of CC work performed by the husband (just slightly above "equal") the effect on ABP is better for Ambivalent compared to Supportive relationships.

Table 4

Marginal Mean Ambulatory Blood Pressure Differences Between Ambivalent and Supportive Marital Relationships at Varying Levels of Childcare Equity

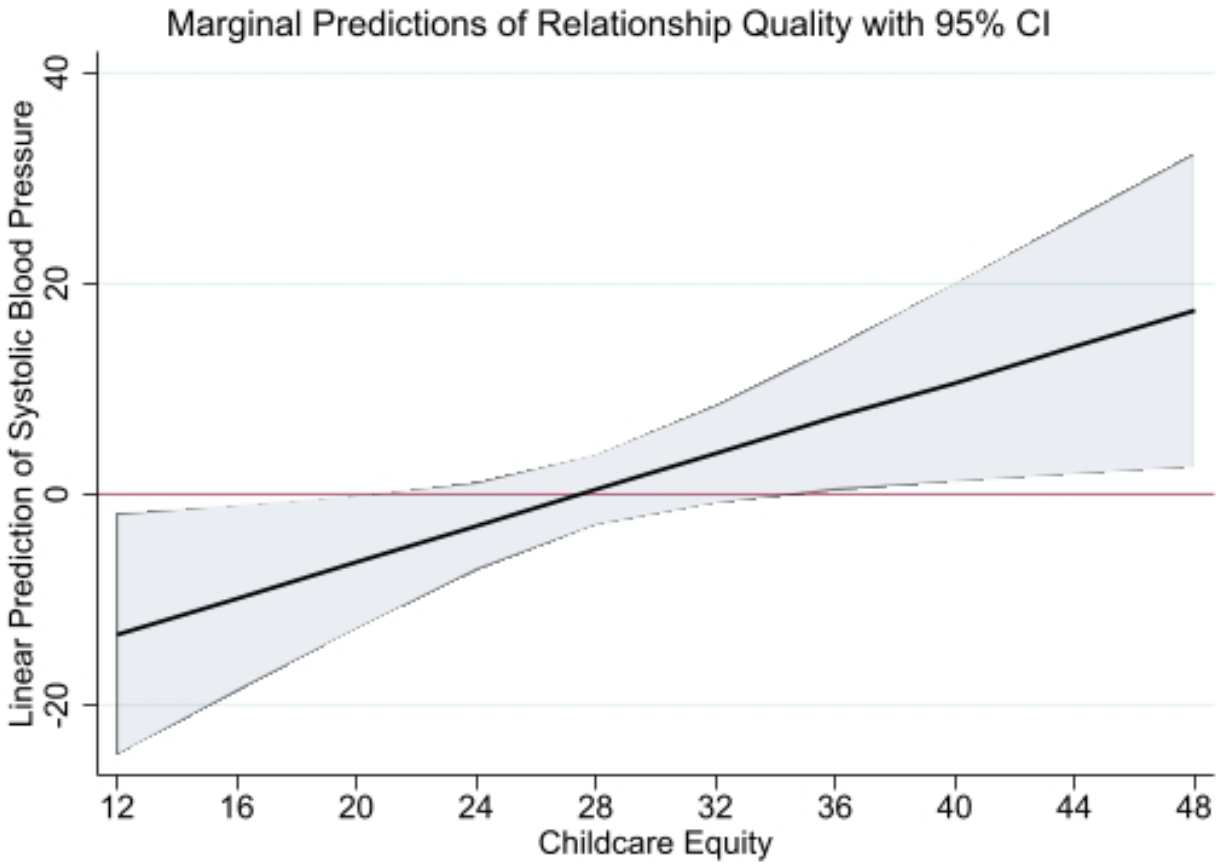
	Systolic			***Diastolic***		
CC Equity Score	***Mean difference***	***SE***	**95% CI**	***Mean difference***	***SE***	**95% CI**
12	-14.26 *	5.91	-25.85, -2.67	-7.44 *	3.30	-13.89, -.98
16	-10.60 *	4.54	-19.51, -1.69	-5.58 *	2.53	-10.54, .61
20	-6.94 *	3.25	-13.30, -.57	-3.72 *	1.81	-7.27, .17
24	-3.27	2.17	-7.52, .97	-1.86	1.21	-4.23 .51
28	.39	1.75	-3.04, 3.82	.001	.97	-1.91, 1.91
32	4.05	2.38	-.61, 8.72	1.86	1.32	-.73, 4.45
36 (median)	7.72 *	3.54	.79, 14.65	3.72	1.96	-.13, 7.57
40	11.38 *	4.86	1.86, 20.90	5.58 *	2.70	.29, 10.87
44	15.04 *	6.24	2.82, 27.27	7.44 *	3.46	.65, 14.23
48	18.71 *	7.64	3.73, 33.69	9.30 *	4.25	.97, 17.62

Note. A Childcare Equity score of 12 indicates that the mother does all the work, a score of 60 indicates that the husband does all the work. A score of 36 indicates equal sharing of the work between spouses.

* = $p < .05$

Figure 9

Relationship Quality and Childcare Equity Marginal Mean Differences



Note. Figure displays the information contained in Table 4 graphically with 95% CI. This shows the marginal mean differences between relationship quality predicted systolic blood pressure at varying levels of Childcare Equity. The area where the 95% CI overlaps with the horizontal red line indicates no statistical difference between Ambivalent and Supportive relationships. Thus, only scores on the two extreme ends are statistically significant.

Discussion

The purpose of the current project was to investigate influences on and differences between both employed and SAH married mothers' cardiovascular health. The background stress theory posits that the stress and burden of being responsible for multiple domains will increase a

mother's blood pressure (Terrill et al., 2012), yet there exists a paucity of research focusing specifically on precise and appropriate assessments of blood pressure while simultaneously including important aspects of multiple roles, perceptions of equity in family responsibilities, and marital relationship quality. This project adds to the literature as it included detailed, separate measures of CC and HH equity; a multidimensional assessment of marital quality; and a robust number of detailed ABP outcome data.

Regarding our hypotheses, each of which were tested simultaneously, results indicated that the perception of equity in the division of childcare responsibilities between mothers and their husbands significantly contributed to lower systolic ambulatory blood pressure. Relationships containing high positivity and low negativity (Supportive) had lower systolic ambulatory blood pressure than those which contained simultaneously high positivity and negativity (Ambivalent). Additionally, the effect of relationship quality on both systolic and diastolic ambulatory blood pressure was moderated by the perception of equity in the division of childcare responsibilities between spouses. We did not find significant ABP differences between employed mothers and SAH mothers nor did perceptions of household equity between spouses significantly contribute to ABP. Similarly, there were no significant interaction effects for either of these variables.

Differences Between Mother Conditions

We hypothesized that employed mothers would have higher ABP compared to SAH mothers. As the background stress model posits, employed mothers experience more roles and this may play a role in increased burden and stress which could lead to higher ABP compared to SAH mothers. Importantly, we meticulously screened mothers for this distinct purpose. Contrary to our hypothesis, we did not find that employed mothers had higher ABP than SAH mothers

despite their greater number of roles. Similarly, each of our interaction hypotheses which consisted of testing the differences between these mother conditions, offered null conclusions. These included marital relationship quality, as well as the division and equity of family responsibilities including CC and HH tasks. These results demonstrate that whether one is a SAH or employed mother, ABP health is not significantly different; this includes the scenario where a mother is doing all the CC work (with no husband help) and her relationship with her husband is ambivalent (contains high positivity and negativity).

Results did not point to employed mothers having better ABP than SAH mothers—simply that there were no differences between the two mother conditions. Our evidence fits into the general trend of this research literature (Klumb & Lampert, 2004) that mothers who are employed with children in the home are not at a greater risk for cardiovascular issues. Our findings demonstrate that perhaps there are important influences on ABP which are contributed from both role accumulation theory and the background stress model. For example, it may be that trying to juggle multiple social domains limits time and energy available to spend in those roles, and thus contributes to role overload and role conflict. However, simultaneously, it may also be that various social domains offer a wider network of support and thus diverse benefits, in accordance with role accumulation theory (Gove & Tudor, 1973; Sieber, 1974). This social capital could provide an employed mother with various avenues of support as well as security that, if needed, help can be called upon. Simply being more socially integrated promotes positive psychological states (e.g., identity, purpose, self-worth, and positive affect) and is a sources of motivation for overall general health (Brissette et al., 2000). Studies show that there is even a dose response effect of social integration providing evidence that higher social integration is better for physiological health (Yang et al., 2016). Thus, mothers who are integrated into a

diverse social network through their employment may receive physiological health promoting effects (e.g., ABP). Together, mothers are experiencing both detrimental influences as well as benefits. These results indicate that simply being a SAH mother or an employed mother does not determine ABP health.

Childcare and Household Equity

As noted in the literature, married women spend about twice as much time on CC and HH responsibilities than their husbands (Bianchi et al., 2012; Coltrane, 2000; Mannino & Deutsch, 2007; Poortman & Van Der Lippe, 2009). In the present study, this trend was similarly apparent for CC. Indeed, less than 10% of this sample reported the husband completing an equal amount of CC. This pattern was consistent for both employed and SAH mothers. The current sample was a bit more balanced regarding HH responsibilities, but the majority of this work was still completed by the mother.

One of the strengths of this project is that we used validated scales for both CC and HH responsibilities. We used both scales in the final model which allowed us to accurately account for each of these construct's influence on cardiovascular health. Per our hypotheses, we expected to see greater inequity for both CC and HH constructs to significantly influence ABP. We found that CC equity was a significant contributor to higher systolic ABP (but not diastolic) but that HH equity did not significantly influence ABP. Additionally, the effect of CC equity was significant even while controlling for HH responsibilities. This demonstrates that accounting for CC equity is an important aspect and is separate from HH responsibilities.

This finding is interesting as it highlights the importance of CC responsibilities within a family. The quality of the parental care in child raising is important for the development of the child but the responsibility of carrying the majority of this load has direct health implications for

the mother; mothers who perceived that they were doing the majority of this work had higher systolic blood pressure. HH responsibilities was shown to be similarly imbalanced between mothers and fathers but CC tasks demonstrated to be the driving influence behind this association. Clearly children matter and the responsibility of caring for them carries a lot of weight for parents.

Relationship Quality

As hypothesized, women who reported a supportive marital relationship demonstrated lower systolic (but not diastolic) ambulatory blood pressure than those in an ambivalent relationship. An important aspect of the effect of relationship quality found in the present study is that we did not categorize marital relationships on a continuum of simply "good" or "bad", as most marriages contain varying degrees of positivity and negativity simultaneously. Rather, we were interested to see if accounting for this multidimensional aspect of relationships quality would meaningfully influence diurnal ABP.

Nearly 50% of mothers in our study reported an ambivalent relationship with their spouse. From previous studies in our lab, we typically find this rate closer to about 70%. Mothers in supportive marital relationships demonstrated a substantial -34.3 mmHg systolic ABP than mothers in ambivalent relationships. Although the high positivity in ambivalent relationships may be sources of comfort and support, the high negativity is clearly taking a toll on the mothers' ABP health. This finding demonstrates the importance of capturing the multidimensional nature of marital relationships. Importantly, we controlled for the mothers' current affect regarding their marital relationship. All husbands were currently living in the home, thus accounting for the possible confounding of husband-and-wife separation (whether by choice—plans to divorce, etc.; or by constraint—military deployment, etc.). Either of these

situations would be extraneous variables that could have confounded the mothers' view of her present marital relationship satisfaction.

Interaction of Childcare Equity and Relationship Quality on ABP

Our results indicate that the systolic and diastolic ABP reducing effects are contingent upon both the CC equity and the marital relationship quality of the couple, as displayed in Figure 8 and Table 4. ABP seems to be protected for mothers in supportive relationships who perceive themselves as doing all the CC tasks. However, the more that the husband contributes to CC tasks, with it becoming more equally shared, the more the mother's ABP *increases*. Additionally, mothers in ambivalent relationships fare worse on ABP when she is doing all the CC tasks. However, the more that the husband contributes to CC tasks, the more the mother's ABP *decreases*. In fact, when CC equity is low, with the mother performing the majority of the tasks, mothers in supportive relationships have lower ABP by -14.26 / -7.44 mmHg. When CC equity is more equal between partners, mothers in supportive relationships have higher ABP by 18.71 / 9.30 mmHg.

The linear association between ambivalent marriages and CC equity on ABP makes intuitive sense; in an ambivalent relationship that contains highly negative aspects, the less the husband contributes to the CC duties, the more adversely impacted the mother's ABP health. In this same context of a highly ambivalent relationship situation, as partners perform more of an equal share of the CC tasks, the effect on ABP is less pronounced. Decreasing mothers' CC tasks, which can sometimes be monotonous routine, could directly benefit mothers in various ways such as prioritization of important duties, more recreational time, or even just a reprieve from routine, thus contributing to her ABP health. Additionally, husbands' investment in family processes and routine tasks such as helping with homework, putting children to bed, arranging

for daycare, and disciplining directly displays their love and devotion to the family. Thus, even in ambivalent marital relationships, the husband's commitment to family is not in question. In this sense, actions really do speak louder than words.

Whereas the ambivalent linear relation is intuitive, the linear association between supportive marriages and CC equity on ABP is less so. These results reveal that in supportive marital (low negativity and high positivity) relationships, mothers demonstrate lower ABP. However, as partners perform more of an equal share of the CC tasks the effect on ABP becomes increasingly worse. As indicated, the effect size of relationship quality is quite large. Thus, at lower levels of CC equity where there is less CC tasks performed by husbands, it seems that being in a highly supportive and positive marriage acts as a protective factor, despite the majority of CC responsibilities falling on the mother. One potential explanation for the increase in ABP when the CC tasks become more equitable for supportive marital relationships could be beliefs regarding gender roles. Despite the recent societal departure from traditional gender roles (Eagly & Wood, 1991), many families still hold these values. Possibly, mothers who believe that CC duties are her sole responsibility, are at odds with the equitable responsibilities. The incongruent clash of behavior and ideology is not a new phenomenon. Indeed, cognitive dissonance theory (Festinger, 1957) has been said to be one of the most influential theories in social psychology (Cooper, 2007). According to this theory, the more our thoughts and behaviors are in competition, the more one of these needs to give or cognitive dissonance ensues and brings about negative consequences including physiological effects (Croyle & Cooper, 1983). It may be that some mothers are experiencing cognitive dissonance if they feel that their husbands are contributing more to the CC responsibilities than their held belief. Along these lines, the couples' marital satisfaction could be a result from these gender roles being upheld by the mother

performing most of the CC tasks. For example, when a couple hold these traditional gender roles, and the mother is performing the majority of the CC tasks, their marital satisfaction is higher because family processes are functioning appropriately for their held values (i.e., cognitive dissonance is low because values and behaviors are congruent).

This interaction demonstrates that the influences that marital relationship quality and childcare equity have on mothers' ABP are interconnected as well as nuanced. As noted in the literature, unequal CC responsibilities can negatively affect the marital relationship (Barstad, 2014; Frisco & Williams, 2003; Newkirk et al., 2017). The more that partners participate equally, the more satisfied couples are with overall sex life, cuddling, relationship quality, and the amount of passion in their marital relationship. This lends evidence to the idea that there is likely a cyclical aspect to relationship processes such as CC tasks and marital relationship quality (McNulty et al., 2016). Equity in CC may contribute to a better relationship which leads to more satisfaction with relationships processes. This, in turn, could contribute to mothers' healthier ABP.

Limitations

There are several limitations of the current study that should be noted. We used employment outside the home as the defining difference between employed and SAH mothers. Subsequently, mothers who were employed had one more role than did SAH mothers. We then tested the difference between more and less roles. However, it is completely plausible that a SAH mother could experience a greater number of roles than an employed mother (e.g., participation in PTA school boards, volunteer work, or have more intensive church callings, to name a few). We also did not ask for reasons employed mothers in the study were working. The stress of being *pushed* into employment, rather than entering employment by choice, could

influence a mother's outlook into her situation. Indeed, many may be working out of desire rather than necessity. This would play into their stress—seeing it as necessary or unnecessary is an antecedent process which could subsequently influence ABP health.

Part of the background stress model is that it defines background stress specifically as the stress from multiple roles including the stress of being employed. Although we did account for current stress levels in our analyses by using the Perceived Stress Scale, it did not fully account for these assumptions. This scale was more general as it asks each item in the scale as "in the past month".

Several factors relating to parenthood are important to note as well. The first factor is the parenting stage, as having a child under the age of six is fundamentally different than one who is over the age of 18 and no longer living in the home. To assess this, we used a staged child age question that had mothers select each of the categories that described their current parenting stage. Participants selected from the options of "child under the age of 6", "child between the ages of 6 and 12", and "child between the ages of 12 and 18". Indeed, the majority, nearly 81%, reported having a child under the age of six. However, while the nuance of this question allowed us to assess the parenting stage the participant is in, it was conflated as to the number of children the mother has. This is the second parenting factor that would have added to the strength of the present study. It has been shown in the literature that the number of children is positively associated with systolic and diastolic blood pressure and greater marital dissatisfaction (Brisson et al., 1999; Twenge et al., 2003). The question of "how many children do you have" was not included in the present study. Potentially, some participant mothers could have had four children (or more) under the age or six, but we were unable to account for that aspect. This is an aspect that should be included in future research.

Research in the division of CC and HH responsibilities suggests that both equity and fairness are important factors to account for in both relationship and health outcomes. In the present study we had the participant mother indicate which tasks, and how much of each task, was typically completed by her compared to her husband. This gave us a good perceived equity scale. However, we did not account for *fairness* in the division of work. Results indicated that mothers are doing most of the work with regard to CC and HH responsibilities. However, we have no indication of how the participant mother feels toward this division. It could be that although she is doing all the work, she may feel it a fair division. Conversely, it could also be that a couple divides their CC and HH work evenly between themselves, but the mother considers this unfair (either to herself or her husband).

Finally, most of our participants were White (88%) and educated—the majority having completed at least some college education (81%). Thus, we should exercise caution in generalizing beyond the current sample.

Strengths and Future Directions

Despite these limitations, our study has several laudable strengths that lend justification to our conclusions. Combined with the large number of participants in each group (112 per condition) and the high number of ABP readings ($M = 24$) for each of those participants, this study was appropriately powered to detect our hypothesized predictions at the 95% confidence level. Our analytical strategy was particularly appropriate for the data. We did not simply average each of the ABP readings into a single composite score, rather, we used a multilevel mixed model that specifically accounted for the within-subject variability as well as the between-subject fixed effects.

Regarding participant age, this study can externally generalize well. This was not simply a college sample of participants (as is common in psychology) rather, this was a community sample (M_{age} = 32) that included participants from Utah, Nevada, and South Carolina. Our population of interest was healthy mothers, and our sample had good external validity in that regard. Participants were generally healthy with over 87% of participants self-reporting their health as good or excellent. Each of the participant mothers were screened for good health and normal BMI. None of the participants had any cardiovascular diagnoses or were currently prescribed with blood pressure medication that could have skewed the observed findings.

Although a true experiment addressing our research questions was not plausible given the constraints to manipulating the variables of interest (it would not be ethical to manipulate family and employment situations), our screening process allowed us to control for key variables and draw appropriate conclusions from the obtained results. Additionally, we had good internal validity as we controlled for various extraneous variables that could have confounded our results including working outside the home, being married for at least two years, having children currently in the home, and participating in the study on a typical/routine day. With regard to controlling for various variables, however, future research could investigate these associations with a different analytical approach which avoids hyper controlling for these variable types in the analysis.

Our findings regarding the association between ABP, CC equity, and relationship quality are also interesting as they highlight areas of direct application; husbands can do more to help balance these inequities. Removing some of the burden from mothers, in the form of CC help could potentially have an immediate impact in reducing a mother's diurnal blood pressure. Additionally, the marital relationship quality finding has a clear and distinct message—spouses

should prioritize their marital relationship and work to nurture the supportive aspects. Specifically, couples should work to cultivate the positivity that already exists and reduce the negativity. These results suggest that by doing this, mothers will be directly benefitted by reduced diurnal systolic ambulatory blood pressure. Interestingly—and a bit counterintuitive—our results demonstrate that there should be caution in simply prescribing that a husband takes more of an equal share of the CC responsibilities. For those in ambivalent marital relationships, a more equal share of the load seems to be salubrious to mothers' ABP health. However, those in supportive relationships may need to examine their shared family values and determine if sharing the CC load fits within their ideology for it to be beneficial. Additionally, future directions should include gender ideology as a primary variable to investigate this association further.

There are several implications from the present study that suggest lines for future research involving these topics. To test differences between mothers' multiple roles, researchers should have participants designate the roles that are currently dominant in their life, including with each role a percent of daily activity devoted or amount of burden associated with each role. Researchers could then divide up the sample based on self-defined multiple roles. This also allows for quantifiability and variability between multiple roles. The stage of parenting, child age, and the number of children are important factors that should be included for future studies investigating motherhood. Additionally, future studies should include *push* and *pull* factors of mothers' employment decisions as well as have each mother define the degree to which these factors influence her employment choices. As it relates to the background stress model, future research would benefit from a scale that specifically accounts for the background stress from multiple roles.

Our measures of both CC and HH work equity and relationship quality produced a *perceived* construct from the mothers' point of view. The results of these scales may or may not reflect the reality of the family situations. Future research should collect this information from the husband and compare answers to these questions between spouses. This is not to discount the power of perception (Adjzen & Fishbein, 1980). The reality of the CC and HH work division and the marital relationship quality may not be as important as what the participant perceives as reality. The important point in both constructs is how much of the at-home responsibilities the mother *thinks* and *feels* she is doing and how much positivity and negativity does she *feel she experiences* in the marriage. Future research should also include both equity and fairness in the evaluation of CC and HH work.

Conclusion

Mothers are increasingly part of the work force and are now sharing more of the income earning responsibilities with their husbands. However, the family responsibilities in the home are not resulting in a similar shifting of becoming more equitable and shared between partners. This study examined the contemporary familial changes in society by comparing ambulatory blood pressure between stay-at-home mothers and employed mothers. We examined the division of childcare and household equity between partners as well as the influence of relationship quality. Our hypotheses were grounded in a theoretical model that aided us in *a priori* predictions as well as drawing justifiable conclusions. We found that (1) the perception of equity in the division of childcare responsibilities between mothers and their husbands significantly contributed to lower systolic ambulatory blood pressure. (2) Married couples in relationships containing high positivity and low negativity (Supportive) had lower systolic ambulatory blood pressure than those which contained simultaneously high positivity and negativity (Ambivalent). (3) The effect

of relationship quality on both systolic and diastolic ambulatory blood pressure was moderated by the perception of equity in the division of childcare responsibilities between spouses. Lastly, (4) we found that there were no ambulatory blood pressure differences between the employed and SAH mother conditions.

The current study addressed gaps in the literature by examining (a) diurnal blood pressure associated with holding more roles, assessed with objective methods (ABP); (b) ambulatory blood pressure differences in mothers who stay-at-home full time and thus experience fewer roles, and mothers employed outside of the home with a greater number of roles; (c) the influence that perceived equality of CC and HH tasks contributes, and (d) the investigation of a multidimensional assessment of marital quality on these health outcomes. Finally, this project contributes to the literature by its real world, applicable findings regarding dynamics and processes within marital relationships. These findings are important for clinical application and could be implemented for marital interventions and trainings used to directly influence mothers' blood pressure health.

References

Aboa-Éboulé, C., Brisson, C., Maunsell, E., Mâsse, B., Bourbonnais, R., Vézina, M., Milot, A., Théroux, P., & Dagenais, G. R. (2007). Job strain and risk of acute recurrent coronary heart disease events. *JAMA*, *298*(14), 1652-1660. https://doi.org/10.1001/jama.298.14.1652

Adjzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour. *Englewood Cliffs NJ: Pren-tice Hall*.

Almeida, D. M., Maggs, J. L., & Galambos, N. L. (1993). Wives' employment hours and spousal participation in family work. *Journal of Family Psychology*, *7*(2), 233-244. https://doi.org/10.1037/0893-3200.7.2.233

Amato, P. R., Johnson, D. R., Booth, A., & Rogers, S. J. (2003). Continuity and change in marital quality between 1980 and 2000. *Journal of Marriage and Family*, *65*(1), 1-22. https://doi.org/10.1111/j.1741-3737.2003.00001.x

Arendell, T. (2000). Conceiving and investigating motherhood: The decade's scholarship. *Journal of Marriage and Family*, *62*(4), 1192-1207. https://doi.org/10.1111/j.1741-3737.2000.01192.x

Barnett, R. C., & Shen, Y.-C. (1997). Gender, high- and low-schedule-control housework tasks, and psychological distress: A study of dual-earner couples. *Journal of Family Issues*, *18*(4), 403-428. https://doi.org/10.1177/019251397018004003

Barstad, A. (2014). Equality is bliss? Relationship quality and the gender division of household labor. *Journal of Family Issues*, *35*(7), 972-992. https://doi.org/10.1177/0192513X14522246

Baxter, J. (1993). *Work at home: The domestic division of labour / Janeen Baxter*. University of Queensland Press.

Baxter, J., Hewitt, B., & Western, M. (2005). Post-familial families and the domestic division of labour. *Journal of Comparative Family Studies*, *36*(4), 583-600. http://www.jstor.org/stable/41604036

Becker, G. S. (1974). A theory of marriage. Economics of the family. *The Economic Approach to Human Behavior, op. cit*, 216.

Benjamin, E. J., Virani, S. S., Callaway, C. W., Chamberlain, A. M., Chang, A. R., Cheng, S., Chiuve, S. E., Cushman, M., Delling, F. N., Deo, R., de Ferranti, S. D., Ferguson, J. F., Fornage, M., Gillespie, C., Isasi, C. R., Jiménez, M. C., Jordan, L. C., Judd, S. E., Lackland, D., ... (2018). Heart disease and stroke statistics—2018 update: A report from the American Heart Association. *Circulation*, *137*(12), e67-e492. https://doi.org/10.1161/CIR.0000000000000558

Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science and Medicine*, *51*(6), 843-857. https://www.ncbi.nlm.nih.gov/pubmed/10972429

Bianchi, S. M., Milkie, M. A., Sayer, L. C., & Robinson, J. P. (2000). Is anyone doing the housework? Trends in the gender division of household labor. *Social Forces*, *79*(1), 191-228. https://doi.org/10.1093/sf/79.1.191

Bianchi, S. M., Sayer, L. C., Milkie, M. A., & Robinson, J. P. (2012). Housework: Who did, does or will do it, and how much does it matter? *Social Forces*, *91*(1), 55-63.

Bird, C. E. (1999). Gender, household labor, and psychological distress: The impact of the amount and division of housework. *Journal of Health and Social Behavior*, *40*(1), 32-45. https://doi.org/10.2307/2676377

Birmingham, W., Uchino, B. N., Smith, T. W., Light, K. C., & Butner, J. (2015). It's complicated: Marital Ambivalence on ambulatory blood pressure and daily interpersonal functioning. *Annals of Behavioral Medicine*, *49*(5), 743-753. https://doi.org/10.1007/s12160-015-9709-0

Bratberg, E., Dahl, S.-Å., & Risa, A. E. (2002). 'The double burden': Do combinations of career and family obligations increase sickness absence among women? *European Sociological Review*, *18*(2), 233-249. http://www.jstor.org/stable/3559501

Brezinka, V., & Kittel, F. (1996). Psychosocial factors of coronary heart disease in women: A review. *Social Science and Medicine*, *42*(10), 1351-1365.

Brissette, I., Cohen, S., & Seeman, T. E. (2000). Measuring social integration and social networks. In S. Cohen, L. G. Underwood, B. H. Gottlieb, S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention: A guide for health and social scientists.* (pp. 53-85). Oxford University Press. https://doi.org/10.1093/med:psych/9780195126709.003.0003

Brisson, C., Laflamme, N., Moisan, J., Milot, A., Masse, B., & Vezina, M. (1999). Effect of family responsibilities and job strain on ambulatory blood pressure among white-collar women. *Psychosomatic Medicine*, *61*(2), 205-213. https://doi.org/10.1097/00006842-199903000-00013

Brooks, K. P., & Dunkel Schetter, C. (2011). Social negativity and health: Conceptual and measurement issues. *Social and Personality Psychology Compass*, *5*(11), 904-918. https://doi.org/10.1111/j.1751-9004.2011.00395.x

Bures, R. M., Koropeckyj-Cox, T., & Loree, M. (2009). Childlessness, parenthood, and depressive symptoms among middle-aged and older adults. *Journal of Family Issues*, *30*(5), 670-687. https://doi.org/10.1177/0192513X08331114

Burg, M. M., & Seeman, T. E. (1994). Families and health: The negative side of social ties. *Annals of Behavioral Medicine*, *16*(2), 109-115. https://www.lib.byu.edu/cgi-bin/remoteauth.pl?url=http://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1995-06862-001&site=ehost-live&scope=site

Buttner, E. H., & Moore, D. P. (1997). Women's organizational exodus to entrepreneurship: Self-reported motivations and correlates with success. *Journal of small business management*, *35*, 34-46.

Cáceres-Delpiano, J., & Simonsen, M. (2012). The toll of fertility on mothers' wellbeing. *Journal of Health Economics*, *31*(5), 752-766. https://doi.org/https://doi.org/10.1016/j.jhealeco.2012.05.006

Cacioppo, J. T., Malarkey, W. B., Kiecolt-Glaser, J. K., Uchino, B. N., Sgoutas-Emch, S. A., Sheridan, J. F., Berntson, G. G., & Glaser, R. (1995). Heterogeneity in neuroendocrine and immune responses to brief psychological stressors as a function of autonomic cardiac activation. *Psychosomatic Medicine*, *57*(2), 154-164. https://doi.org/10.1097/00006842-199503000-00008

Campo, R. A., Uchino, B. N., Holt-Lunstad, J., Vaughn, A., Reblin, M., & Smith, T. W. (2009). The assessment of positivity and negativity in social networks: The reliability and

validity of the social relationships index. *Journal of Community Psychology*, *37*(4), 471-486. https://doi.org/10.1002/jcop.20308

Carson, A. P., Rose, K. M., Catellier, D. J., Diez-Roux, A. V., Muntaner, C., & Wyatt, S. B. (2009). Employment status, coronary heart disease, and stroke among women. *Annals of Epidemiology*, *19*(9), 630-636. https://doi.org/https://doi.org/10.1016/j.annepidem.2009.04.008

Cha, Y. (2010). Reinforcing separate spheres: The effect of spousal overwork on men's and women's employment in dual-earner households. *American Sociological Review*, *75*(2), 303-329. https://doi.org/10.1177/0003122410365307

Chesters, J., Baxter, J., & Western, M. (2009). Paid and unpaid work in Australian households: Trends in the gender division of labour, 1986-2005. *Australian Journal of Labour Economics*, *12*(1), 89.

Chiswick, B. R., & Houseworth, C. (2011). Ethnic intermarriage among immigrants: Human capital and assortative mating. *Review of Economics of the Household*, *9*(2), 149-180. https://doi.org/10.1007/s11150-010-9099-9

Choi, H., & Marks, N. F. (2008). Marital conflict, depressive symptoms, and functional impairment. *Journal of Marriage and Family*, *70*(2), 377-390. https://doi.org/10.1111/j.1741-3737.2008.00488.x

Claffey, S. T., & Mickelson, K. D. (2009). Division of household labor and distress: The role of perceived fairness for employed mothers. *Sex Roles*, *60*(11-12), 819-831. https://doi.org/10.1007/s11199-008-9578-0

Clark, S. M., Saules, K. K., Schuh, L. M., Stote, J., & Creel, D. B. (2014). Associations between relationship stability, relationship quality, and weight loss outcomes among bariatric

surgery patients. *Eating Behaviors*, *15*(4), 670-672. https://doi.org/10.1016/j.eatbeh.2014.09.003

Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health*. Sage.

Coltrane, S. (2000). Research on household labor: Modeling and measuring the social embeddedness of routine family work. *Journal of Marriage and the Family*, *62*(4), 1208-1233. https://doi.org/10.1111/j.1741-3737.2000.01208.x

Cooper, J. (2007). *Cognitive dissonance: 50 years of a classic theory*. Sage.

Correll, S. J. (2004). Constraints into preferences: Gender, status, and emerging career aspirations. *American Sociological Review*, *69*(1), 93-113. https://doi.org/10.1177/000312240406900106

Croyle, R. T., & Cooper, J. (1983). Dissonance arousal: Physiological evidence. *Journal of Personality and Social Psychology*, *45*(4), 782-791. https://doi.org/10.1037/0022-3514.45.4.782

Czernichow, S., Castetbon, K., Salanave, B., Vernay, M., Barry, Y., Batty, G. D., Hercberg, S., & Blacher, J. (2012). Determinants of blood pressure treatment and control in obese people: Evidence from the general population. *Journal of Hypertension*, *30*(12), 2338-2344. https://doi.org/10.1097/HJH.0b013e3283593010

Dai, W. (2016). Dual-earner couples in the United States. *Encyclopedia of Family Studies*. https://doi.org/doi:10.1002/9781119085621.wbefs406 (Major Reference Works)

Damaske, S., & Frech, A. (2016). Women's work pathways across the life course. *Demography*, *53*(2), 365-391. https://doi.org/10.1007/s13524-016-0464-z

Davis, S. N., & Greenstein, T. N. (2013). Why study housework? Cleaning as a window into power in couples. *Journal of Family Theory & Review*, *5*(2), 63-71. https://doi.org/10.1111/jftr.12004

Dempsey, K. C. (2000). Men and women's power relationships and the persisting inequitable division of housework. *Journal of Family Studies*, *6*(1), 7-24. https://doi.org/10.5172/jfs.6.1.7

Deutsch, F. M., Lussier, J. B., & Servis, L. J. (1993). Husbands at home: Predictors of paternal participation in childcare and housework. *Journal of Personality and Social Psychology*, *65*(6), 1154-1166. https://doi.org/10.1037/0022-3514.65.6.1154

Dugan, A. G., & Barnes-Farrell, J. L. (2018). Working mothers' second shift, personal resources, and self-care. *Community, Work & Family*, 1-18. https://doi.org/10.1080/13668803.2018.1449732

Eagly, A. H., & Wood, W. (1991). Explaining sex differences in social behavior: A meta-analytic perspective. *Personality and Social Psychology Bulletin*, *17*(3), 306-315. https://doi.org/10.1177/0146167291173011

Ebi-Kryston, K. L., Higgins, M. W., & Keller, J. B. (1990). Health and other characteristics of employed women and homemakers in Tecumseh, 1959-1978: II. Prevalence of respiratory and cardiovascular symptoms and illnesses, mortality rates and physical and physiological measurements. *Women & Health*, *16*(2), 23-39.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175-191. https://doi.org/10.3758/BF03193146

Festinger, L. (1957). *A theory of cognitive dissonance* (Vol. 2). Stanford University Press.

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. https://doi.org/10.1037/0893-3200.11.4.489-502

Fokkema, T. (2002). Combining a job and children: Contrasting the health of married and divorced women in the Netherlands? *Social Science & Medicine*, *54*(5), 741-752. https://doi.org/https://doi.org/10.1016/S0277-9536(01)00106-X

Frech, A., & Damaske, S. (2012). The relationships between mothers' work pathways and physical and mental health. *Journal of Health and Social Behavior*, *53*(4), 396-412. https://doi.org/10.1177/0022146512453929

Frisco, M. L., & Williams, K. (2003). Perceived housework equity, marital happiness, and divorce in dual-earner households. *Journal of Family Issues*, *24*(1), 51-73. https://doi.org/10.1177/0192513X02238520

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. https://doi.org/10.1097/01.PSY.0000097350.95305.FE

Gilbert-Ouimet, M., Brisson, C., Milot, A., & Vezina, M. (2017). Double exposure to adverse psychosocial work factors and high family responsibilities as related to ambulatory blood pressure at work: A 5-year prospective study in women with white-collar jobs. *Psychosomatic Medicine*, *79*(5), 593-602. https://doi.org/10.1097/psy.0000000000000450

Gjerdingen, D. K., Froberg, D. G., Chaloner, K. M., & McGovern, P. M. (1993). Changes in women's physical health during the first postpartum year. *Archives of Family Medicine*, *2*(3), 277.

Goldin, C. (1994). *The U-shaped female labor force function in economic development and economic history* (No. w4707). National Bureau of Economic Research.

Goldstein, I. B., Shapiro, D., Chicz-DeMet, A., & Guthrie, D. (1999). Ambulatory blood pressure, heart rate, and neuroendocrine responses in women nurses during work and off work days. *Psychosomatic Medicine*, *61*(3), 387-396.

Goode, W. J. (1960). A theory of role strain. *American Sociological Review*, *25*(4), 483-496. https://doi.org/10.2307/2092933

Goodwin, J., Bilous, M., Winship, S., Finn, P., & Jones, S. C. (2007). Validation of the Oscar 2 oscillometric 24-h ambulatory blood pressure monitor according to the British hypertension society protocol. *Blood Press Monit*, *12*(2). https://journals.lww.com/bpmonitoring/Fulltext/2007/04000/Validation_of_the_Oscar_2_oscillometric_24_h.9.aspx

Gottman, J. M., & Silver, N. (2015). *The seven principles for making marriage work: A practical guide from the country's foremost relationship expert*. Harmony.

Gove, W. R., Hughes, M., & Style, C. B. (1983). Does marriage have positive effects on the psychological well-being of the individual? *Journal of Health and Social Behavior*, *24*(2), 122-131. https://doi.org/10.2307/2136639

Gove, W. R., & Tudor, J. F. (1973). Adult sex roles and mental illness. *AJS*, *78*(4), 812-835. http://www.ncbi.nlm.nih.gov/pubmed/4567616

Grames, H. A., Miller, R. B., Robinson, W. D., Higgins, D. J., & Hinton, W. J. (2008). A test of contextual theory: The relationship among relational ethics, marital satisfaction, health problems, and depression. *Contemporary Family Therapy*, *30*(4), 183-198. https://doi.org/10.1007/s10591-008-9073-3

Grewen, K. M., Girdler, S. S., & Light, K. C. (2005). Relationship quality: Effects on ambulatory blood pressure and negative affect in a biracial sample of men and women. *Blood Press Monit*, *10*(3), 117-124.

Grunow, D., Schulz, F., & Blossfeld, H.-P. (2012). What determines change in the division of housework over the course of marriage? *International Sociology*, *27*(3), 289-307. https://doi.org/10.1177/0268580911423056

Gump, B. B., & Matthews, K. A. (1999). Do background stressors influence reactivity to and recovery from acute stressors? *Journal of Applied Social Psychology*, *29*(3), 469-494. https://doi.org/10.1111/j.1559-1816.1999.tb01397.x

Gunter, N. C., & Gunter, B. G. (1990). Domestic division of labor among working couples. *Psychology of Women Quarterly*, *14*(3), 355-370. https://doi.org/10.1111/j.1471-6402.1990.tb00025.x

Guyll, M., & Contrada, R. J. (1998). Trait hostility and ambulatory cardiovascular activity: Responses to social interaction. *Health Psychology*, *17*(1), 30-39. https://doi.org/10.1037//0278-6133.17.1.30

Haning, R. V., O'Keefe, S. L., Randall, E. J., Kommor, M. J., Baker, E., & Wilson, R. (2007). Intimacy, orgasm likelihood, and conflict predict sexual satisfaction in heterosexual male and female respondents. *Journal of Sex & Marital Therapy*, *33*(2), 93-113. https://doi.org/10.1080/00926230601098449

Harryson, L., Strandh, M., & Hammarström, A. (2012). Domestic work and psychological distress−What is the importance of relative socioeconomic position and gender inequality in the couple relationship? *PLOS One*, *7*(6), e38484. https://doi.org/10.1371/journal.pone.0038484

Haynes, S. G., & Feinleib, M. (1980). Women, work and coronary heart disease: Prospective findings from the framingham heart study. *American Journal of Public Health*, *70*(2), 133. https://doi.org/10.2105/AJPH.70.2.133

Heath, R., & Jayachandran, S. (2016). The causes and consequences of increased female education and labor force participation in developing countries. *National Bureau of Economic Research Working Paper Series*, *No. 22766*. https://doi.org/10.3386/w22766

Hedges, S. M., Krantz, D. S., Contrada, R. J., & Rozanski, A. R. (1990). Development of a diary for use with ambulatory monitoring of mood, activities, and physiological function. *Journal of Psychopathology and Behavioral Assessment*, *12*(3), 203-217. https://doi.org/10.1007/BF00960618

Helms, H. M., Walls, J. K., Crouter, A. C., & McHale, S. M. (2010). Provider role attitudes, marital satisfaction, role overload, and housework: A dyadic approach. *Journal of Family Psychology*, *24*(5), 568-577. https://doi.org/10.1037/a0020637

Henriksen, R. E., Torsheim, T., & Thuen, F. (2015). Relationship satisfaction reduces the risk of maternal infectious diseases in pregnancy: The Norwegian mother and child cohort study. *PLOS One*, *10*(1), e0116796. https://doi.org/10.1371/journal.pone.0116796

Hibbard, J. H., & Pope, C. R. (1991). Effect of domestic and occupational roles on morbidity and mortality. *Social Science & Medicine*, *32*(7), 805-811.

Hill, E. J. (2005). Work-family facilitation and conflict, working fathers and mothers, work-family stressors and support. *Journal of Family Issues*, *26*(6), 793-819. https://doi.org/10.1177/0192513X05277542

Hochschild, A., & Machung, A. (1990). *The second shift*. Avon Books.

Hochschild, A., & Machung, A. (2012). *The second shift: Working families and the revolution at home*. Penguin.

Hoffman, L., Hoffman, L. N. W., & Youngblade, L. (1999). *Mothers at work: Effects on children's well-being*. Cambridge University Press.

Holt-Lunstad, J., Birmingham, W., Howard, A. M., & Thoman, D. (2009). Married with children: The influence of parental status and gender on ambulatory blood pressure. *Ann Behav Med*, *38*(3), 170-179. https://doi.org/10.1007/s12160-009-9152-1

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. https://doi.org/10.1007/s12160-008-9018-y

Impett, E. A., Muise, A., & Peragine, D. (2014). Sexuality in the context of relationships. *APA handbook of sexuality and psychology*, *1*, 269-315.

Ituarte, P. H. G., Kamarck, T. W., Thompson, H. S., & Bacanu, S. (1999). Psychosocial mediators of racial differences in nighttime blood pressure dipping among normotensive adults. *Health Psychology*, *18*(4), 393-402. https://doi.org/10.1037/0278-6133.18.4.393

Johnson, N. J., Backlund, E., Sorlie, P. D., & Loveless, C. A. (2000). Marital status and mortality: The national longitudinal mortality study. *Annals of Epidemiology*, *10*(4), 224-238. https://doi.org/10.1016/s1047-2797(99)00052-6

Kamarck, T. W., Jennings, J. R., Debski, T. T., Glickman-Weiss, E., Johnson, P. S., Eddy, M. J., & Manuck, S. B. (1992). Reliable measures of behaviorally-evoked cardiovascular reactivity from a PC-based test battery: Results from student and community samples. *Psychophysiology*, *29*(1), 17-28. http://onlinelibrary.wiley.com/doi/10.1111/j.1469-8986.1992.tb02006.x

Kamarck, T. W., Shiffman, S. M., Smithline, L., Goodie, J. L., Paty, J. A., Gnys, M., & Jong, J. Y. (1998). Effects of task strain, social conflict, and emotional activation on ambulatory cardiovascular activity: Daily life consequences of recurring stress in a multiethnic adult sample. *Health Psychology*, *17*(1), 17-29. http://www.ncbi.nlm.nih.gov/pubmed/9459066

Kendig, H., Dykstra, P. A., van Gaalen, R. I., & Melkas, T. (2007). Health of aging parents and childless individuals. *Journal of Family Issues*, *28*(11), 1457-1486. https://doi.org/10.1177/0192513X07303896

Kiecolt-Glaser, J. K., 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. https://doi.org/10.1037/0022-006X.64.2.324

Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin*, *127*(4), 472-503. https://www.ncbi.nlm.nih.gov/pubmed/11439708

Kivimäki, M., Nyberg, S. T., Batty, G. D., Fransson, E. I., Heikkilä, K., Alfredsson, L., Bjorner, J. B., Borritz, M., Burr, H., Casini, A., Clays, E., De Bacquer, D., Dragano, N., Ferrie, J. E., Geuskens, G. A., Goldberg, M., Hamer, M., Hooftman, W. E., Houtman, I. L., ... (2012). Job strain as a risk factor for coronary heart disease: A collaborative meta-

analysis of individual participant data. *The Lancet*, *380*(9852), 1491-1497. https://doi.org/https://doi.org/10.1016/S0140-6736(12)60994-5

Klumb, P. L., & Lampert, T. (2004). Women, work, and well-being 1950–2000: A review and methodological critique. *Social Science & Medicine*, *58*(6), 1007-1024. https://doi.org/https://doi.org/10.1016/S0277-9536(03)00262-4

Knoll, N., Hohl, D. H., Keller, J., Schuez, N., Luszczynska, A., & Burkert, S. (2017). Effects of dyadic planning on physical activity in couples: A randomized controlled trial. *Health Psychology*, *36*(1), 8-20. https://doi.org/10.1037/hea0000423

Kostiainen, E., Martelin, T., Kestilä, L., Martikainen, P., & Koskinen, S. (2009). Employee, partner, and mother: Woman's three roles and their implications for health. *Journal of Family Issues*, *30*(8), 1122-1150. https://doi.org/10.1177/0192513X08329597

La Rosa, J. H. (1988). Women, work, and health: Employment as a risk factor for coronary heart disease. *American Journal of Obstetrics and Gynecology*, *158*(6, Part 2), 1597-1602. https://doi.org/https://doi.org/10.1016/0002-9378(88)90196-2

Lachance-grzela, M., & Bouchard, G. (2010). Why do women do the lion's share of housework? A decade of research. *Sex Roles*, *63*(11-12), 767-780. https://doi.org/http://dx.doi.org/10.1007/s11199-010-9797-z

Lahelma, E., Arber, S., Kivelä, K., & Roos, E. (2002). Multiple roles and health among British and Finnish women: The influence of socioeconomic circumstances. *Social Science & Medicine*, *54*(5), 727-740.

Landsbergis, P. A., Dobson, M., Koutsouras, G., & Schnall, P. (2013). Job strain and ambulatory blood pressure: A meta-analysis and systematic review. *American Journal of Public Health*, *103*(3), e61-e71. https://doi.org/10.2105/AJPH.2012.301153

Laurenceau, J. P., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. *Journal of Family Psychology*, *19*(2), 314-323. https://doi.org/10.1037/0893-3200.19.2.314

Light, K. C., Smith, T. E., Johns, J. M., Brownley, K. A., Hofheimer, J. A., & Amico, J. A. (2000). Oxytocin responsivity in mothers of infants: A preliminary study of relationships with blood pressure during laboratory stress and normal ambulatory activity. *Health Psychology*, *19*(6), 560-567. https://doi.org/10.1037/0278-6133.19.6.560 (Stress and Reproduction)

Luecken, L. J., Suarez, E. C., Kuhn, C. M., Barefoot, J. C., Blumenthal, J. A., Siegler, I. C., & Williams, R. B. (1997). Stress in employed women: Impact of marital status and children at home on neurohormone output and home strain. *Psychosomatic Medicine*, *59*(4), 352-359. https://doi.org/10.1097/00006842-199707000-00003

Lye, D. N., & Biblarz, T. J. (1993). The effects of attitudes toward family life and gender roles on marital satisfaction. *Journal of Family Issues*, *14*(2), 157-188.

Maas, M. K., McDaniel, B. T., Feinberg, M. E., & Jones, D. E. (2015). Division of labor and multiple domains of sexual satisfaction among first-time parents. *Journal of Family Issues*, *39*(1), 104-127. https://doi.org/10.1177/0192513X15604343

Mammen, K., & Paxson, C. (2000). Women's work and economic development. *Journal of Economic Perspectives*, *14*(4), 141-164. https://doi.org/10.1257/jep.14.4.141

Mannino, C. A., & Deutsch, F. M. (2007). Changing the division of household labor: A negotiated process between partners. *Sex Roles*, *56*(5-6), 309-324. https://doi.org/10.1007/s11199-006-9181-1

Marks, S. R. (1977). Multiple roles and role strain: Some notes on human energy, time and commitment. *American Sociological Review*, 921-936.

Marler, M. R., Jacob, R. G., Lehoczky, J. P., & Shapiro, A. P. (1988). The statistical analysis of treatment effects in 24-hour ambulatory blood pressure recordings. *Statistics in Medicine*, *7*(6), 697-716. https://doi.org/10.1002/sim.4780070608

Mattingly, M. J., & Smith, K. E. (2010). Changes in wives' employment when husbands stop working: A recession-prosperity comparison. *Family Relations*, *59*(4), 343-357. https://doi.org/10.1111/j.1741-3729.2010.00607.x

McMunn, A., Bartley, M., & Kuh, D. (2006). Women's health in mid-life: Life course social roles and agency as quality. *Social Science & Medicine*, *63*(6), 1561-1572. https://doi.org/https://doi.org/10.1016/j.socscimed.2006.03.039

McNulty, J. K., Wenner, C. A., & Fisher, T. D. (2016). Longitudinal associations among relationship satisfaction, sexual satisfaction, and frequency of sex in early marriage. *Archives of Sexual Behavior*, *45*(1), 85-97. https://doi.org/10.1007/s10508-014-0444-6

Mederer, H. J. (1993). Division of labor in two-earner homes: Task accomplishment versus household management as critical variables in perceptions about family work. *Journal of Marriage and Family*, *55*(1), 133-145. https://doi.org/10.2307/352964

Meijer, A. M., & van den Wittenboer, G. L. H. (2007). Contribution of infants' sleep and crying to marital relationship of first-time parent couples in the 1st year after childbirth. *Journal of Family Psychology*, *21*(1), 49-57. https://doi.org/10.1037/0893-3200.21.1.49

Mencarini, L., & Vignoli, D. (2017). Employed women and marital union stability: It helps when men help. *Journal of Family Issues*, *39*(5), 1348-1373. https://doi.org/10.1177/0192513X17710283

Moehling, C. M. (2001). Women's work and men's unemployment. *The Journal of Economic History*, *61*(4), 926-949. https://doi.org/10.1017/S0022050701042036

Mosisa, A., & Hipple, S. (2006). Trends in labor force participation in the United States. *Monthly Labor Review*, *129*, 35+. https://link.galegroup.com/apps/doc/A157745506/AONE?u=byuprovo&sid=AONE&xid=bb9ccf75

Newkirk, K., Perry-Jenkins, M., & Sayer, A. G. (2017). Division of household and childcare labor and relationship conflict among low-income new parents. *Sex Roles*, *76*(5), 319-333. https://doi.org/10.1007/s11199-016-0604-3

Newsom, J. T., Mahan, T. L., Rook, K. S., & Krause, N. (2008). 'Stable negative social exchanges and health': Correction to Newsom et al. (2008). *Health Psychology*, *27*(3), 357-357. https://doi.org/10.1037/0278-6133.27.3.357

Nomaguchi, K. M., & Milkie, M. A. (2003). Costs and rewards of children: The effects of becoming a parent on adults' lives. *Journal of Marriage and Family*, *65*(2), 356-374. https://doi.org/10.1111/j.1741-3737.2003.00356.x

Offer, S., & Schneider, B. (2011). Revisiting the gender gap in time-use patterns: Multitasking and well-being among mothers and fathers in dual-earner families. *American Sociological Review*, *76*(6), 809-833. https://doi.org/10.1177/0003122411425170

Orbuch, T. L., & Eyster, S. L. (1997). Division of household labor among Black couples and White couples. *Social Forces*, *76*(1), 301-332.

Parati, G., Vrijens, B., & Vincze, G. (2008). Analysis and interpretation of 24-h blood pressure profiles: Appropriate mathematical models may yield deeper understanding. *American Journal of Hypertension*, *21*(2), 123-125. https://doi.org/10.1038/ajh.2007.27

Park, T., & Lee, Y. J. (2002). Covariance models for nested repeated measures data: Analysis of ovarian steroid secretion data. *Stat Med*, *21*(1), 143-164. http://www.ncbi.nlm.nih.gov/pubmed/11782056

Patrick, C., Stephens, H., & Weinstein, A. (2016). Where are all the self-employed women? Push and pull factors influencing female labor market decisions. *Small Business Economics*, *46*(3), 365-390. https://doi.org/10.1007/s11187-015-9697-2

Perloff, D., Sokolow, M., & Cowan, R. (1983). The prognostic value of ambulatory blood pressures. *JAMA*, *249*(20), 2792-2798. https://doi.org/10.1001/jama.1983.03330440030027

Perren, S., von Wyl, A., Burgin, D., Simoni, H., & von Klitzing, K. (2005). Depressive symptoms and psychosocial stress across the transition to parenthood: Associations with parental psychopathology and child difficulty. *Journal of Psychosomatic Obstettrics & Gynaecology*, *26*(3), 173-183.

Perry-Jenkins, M., Newkirk, K., & Ghunney, A. K. (2013). Family work through time and space: An ecological perspective. *Journal of Family Theory & Review*, *5*(2), 105-123. https://doi.org/10.1111/jftr.12011

Pew Research Center. (2015). *The rise in dual income households*. Washington, D.C. Retrieved June 6, 2019 from https://www.pewresearch.org/ft_dual-income-households-1960-2012-2/

Pickering, T. G., Shimbo, D., & Haas, D. (2006). Ambulatory blood-pressure monitoring. *N Engl J Med*, *354*(22), 2368-2374. https://doi.org/10.1056/NEJMra060433

Polachek, A. J., & Wallace, J. E. (2015). Unfair to me or unfair to my spouse: Men's and women's perceptions of domestic equity and how they relate to mental and physical

health. *Marriage & Family Review*, *51*(3), 205-228. https://doi.org/10.1080/01494929.2015.1031420

Poortman, A.-R., & Van Der Lippe, T. (2009). Attitudes toward housework and child care and the gendered division of labor. *Journal of Marriage and Family*, *71*(3), 526-541. https://doi.org/10.1111/j.1741-3737.2009.00617.x

Reblin, M., Vaughn, A. A., Birmingham, W. C., Smith, T. W., Uchino, B. N., & Spahr, C. M. (2020). Complex assessment of relationship quality within dyads. *Journal of Community Psychology*, *48*(7), 2221-2237. https://doi.org/10.1002/jcop.22392

Reese, J. B., Somers, T. J., Keefe, F. J., Mosley-Williams, A., & Lumley, M. A. (2010). Pain and functioning of rheumatoid arthritis patients based on marital status: Is a distressed marriage preferable to no marriage? *The Journal of Pain*, *11*(10), 958-964. https://doi.org/https://doi.org/10.1016/j.jpain.2010.01.003

Ren, X. S. (1997). Marital status and quality of relationships: The impact on health perception. *Social Science & Medicine*, *44*(2), 241-249. https://doi.org/https://doi.org/10.1016/S0277-9536(96)00158-X

Rendall, M. S., Weden, M. M., Favreault, M. M., & Waldron, H. (2011). The protective effect of marriage for survival: A review and update. *Demography*, *48*(2), 481. https://doi.org/10.1007/s13524-011-0032-5

Reviere, R., & Eberstein, I. W. (1992). Work, marital status, and heart disease. *Health Care for Women International*, *13*(4), 393-399.

Robles, T. F. (2014). Marital quality and health: Implications for marriage in the 21st century. *Current Directions in Psychological Science*, *23*(6), 427-432. https://doi.org/10.1177/0963721414549043

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. https://doi.org/10.1037/a0031859

Rook, K. S. (2015). Social networks in later life: Weighing positive and negative effects on health and well-being. *Current Directions in Psychological Science*, *24*(1), 45-51. https://doi.org/10.1177/0963721414551364

Rose, K. M., Newman, B., Tyroler, H. A., Szklo, M., Arnett, D., & Srivastava, N. (1999). Women, employment status, and hypertension: Cross-sectional and prospective findings from the Atherosclerosis Risk in Communities (ARIC) Study. *Annals of Epidemiology*, *9*(6), 374-382.

Roski, J., Schmid, L. A., & Lando, H. A. (1996). Long-term associations of helpful and harmful spousal behaviors with smoking cessation. *Addictive Behaviors*, *21*(2), 173-185. https://doi.org/10.1016/0306-4603(95)00047-X

Ross, C. E., Mirowsky, J., & Goldsteen, K. (1990). The impact of the family on health: The decade in review. *Journal of Marriage and the Family*, *52*(4), 1059-1078.

Rusbult, C. E., & Martz, J. M. (1995). Remaining in an abusive relationship - an investment model analysis of nonvoluntary dependence. *Personality and Social Psychology Bulletin*, *21*(6), 558-571. https://doi.org/Doi 10.1177/0146167295216002

Sayer, L. C. (2016). Trends in women's and men's time use, 1965–2012: Back to the future? In S. M. McHale, V. King, J. Van Hook, & A. Booth (Eds.), *Gender and Couple Relationships* (pp. 43-77). Springer International Publishing. https://doi.org/10.1007/978-3-319-21635-5_2

Schoenfeld, E. A., Loving, T. J., Pope, M. T., Huston, T. L., & Štulhofer, A. (2017). Does sex really matter? Examining the connections between spouses' nonsexual behaviors, sexual frequency, sexual satisfaction, and marital satisfaction. *Archives of Sexual Behavior*, *46*(2), 489-501. https://doi.org/10.1007/s10508-015-0672-4

Shihab, H. M., Meoni, L. A., Chu, A. Y., Wang, N.-Y., Ford, D. E., Liang, K.-Y., Gallo, J. J., & Klag, M. J. (2012). Body mass index and risk of incident hypertension over the life course: The Johns Hopkins Precursors Study. *Circulation*.

Shumaker, S. A., & Hill, D. R. (1991). Gender differences in social support and physical health. *Health Psychology*, *10*(2), 102-111. https://doi.org/10.1037/0278-6133.10.2.102

Sieber, S. D. (1974). Toward a theory of role accumulation. *American Sociological Review*, *39*(4), 567-578. https://doi.org/10.2307/2094422

Simon, R. W., & Caputo, J. (2018). The costs and benefits of parenthood for mental and physical health in the United States: The importance of parenting stage. *Society and Mental Health*, 2156869318786760. https://doi.org/10.1177/2156869318786760

Smith, T. W., Uchino, B. N., Berg, C. A., Florsheim, P., Pearce, G., Hawkins, M., Henry, N. J. M., Beveridge, R. M., Skinner, M. A., Ko, K. J., & 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. https://doi.org/10.1037/a0016067

Snijders, T. A., & Bosker, R. J. (2011). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. Sage.

Spain, D., & Bianchi, S. (1996). *Balancing act: Motherhood, marriage, and employment among American women*. Russell Sage Foundation.

Sperlich, S., & Geyer, S. (2015). The impact of social and family-related factors on women's stress experience in household and family work. *International Journal of Public Health*, *60*(3), 375-387. https://doi.org/10.1007/s00038-015-0654-2

Sprecher, S., Cate, R. M., Harvey, J., & Wenzel, A. (2004). Sexual satisfaction and sexual expression as predictors of relationship satisfaction and stability. *The handbook of sexuality in close relationships*, 235-256.

Stohs, J. H. (1995). Predictors of conflict over the household division of labor among women employed full-time. *Sex Roles*, *33*(3-4), 257. https://www.proquest.com/scholarly-journals/predictors-conflict-over-household-division-labor/docview/225378230/se-2?accountid=4488

Stohs, J. H. (2000). Multicultural women's experience of household labor, conflicts, and equity. *Sex Roles*, *42*(5), 339-361. https://doi.org/10.1023/A:1007094120408

Stone, P. (2008). *Opting out?: Why women really quit careers and head home*. Univ of California Press.

Strandberg, T. E. (2019). Blood pressure in a 100-year perspective. *Circulation*, *140*(2), 101-102. https://doi.org/10.1161/CIRCULATIONAHA.119.040168

Stull, D. E., Bowman, K., & Smerglia, V. (1994). Women in the middle: A myth in the making. *Family Relations: An Interdisciplinary Journal of Applied Family Studies*, *43*(3), 319-324. https://doi.org/10.2307/585424

Tai, T.-o., & Baxter, J. (2018). Perceptions of fairness and housework disagreement: A comparative analysis. *Journal of Family Issues*, *39*(8), 2461-2485. https://doi.org/10.1177/0192513X18758346

Tao, W., Janzen, B. L., & Abonyi, S. (2010). Gender, division of unpaid family work and psychological distress in dual-earner families. *Clinical practice and epidemiology in mental health : CP & EMH*, *6*, 36-46. https://doi.org/10.2174/1745017901006010036

Terrill, A. L. (2012). *Effect of multiple roles on ambulatory blood pressure in women* [Unpublished doctoral dissertation]. Washington State University.

Terrill, A. L., Garofalo, J. P., Soliday, E., & Craft, R. (2012). Multiple roles and stress burden in women: A conceptual model of heart disease risk. *Journal of Applied Biobehavioral Research*, *17*(1), 4-22. https://doi.org/10.1111/j.1751-9861.2011.00071.x

Theorell, T. (1991). Psychosocial cardiovascular risks – on the double loads in women. *Psychotherapy and Psychosomatics*, *55*(2-4), 81-89. https://doi.org/10.1159/000288413

Thomas, C. L., Laguda, E., Olufemi-Ayoola, F., Netzley, S., Yu, J., & Spitzmueller, C. (2018). Linking job work hours to women's physical health: The role of perceived unfairness and household work hours. *Sex Roles*, *79*(7), 476-488. https://doi.org/10.1007/s11199-017-0888-y

Thompson, M. L., Williams, M. A., & Miller, R. S. (2009). Modelling the association of blood pressure during pregnancy with gestational age and body mass index. *Paediatric & Perinatal Epidemiology*, *23*(3), 254-263. https://doi.org/10.1111/j.1365-3016.2009.01027.x

Thurston, R. C., Sherwood, A., Matthews, K. A., & Blumenthal, J. A. (2011). Household responsibilities, income, and ambulatory blood pressure among working men and women. *Psychosomatic Medicine*, *73*(2), 200-205. https://doi.org/10.1097/PSY.0b013e3182080e1a

Trief, P. M., Jiang, Y., Beck, R., Huckfeldt, P. J., Knight, T., Miller, K. M., & Weinstock, R. S. (2017). Adults with type 1 diabetes: Partner relationships and outcomes. *Journal of health psychology*, *22*(4), 446-456. https://doi.org/10.1177/1359105315605654

Trudel, X., Brisson, C., Milot, A., Masse, B., & Vézina, M. (2013). Psychosocial work environment and ambulatory blood pressure: Independent and combined effect of demand-control and effort-reward imbalance models. *Occupational and Environmental Medicine*, *70*(11), 815. https://doi.org/10.1136/oemed-2013-101416

Twenge, J. M., Campbell, W. K., & Foster, C. A. (2003). Parenthood and marital satisfaction: A meta-analytic review. *Journal of Marriage and Family*, *65*(3), 574-583. https://doi.org/10.1111/j.1741-3737.2003.00574.x

U.S. Bureau of Labor Statistics. (2017). *Employment characteristics of families summary*. https://www.bls.gov/news.release/famee.nr0.htm

U.S. Bureau of Labor Statistics. (2018). *Annual report: Women in the labor force: A databook.* https://www.bls.gov/cps/demographics.htm#women

Uchino, B. N. (2004). *Social support and physical health: Understanding the health consequences of our relationships*. Yale University Press.

Uchino, B. N., Berntson, G.G., Holt-Lunstad, J.L., & Cacioppo, J.T. (2001). Stress-induced autonomic and immunologic reactivity. In D. L. F. R. Ader, & N. Cohen (Ed.), *Psychoneruoimmunology* (3rd ed., pp. 317-333). Academic Press.

Uchino, B. N., Holt-Lunstad, J., Uno, D., & Flinders, J. B. (2001). Heterogeneity in the social networks of young and older adults: Prediction of mental health and cardiovascular reactivity during acute stress. *Journal of Behavioral Medicine*, *24*(4), 361-382. https://www.ncbi.nlm.nih.gov/pubmed/11523333

Uchino, B. N., Smith, T. W., & Berg, C. A. (2014). Spousal relationship quality and cardiovascular risk: Dyadic perceptions of relationship ambivalence are associated with coronary-artery calcification. *Psychological Science*, *25*(4), 1037-1042. https://doi.org/10.1177/0956797613520015

Umberson, D. (1987). Family status and health behaviors: Social control as a dimension of social integration. *Journal of Health and Social Behavior*, *28*(3), 306-319. https://doi.org/10.2307/2136848

Umberson, D. (1992). Gender, marital status and the social control of health behavior. *Social Science and Medicine*, *34*(8), 907-917. https://www.ncbi.nlm.nih.gov/pubmed/1604380

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. https://doi.org/10.1177/002214650604700101

VerBruggen, R., & Wang, W. (2019). The real housewives of america: Dad's income and mom's work. https://ifstudies.org/ifs-admin/resources/newfinalifsresearchbrief-verbruggenwang-realhousewives.pdf

Voydanoff, P., & Donnelly, B. W. (1999). The intersection of time in activities and perceived unfairness in relation to psychological distress and marital quality. *Journal of Marriage and Family*, *61*(3), 739-751. https://doi.org/10.2307/353574

Waldron, I. (1978). The coronary-prone behavior pattern, blood pressure, employment and socio-economic status in women. *Journal of Psychosomatic Research*, *22*(2), 79-87. https://doi.org/https://doi.org/10.1016/0022-3999(78)90033-8

Waldron, I., & Herold, J. (1986). Employment, attitudes toward employment, and women's health. *Women and Health*, *11*(1), 79-98. https://doi.org/10.1300/J013v11n01_05

Waldron, I., Herold, J., & Dunn, D. (1982). How valid are self-report measures for evaluating relationships between women's: Health and labor force participation? *Women and Health*, *7*(2), 53-66. https://doi.org/10.1300/J013v07n02_06

Willson, Andrea E., Shuey, Kim M., & Elder, J. Glen H. (2007). Cumulative advantage processes as mechanisms of inequality in life course health. *American Journal of Sociology*, *112*(6), 1886-1924. https://doi.org/10.1086/512712

Yang, Y. C., Boen, C., Gerken, K., Li, T., Schorpp, K., & Harris, K. M. (2016). Social relationships and physiological determinants of longevity across the human life span. *Proceedings of the National Academy of Sciences*, *113*(3), 578. http://www.pnas.org/content/113/3/578.abstract