Hostility in Marital Interaction, Depressive Symptoms and Physical Health of Husbands and Wives

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A dissertation submitted to the faculty of Brigham Young University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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Abstract

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The purpose of this study was to determine how hostility from either partner in a marital interaction affected marital partners’ perceived general physical health, while investigating for indirect effects of partners’ depression. A total of 296 married couples who participated in Waves 1 and 2 of the Flourishing Families Project were videotaped while completing a marital discussion task. Their interaction was coded for hostile behaviors using the Iowa Family Interaction Rating Scales, IFIRS. Structural equation modeling was used to examine how hostility in marital interactions at Wave 1 was related to partners’ self-reports of physical health as measured by the RAND Health Survey 1.0 and depression as measured by the CES-D at Wave 1. Health of partners was controlled for at Wave 1. Findings from structural equation modeling showed that the husband’s hostility directly affected his own general physical health and indirectly affected it through his depression. His hostility indirectly affected his wife’s general physical health through her depression. The wife’s hostility indirectly affected her physical health through her depression.

Keywords: hostility, couples, depression, health, husband, wife
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Hostility in Marital Interaction, Depressive Symptoms and Physical Health of Husbands and Wives

Introduction

The purpose of this study was to determine how hostility from either partner in a marital interaction affected marital partners’ perceived general physical health, while investigating for indirect effects of partners’ depression.

Several factors have been shown to affect general, physical, and mental health (e.g., Bateson, 1951; Bateson, 1972; Haley, 1963; Haley, 1976; Jackson, 1959; Jackson 1965; Minuchin, 1974; Madanes, 1981; Watzlawick, Beavin, & Jackson, 1967). The environment in which individuals live can negatively influence their general health, which in turn affects their physical health (Hays, Marshall, Wang, & Sherbourne, 1994). Lifestyle choices can also affect one’s health. For instance, the etiology of chronic illnesses is often debated (e.g., Aronowitz, 1998; Mair, Crowley, & Bundred, 1996), but some chronic illnesses have been directly tied to lifestyle, such as type II diabetes, which has direct ties to sedentary lifestyles and poor diet (e.g., Tuomilehto et al., 2001). These lifestyle choices are associated with pressures and stressors of life, personal experiences, and perceptions of life (Gregg, Callaghan, Hayes, & Singer, 2007).

Personal behaviors and marital partners’ behaviors seem to be additional determining factors in whether a person declines in general and physical health. The health and status of a marital relationship, such as the degree of conflict or satisfaction, can affect the partners’ health both physically and mentally, resulting in increased correlation, for example, to depression and eating disorders (Davidson, 1994) or to fibromyalgia (Schanberg, Keefe, Lefebvre, Kredich, & Gil, 1998).
More specifically, marriage and family therapists have long believed that families who neglected to change their negative social interactions (in addition to harmful environments and lifestyle choices) would deteriorate as families and as individuals (e.g., Bateson, 1951; Bateson, 1972; Haley, 1963; Haley, 1976; Jackson, 1959; Jackson, 1965; Minuchin, 1974; Madanes, 1981; Watzlawick, Beavin, & Jackson, 1967). Anger and hostility, which are difficult to distinguish from one another (Smith, Glazer, Ruiz, & Gallo, 2004) are examples of such negative social interaction. A wife’s anger appears to be closely related to marital distress in both husbands and wives (Glazer, Smith, Nealey-Moore, & Hawkins, 2002). Wives’ anger and hostility may even be a more sensitive predictors of marital functioning than husbands’ when controlling for dependency in the relationship (Baron, Smith, Butner, Nealey-Moore, Hawkins, & Uchino, 2007). Anger appears to be sometimes associated with dominance and can evoke fear in others and mask fear within the person exhibiting the anger. Anger itself can be defined as “an unpleasant emotion ranging in intensity from irritation or annoyance to fury or rage” (Smith, 1994, p. 26).

Hostile behavior has been shown to adversely affect health irrespective of the age of the person exhibiting the behavior (Smith, Allred, Morrison, & Carlson, 1989; Smith, Ruiz, & Uchino, 2000). Depression has also received increased attention in recent years as a factor affecting the general health of both men and women (e.g., Black & Markides, 1999; Black, Goodwin, & Markides, 1998; Black, Markides, & Ray, 2003; Eaton, Armenian, Pratt & Ford, 1996; Jonas & Lando, 2000; Ladwig, Roll, Breithardt, Buddle, & Boggerefe, 1994; Mendes et al., 1998, Pennix et al., 1998). This study attempts to link hostility observed in a marriage interaction to the partners’ depression and the physical health a year later. First, however, it is
necessary to define the behaviors associated with the measurement of hostility in the present study.

**Aspects of Hostility**

Hostile behaviors can be observed in four categories. Generally, *hostility* can be defined as a “negative attitude toward others, consisting of enmity, denigration, and ill will” (Smith, 1994, p. 26). *Angry coercion* has been grouped within the larger concept of hostility (Melby et al., 1998), and has the underlying motive of reducing the choices of others through intimidation. *Reciprocated hostility* is a response to one person’s hostile, conflictual, angry-coercive, and disapproving behavior with the same types of behavior, (Melby et al., 1998). *Contempt* involves disgust, disdain, derision, and scorn, not just for another person’s actions or words, but for the other person (Melby et al., 1998). This study measured these hostile behaviors by examining the presence of angry coercion, hostility, reciprocated hostility, and contempt during a videotaped twenty-five minute marital discussion.

**Literature Review**

**Hostility and Health**

Hostility could affect the health of the person toward whom it is directed. Furthermore, hostility may affect the health of the hostile person. The following sections identify research findings related to these two effects.

**The hostile person’s health.** As a personality trait, hostility may act as a risk factor for physical illness (Gallo & Smith, 1998). Hostility seems to impact the hostile person significantly. Some personality types who frequently demonstrate hostility, like Type A males, appear to have more vulnerability to physiological issues (Harbin, 1989).
Anger and hostility, which are difficult to distinguish (Smith, Glazer, Ruiz, & Gallo, 2004), may have both direct and indirect associations with health because of their potential to create hostile social environments—which tends to decrease social support and increase personal physiological reactivity (Smith, 1992, 1994). Apparently, any interaction that evokes dominance and unfriendliness in a person can “influence the psycho-physiological correlates of trait anger and hostility in a marital context” (Glazer, Smith et al., 2002), namely negative cardiovascular responses. In a review of the link between hostility and health, Smith (1992) found that there are several mechanisms that may explain the link, such as the person’s daily habits, lack of social support, interpersonal conflicts, and heightened physiological reactivity. Overall the relationship between hostility and health problems remains even when controlling for dominance and a similar negative relationship exists between dominance and health when controlling for hostility (Siegman, Townsend, Civelek, & Blumenthal, 2000). Associations between health and hostility may also be mediated by negative health behaviors (Everson et al., 1997), like more interpersonal conflict, less social support, and more stress (Smith, 1992); nevertheless, the link remains when the behaviors are controlled for in prospective studies (Miller et al., 1996).

In addition, despite controlling for anger, age, body mass index, smoking status, systolic and diastolic blood pressure, serum cholesterol level, and whether the participant drank two or more drinks of alcohol per day, it was still found that a person manifesting high dominance was still likely to contribute to the development of heart disease (Siegman, Kubzansky, Kawachi, Boyle, Vokonas, & Sparrow, 2000).

**Men.** Among men, there is evidence that when they become angry, their physiology can change significantly and remain aroused for extended periods of time (Levenson, Carstensen, & Gottman, 1994). Hostile individuals often have high blood pressure and heart rate as a result of
their tendency to resist help and influence from others, and try to force their own help and
influence on others (Smith, Allred, Morrison, & Carlson, 1989; Smith, Ruiz, & Uchino, 2000).
Hostile men are especially prone to have a sustained increase of both emotional and
cardiovascular reactivity when they are asked to try and influence their wives in a conflictual
setting (Whitson & El-Sheikh, 2003). Personalities with high hostility and anger are confirmed to
be at higher risk for heart disease (Adler & Matthew, 1994; Helmers, Posluszny, & Krantz, 1994;
Miller, Smith, Guijarro, & Hallet, 1996). Furthermore, hostility in men has been shown to
decrease metabolism, leading to “obesity, central adiposity, and insulin resistance, which can
exert effects on blood pressure and serum lipids” (Niaura et al., 2000, p. 7).

Dominating behavior is often associated with hostility and can be difficult to distinguish
(Siegman et al., 2000). It has also been found to predict heart disease, even when anger was
controlled for statistically (Siegman, Kuzansky et al., 2000). Dominating behavior has been
shown to affect men’s blood pressure (Gramer, 2003; Gramer & Huber, 1997). Aggression
(which is different from the dominance measures in the above studies) also affects blood
pressure (Smith and Gallo, 1999); the findings were interpreted as further evidence of a link
between hostility and adverse health effects.

Men with anger issues have been found to have increased risk of stroke (Everson et al.,
1999), cardiovascular disease, heart attack (Chang et al., 2002), and “a combination of an
unhealthy lipid profile, high levels of insulin, insulin resistance, visceral body fat, and elevated
blood pressure” (Smith et al., 2004, p. 1245; see also, e.g., Niaura et al., 2000; Raikkonen,
Matthews, & Kuller, 2002; Raikkonen, Matthews, Kuller, Reiber, & Bunker, 1999; Surwit,
Williams, Siegler, Lane, Helms, & Applegate, 2002). Everson et al. (1997) found that health
risks moderated the relationship between hostility and mortality in men, but the relationship was still significant.

**Women.** When women have higher hostility they also appear to have increased risk of problems with heart disease (Chaput et al., 2002), atherosclerosis (Harris, Karen, Matthews, Sutton-Tyrell, & Kuller, 2003), endothelial dysfunction (Gottdiener, Kop, Hauser, McEneny, Herrington, & Krantz, 2003), and under stressful conditions increased blood pressure, heart rate, and neuroendocrine levels (Suarez, Kuhn, Schanenberg, Williams, & Zimmerman, 1998). Associations between hostility and carotid artery disease in women may also explain an association with ischemic stroke (a restriction in blood supply to the brain) (Julkenen, Salonen, Kaplan, Chesney, & Salonen, 1994; Matthews, Owens, Kuller, Sutton-Tyrrell, & Jansen-McWilliams, 1998). Facial expressions of anger have also been found to be associated with ischemia (Rosenberg et al., 2001).

**Health effects for the receiver of hostility.** A series of studies by Gramer and associates found that individuals who were paired with a high dominant participant were slower to recover from stress, showing delayed diastolic blood pressure recovery (Gramer & Berner, 2005). Overall, women have been found to have more physiological arousal when they are in negative marital conflict—which may involve hostility, dominance, and anger (Kiecolt-Glaser et al., 1996; Kiecolt-Glaser et al., 1997; Levenson, Cartensen, & Gottman, 1993).

Physical violence seems to be a means of exerting control and hostility towards a partner (Frieze & McHugh, 1992). Men are generally not only more physically aggressive, but also more verbally and psychologically aggressive (Eagly & Steffen, 1986). Overall men have been found in other studies to use more coercion in marital discussions, while women may go to great lengths to avoid upsetting their husbands in such discussions (Ball et al., 1995).
Therefore, physical violence has obvious implications for women’s physical health and can end in severe injuries or even murder (Walker, 1981). However, definitions of domestic violence include any type of coercive and extreme controlling behavior that limits a person’s freedom or psychological well-being (e.g., American Medical Association, 1992; Walker, 1979; Lewandowski et al., 1994; Stuart et al., 1997). Rogers and Miller (1988) suggested that men, in general, tend to be more dominant in their conversations, while women are more supportive. Verbal aggression and threats may therefore contribute to physical health issues, such as eating disorders (Robinson, 2003), and may affect women’s health by contributing to posttraumatic stress disorder (i.e., Battered Woman Syndrome, Walker, 1981).

Chronic stress may be associated with physiological changes that influence present or future overall physical health (Robles & Kiecolt-Glaser, 2003). Chronic stress from any source, including relationships, makes people more susceptible to colds and sickness (Cohen et al., 1998); an excess of sympathetic activation in the body over an extended period of time seems to explain how chronic stress can lead to poor health (Whitson et al., 2003).

**Hostility and Marriage**

Hostility’s negative correlations with marital functioning have been previously confirmed in several studies (Baron et al., 2007; Miller, Markides, Chiriboga, & Ray, 1995; Newton & Kiecolt-Glaser, 1995), and marital functioning may act as “a mechanism potentially linking hostility and health” (Smith et al., 2004, p. 1242). Summing up a decade of research, Kiecolt-Glaser and Newton (2001) conclude that “marital functioning is consequential for health; negative dimensions of marital functioning have indirect influences on health outcomes through depression and health habits, and direct influences on cardiovascular, endocrine, immune, neurosensory, and other physiological mechanisms” (p. 472).
Aggression, struggles for power, and oppression of one’s partner all seem to strongly affect levels of marital satisfaction and individual happiness; more specifically, wives tend to feel that their sense of self-respect, competence, and freedom to pursue individual activities are controlled by aggressive husbands (Ehrensaft, Langhinrichsen-Rohling, Heyman, O’Leary, & Lawrence, 1999). Whether and when a partner withdraws or pursues/demands seems to predict overall relationship aggression and violence (Sagrestano, Heavey, & Christensen, 1999). In a study that coded for dominance in speech and listening, marital satisfaction decreased with increased power inequality; this was true even after controlling for marital dissatisfaction, decision-making power, and discontent with the distribution of decision-making power (Whisman & Jacobson, 1990).

A significant imbalance of power may result in decreased marital satisfaction by preventing a true feeling of companionship (Wolfe, 1959). Attachment patterns in families vary depending on the levels of hostility present in the home (Horowitz, Rosenberg, & Bartholomew, 1993). Hostility is related to psychological aggression and severe violence when studied in the context of family attachment (Lawson, 2008). Marriage and family theorists have postulated that power may affect individuals’ and families’ psychological symptomatology (e.g., Watzlawick, Weakland, & Fisch, 1974). It is plausible that subordinate spouses may even try to balance the power distribution in a relationship through the manifestation of various symptoms like depression (Madanes, 1981).

Couples in unhappy marriages have historically reported poorer health than divorced couples (e.g., Hetherington, 1993; Renne, 1971). Levels of marital quality have a positive correlation with physical health in both husbands and wives in a latent growth curve model using psychological well-being and health risk behaviors of the partners as mediators (Wickrama,
Lorenz, Conger, & Elder, 1997). Married partners may be most at risk for hypertension during mid-life if they are in a distressful marriage with poor marital quality (Wickrama, Lorenz, Wallace, Peiris, & Conger, 2001). In the same study, marital quality was found to be inversely associated with psychological distress (Wickrama et al., 2001). Poor upkeep of one’s self, or the relationship, or poor partner relational skills may also contribute to this stress (e.g., Beach et al., 1996; House, Landis, & Umberson, 1988).

Self-reported marital strain can be a significant predictor of physical and mental health in individuals (Williams & Umberson, 2004). As partners age, marital strain may actually accelerate a decline in self-rated health for both men and women (Umberson, Williams, Power, Liu, & Needham, 2006). Unsatisfying marriages negatively affect psychological well-being in both men and women (Williams, 2003); conversely, being in a positive marriage reduces the risk of engaging in risky lifestyles when economic status is controlled for in families (Wickrama, Conger, & Lorenz, 1995).

Self-focused individuals, who are more likely to demonstrate an overall lack of compassion or attention for partner’s needs and concerns with regard to decision-making (Harter, Waters, Pettitt, Whitesell, Kofkin, & Jordan, 1997), are also more likely to have high power and dominance (Neff & Harter, 2002). The structure of power in the relationship appears to affect the degree to which couples benefit from counseling (Gray-Little, Baucom, & Hamby, 1996). If power imbalances are left unchecked and continue to increase, they have been shown to decrease marital closeness, intimacy, and even support (e.g., Beavers, 1985; Gordon & Baucom, 2003; Larson, Hammond, & Harper, 1998).

Smith and colleagues conjectured that outward criticism in a marriage may actually be a result of deeper hostility and dominance (2004). Such may be the case in male batterers who
typically score high on hostility and dominance (e.g., Johnson, 1995; Malamuth & Thornhill, 1994). These hostile individuals’ heightened cardiovascular responses (e.g., Gottman et al., 1995; Smith & Gallo, 1999) may possibly be the result of attempting to control marital partners and others (Smith, Allred, Morrison, & Carlson, 1989). Their hostility exacerbates marital processes (Smith, Pope, Sanders, Allred, & O’Keefe, 1988; Smith, Sanders, & Alexanders, 1990) and outcomes (Newton, & Kiecolt-Glaser, 1995; Miller et al., 1995) that may again affect the physiology of both partners (Kiecolt-Glaser & Newton, 2001).

In contrast, Whitson and colleagues have proposed that some individuals may actually be shielded from typical deterioration in physical health when there is high marital conflict, depending upon protective factors including biological factors (e.g., parasympathetic vagal regulation) (2003). An example of this regulation might be visible in individuals who are able to confront their disturbing thoughts and feelings and thus more likely to alleviate autonomic arousal (Pennebaker & Beall, 1986). This may also be true of partners who are able to acknowledge that they are being treated in a hostile manner and appropriately confront the problem, possibly improving their measures of health. They may also have reduced health care visits, and be the recipients of improved immune functioning (Pennebaker, Kiecolt-Glaser, & Glaser, 1988).

**Hostility and Gender**

The cardiovascular effects of discussing problems between marital partners seem to differ by sex, as evidenced by men whose blood pressure tends to go up depending on the pace of their speech, whereas women’s blood pressure tends to increase depending on the hostility of the interaction (Ewart, Taylor, Kraemer, & Agras, 1991). Men and women both have been found to suffer similar risk of coronary heart disease when interacting with angry, hostile, and aggressive
partners (Smith & Brown, 1991). Compared to their husbands, wives are generally more likely to be influenced by their perceptions of conflict (Ball, Cowan, & Cowan, 1995). Three studies have found significant gender differences when hostility and similar behaviors were studied with regard to their effects on coronary heart disease; men’s health was found to be significantly at risk when they were dominant (Siegman, 1993; Siegman, Kubzansky et al., 2000; Siegman, et al., 2000).

Studies have pointed out that “sex, age, socio-demographic composition or ethnicity could influence the strength of the association between hostility and physical health” (Miller et al., 1996, p. 324). Gender plays an important role in the definition and study of power and can be a primary determining factor in how and when power is used. In traditional settings women are often portrayed as more emotional and men more task-oriented (Ball et al., 1995). Often it is assumed that the woman has less power than the man in both the home and in society (e.g., Tichenor, 1999; Byrne & Clark, 2000), and that the man is granted greater influence on family outcomes. This power imbalance has been referred to as an invisible dominance and may cause women to hold back their opinions when in the presence of their husbands—even when they may have more expertise (Zipp, Prohaska, & Bemiller, 2004). In certain situations women may even be prone to overestimate their level of dominance in the relationship (Moskowitz, 1993). Women who earn more income than their husbands may still surrender much of their power to the man because of internal conflict concerning traditional obligations and their roles inside and outside of the home (Tichenor, 1999). Specific areas of concern might include housework and financial responsibilities. Couples who are able to implement relationships where hostility is largely absent are more likely to enjoy balanced levels of support in the home (Kollack, Blumstein, & Schwartz, 1985).
Hostility, Depression, and Marriage

Depression may act as an indirect influence on many of the negative physiological changes that have been associated with hostility and aggression (Miller, Freedland, Carney, Stetler, & Banks, 2003). Depression and anger have both been associated with decreased vasodilation and thus greater risk of cardiovascular disease (Harris et al., 2003). Halloran (1998) points out that a relationship between marital distress or marital discord and depression has been found repeatedly in empirical studies (e.g., Brown & Harris, 1978; Costello, 1982; Kessler, Price, & Wortman, 1985; Beach, Nelson, & O'Leary, 1988; Coleman & Miller, 1975). Conversely, partners have a reduced risk of depression when they are satisfied in their marriage (e.g., Monroe, Bromet, Connell, & Steiner, 1986).

Power and dominance need to be considered when studying the association between depression and marital distress because of their moderating effects (Halloran, 1998). Studies have previously shown that depression does affect family power outcomes, power processes, and the number of power bases that are present (Byrne & Carr, 2000; Byrne, Carr, & Clark, 2004). For instance, couples struggling with depression not only are more likely to have had more overall marital dissatisfaction and less constructive communication, as well as more dissatisfaction with spending their surplus money, they also are more likely to have experienced physical assault in the last year (Byrne et al., 2004).

Hostility or an imbalance of power may be manifested in the division of household tasks among spouses, which appears to be an important factor in measuring marital equality (Kulik, 2002). Partners with more traditional divisions of labor (wife does most of the household chores) report less love and greater conflict (MacDermid, Huston, & McHale, 1990). Apparently an
overworked or subordinated spouse is more likely to suffer from depression; and this can result in decreased physical health, or even the development of physical illness.

When a spouse chooses not to listen to his or her partner, this may be an example of relational aggression that results in conflict or failed decision-making processes, and it has been found ultimately to contribute to depression in the unheard partner (Ball et al., 1995). These covert power-plays of being sullen or uncompromising could fit under the heading of psychological abuse, a factor found to specifically lead to depressive symptoms (Scafidi, 2007). Psychological abuse has the tendency to be secretive, unacknowledged, and even denied in relationships; according to theory it may be a reflection of a man’s tendency to dominate outcomes in a marriage and limit a woman’s decision-making power, which ultimately leads to a decrease in marital functioning (Gray-Little, Baucom, & Hamby, 1996). Battered women typically undergo severe attacks on their emotional health (Randall, 1990). The primary response of a battered woman is depression (Walker, 1984). Battered woman syndrome is strongly associated with depression, and depression itself is a strong predictor of family violence (Campbell, Kub, Belknap, & Templin, T. N., 1997).

Subordinate spouses who are in a relationship with significant hostility and power imbalance are more likely to develop symptoms of depression, anxiety, obsessive thoughts, panic attacks, compulsive behavior, substance abuse, or psychosexual dysfunctions that balance the power inequality (Bagarozzi, 1990). Research outcomes have found that depression is often closely linked to decreased levels of physical health (e.g., Beekman et al., 1997; Skarupski, 1997); depression in both marital partners is associated with marital distress, indirect and direct physical health declines, and increased stress in older couples (Sandberg & Harper, 2000). Couples who disagree regularly often report being sad and angry afterwards, and are more likely
to be depressed; in turn, they tend to experience each other as hostile and conflictual, which ultimately seems to worsen symptoms of reported depression (Kahn, Coyne, & Margolin, 1985; Hautzinger, Linden, & Hoffman, 1982).

**Measuring Hostility and Health Together**

Empirically validating how psychological distress affects physical health and physiological changes has historically met challenges (Shedler, 1993), but research techniques have found ways to address these problems. Self-report measures have been replaced with observational measures because they demonstrate some of the best efficacy in measuring dominance and similar concepts (Moskowitz, 1982). The advantages of using a behavioral coding system is that facial expressions and other nonverbal cues can be coded and social desirability will have little influence in whether a couple is coded with particular traits such as hostility and angry coercion.

Hostility can manifest itself in many ways and there are many challenges to measuring hostility, including: (a) deciding whether to measure from the actor’s or observer’s perspective; (b) lack of awareness from the actor’s point of view; (c) actors concealing power struggles behind closed doors; (d) recognizing objective manifestations of power versus subjective awareness; (e) differentiating power from authority and similar concepts; and (f) validly measuring power cross-culturally (Hacker, 1977).

Hostility and dominance may be seen in interactional studies as competition between partners through marital communication; this is usually manifested as “one-up” types of behavior (e.g., Miller & Miller, 1979; Smith & MacKenzie, 2006). Similarities have been found in scoring between observations of domineering and power motives in the Thematic Apperception Test (TAT) (Crowley, 1990) based on forms of power like forceful actions, exerting control,
attempts to influence with contention, giving unsolicited advice, attempting to impress others, and taking action that arouses strong emotional reactions in others (Malamuth & Thornhill, 1994). Previous studies have been successful in measuring hostility and similar power imbalances in relationships by observing and coding: who speaks the most often, who initiates conversations, who interrupts, who instructs and acts, and who questions the most (e.g., Caputo, 1963; Farina, 1960; Gottman, 1979; Gray-Little, 1982; Jacobson & Holtzworth-Munroe, 1986; Kenkel, 1963; Kolb & Strauss, 1974; Kollock, Blumstein & Schwartz, 1985; Leighton, Stollack & Fergusson, 1971; Rogers & Millar, 1988; Sprenkle & Olson, 1978; Strauss, 1968; Strodtbeck, 1951). Conversations and some forms of non-verbal communication may be the defining interactions through which marital power is negotiated, the relationship is defined, and the rules and dominance are established (e.g., Bateson, 1951; Bateson, 1972; Haley, 1963; Jackson, 1959; Jackson 1965; Watzlawick et al., 1967).

Attempts to measure power have also included observing and assessing decision-making processes in the relationship (Herbst, 1952; Corrales, 1975; Gray-Little, 1982; Szinovacz, 1981): which partner speaks more, and which partner changes the subject more (Palmer, 1989) and which partner consistently reports fewer problems and severe behaviors than the other (Moffitt et al., 1997). In theory, a less powerful partner may be detected in a relationship by observing conversational tactics, such as a greater likelihood of interrupting, using back channels, or using tag questions (Kollock et al., 1985). Power imbalances may also be observed and measured through concepts like psychological abuse, dominance, hostility, angry and coercive attempts to control another partner, and aggressive marital communication patterns that are verbal, non-verbal, or physical (e.g., Forte, 1998).
In summary, observational coding is generally accepted as the most effective way to gather data on hostility and similar psychological processes that may affect physical health.

**Purpose of Study and Hypotheses**

The primary purpose of this study was to examine the relationship between hostility, depression, and physical health. No other study, to the investigators’ knowledge, has directly analyzed the relationships between this combination of variables in marital couples. There are studies associating hostility with depression, and other studies associating depression with physical health, and still other studies associating hostility with physical health; but this is the first study tying the three variables together.

The hypotheses of this study included:

1. It was hypothesized that the husband’s hostility will affect his own health both directly and indirectly through his and his wife’s depression.
2. It was hypothesized that the husband’s hostility will affect his wife’s health both directly and indirectly through his and his wife’s depression.
3. It was hypothesized that the wife’s hostility will affect her own health both directly and indirectly through her and her husband’s depression.
4. It was hypothesized that the wife’s hostility will affect her husband’s health both directly and indirectly through her and her husband’s depression.

It is proposed that the more likely a partner is to control or influence a relationship, the more his or her own health will decrease along with the health of the partner.
Method

Participants

Participants in this study came from the first and second waves of a longitudinal study called the *Flourishing Families Project (FFP).* This ongoing project includes parents living in or around the Seattle, Washington, area with a child who ranges from 10 to 13 years of age. Trained college students interviewed these couples in their homes during a one-hour videotaped session and couples completed a one-and-one-half hour self-administered questionnaire. This study includes data from both of these assessments. The children were interviewed also, but this study uses only the data gathered from the parents. Wave 1 and Wave 2 data used for this study were collected in the years 2007 and 2008.

The sample used in this study consists of 296 heterosexual couples. The spouses’ ages ranged from 27 to 56 for husbands and 27 to 62 for wives. With a mean age of 43.49 for wives ($SD = 5.32$), and age 45.38 years for husbands ($SD = 6.10$) at Wave 1. The majority of couples were middle-class families with one mother and one father living at home. The majority of wives were European American (82.8%); 4.1% reported African American ethnicity, 4.4% reported Asian American ethnicity, 3.0% reported Hispanic ethnicity, 5.7% indicated that they had “Other” ethnicity or were “Multi-Ethnic.” The majority of husbands were European American (86.4); 5.1% reported African American ethnicity, 2.0% reported Asian American ethnicity, 1.0% reported Hispanic ethnicity, 5.4% indicated that they had “Other” ethnicity or were “Multi-Ethnic.” A small but significant portion of the sample consists of remarried/step-families (5% or 15 families). The majority of the husbands (93.9%) and wives (94.2%) in the sample have at least some college education; and 80.8% of the husbands and 75% of the wives
reported an income of $50,000 or more annually. (See Table 1 for more specifics about participants’ demographics.)

Procedure

Recruitment for waves 1 and 2 primarily came from a purchased national telephone survey database (Polk Directories/InfoUSA). With a purported database of over 82 million households, the Polk directory was created using census tracts that reflect socio-economic and racial stratification reports in local school districts. Families were randomly selected from a pool of eligible families with a child between the ages of 10 and 13 who lived within the geographical area targeted for study by the FFP. A multi-stage recruitment protocol was used to identify and contact eligible families for the project. Following a letter of introduction, eligibility was confirmed by interviewers through a home contact or a phone call. Informed consent (Appendix A) as approved by the BYU IRB was subsequently gathered and interviewers set up times to conduct interviews and administer questionnaires.

Participants were also recruited through family referral. Two referrals were requested from families after they had completed their own in-home interviews. This allowed for an extension of sample beyond those represented in the Polk Directory and increased participation by families of lower socioeconomic status who could not be contacted by telephone, magazine, or internet subscription reports. This also appeared to significantly increase the representation of non-white ethnicities in the sample. Of the 692 household identities purchased from the Polk directory, 372 families actually had children in the specified age range. Referrals increased this eligible sample to 500 families. Families who did not participate in the study most often cited privacy concerns and a lack of time. The data were limited to couples in a heterosexual relationship because of the low number of same-sex couples (n = 5) identified and to create a
more homogeneous sample for more generalizable results. The Wave 1 response rate was 62%. Of the original families that participated in the Wave 1 response, 95% participated in Wave 2.

In both waves of the study, couples who took part in the marital task were given 25 minutes alone to answer questions printed on 20 cards. Directions were first given to the couple by an interviewer who set up the camera, explained the procedure, and then left for a part of the house out of earshot of the couple, then returned at the end of the 25 minutes. A list of the 20 questions is included in Appendix C, but a sample of them includes: “What do we especially like or admire about each other? Why is that?” and “Do we tell each other when we are sad, worried or have a problem? Why or why not? What does the other one do or say?” For each of the cards, participants were invited to discuss their answers together and continue talking until an alarm rang and the interviewer returned.

Measures

In addition to the three measures below, there was also an assessment and control for length of marriage, education level, and income at Wave 1.

Tasks for observational coding. Coding itself is a process whereby observed behaviors are viewed by a trained coder who then provides a rating on each of several scales. Coders are trained to be as objective as possible and to follow the coding manual as closely as possible. During the six weeks or 90 hours of training for coders, a series of quizzes and tests are used to ensure that coders are intensely familiar with the coding manual, which includes several written pages for each of the 37 scales and gives examples and non-examples of the codes. These descriptions were the guide by which coders were to evaluate the observed behavior. Coders’ own experiences and perceptions were to be subordinated to the coding manual, which details descriptions of what the codes were designed to assess. At the end of the six weeks of training,
coders were required to code with 80% accuracy a criterion DVD task that had been previously
coded by coders at the Iowa Institute for Social and Behavioral Research. For the coding
variables used in this study there was an inter-rater reliability range from .80 to .91 (Table 2).

Interactional tasks to be coded based on the videotaped couple interviews were randomly
assigned to a primary coder. Tasks were also randomly assigned to a second reliability coder so
that, in all, every fourth tape was coded for reliability. A team leader analyzed the difference in
scores between the primary coder and the reliability coder and told the two coders when they
differed more than two points on a scale without providing them with their original scores. The
coders watched the task at least once more together, identifying specific points that correlated
with the scales and discussing their differences in perception while referring to the manual until
they reached a consensus score for each of the disparate scales. To prevent coder drift, consensus
meetings were periodically conducted in a public manner where all members of the coding team
were encouraged to attend and discuss their observations and ask questions about various codes
and small distinctions in coding behavior. In addition, coders were encouraged to spend some
time each week rereading parts of the manual to become increasingly familiar with the subtleties
of each scale.

**Hostile interactions measures.** The Iowa Family Interaction Rating Scales (IFIRS)
(Melby et al., 1998) were used to code hostility in this study. The IFIRS has been used for
numerous studies on a variety of topics but were originally designed for the study of families
(Melby et al., 1998). The reliability and validity of several of the IFIRS have been assessed in
past studies (Melby, Conger, Ge, & Warner, 1995; Melby, Conger, & Puspitawati, 1999; Melby,
Ge, Conger, & Warner, 1995). The IFIRS rating scales measure hostility and related concepts in
relationships (individual, marital, and parental) as well as in problem solving. Many studies have
previously used the IFIRS codes of hostility, verbal attack, physical attack, dominance, angry coercion, and other related scales in their studies (e.g., Conger, Conger, Elder, Lorenz, Simon, & Whitbeck, 1992; Conger & Conger, 1994; Cui, Conger, Bryan, & Elder, 2002; Ge, Conger, Lorenz, & Simons, 1994; Ge et al., 1996; Matthews, Conger, & Wickrama, 1996; Reuter & Conger, 1998; Reuter & Conger, 1995).

To gain the advantage of having error measures and to attain the most distilled form of hostility, latent variables rather than sum scores were produced for partner hostility. All of the scales mentioned above and any others that are related to dominance and hostility were included in an exploratory factor analysis with promax rotation (see Table 2). Those scales which most closely grouped into a variable for both sexes included (each named scale is followed by the factor loading latent variable for wives and husbands): Hostility (wife .92, husband .76), Angry Coercion (wife .75, husband .75), Contempt (wife .90, husband .88), and Reciprocate Hostility (wife .58, husband .68). All of the IFIRS scales are listed in Appendix B. Those scales selected acted as indicators for the latent variables of husband and wife hostile behaviors (see Figure 1). The scales used in this study are Hostility, Angry Coercion, Contempt, and Reciprocate Hostility. Description of all of these scales can be found in great detail in the IFIRS code book (Melby et al., 1998) and in Appendix B. Below are some direct quotes from the code book describing the scales.

**Hostility.** This scale measures the degree to which the focal displays hostile, angry, critical, disapproving, and/or rejecting behavior toward another interactor’s behavior (actions), appearance, or state. Take the following behaviors into account: NONVERBAL COMMUNICATION, such as angry or contemptuous facial expressions and menacing/threatening body posture; EMOTIONAL EXPRESSION, such as irritable,
sarcasm, or curt tones of voice or shouting; rejection such as actively ignoring the other, showing contempt or disgust for the other or the other’s behavior, denying the other’s needs; and the CONTENT of the statements themselves, such as complaints about the other or denigrating or critical remarks, e.g., “You don’t know anything” or “You could never manage that.” Bear in mind that two people can disagree without being hostile. To be hostile, disagreements must include some element of negative affect such as derogation, disapproval, blame, ridicule, etc. Young children may express hostility through negative or physically aggressive behaviors directed toward the other person (e.g., yelling, kicking, hitting, or throwing objects). (Melby et al., 1998, p. 55)

**Angry Coercion.** This code is considered by the Iowa behavioral coding system to be the opposite of assertiveness. Where assertiveness is a means of influencing another person in a positive non-threatening manner, angry coercion is considered a means of trying to influence the other by means of anger, which could include threats and fear-inducing tactics that resemble anger. The manual describes Angry Coercion as follows:

This scale is a specific form of Hostility that assesses the degree to which the focal achieves goals, attempts to control or change the behavior or opinions of another interactor, or attempts in a hostile manner to get another interactor to do what the focal wants (i.e., power plays, demands, hostile commands, stubbornness, resistance, obstinence, contingent physical or verbal threats, refusals, prohibitions, forcing own opinions on the other, angry whining, angry blaming, contemptuous mocking, derogatory insistence, etc.). To score on Angry Coercion, the focal’s change attempts must demonstrate hostile, contemptuous, or sarcastic affect, as opposed to depressed affect. (Melby et al. 1998, p. 73)
**Reciprocate Hostility.**

This scale measures the degree to which the focal responds to another interactor’s hostile, conflictual, angry-coercive, and disapproving behavior in like manner. Look at the extent to which the focal reciprocates such behavior (“adds to the heat”) through the use of hostility, contempt, and/or angry coercion (either verbal or nonverbal). The reciprocated behaviors must occur in response to behavior occurring within the dyad. (Melby et al., 1998, p. 81)

**Contempt.**

This scale is a specific form of Hostility that assesses the amount of disgust, disdain, derision, and scorn shown toward another interactor. The content includes personally derogatory adjectives, mocking statements, criticisms of the other person, comments that put down and demean another’s personal characteristics, and sarcasm directed toward the other person as a person. The emotional tone is superior, condescending, distant, cool, cold, or icy versus hot and engaged. At higher levels, the voice reflects being fed-up, sickened, or repulsed. At lower levels the affective tone may be neutral but the voice reflects patronization and superiority. The feeling conveyed is that the other person is not valued or is incompetent. Nonverbal behaviors may include rolling the eyes, short exasperated sighs, or other indications of disgust. Look for the presence of unkind statements presented in a disdainful manner that demean and put down the other person. Such statements must include an element of disgust, not merely make fun of the other person. (Melby et al., 1998, p. 69)

The possible scaled scores for each of these codes range from 1 to 9, with 1 being the lowest and 9 being the highest. The exact wording used in the IFIRS manual (Melby et al., 1998)
for each possible odd number score of these scales can be found in Appendix B. Even numbers were given when what was observed appeared to be something in between the two odd numbers. This study used only the husband and wife measurements from the marital scales. A final macro score for each of these scales is given for each person during the marital discussion task. The behavioral interaction coding used in this study assesses the presence of hostility using the IFIRS, as well as creating the hostility latent variables as seen in Figures 2 and 3.

**Measurement of Depression.** A latent variable of depression was created using two subscales: Depressive Symptoms and Interpersonal Troubles. These subscales were derived by exploratory factor analysis with promax rotation. Both subscales were created using items from the Center for Epidemiological Studies–Depression scale (CES-D; Radloff, 1977). For this study a modified Iowa form was used that has only 11 items, but this shorter form retains its reliability and the factor structures of the four symptom dimensions of the original (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). Both husbands and wives responded to these 11 items based on a 3-point Likert scale ranging from 1 (never) to 3 (most of the time). Sample questions include: “I felt depressed”; “People were unfriendly”; and “I could not get ‘going.’” Possible scores range from 11 to 33. Higher scores indicate higher levels of depression. Past research with this scale has indicated Cronbach’s alpha reliability coefficients to be .85 in the general population and .90 in the clinical population (Radloff, 1977). For this sample, reliability was found to be .82 for wives and .78 for husbands.

**Physical health measurement.** Participants were asked to rate their health using 15 items from the RAND Health Survey 1.0 (RAND Health Sciences Program, 1992; Vanderzee et al., 1996), including items related to physical functioning, role limitations due to physical health, and pain. The original measure (RAND 36-Item Health Survey 1.0) was reduced to 15 items
because of concerns about questionnaire length, creating four subscales. Items selected for the SEM model included: “How would you rate your health?” with a 5-point Likert scale ranging from 1 (poor) to 5 (excellent) to assess general health. The other four items used as indicators for the latent variable of health, after using exploratory factor analysis with a promax rotation, came from the General Health subscale asking whether they believed they get sick more easily than others (factor loadings: wife .76, husband .75), are as healthy as others (factor loadings: wife .70, husband .68), if they believe they will get worse (factor loadings: wife .69, husband .76), and if they believe their health is excellent (factor loadings: wife .95, husband .78). For more information on the RAND Health Survey see Appendix D. The RAND Health Survey is easy to use, patient-friendly, and meets strict criteria for reliability and validity (Brazier et al., 1992). The reliability coefficient (Cronbach’s alpha) was found to be .81 for the General Health subscale (Vanderzee, Sanderman, Heyink, & de Haes, 1996). The physical health data were taken from Wave 2 of the Flourishing Family data, thus creating a longitudinal study. The Wave 1 physical health data was also used as a control in the SEM model using the same five items as Wave 2.

**Model**

As can be seen in Figure 1, each partner’s latent variable of hostility was measured by four indicators all taken from coding of the observational marital task. The latent variables for depression in each partner were composed from two self-reported measures of depression. The latent health variables were created from five self-reported measures of health. The choices of these variables are based on previous research findings suggesting that physical health may be indirectly affected by depression levels. The model was designed to determine whether these
indirect effects are responsible for poor physical health, or whether there is also a direct path between hostility and physical health of the partners.

**Results**

The purpose of this study was to determine whether observed hostile marital interactions significantly predicted marital partners’ physical health directly or indirectly through depression. The means, standard deviations, Cronbach’s alpha inter-rater reliability coefficients for coding, scale reliability coefficients for questionnaires, and factor loadings on latent variables are all shown in Table 2. With this being a community sample, one concern was whether there would be enough variation in the Hostility codes. As can be seen in the table, the ranges for every code varied from 1–9 indicating good variation. Wives tended to have higher hostility scores at Wave 1 than did husbands, especially for wife Hostility, which had the largest standard deviation ($M = 2.88, SD = 2.78$) and the third highest inter-rater reliability score ($\alpha = .85$). As seen in the t-test scores (see Table 3), wives were significantly higher on hostility, angry coercion, and contempt than were husbands (2.88 vs. 2.45, 1.76 vs. 1.43, and 2.15 vs. 1.90). Overall, the mean scores for all of the hostility scales were considered low for an IFIRS scale, which is what was expected for this community sample (as opposed to a clinical sample) of couples.

Insert Table 2 Here

Depression mean scores and standard deviations between husbands and wives were also similar to one another, with only a .03 difference between the mean scores and .01 difference between standard deviations for wife Interpersonal Problems ($M = 2.34, SD = .64$) and husband Interpersonal Problems ($M = 2.37, SD = .65$). Husbands had a slightly greater range for the Depressive Subscale (9–24) than did wives (9–22), but still had a slightly lower mean score of 12.31 to wives’ mean score of 12.48, and they had a smaller standard deviation ($SD = 2.74$)
compared to wives ($SD = 2.86$) on this self-reported measure. Table 3 shows the results of paired samples t-tests for the measures. Husbands were more likely than wives to report that they got sick more easily than most people (3.78 vs. 3.99, when reverse scored), and wives were more likely than husbands to report they were as healthy as other people (3.99 vs. 3.78).

The General Perceived Health items all had relatively high mean scores with the lowest being husbands’ As Healthy as Others ($M = 3.78$, $SD = 1.22$). Husband mean health scores were only slightly lower than the wife mean health scores. The mean scores were high on health and depression and low on hostility, most likely because the sample was taken from the community (as opposed to a clinical sample) and the majority of adults were in the age range from late 30s to late 40s, and thus were not older and theoretically sicker people.

Insert Table 3 Here

**Correlations**

Strong support for the hypotheses was found in the significant correlation scores, which suggested the need for further investigation into predictive analysis. The correlations for all measured variables are shown in Table 4. The Hostility scales correlated with one another, as did the depression subscales and health items, except the health items did not correlate well between the sexes. These three major measures’ indicators also had significant correlation between themselves in many places. These are discussed in more detail below.

Insert Table 4 Here

The correlations most pertinent to the hypotheses were those between indicators of Hostility and General Health. If these correlated well with one another then further analysis would be justified. The husband General Health item was correlated with each of the husband and wife Hostility scales (e.g., wife Angry Coercion $r = -.13$; husband Angry Coercion $r = -.16$).
with the exception of wife Hostility ($r = -.08$). Results were the same on the husbands’ Will Get Worse (which was reverse coded) subscale (e.g., wife Contempt $r = -.22$; husband Reciprocate Hostility $r = -.21$), including a significant correlation with wife Hostility ($r = -.22$). However, the majority of the health items did not significantly correlate with Hostility scales (only 24 of the 80 possibilities). Most of these significant correlations were on the husbands’ General Health, Excellent Health, and Will Get Worse items.

Of secondary importance to the hypotheses was the relationship between the Hostility scales and depression subscales and between depression subscales and health items. Each of the husbands’ health items correlated significantly with his own depression (e.g., General Health and Depressive Symptoms $r = -.38$, As Healthy As Others and Interpersonal $r = -.38$), except for on the As Healthy As Others subscale with Depressive Symptoms ($r = -.18$). The wife General Health items correlated significantly with wives’ subscale Depressive Symptoms (e.g., General Health $r = -.33$; Will Get Worse $r = -.21$) except there was no significant correlation between wife Sick Easier and her Depressive Symptoms ($r = -.24$ ns).

The husband and wife depression subscales each correlated significantly with the wife Hostility score (e.g., wife Depressive Symptoms $r = .26$; and husband Interpersonal $r = .16$). The husbands’ two depression subscales correlated with each of his own Hostility scale scores (e.g., Depressive Symptoms and Hostility $r = .20$, Interpersonal and Reciprocate Hostility $r = .13$). The wives’ Depressive Symptoms subscale correlated similarly with most of the husband Hostility scores (e.g., wife Depressive Symptoms and husband Angry Coercion $r = .14$). One of the few things that did not correlate were the husbands’ Depression Symptoms subscale, which did not correlate with any of the wife hostility scores except Hostility ($r = .28$), but two of the wife hostile scores correlated with the husband Interpersonal subscale (Hostility $r = .16$, and
Reciprocate Hostility $r = .13$). These correlations were in the expected directions and of approximate expected strength. The strength of these correlations warranted further investigation for causal analysis and structural equation modeling.

**SEM Results**

The data from the measures mentioned in the Method section were analyzed using the Actor-Partner Independence Model (APIM; Kashy & Kenny, 1999; Kenny 1996; Kenny, Kashy, & Cook, 2006) with structural equation modeling (SEM). The APIM is a “model of dyadic relationships that integrates a conceptual view of interdependence in two-person relationships with the appropriate statistical techniques for measuring and testing it” (Cook & Kenny, 2005, p. 101). Structural equation modeling is an alternative to multiple regressions that uses path analyses and factor analysis to find relationships between latent constructs while accounting for measures of error. Using AMOS 16.0 (SPSS, 2007) structural equation modeling was used to determine the fit and scale properties of the regression paths within the structural model and its goodness of fit, which was adequate ($\chi^2 = 308.64, df = 342, p = .073, CFI = .992, RMSEA = .02$). The model was constructed after first identifying variables that would load adequately on each latent variable as seen in Figure 1. Latent variables were created for hostility, depression, and physical health in each partner. The General Perceived Health variables for Wave 1 and Wave 2 were derived from the same five items in the RAND scale. Wave 1 General Perceived Health acted as a control in the model because of its significant reactions. Other variables that were controlled for but were insignificant included: income, education, and length of marriage. Those variables which loaded for both partners and were above .55 were included in the structural equation model. As seen in Table 2, the lowest loading was 0.68 (husband Reciprocate Hostility). Exploratory factor analysis was used to determine whether the items in the CES-D
could be narrowed into subscales. Two of the items, "I felt that people disliked me" and "people were unfriendly," factored into one subscale called Interpersonal Trouble, while the other nine items factored into a second subscale called Depressive Symptoms (see Figure 1). For more information on the CES-D, see Appendix D. These subscales were used as indicators on the latent variable of depression for the husband and wife. There was very little missing data (less than 1%). Only two variables were missing one response; both were at Wave 1 under the husband health items: Get Sick Easier and Health Will Get Worse. These two missing items were handled through the use full information maximum likelihood in AMOS.

Figure 1 depicts the final variables that were used in the SEM model, with five items on each partner’s two latent variables of General Perceived Health (Waves 1 and 2), two subscales on each partner’s latent variable of depression, and four scales on each partner’s latent variable of Hostility. The final model, as seen in Figure 2, had an overall acceptable fit with $\chi^2 = 308.64$, $df = 342$, $CFI = .992$, and $RMSEA = .02$. Figure 1 depicts all of the variables and paths in the SEM model, while Figure 2 was simplified to show only significant paths with standardized betas.

There was no significant relationship between Wave 1 husband General Perceived Health and wife General Perceived Health nor any of the other Wave 1 variables. However, Wave 1 husband General Perceived Health was significantly related to his Wave 2 General Perceived Health ($\beta = .86, p < .001$). Wife Wave 1 and Wave 2 General Perceived Health variables had a similar significant path ($\beta = .83, p < .001$).
The first hypothesis was that the husband’s hostility will affect his own health (General Perceived Health) both directly and indirectly through his and his wife’s depression. Husband Hostility was significantly negatively related to his General Perceived Health directly ($\beta = -.20$, $p < .01$). As can be seen in Figure 2, husband Hostility also indirectly predicted the husband General Perceived Health, with Hostility being significantly positively related to Depression ($\beta = .22$, $p < .001$) and Depression being significantly negatively related to General Perceived Health ($\beta = -.27$, $p < .001$). Indirect effects were calculated using the Sobel test (Preacher & Hayes, 2008). Indirect effects for the path going through the husband’s Depression variable to his General Perceived Health were significant with a Sobel test = -2.23, $p = .025$. The wife’s Depression did not indirectly affect this relationship, because her Depression did not affect his General Perceived Health ($ns$). The null hypothesis was only partially rejected for this hypothesis.

The second hypothesis was that the husband’s hostility will affect his wife’s health both directly and indirectly through his and his wife’s Depression. The husband Hostility was not directly related to the wife General Perceived Health ($ns$). As can be seen in Figure 2, the husband Hostility did have a significant positive relationship to both wife Depression ($\beta = .16$, $p < .05$) and husband Depression ($\beta = .22$, $p < .001$). There is also a relationship between wife Depression and wife General Perceived Health ($\beta = -.15$, $p < .05$) but not between husband Depression and wife General Perceived Health ($ns$). Thus, there is an indirect effect between husband Hostility and wife General Perceived Health which is significant according to a Sobel test result of -1.98, $p > .05$. Thus, the null hypothesis was only partially rejected for this hypothesis.
The third hypothesis was that the wife’s hostility will affect her own health (General Perceived Health) both directly and indirectly through her and her husband’s Depression. The wife Hostility was not directly related to her own General Perceived Health ($\beta = -0.06 \, ns$). As can be seen in Figure 2 her Hostility did have a significant positive relation to her own Depression ($\beta = .14, \, p < .05$) but not husband Depression ($ns$); and there is a relationship between wife Depression and wife General Perceived Health ($\beta = -.15, \, p < .05$). There is not a significant path between wife hostility and husband Depression. The indirect path whereby the wife’s General Perceived Health was significantly related to her Hostility was only routed through her own Depression. This indirect path was significant with a Sobel test yield of $-1.15, \, p = .25$. Thus, the null hypothesis was only partially rejected for this hypothesis.

The fourth hypothesis was that the wife’s hostility will affect her husband’s health (General Perceived Health) both directly and indirectly through her and her husband’s Depression. Wife Hostility was not directly nor indirectly related to husband General Perceived Health. The null hypothesis was retained for this hypothesis.

In summary, husband Hostility affected his General Perceived Health indirectly through his Depressive Symptoms; the husband Hostility only affected wife General Perceived Health indirectly through her Depressive Symptoms; the wife Hostility affected her own General Perceived Health only indirectly through her own Depressive Symptoms; and finally the wife Hostility did not affect the husband General Perceived Health at all in the model.
Discussion

This discussion section will give an overview of how the findings and implications of this study are significant when applied to theories of power, depression, relationships, and general health. Marriage and family therapists will be able to apply these findings to principles of practice. Future research can use these findings to help them design and analyze their studies. Support for the validity of this study is strong based on sample size, coding/analysis, follow-up, and potential replicability. These strengths and others outweigh the limitations of the study and provide new evidence for the links between relationship behavior and individual physical and mental health.

How are the Results of this Study Different from Other Studies?

The results of this study both supported and differed from other studies researching similar relationships between variables. This study did not find a direct association between the husband’s hostility and his wife’s physical health, like another study which found that the husband’s higher score on a self-report hostility scale was associated with his wife’s increased systolic blood pressure when measured during an observed marital interaction (Smith & Brown, 1991). Instead the current study found that the wife’s health was affected only indirectly through her depression. However, in a manner similar to Smith and Brown’s results, there was no direct association between the wife’s hostility and the husband’s physiological response when controlling for health at Wave 1. The difference may be attributable to the fact that Smith and Brown (1991) only assessed for physical changes in the persons at the time of the marital interchange and not one year later. Perhaps hostility has a delayed effect in some instances or affects individuals or a gender differently. A slow accumulation of depression over the year because of the hostility may possibly contribute to the measured decline in health.
Self-reported health declines in women in this study were found to occur indirectly through the husband’s or wife’s hostility as channeled through the wife’s depression. Smith and Brown (1991) found no reactivity in the wife to her own hostility. Another study found women with high levels of anger or anxiety/depression were less likely to have positive vasodilation and more likely to score higher on an indicator of carotid atherosclerosis (Harris et al., 2003). This was similarly validated in another study with post-menopausal women who scored high on anger (Matthew, Owens, Kuller, Sutton-Tyrrell, & Jansen-McWilliams, 1998). This difference in findings could be because of the differences in measurements of hostility versus anger. Again, issues of immediate change versus long-term follow-ups could also be affecting the results, or the younger average age of the present study respondents (45 men, 43 women) to those in Matthew et al. and Harris et al., who were post-menopausal. The present study’s older average age compared to the younger average age of Smith and Brown’s sample (men 27, women 25) may also have influenced results. The difference could also be the difference in health measurements.

The sample measured in this study used a community sample, like others (e.g., Brown & Smith, 1992; Harris, Matthews, Sutton-Tyrrell, & Kuller, 2003; Miller et al., 1995; Ruiz, Uchino, & Smith, 2006; Siegman et al., 2000; Smith, Allred, Morrison, & Carlson, 1989; Smith & Brown, 1991; Niaura et al., 2000; Surwit et al., 2002) and still found significant results, as did those that used more clinical samples (e.g. Lawson, 2008; Paivio & Bahr, 1998). In this study, however, there were no direct effects between the husband’s hostility and his wife’s health decline. In the present study the findings that hostility affected physical health differed from the findings of Candell (1994), who completed telephone interviews with couples who had an average age of 41. Candell concluded that dominance alone did not have an effect on physical
health. Perhaps if Candell had included depression, then a relationship could have been found, or perhaps the results differ because Candell only measured dominance or because data were gathered only through phone interviews.

**The Role of Gender and Tasks**

One advantage of this study is its use of both male and female samples who were married to one another, and its measurement of not only male but also female hostility. Most other studies have used all-male or mostly male samples; relatively few included both males and females (Smith, 2003). The current study does appear to corroborate other studies’ results that hostility in marital interactions is stressful enough in some instances to affect the physical health of both partners negatively, and in other instances indirectly affects physical health negatively through depression. However, the differences that were found, by gender, in this study suggest that husbands and wives may have varying vulnerabilities to hostility in marital interactions. This may be explained by differences in sociality or even physiology.

The finding that a husband’s hostility affected his own physical health is probably the most universally verified finding of this study (e.g., Brown & Smith, 1992; Sanders, Smith, & Alexander, 1991; Siegman, Kuzbarsky et al., 2000; Siegman et al., 2000; Smith & Brown, 1991; Smith & Gallo, 1999; Smith, Ruiz, & Uchino, 2000). But no previous study had included depression as a factor to discover its indirect effects. However, contrary to other studies, women in this study had the highest levels of observed hostility in the discussion tasks compared to the men, who are usually found to be more aggressive and coercive in their speech (e.g., Ball et al., 1995; Kollock et al., 1985). Why women were not directly affected by their own hostility is unknown and deserves further investigation in future studies.
The difficulty of the partner interaction task used in a study is known to create greater cardiovascular responses in hostile men (Contrada, Wright, & Glass, 1984). In addition, topics discussed in the interaction tasks can affect the behavior and reactions of participants when assessing for hostility’s effects on health (Smith, Ruiz, & Uchino, 2000). For example, when male participants believe that they have more to lose or gain, then they are more likely to use hostility and have increased systolic and diastolic blood pressure (Smith, Allred, Morrison, & Carlson, 1989). The tasks used in the present study did not involve high stakes, and were not designed to provoke specific responses of hostility. The discussion questions instead focused on more positive and developmental aspects of the couple’s relationship as opposed to commonly used problem-solving tasks in which couples are asked to discuss topics that are known to be conflictual for them. If hostility was detected in this study’s non-provoking tasks then it seems plausible that even greater hostility would be evoked in a problem-solving situation as real-life often presents. The women in this study may have scored higher on hostile scales because they were discussing safe topics that allowed for them to express feelings of animosity more directly. Nevertheless, measures of hostility in even these low-risk interaction tasks were sufficient to predict physical health declines in both men and women over time.

**Effects of Depression and Gender**

Hostility in marital interactions was found to affect the husband’s physical health directly and wife’s physical health indirectly through depression. This difference could be an indicator of how husbands and wives process information differently or perceive and internalize external forces differently. Men of every age group from community samples seem to be affected by hostility: a younger average age of 23.8 (Smith et al., 2000), an older average age of 54 (Everson et al., 1997), and a median average age of 45 in the present study. Compared to women, men
have always shown more heightened risk of cardiovascular problems because of their own hostility (e.g., Brown & Smith, 1992; Smith, 2003).

The men with hostile behaviors may have seen decreases in their health after one year because of the negative psychophysiological processes they endured, like heightened cardiovascular responses, which have been validated in numerous studies (e.g., Brown & Smith, 1992; Sanders et al., 1991; Siegman, Kubzansky et al., 2000; Siegman et al., 2000; Smith & Brown, 1991; Smith & Gallo, 1999; Smith, Ruiz, & Uchino, 2000). On the other hand, in the present study women’s hostility seemed to affect their own health only as routed through their own depression; in other studies women’s anxiety and anger seemed directly to affect women’s health (Harris et al., 2003; Matthew, Owens, Kuller, Sutton-Tyrrell, & Jansen-McWilliams, 1998). Perhaps anxiety is similar to the depression in its effect on health.

The hostility of each partner was significantly related to his or her own depression and to his or her partner’s depression in the model—with the exception of the effect of the wife’s hostility on her husband’s depression. Depression is a factor that cannot be ignored in marital couples. Its presence in the husband or wife, as found in this study, seems to be a primary means whereby hostility directly or indirectly affects their own or their partner’s general physical health.

**Implications for Theory**

The hypothesized connection between hostility, depression, and physical health has been validated in this study. Previous research had connected depression, physical health, and hostility in the three possible dyads, but all three had never been combined in a model for direct examination. Theory suggests that hostility does negatively affect physical health, so it was somewhat surprising to find that the neither the husbands’ nor the wives’ hostility directly
affected the spouses’ health. Future studies may use the results of this study to justify including mood variables similar to the depression variable measured herein. The findings of this study do support theories suggesting that mental and physical self-reports are associated and a person suffering from depression may be at greater risk of health declines.

The results of this study add in a small way to theories that psychophysiological arousal occurs in men when hostility is demonstrated by their wives (Gottman & Levenson, 1988). Men become angry more often than their wives and refer to things that were said by their wives as the provocation for their own behavior (Witte, 2005). Any such arousal in men is apparently not permanent and does not affect the men over the long term.

The theory that the husband’s hostility negatively affects him was reinforced, but it is peculiar that wives do not share this same sensitivity. Perhaps because wives have a higher mean on the hostility scales, hostility appears to influence husbands more. Perhaps the women in this sample would have shown just as high or higher effects if the men in this study had higher hostility scores. Perhaps the sampling of men in this study did not demonstrate a high enough measure of hostility to produce necessary results. Perhaps a more clinical sample of men who were in unstable relationships or a more anger inducing task would have provided results more consistent with this theory and the second hypothesis. No studies have been identified that show women are more vulnerable than men to varying levels of hostility. Apparently women convert hostility into feelings of depression, which then adversely affects their health. It may also be true that some women or men have learned to shield themselves from hostility, and that these coping factors help buffer the relationship between hostility and health; similar to how those who have higher parasympathic vagal regulation appear to be more immune to hostility’s usual effects on physical health (Whitson et al., 2003). Another theory that may need further investigation but
was not sustained in the current study is that women are better able than men to process their aroused emotions in healthy ways over a one year period because of better coping skills or socialization of the genders (Smith & Brown, 1991). Instead it seems that women suffer more depression as hostility is present. There is a scarcity of theory on how the wife’s hostility and aggression affects her own or her husband’s health. Theory according to this study’s results suggests that women’s hostility does not negatively affect the husband’s health but does have the potential to hurt her own.

Another theory that was not sampled for, but could be true, is that hostile men may have suffered in their health as a result of not having as many emotionally supportive friends or support systems on which to depend in times of emotional crisis (Callaghan & Morrissey, 1993). The socialization of husbands and wives, marital factors, social context, and cardiovascular reactivity have all been suggested as reasons for why we may see differences in results (e.g., Smith & Brown, 1991; Brown & Smith, 1992). Length of marriage, education, and income were all controlled for in this study and did not affect results so this theory may not be completely accurate. In summary, husbands and wives may exhibit different types of hostility, may be socialized to cope with them in varying ways, and may have varying physiological vulnerabilities which explain more positive or negative effects on their perceived general health after one year.

**Implications for Marriage and Family Therapy Practice**

An important implication of the findings of this study for clinicians is that even minimal hostility can have a serious impact on clients’ health, and that it should be avoided even in low doses across time. Perhaps more emphasis in therapy should be placed on changing seemingly innocuous hostile behaviors that can be detrimental over time. As measured in this study the
hostile behaviors likely to affect the physical health of partners are angry coercion, contempt, hostility, and reciprocating hostility. Couples who delay counseling while demonstrating these behaviors may have health declines in as little as a year’s time.

Therapists will also want to pay better attention to how partners are internalizing the hostile interactions and whether or not it is contributing to their depression. Clinicians may want to treat the depression simultaneously with the hostility in the relationship, and make consumers aware of how depression may be affecting their health. Therapists who can help clients lessen their depression earlier may help these persons stay healthier in not just a mental way but physically as well. Steps to do this might include addressing sources of hostility in their lives and recognizing how it contributes to depression.

Previous studies have shown that more hostile males benefit from psychotherapy because of how it helps them to confront their insecurities and inadequate self-esteem (Friedman & Ulmer, 1984). Therapists should be aware that the hostility and high stress tend to be results of the hostile person’s “attributing hostile intent to the actions of others” and essentially driving them away (Smith & Glazer, 2006, p. 25). Therapists may want to help men identify these factors and construct better coping skills and support systems to deal with stressors that could exacerbate the effects of hostility. In addition, hostile males do appear to be somewhat more susceptible to psychological issues like depression (Harbin, 1989).

This sample most likely contains a few clinical families who may have had a greater presence of hostility and physical health problems, but individuals with physical health problems may also have been less likely to complete the tasks or enroll in the research project in the first place. That findings were consistent with several of the hypotheses in such a normal and non-clinical sample makes it appear as though hostility has a rapid and powerful effect on people’s
health. In practice, therapists can assume that their population of clinical couples will have more pronounced problems than those sampled in this study. Therapists may want to educate patients about the results of this study, and in part orient clinical practices towards reducing hostility, as well as making patients aware of how it affects their physical and mental health.

**Recommendations for Research**

A more clinical sample for future studies may be composed of non-married couples, since previous findings have found that physical violence is more than twice as likely among cohabitating couples as among married individuals (Russell & Hulson, 1992). Studies in the future may also look for more dyadic effects to see if effects are worse when both partners are hostile, or if one partner is significantly less hostile than another. It is also of interest that female hostility did not significantly correlate with male hostility, suggesting little relationship between the two variables.

Future studies may use more objective means of observing a person’s physical health and assessing for known cardiovascular risk factors like smoking. However, other studies have found results that suggest that even when all other cardiovascular risks and even biological risks are controlled for, hostility remains a danger to physical health (e.g. Harris et al., 2003; Matthew et al., 1998; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Julkunen et al., 1994; Siegman et al., 2000). Less ambiguous measurements of health may be used in future studies, but it is also noteworthy that despite their limitations, self-reports may be better in some ways for measuring health, because there are so many things that would have to be measured or that could change in a person’s physiological make-up that a participant’s personal observations may be more sensitive than tests could ever be. A combination of the two might be the best choice.
That the findings of this study were detected after just one year of time suggests that hostility has a rapid effect on its actors. Whether it takes longer for some of hostility’s affects on physical health to become present will have to be determined by future studies. The other hypotheses of this study may eventually be able to reject the null hypothesis if more years are allowed to elapse. Future studies may use even more distant waves of the *Flourishing Families* data to create a latent growth curve model, which may show even greater linkage between factors.

Future studies may also consider the results of recent studies suggesting the importance of considering which of the two spouses initiates the topics discussed (Caughlin & Vangelisti, 1999), who participates in the discussion, and what the overall nature of the conflict structure looks like (Newton & Sanford, 2003; Vehofstadt, Buysse, De Clercq, & Goodwin, 2005). More research needs to be done regarding female hostility, but the results of this study, with a community population of married females, suggest that women do not suffer from hostility as men do; at least not over the course of one year. A future study may want to investigate more closely different extremes and types of hostility, with more specific measures of psychological abuse.

Ideas from this study that could be further investigated include asking why the wife’s perceived physical health was only affected indirectly by her and her husband’s hostility when routed through her depression; why the husband’s hostility also indirectly affected his own health; and why the husband’s hostility directly affected his own health. It is possible that depression may have already been present in the relationship despite any hostility and perhaps there are still other variables that would show mediating or indirect affects between hostility and health. Perhaps future studies could identify other variables at work in this context that protect
women from their own hostility. Researchers may also discover that these women route stress to other parts of their lives, which may affect them adversely or in other ways.

**Strengths and Contributions of this Study**

The findings of this study have extended previous findings regarding how hostility can affect the health of partners in a relationship. That this study was the first of its kind to use SEM to verify relationships between hostility, depression, and physical health gives it a clearer picture of the interrelationships between variables. Another contribution of this study was its use of a large sample of both husbands and wives. Other pluses included its use of observational coding scales and its one year follow-up. This study’s model offers additional evidence that a decline in health can happen rapidly as perceived by the participant in a self-report measure.

**Strength of measures.** This was the first published study to use the IFIRS in examining links between hostility and health. Previous studies have primarily assessed hostility using self-report measures (Smith, Glazer, Ruiz, & Gallo, 2004), but a few have assessed for hostility by observing a person’s style of response (i.e., Type A) in a structured interview (Rosenmann, 1978). The Interpersonal Hostility Assessment Technique (IHAT) (Brummett, Maynard, Haney, Siegler, & Barefoot, 2000; Haney, Maynard, Houseworth, Scherwitz, Williams, & Barefoot 1996) also uses a structured interview where the participant is asked challenging questions and observed in his style, as well as in expressions of disgust or anger (Brummett et al., 1998). The two self-report instruments most commonly used for hostility studies include the Cook-Medley Hostility Scale (Cook & Medley, 1954) (e.g., Chaput et al., 2002; Gottdiener et al., 2003; Harris et al., 2003; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Niaura et al., 2000; Smith & Brown, 1991; Suarez et al., 1998; Surwit et al., 2002) and the Buss-Perry Aggression Questionnaire (Buss & Perry, 1982) (e.g., Baron et al., 2007; Ruiz, 2006), which are both self-
report measures. The Cook-Medley Hostility scale was adapted for some studies but is a 50-item component of the Minnesota Multiphasic Personality Inventory—a self-report instrument that each respondent completes independent of his or her partner. No studies have been identified that have measured hostility between partners using an observational coding system (Smith & Glazer, 2006), making this study exceptional because it eliminates the more obvious problems of self-report instruments that are always present even when they are reliable and do have good internal validity (Shedler, 1993). In addition, this study is the only one of its kind to look for effects on both marital partners while using observational measures.

Its results, which were gathered in only one year, also give powerful support for future predictions that clinicians and researchers can make with regard to how hostility will affect marital partners in the future. The fact that the physical health results were based on self-reports only adds to the strength of the argument, because it is more common for individuals to minimize rather than aggrandize their reports of health (Shedler, 1993). The large sample size, the use of a community sample of both husbands and wives, and the use of an observational coding system all stand out as strengths of this study. The present study also used marital interactions that were allowed to happen in a natural setting during a discussion task that was not a problem-solving task.

**Limitations**

Partners were interviewed in their homes and they were asked to answer common questions that couples tend to discuss, yet it is possible that filming the couples may have changed the way they normally act. The questions on the index cards were contrived, the video camera was openly visible, and couples were under a time constraint that may have resulted in
hurrying through important issues that might normally have created more or less contentious demonstrations of hostility.

Self-report scales may be a poor means of assessing true mental health (depression) in an individual, and may be measuring only psychological defensive mechanisms such as denial in certain persons (Shedler, 1993). Self-report scales have suffered from the complexities of being able to assess appropriately that which clinicians can detect in interviews and observation (Loevinger & Ossorio, 1959). This does raise concerns about assessing for physical health with self-report measures because of the risk of minimization and failure to report. The self-reports of physical health in this study may have been affected by people minimizing or exaggerating their levels of health, thus giving false impressions of a person’s health (Smith & MacKenziem, 2006). We do not know exactly what about any participant’s physical health was actually in decline. More specific or additional measures may have had different results or revealed more information and shed more light on associations, mediators, or moderators associated with the variables in the SEM.

Conclusion

The purpose of this study was to determine if hostility and its indirect effects through depression were associated with a decline in physical health in marital partners over a limited period of time. The findings of this study appear to confirm that hostility, either directly or indirectly, does have the capacity to reduce physical health in partners. That this study assessed both marital partners and sampled males and females makes it valuable for understanding emotional, physical, and behavioral issues with regard to gender. Partners who neglect to correct hostility may ultimately see a decline in their own or their partner’s health. More research in this area will continue to turn up explanations for this phenomenon, and future studies may be able to
determine how longer periods of time will influence some of the gender effects seen in this sample. Apparently men are most at risk of experiencing physical health declines if hostility is present in the relationship, as evidenced by measured declines after just one year from observed hostility in themselves or their wives.


References


RAND Health Sciences Program. (1992). *RAND 36-item health survey 1.0*. Santa Monica, CA: RAND.


Rosenberg, E. L., Ekman, P., Jian, W., Babyak, M., Coleman, R. E., Hanson, M., . . .


among subjects with impaired glucose tolerance. New England Journal of Medicine, 344, 1343–1350.


Table 1.

Demographic Characteristics of Sample

<table>
<thead>
<tr>
<th></th>
<th>Husbands M(SD)</th>
<th>Wives M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age at Time 1</strong></td>
<td>45.38(6.10)</td>
<td>43.49(5.32)</td>
</tr>
<tr>
<td><strong>Age at Time 2</strong></td>
<td>46.45(6.03)</td>
<td>44.56(5.70)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>96.3%</td>
<td>96.9%</td>
</tr>
<tr>
<td>Cohabiting</td>
<td>3.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
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<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>86.4%</td>
<td>82.8.0%</td>
</tr>
<tr>
<td>African American</td>
<td>5.1%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Asian American</td>
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<td>4.4%</td>
</tr>
<tr>
<td>Other</td>
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<td>2.0%</td>
</tr>
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<td>3.7%</td>
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<tr>
<td><strong>Education</strong></td>
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<td></td>
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<td>4.4%</td>
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<tr>
<td>Some College</td>
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<td>23.7%</td>
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<tr>
<td>Bachelor’s Degree</td>
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<td>41.4%</td>
</tr>
<tr>
<td>Grad/Professional Degree</td>
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</tr>
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<td><strong>Household Income</strong></td>
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<td>Time 2</td>
</tr>
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<td>Under $15000</td>
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<td>2.4%</td>
</tr>
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<td>$15,001–24,999</td>
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<td>5.8%</td>
</tr>
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<td>$25,000–49,999</td>
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<td>$50,000–74,999</td>
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<td>$150,000+</td>
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<td>4.1%</td>
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<tr>
<td>Missing</td>
<td>3.0%</td>
<td>1.4%</td>
</tr>
<tr>
<td><strong>Family Size</strong></td>
<td>4.37 (1.03) 3–9 range</td>
<td>4.42 (1.00) 3–9 range</td>
</tr>
</tbody>
</table>
Table 2. Means, Standard Deviations, Range, Alpha Coefficients, and Factor Loadings for All Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>(SD)</th>
<th>Range</th>
<th>Interrater Reliability/α</th>
<th>Factor Loading on Latent Variable</th>
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<tr>
<td><strong>Wife Hostility T1</strong> (Time 1—Observed Interaction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife Hostility</td>
<td>2.88</td>
<td>(2.78)</td>
<td>1–9</td>
<td>.85</td>
<td>.92</td>
</tr>
<tr>
<td>Wife Angry Coercion</td>
<td>1.76</td>
<td>(1.38)</td>
<td>1–9</td>
<td>.80</td>
<td>.75</td>
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<tr>
<td>Wife Contempt</td>
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<td>(1.70)</td>
<td>1–9</td>
<td>.83</td>
<td>.90</td>
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<tr>
<td>Wife Reciprocate Hostility</td>
<td>1.39</td>
<td>(1.16)</td>
<td>1–9</td>
<td>.82</td>
<td>.58</td>
</tr>
<tr>
<td><strong>Wife Hostility T1</strong> (Time 1—Observed Interaction)</td>
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<tr>
<td>Husband Hostility</td>
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<td>.76</td>
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<td>(1.11)</td>
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<td>.75</td>
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<tr>
<td>Husband Contempt</td>
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<td>(1.48)</td>
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<td>.88</td>
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<td>Husband Reciprocate Hostility</td>
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<td>(1.02)</td>
<td>1–9</td>
<td>.81</td>
<td>.68</td>
</tr>
<tr>
<td><strong>Wife Depressive Symp. T2</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive Subscale</td>
<td>12.48</td>
<td>(2.86)</td>
<td>9–22</td>
<td>.81</td>
<td>.80</td>
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<tr>
<td>Interpersonal Troubles</td>
<td>2.34</td>
<td>(.64)</td>
<td>2–4</td>
<td>.54</td>
<td>.74</td>
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<tr>
<td><strong>Husband Depressive Symp. T2</strong></td>
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<td>Depressive Subscale</td>
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<td>(2.74)</td>
<td>9–24</td>
<td>.77</td>
<td>.75</td>
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<tr>
<td>Interpersonal Troubles</td>
<td>2.37</td>
<td>(.65)</td>
<td>2–4</td>
<td>.58</td>
<td>.71</td>
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<tr>
<td><strong>Wife General Health T2</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>General Health</td>
<td>3.87</td>
<td>(.90)</td>
<td>1–5</td>
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<tr>
<td>Get Sick Easier than Most (R)</td>
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<td>(.94)</td>
<td>1–5</td>
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<td>.76</td>
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<tr>
<td>As Healthy As Others</td>
<td>3.99</td>
<td>(1.03)</td>
<td>1–5</td>
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<td>.70</td>
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<td>Health will Get Worse (R)</td>
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<td>(.92)</td>
<td>1–5</td>
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<td>.69</td>
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<tr>
<td>Health is Excellent</td>
<td>3.94</td>
<td>(1.05)</td>
<td>1–5</td>
<td>.84</td>
<td>.95</td>
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<tr>
<td><strong>Husband General Health T2</strong></td>
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<tr>
<td>General Health</td>
<td>3.85</td>
<td>(.82)</td>
<td>1–5</td>
<td>.69</td>
<td>.85</td>
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<tr>
<td>Get Sick Easier than Most (R)</td>
<td>4.46</td>
<td>(.81)</td>
<td>1–5</td>
<td>.73</td>
<td>.75</td>
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<td>3.78</td>
<td>(1.22)</td>
<td>1–5</td>
<td>.65</td>
<td>.68</td>
</tr>
<tr>
<td>Health will Get Worse (R)</td>
<td>4.17</td>
<td>(.96)</td>
<td>1–5</td>
<td>.80</td>
<td>.76</td>
</tr>
<tr>
<td>Health is Excellent</td>
<td>3.90</td>
<td>(1.05)</td>
<td>1–5</td>
<td>.74</td>
<td>.78</td>
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</table>

*Note.* (R) means item was reverse coded
Table 3. Results of Paired Samples $t$-tests for Gender (husband vs. wife) Differences (296 couples)

<table>
<thead>
<tr>
<th>Paired Variable</th>
<th>$t$</th>
<th>$p$ value</th>
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</thead>
<tbody>
<tr>
<td>Observed Interaction</td>
<td></td>
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</tr>
<tr>
<td>Hostility*</td>
<td>4.66</td>
<td>.000</td>
</tr>
<tr>
<td>Angry Coercion*</td>
<td>4.24</td>
<td>.000</td>
</tr>
<tr>
<td>Contempt*</td>
<td>2.74</td>
<td>.007</td>
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<tr>
<td>Reciprocate Hostility</td>
<td>1.06</td>
<td>.292</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive Symptoms</td>
<td>.94</td>
<td>.346</td>
</tr>
<tr>
<td>Interpersonal Problems</td>
<td>.45</td>
<td>.654</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
</tr>
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*Husbands and wives were significantly different from each other
Table 4. Correlations of All Measured Variables

\(^1 p < .05\), \(^2 p < .01\), \(^3 p < .001\)

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Variables

1. FHostility T1
2. FAngry Coercion T1
3. FContempt T1
4. FReciprocate Hostility T1
5. MHostility T1
6. MAngry Coercion T1
7. MContempt T1
8. MReciprocate Hostility T1
9. FDepressive Symptoms T2
10. FInterpersonal T2
11. MDepressive Symptoms T2
12. MInterpersonal T2
13. FGenHealth T2
14. FSick Easier T2
15. FAsHealthy T2
16. FWill Get Worse T2
17. FExcellent Health T2
18. MGenHealth T2
19. MSick Easier T2
20. MAsHealthy T2
21. MWill Get Worse T2
22. MExcellent Health T2

\(^1 p < .05\), \(^2 p < .01\), \(^3 p < .001\)
Figure 1. SEM Model of Hostility with All Variables
Figure 2. SEM Results with Standardized Betas for Statistically Significant Paths in Model. Beta Weights

\*p < .05, \**p < .01, \***p < .001

\[\chi^2 = 308.64, \text{df} = 342, p = .073, \text{CFI} = .992, \text{RMSEA} = .02\]
Appendix A

Consent to be a Research Subject

Introduction
This study is being conducted by members of the Flourishing Families Project, with researchers from Brigham Young University. You were selected as a possible participant family for this study because your child is a 10-13 year-old in the Seattle area.

Procedures
Participation in this study involves an in-home interview that will last approximately 2 ½ hours. In this interview we will explain the study to you and give you a series of surveys for you and your child to complete. These surveys will ask you questions about your family, how you relate with each other, your family goals, and other aspects of your family life. The surveys will take about 1 ½ hours for parents and about 40 minutes for the child to complete. During this visit we will also have your family do some discussion activities. We will video tape these discussions (with the interviewer leaving the room) so we can better record your responses. Also, as part of your participation, we are asking that you sign a release form to provide the Flourishing Families Project with access to your child’s school record information (e.g., grades, WASL, truancy, and attendance). Local school districts will only release your child’s information with parental consent. Your child’s school record information will remain confidential and will only be used in conjunction with the purpose of the study outlined here.

Risks/Discomforts
There are minimal risks for participation in this study. However, you may feel emotional discomfort when answering questions about personal beliefs or family interaction patterns. When participating in the video-taped activities, it is possible that you may feel uncomfortable when talking in front of others. The researchers will not be in the room during your family discussions.

Benefits
There are no direct benefits to subjects. However, it is hoped that through your participation researchers will learn more about family life and be able to assist educators and professionals who serve families.

Confidentiality
All information provided will remain confidential and will only be reported as group data with no identifying information. All data, including questionnaires and tapes/transcriptions from the discussion activities, will be kept in a locked storage cabinet and only those directly involved with the research will have access to them. After the research is completed, the questionnaires and tapes will be destroyed.
Compensation
Participants will receive Visa cash cards for completing the questionnaire. Your family will receive Visa cash cards totaling $200 dollars (a $150 card will be given for parent participation, and a $50 card will be given to your child). During the interview you may decline to answer questions; however, both parents and the child must complete at least 80% of the interview to receive the Visa cash card compensation.

Participation
Participation in this research study is voluntary. You have the right to withdraw at any time or refuse to participate.

Questions about the Research
If you have questions regarding this study, you may contact Dr. Randal D. Day at 801-422-6415, day@byu.edu or Dr. James M. Harper at 801-422-3819, james_harper@byu.edu.

If you have questions you do not feel comfortable asking the researcher, you may contact Dr. Renea Beckstrand, IRB Chair, at (801) 422-3873, or at renea_beckstrand@byu.edu.

CONSENT SIGNATURES

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

Signature: ___________________________ Date: ____________
Parent

Signature: ___________________________ Date: ____________
Parent

RESEARCHER STATEMENT

I have discussed the above points with the child. It is my opinion that the participant understands the risks, benefits, and procedures involved with participation in this research study.

Signature: ___________________________ Date: ____________
Interviewer

Respondent Copy
Consent to be a Research Subject

CONSENT SIGNATURES

I have read, understood, and received a copy of the above consent and desire of my own free will to participate in this study.

Signature:_______________________________________       Date:_____________

Parent

Signature:_______________________________________       Date:_____________

Parent

RESEARCHER STATEMENT

I have discussed the above points with the child. It is my opinion that the participant understands the risks, benefits, and procedures involved with participation in this research study.

Signature:________________________________________      Date:______________

Interviewer
Appendix B

IOWA FAMILY INTERACTION RATING SCALES

Dyadic Interaction Scales Used

Hostility (HS): the extent to which hostile, angry, critical, disapproving rejecting or contemptuous behavior is directed toward another interactor’s behavior (actions), appearance, or personal characteristics. Also includes behaviors coded #2 through #7 below.

Contempt (CT): a specific form of hostility characterized by disgust, disdain, or scorn of another interactor.

Angry Coercion (AC): control attempts that include hostile, contemptuous, threatening, or blaming behavior.

Reciprocate Hostile (RH): extent to which the focal reciprocates in like manner the hostility of another interactor.

The Iowa Family Interaction Rating Scales

(Underlined scales are considered for use in this study)

A. Individual Characteristic Scales

1. Physically Attractive (PA)
2. Humor/Laugh (HU)
3. Sadness (SD)
4. Anxiety (AX)
5. Whine/Complain (WC)
6. Externalized Negative (EX)
7. Positive Mood (PM)
8. Defiance (DF)
9. Compliance (CP)
10. Rater Response (RR)
B. Dyadic Interaction Scales

1. Hostility (HS)

2. Verbal Attack (VA)

3. Physical Attack (AT)

4. Contempt (CT)

5. Angry Coercion (AC)

6. Escalate Hostile (EH)

7. Reciprocate Hostile (RH)

8. Dominance (DO)

9. Lecture/Moralize (LM)

10. Interrogation (IT)

11. Denial (DE)

12. Warmth/Support (WM)

13. Endearment (ED)

14. Physical Affection (AF)

Rating Scales 1 1998 ii

15. Escalate Warmth/Support (EW)

16. Reciprocate Warmth/Support (RW)

17. Assertiveness (AR)

18. Listener Responsiveness (LR)

19. Communication (CO)

20. Prosocial (PR)

21. Antisocial (AN)
22. Avoidant (AV)

C. Dyadic Relationship Scales

1. Silence/Pause (SP)

2. Relationship Quality (RQ)

**HOSTILITY**

1 = Not at all characteristic:

The focal displays no examples of hostile, angry, critical, disapproving, sarcastic or rejecting behavior, or hostile actions.

2 =

3 = Minimally characteristic:

The focal infrequently displays evidence of low-intensity hostility, but it is quickly abated. Examples of low-intensity hostility are mild criticism with minimal negative affect, an occasional abrupt remark, a scowl or frown, a cynical smile, and in children particularly, a taunt or tease. Physical behaviors include an occasional light push or shove.

4 =

5 = Somewhat characteristic:

The focal sometimes displays examples of low-level or moderately intense hostility, such as curt or irritable responses, mild rejection, or some moderately intense criticism or anger. The intensity of the negative affect helps to distinguish the appropriate score; includes infrequent but moderately intense hostility. Young children who respond to parental behaviors with moderately irritable or angry behaviors would also be scored at this level.
6 =

Rating Scales 2  1998

56

7 =  Moderately characteristic:

The focal fairly often shows hostility or demonstrates more intense and/or prolonged critical comments, such as some shouting, and several curt or sarcastic remarks. The focal may also show more intense rejection or rebuffing of the other person’s requests for assistance or affection. The focal may also show more denigration or mocking. Even a single instance of hostility may be scored ‘7’ if it is of relatively high intensity. Evidence of hostility includes yelling and/or physically aggressive behaviors toward the other person.

8 =

9 =  Mainly characteristic:

The focal frequently displays behaviors that are angry, critical, disapproving, and/or rejecting. There may be a relatively high degree of shouting, angry tones of voice, heavy use of sarcasm to denigrate the other, sharp or frequent criticism or mocking. The focal may be highly rejecting and rebuff parental attempts at contact (i.e., young children). The focal can be enraged and inflamed, but does not need to be this extreme in order to be coded a ‘9’. One extremely intense instance of hostility, e.g., a burst of inflamed name calling, or a burst of physically aggressive behaviors toward the other person, may be scored ‘9’.

CONTEMPT

1 =  Not at all characteristic:
The focal displays no signs of contempt toward the other interactor.

2 =

3 = Minimally characteristic:

The focal infrequently shows evidence of contempt toward the other interactor. However, such behavior is of low frequency and intensity.

4 =

5 = Somewhat characteristic:

The focal sometimes expresses contempt toward the other interactor. Such behavior is of low to moderate frequency or intensity. Even one instance of contempt may be scored ‘5’ if it is of moderate intensity.

6 =

7 = Moderately characteristic:

The focal fairly often expresses contempt toward the other interactor that is of low to moderate intensity. Even one instance of contempt may be scored ‘7’ if it is of relatively high intensity.

8 =

9 = Mainly characteristic:

The focal frequently expresses contempt toward the other interactor. Such behavior is of quite high intensity. However, even one instance of extremely intense contempt may be scored ‘9’.

ANGRY COERCION

1 = Not at all characteristic:

The focal demonstrates no signs of angry-coercive or manipulative behavior.
2 =

3 = Minimally characteristic:
The focal rarely demonstrates angry-coercive behaviors. Such behaviors are mild and quickly abated; they are the exception rather than the rule.

4 =

5 = Somewhat characteristic:
The focal sometimes displays angry-coercive behaviors. He/she sometimes behaves in a way that is manipulative in order to get what he/she wants. Angry-coercive behaviors may occur intermittently but tend to be of only low or moderate duration. More extreme behaviors rarely, if ever, occur. If of moderate intensity, one angry-coercive behavior could be scored ‘5’.

6 =

7 = Moderately characteristic:
The focal fairly often displays angry-coercive characteristics. Angry-coercive behaviors may be commonplace. The focal may infrequently include verbal and physical threats, refusals, or prohibitions to influence the other. If quite intense, even a single occurrence of Angry Coercion may be scored ‘7’.

8 =

9 = Mainly characteristic:
The focal frequently displays angry-coercive behaviors. Most, if not all of the previously mentioned behaviors, including physical or verbal threats, may be characteristic of the focal’s interactive style. An individual may be scored a ‘9’ because of the intensity of the behavior, such as physical or verbal threats, OR
because he/she frequently attempts to change the behavior of the other in a hostile or contemptuous fashion during part of the interaction.

**RECIPIOCATE HOSTILITY.**

1 = Not at all characteristic:

No reciprocation of hostility is present or the other interactor displays no hostility.

2 =

3 = Minimally characteristic:

The other interactor initiates hostility but the focal rarely reciprocates. The focal generally attempts to de-escalate the conflict by using humor or ignoring the other’s comments. When the other interactor behaves hostilely toward the focal, the focal may respond in kind, either immediately or after a slight delay. However, the presence of such reciprocations is rare and the intensity is at a low level.

4 =

5 = Somewhat characteristic:

The focal sometimes displays hostile, contemptuous, or angry-coercive behaviors in response to such behavior from another interactor. The focal usually does not contribute to making the disagreement heated and may engage in diffusing the conflict. The hostile or angry-coercive behavior by the focal must closely follow hostile behaviors of the other, i.e., must be reciprocated immediately or within a short period of time. A nonverbal action or gesture may take the place of a reciprocating verbal comment. For example, a facial expression of disgust in response to another’s hostile remarks may reciprocate conflict. The hostile response could involve a different topic of discussion or type of action, but appears
to be triggered by the other’s hostility.

6 =

7 = Moderately characteristic:

The focal fairly often reciprocates with hostile, contemptuous, or angry-coercive comments or behaviors. Such reciprocations may be fairly hostile on more than one occasion. The focal usually does not attempt to diffuse the conflict. There may be instances, however, when hostility is not reciprocated. Especially in activity-based tasks with young children these interactions may depend on conflictual nonverbal responses as well as verbal exchanges with the other person.

8 =

9 = Mainly characteristic:

On many occasions, the focal reciprocates hostile, contemptuous, or angry-coercive comments or behaviors. There may be periods in the interaction in which focal’s responses are very hostile, as an attack-counterattack interaction. There are few, if any, instances in which the focal makes an attempt to diffuse conflict. Reciprocation of hostility and/or coercion is evident on numerous occasions throughout the task.
Appendix C

Marital Task Questions:

1. How long have we known each other? How did we meet? What were some of the things that first attracted us to each other?

2. When and how much do we see each other? How satisfied are we with the amount and quality of our time together?

3. What do we each find most enjoyable, pleasant or rewarding about our relationship? What recent experiences have we especially enjoyed together?

4. How satisfied are we with the way we handle household responsibilities? What would we like to change about how we handle these responsibilities?

5. How often and when do we usually disagree with each other? What happens when we disagree? How often does one or the other of us get angry or pout?

6. What was one of our last disagreements? What did each of us say or do? Are we happy or unhappy with the way we handled this disagreement?

7. What do we especially like or admire about each other? Why is that?

8. Do we tell each other when we are sad, worried or have a problem? Why or why not? What does the other one do or say?

9. What was something each of us did recently to help, support, or make life easier for the other?

10. How has our relationship changed or stayed the same since we first met? How might it change in the future?

11. How do we get along with people in each other’s family? Why is this? What would you like to change about these relationships?

12. What positive or good things happened to each of us this past year? How did these experiences affect our relationship?

13. How do we get along with each other’s friends? What would you like to change about these friendships?

14. What’s the most important thing a parent can do in raising a child? How much do we agree or disagree about childrearing?

15. How do we each feel about our financial situation? How much do we agree or disagree about spending or saving money?
16. How happy is each of us with the work we do? Would we change anything? Why or why not?

17. How happy is each of us with the education we received? Would we change anything? Why or why not?

18. What do we hope our live will be like in the future? Do we think this will happen? Why or why not?

19. What most frustrates us about each other and our relationship? What do we most value about each other and our relationship?

20. Please talk more about these questions until the interview returns.
Appendix D

Sections from *The Flourishing Family Codebook* on Health and Depression Items

**Depression Items**

- Method section summary paragraph
  
  *Depression*. Parent’s level of depression was assessed based on physical, emotional, and behavioral symptoms (CES-D, Radloff, 1977). Parents responded to 11 items based on a 3-point Likert scale ranging from 1 (never) to 3 (most of the time). Sample questions include “I felt depressed”, “People were unfriendly” and “I could not get ‘going’”. Questions 5 and 8 were reverse coded so that higher scores indicate higher levels of depression. Past research indicates Cronbach’s Alpha reliability coefficients to be .85 in the general population and .90 in the clinical population (Radloff, 1977). For this sample, reliability was found to be P1 = .815 (P2 = .775).

- Conceptual Justification: It is hypothesized that some family processes co-vary with depression in individual family members. For example, marital conflict and dysregulation are likely related to mothers’ depression. Constraining family implicit rules will be likely related to children’s depression. We will also be able to determine how family members’ depression covaries since there is some evidence that depression is “contagious” in families.

- Historical Information: An assessment of depression based on physical, emotional, and behavioral symptoms. This questionnaire was originally made up of 20 questions. Items 1, 3, 4, 5, 8, 9, 10, 13, and 17 were removed for this survey due to concerns about questionnaire length. In addition, the original scale had 4 options for respondents: “1- Rarely or none of the time,” “2- Some or a little of the time,” “3- Occasionally or a moderate amount of the time,” and “4- Most or all of the time.” However, in this project, respondents answered statements about the past week related to depressive symptoms which were coded on a 3-point Likert scale ranging from “1 = never” to “3 = Most of the time.”

- Questions 5 and 8 were reverse coded so that higher scores indicate higher levels of depression.

| Variable Values: | | |
|------------------|------------------|------------------|------------------|
| 1=Never | 2=Some of the time | 3=Most of the time | |
| Variable Name | Item Label | Freq. | Freq. |
| P1Dep1_1 | I did not feel like eating; my appetite was poor. | 500 | 343 |
| P1Dep2_1 | I felt depressed. | 500 | 343 |
| P1Dep3_1 | I felt everything I did was an effort. | 499 | 344 |
| P1Dep4_1 | My sleep was restless. | 500 | 344 |
Based on means (not sums)
Maximum: P1 = 2.55 (P2 = 2.45)
Minimum: P1 = 1.00 (P2 = 1.00)
Mean: P1 = 1.4113 (P2 = 1.3406)
Standard Deviation: P1 = .31224 (P2 = .27517)

Health Items

- Method section summary paragraph

  Physical Health. The adult’s level of health was assessed using 15 items from the RAND Health and Survey 1.0 (VanderZee et al., 1996), including items related to physical functioning, role limitations due to physical health subscale, and pain subscale. Parents responded to 1 question about general health based on a 5-point Likert scale ranging from 1 (poor) to 5 (excellent). The question was, “How would you rate your health”. Parents responded to 10 items based on a 3-point Likert scale ranging from 1 (Yes, limited a lot) to 3 (No, not limited at all). Sample questions include, “Walking one block” and “Lifting or carrying groceries”. Higher scores indicate fewer limitations on physical functioning, or better physical well-being. Parents answered 4 yes or no questions about problems in their daily activities or work in the past 4 weeks they had difficulty with because of their physical health. Sample questions include, “Accomplished less than you would like” and “Were limited in the kind of work or other activities”. Parents responded to 2 items ranging from 1 (not at all) to 5 (extremely). A sample question is, “How much bodily pain have you had during the past 4 weeks?”. Parents responded to 4 questions based on a 5-point Likert scale ranging from 1 (definitely false) to 5 (definitely true). Negative items were reverse coded so that higher scores indicate better general health. Reliability coefficients (Cronbach’s Alpha) were found to be .81 for General Health, .88 for Pain, .92 for Physical Functioning, and .90 for Role limitations (VanderZee, Sanderman, Heyink, & de Haes, 1996). Similarly, in this sample reliability coefficients were found to be .778 for P1 and .664 for P2 (General Health), .851 for P1 and .752 for P2 (Pain), .881 for P1 and .837 for P2 (Physical Functioning), and .921 for P1 and .932 for P2 (Role Limitations).

- Conceptual Justification: This measure assesses the level of health of the adults in the household. Little is known about the role of inner family life constructs and how those processes contribute to the physical well-being of adult family members over time. There have been several key studies that have taken a snap-shot, cross sectional view of this research question. However, little is known about how a battery of family processes may
work together to provide answers about the relationship between health and family functioning.

- **Historical Information:** Participants were asked to rate their health. The original measure (RAND 36-Item Health Survey 1.0) was reduced to include items 1 (general health), 3-12 (physical functioning subscale), 13-16 (role limitations due to physical health subscale), 21-22 (pain subscale), and 33-36 (general health subscale) because of concerns about questionnaire length. Responses were based on a 5-point Likert scale ranging from 1 = poor to 5 = excellent. Item P1Hlth1a_1 also falls under the General Health Items subscale but consists of a different response scale.

### General Health Items

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Label</th>
<th>Item Freq. P1</th>
<th>Item Freq. P2</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1Hlth1a_1</td>
<td>How would you rate your health?</td>
<td>499</td>
<td>343</td>
</tr>
</tbody>
</table>

Respondents answered questions about activities they might do in a typical day and to what degree that their health limits them in these activities. Participants responded on a 3-point Likert scale ranging from 1 = Yes, limited a lot to 3 = No, not limited at all.

- Numbers 18 and 20 were reverse coded so that higher scores indicate better general health. Higher scores indicate fewer limitations on physical functioning, or better physical well-being.

- Respondents answered questions about how true or false the following statements were for them. Participants responded on a 5-point Likert scale ranging from 1 = Definitely false to 5 = Definitely true.

### General Health Items

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Label</th>
<th>Item Freq. P1</th>
<th>Item Freq. P2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>ID</td>
<td>Description</td>
<td>Count</td>
<td>Code</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>P1Hlth18d_1</td>
<td>I seem to get sick a little easier than other people.</td>
<td>500</td>
<td>344</td>
</tr>
<tr>
<td>P1Hlth19d_1</td>
<td>I am as healthy as anybody I know.</td>
<td>500</td>
<td>344</td>
</tr>
<tr>
<td>P1Hlth20d_1</td>
<td>I expect my health to get worse in the near future.</td>
<td>499</td>
<td>344</td>
</tr>
<tr>
<td>P1Hlth21d_1</td>
<td>My health is excellent.</td>
<td>500</td>
<td>344</td>
</tr>
</tbody>
</table>

Based on means (not sums)

- **Maximum:** P1 = 5.00 (P2 = 5.00)
- **Minimum:** P1 = 1.25 (P2 = 1.50)
- **Mean:** P1 = 4.0513 (P2 = 4.1010)
- **Standard Deviation:** P1 = .81322 (P2 = .71618)