

**Dispositional Forgiveness and Health in Romantic Relationships:  
An Exploration of Sex Differences, Actor Effects, and Partner Effects**

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## **Abstract**

The individual and dyadic associations between dispositional forgiveness of self, others, and situations and mental and physical health in individuals involved in romantic relationships were examined. Sex differences in the relationship between dispositional forgiveness and health were examined. Sex differences in the dyadic relationship between forgiveness and health were also examined. The dispositional forgiveness scores of 297 partners involved in a romantic relationship were used to predict their own as well as their partners' physical and mental health. Both members of the relationship separately completed an Internet-based questionnaire assessing personality traits, relationship variables, and physical and mental health. The couple was provided with monetary compensation. Analyses revealed that women's dispositional forgiveness of self, others, and situations were positively associated with their own physical and mental health. Similarly, men's dispositional forgiveness of self, others, and situations were positively associated with their own mental and physical health. At the individual level, there were no sex differences in the relationship between dispositional forgiveness and health, nor were there sex differences in men and women's reports of dispositional forgiveness. Analyses revealed that men's forgiveness of others and situations were positively associated with their female partners' mental health. There were no partner effects for women or for physical health. The implications of these results for research in the forgiveness-health literature and research on forgiveness in romantic relationships were discussed as were directions for future research.

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## **Introduction**

## Dispositional Forgiveness and Health in Romantic Relationships:

### An Exploration of Sex Differences, Actor Effects, and Partner Effects

Research examining the determinants of health has expanded beyond the traditional risk factors for developing adverse health outcomes, such as smoking, diet, and disease (Smith, Orleans, & Jenkins, 2004), to include psychosocial factors that may affect health, such as negative emotions and personality characteristics. In terms of health promotion and prevention of disease, a report commissioned by the Canadian Psychological Association (Hunsley, 2002) concluded that there was persuasive evidence that, not only are intervention services designed to address psychosocial factors cost-effective, but that some psychological treatments may be more effective in treating illness than traditional pharmacological interventions. One psychosocial factor that researchers have advocated studying in relation to mental and physical health is forgiveness (McCullough, 2000; Thoreson, Harris, & Luskin, 2000). To people who have been hurt, forgiveness may offer closure to painful relationship transgressions, which may have implications for mental and physical health (Fincham & Beach, 2000). In this study, I examined the association between a tendency towards forgiveness and health in individuals, as well as in their relationship partners. In so doing, I tested individual and dyadic models of the dispositional forgiveness-health relation using the Actor Partner Interdependence Model (APIM; Kenny, Kashy, & Cook, 2006) within the context of long-term romantic relationships. As a brief overview, the model contained actor effects, which predicted that the actor's level of dispositional forgiveness would influence his or her own physical and mental health outcomes. The model also included partner effects, which predicted that the actor's level of dispositional forgiveness would influence his or

her partner's health, and vice-versa. The presence of both actor and partner effects would suggest that both relationship partners' dispositional forgiveness has an effect on the individual's health. Figure 1 presents the model that was tested.

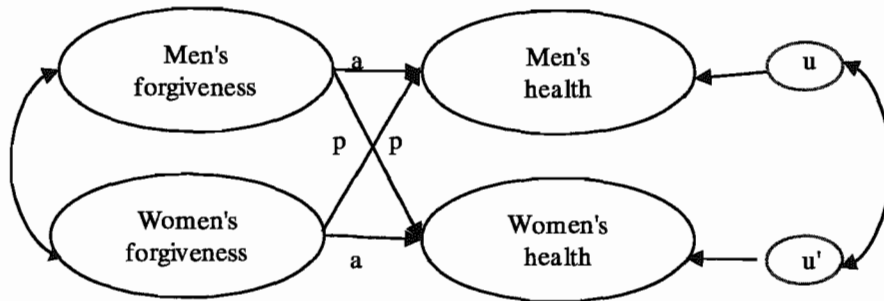


Figure 1. The APIM (Cook & Kenny, 2005; Kenny et al., 2006) of dispositional forgiveness and health.  $u$  = residual/unexplained portion of male partner's health scores.  $u'$  = residual/unexplained portion of female partner's health scores. Paths labelled as  $a$  and  $p$  indicate actor and partner effects, respectively.

Hoyt and McCullough (2005) suggested that “because of its relationship-enhancing potential, the capacity for forgiveness may well be an important indicator of both relational and individual health” (p. 110). Breen, Kashdan, Lesner, and Fincham (2010) have also made reference to the relationship-enhancing and interpersonal nature of forgiveness in promoting well-being. Indeed, research has shown that dispositional forgiveness is positively related to self-reported mental health, self-reported physical health, and physiological indices of health (Worthington et al., 2007). Although it is likely that dispositional forgiveness may have some positive consequences for both individual and relational health, research examining the impact of forgiveness on health among romantic relationship partners is limited to a handful of studies. In addition to the

paucity of research, the studies that have examined the relationship between forgiveness and health in long-term romantic relationships have either ignored the importance of including both members of the romantic relationship or, when both members were included in the study, have used inappropriate data analysis strategies that do not take into consideration the fundamental statistical assumption of independence.

In the current research I moved beyond speculation about the health benefits of dispositional forgiveness within long-term romantic relationships and attempted to offer research support for a dyadic model of forgiveness and health. Initially, I attempted to replicate past research by presenting and testing an intraindividual model of dispositional forgiveness and health. I presented and tested a dyadic model of dispositional forgiveness and health using the APIM, which takes into account nonindependence between the scores of relationship partners. I also examined sex differences in dispositional forgiveness and evaluated whether the relationship between dispositional forgiveness and health was the same for men and women by estimating sex differences in the relationship between dispositional forgiveness and health within the proposed APIM. In conducting this research, I contributed novel information about the potential impact of a general tendency towards forgiveness on both individuals and their partners. I also contributed to the literature examining the forgiveness-health relation by investigating this relationship in couples using a unique statistical framework, and to the literature assessing sex differences in forgiveness by including sex differences as a primary focus of the research design.

This research has several basic and applied implications. For example, in a therapeutic context, mental health counsellors may be able to enhance the likelihood of

forgiveness among unforgiving partners by drawing their attention to the deleterious effects that a general tendency towards unforgiveness can have on the self and on a significant other. In addition, if research supports positive effects of forgiveness following interpersonal and intrapersonal transgressions, treatment and preventative measures incorporating forgiveness could become feasible (Toussaint & Webb, 2005b).

In terms of the theoretical significance of this research, if the predicted model is supported by the data, future researchers could be encouraged to include potential actor and partner effects in their working models of forgiveness and health in romantic relationships. As noted by Kashy and Grievant (1999), it is vital that relationship researchers learn and apply the statistical techniques developed for dyadic data analysis in their research with couples. Moreover, if the hypothesized model is supported by the data, the truly interpersonal nature of forgiveness that has been suggested by others (e.g., Hoyt & McCullough, 2005; Baumeister et al., 1998) would gain further support/credence. As noted by Kenny and Cook (1999), “[t]he presence of partner effects is perhaps the most fundamental indication of interdependence in a close relationship” (p. 446). If the interdependence model (Cook & Kenny, 2005; Kenny et al., 2006) of dispositional forgiveness and health is not supported, this research could still be important because it could potentially validate the practice of taking a primarily intrapersonal approach to assessing dispositional forgiveness.

The presence of actor effects, that is, the association between one individual’s dispositional forgiveness score and his or her health score, would replicate the past research that has found that dispositional forgiveness is associated with physical and mental health at the intrapersonal level. The presence of partner effects; that is, the effect



of one individual's forgiveness scores on his/her partner's health, would extend the previous research and demonstrate a relationship at the interpersonal level between dispositional forgiveness and mental and physical health.

### **Operational Definition of Forgiveness and Measurement Issues**

In order to test whether forgiveness is a psychosocial factor that may contribute to positive individual and relational health outcomes, forgiveness must first be defined.

Worthington, Witvliet, Pietrini, and Miller (2007) have hypothesized that there are several different kinds of forgiveness. Worthington et al. distinguish among intrapersonal forgiveness, decisional forgiveness, and emotional forgiveness.

Intrapersonal forgiveness is defined as an internal process that can involve decisional forgiveness, emotional forgiveness, or both. Decisional forgiveness refers to an individual's decision regarding how she/he intends to behave toward a transgressor. As noted by Miller and Worthington (2010),

decisional forgiveness has an emphasis on controlling one's behaviour and does not necessarily involve changes in cognitions, emotions, or motivation. However, emotional forgiveness involves replacing negative, self-focused unforgiving emotions (e.g., resentment, hostility, anger, fear) with positive other-oriented emotions (e.g., compassion, empathy, love) (p. 13).

My objectives in this research included reducing construct-irrelevant variance by measuring forgiveness at the dispositional level and measuring forgiveness across multiple targets. Given these objectives, I operationally defined forgiveness using the Heartland Forgiveness Scale (HFS; Thompson et al., 2005). As such, dispositional forgiveness, the focus of the present study, was operationally defined in this research as

*the framing of a perceived transgression such that one's responses to the transgressor, transgression, and sequelae of the transgression are transformed from negative to neutral or positive. The source of a transgression, and therefore the object of forgiveness, may be oneself, another person or persons, or a situation that one views as being beyond anyone's control (e.g., an illness, "fate," or a natural disaster) (Thompson et al., 2005, p. 318; italics in original).*

As demonstrated in the operational definition of forgiveness adopted in this research, forgiveness is a process that can be studied at multiple levels (Hoyt & McCullough, 2005). At one level of measurement, forgiveness is associated with a situation-specific event or offense and can, therefore, be referred to as situation-specific forgiveness. According to Hoyt and McCullough (2005), forgiveness processes can also be studied at the level of the relationship or dyad and an individual's "willingness to forgive a particular relationship partner is likely to be at least somewhat consistent across unique offenses that occur within that relationship" (Hoyt & McCullough, 2005, p. 114). Forgiveness can also be measured at the dispositional level and refers to "individual differences in the disposition to forgive that are at least somewhat consistent across relationships and offences within relationships (Hot & McCullough, 2005, p. 114). It has been argued that the premise underlying studies that correlate dispositional forgiveness with other trait-level variables, such as personality, psychopathology, and well-being, is that "some people are more forgiving (across a variety of relationships and specific transgressions) than are others and that this forgiving disposition is rooted in stable personality traits and has consequences for their mental health" (Hoyt & McCullough, p. 114). Although forgiveness measures can be specifically focused on the dyadic level of

forgiveness measurement, because I was interested in predicting scores on global measures of health, I decided to measure forgiveness as a disposition in order to reduce construct-irrelevant variance. As argued by Hoyt and McCullough, in order to accomplish this, “the level of measurement of variables must correspond to the level of analysis of the constructs in the research hypothesis. Scores derived from a different measurement level inevitably contain substantial construct-irrelevant variance” (Hoyt & McCullough, p. 114).

Another issue to consider when defining and measuring forgiveness is the target of forgiveness addressed in the research. Although most research on dispositional forgiveness has focused primarily on forgiveness of others, researchers (Thompson et al., 2005; Hall & Fincham, 2005; Toussaint & Webb, 2005a) have also advocated studying other targets of forgiveness, such as the self (Hall & Fincham, 2005; Thompson et al., 2005) and situations (Thompson et al., 2005). As noted by Thompson et al (2005), assessing multiple targets of forgiveness may be useful because research has suggested that some targets of forgiveness, such as the self, are stronger predictors of outcome variables, such as depression, than other targets of forgiveness.

In addition to testing a dyadic model of dispositional forgiveness of self, others, and situations and health, various measurement issues were also addressed in this research. Participants’ perceptions of their health-related quality of life was the outcome variable and this construct was assessed using the Short Form-36 (SF-36; Ware, Snow, Kosinski, & Gandek, 2000). Although the SF-36 has been considered the gold standard for assessing subjective ratings of health-related quality of life and is a well-validated and reliable measure (Jordan-Marsh, 2002), research has not been clear or consistent as to the

optimal way to analyze SF-36 data. A fundamental inconsistency has related to whether or not physical health and mental health should be operationalized as independent or related constructs. I attempted to further explore this measurement issue.

### **Forgiveness and Health**

In the following sections, an overview of the literature on forgiveness of others and health, self-forgiveness and health, and forgiveness of situations and health is provided. Several researchers (Brown, 2003; McCullough, 2000; Witvliet, Ludwig, & Vander Laan, 2001; Worthington & Scherer, 2004) have argued that a major limitation of research assessing the association between forgiveness and health has been that many studies have included measures of forgiveness that focus on a single transgression, yet, they have employed measures of health that focus on a comprehensive evaluation of mental and physical functioning. As examples, following forgiveness interventions, Coyle and Enright (1997) correlated men's levels of forgiveness of a partner who had undergone an abortion with broad measures of mental health, such as anxiety and grief; and Freedman and Enright (1996), correlated incest survivors' forgiveness of their abusers with global measures of depression and anxiety. Worthington et al. (2007) suggested that, while forgiveness of a specific offense may yield salubrious effects, the potential benefits may be even stronger when a person assumes a general disposition towards forgiveness and forgives multiple offences across various relationships.

Worthington and Scherer's (2004) observation that many studies are inconsistent when they use situation-specific measures of forgiveness and global measures of mental and physical health is important. In the present study, their advice was followed by focusing on dispositional forgiveness as a predictor of global health and well-being.

It was also important to conceptualize and define forgiveness as a multidimensional construct because different targets of forgiveness may have differential relations with health (Hall & Fincham, 2005; Toussaint & Webb, 2005a; Worthington et al., 2007). As an example, it has been argued that the health effects of forgiving the self may be even stronger than those associated with forgiving others (Fincham, Hall, & Beach, 2006). However, in contrast to the growing literature on forgiveness of others and health, there has been relatively little research examining the health benefits (specifically, physical health) of other targets of forgiveness (i.e., self, situations) (Fincham & Hall, 2005; Ingersoll-Dayton & Krause, 2005).

There has been even less research that has examined more than one target of forgiveness within the same study as predictors of physical health and well-being. Wilson, Milosevic, Carroll, Hart, and Hibbard (2008) used a regression analysis to evaluate the unique and shared predictive effects of dispositional forgiveness of self and dispositional forgiveness of others to explain variance in self-reports of perceived physical health. In a sample of 266, predominantly female (81%), university students, Wilson et al. found that both forgiveness of self and forgiveness of others were associated with better reports of physical health and that the relationship between forgiveness of self and physical health remained significant after controlling for the effects of forgiveness of others. They did not find unique effects of dispositional forgiveness of others on health when the effects of dispositional forgiveness of self were controlled.

As part of a study examining the convergence and divergence of interpersonal strengths in a sample of 140, predominantly female (81%), university students, Breen et al. (2010) correlated the scores of undergraduate students on measures of other-

forgiveness, self-forgiveness, and forgiveness of situations with various indicators of personality (e.g., the Big Five), emotional vulnerability (e.g., depression), positive psychological processes (e.g., empathy), well-being (satisfaction with life), dispositional gratitude, and informant ratings. Breen et al. found that all targets of dispositional forgiveness were significantly correlated with the aforementioned variables. Wilson et al. (2008) and Breen et al. noted that any conclusions based upon the results of their research should remain tentative because they had not been replicated. Both of these sets of results should also be replicated with a more representative sample of the population because the limited number of men would likely affect the generalizability of these results as would the young age of the sample. In addition, likely due to their inability to recruit a sufficient sample of men to participate in this study, neither Wilson et al. nor Breen et al. tested for sex differences in forgiveness or health, which, as I have described in a later section of this dissertation, could confound the results of their analyses.

Toussaint and Friedman (2008) studied the association between gratitude, situation-specific forgiveness, dispositional forgiveness of self, others, and situations, and well-being in a sample of 72 psychotherapy outpatients. Toussaint and Friedman recruited an approximately equal number of female (51%) and male patients. Well-being was operationally defined by measures of happiness, life satisfaction, and affect balance. They found that all targets of dispositional forgiveness were significantly and positively associated with the aforementioned indicators of well-being. Of the dispositional forgiveness and situation-specific forgiveness measures, forgiveness of self was found to correlate strongest with the indicators of well-being. Although Toussaint and Friedman included almost equal numbers of men and women in their research, they did not report

whether or not they tested for sex differences on either the forgiveness or well-being variables.

In a sample of 280 undergraduate students (181 female, 99 male), Webb, Colburn, Heisler, Call, and Chickering (2008) found that dispositional forgiveness of self, situations, and others were all significantly and negatively related to depression. In comparing the magnitude of the correlations, Webb et al. found that forgiveness of others was a weaker predictor of depression than forgiveness of situations and forgiveness of self.

To summarize, the past research examining multiple targets of dispositional forgiveness as predictors of physical and mental health is promising and suggests that although all targets of dispositional forgiveness may be positively related to health, the less studied targets, such as forgiveness of situations and self-forgiveness, may account for a larger proportion of variance in health than the widely studied target, forgiveness of others. As such, in the present research, I have taken a multifaceted approach to exploring the relationship between dispositional forgiveness and health by including measures of forgiveness of self, others, and situations.

### **Forgiveness of Others and Health**

Regardless of whether forgiveness is conceptualized as a state or as a disposition, the majority of studies focusing on the relationship between forgiveness of others and health support a moderate, positive relationship between forgiveness of others and physical and mental health. In terms of mental health outcomes, researchers have found that situation-specific forgiveness of others is negatively related to depression (Freedman

& Enright, 1996; Hebl & Enright, 1993; Lawler, Younger, Piferi, Edmundson, & Jones, 2005; Orcutt, 2006; Orth, Berking, Walker, Meier, & Znoj, 2008), grief (Coyle & Enright, 1997), anxiety (Al-Mabuk Enright, & Cardis 1995; Coyle & Enright, 1997; Freedman & Enright, 1996; Hebl & Enright, 1993; Orcutt, 2006; Subkoviak, Enright, Wu, Gassin, Freedman, Olson, & Sarinopoulos, 1995;), psychological distress (Toussaint & Jorgensen, 2008), tension (Lawler et al., 2005), and perceived stress (Lawler, Younger, Piferi, Billington, Jobe, & Edmondson, 2003; Lawler et al., 2005; Orcutt, 2006).

Situation-specific forgiveness of others is positively related to life satisfaction (Bono, McCullough, & Root, 2008; McCullough, Bellah, Kilpatrick, & Johnson, 2001; Toussaint & Friedman, 2008; Toussaint & Jorgensen, 2008), happiness (Toussaint & Friedman, 2008), affect balance (Toussaint & Friedman, 2008) and hopefulness (Al-Mabuk et al., 1995; Freedman & Enright, 1996).

With respect to physical health outcomes, researchers have found that situation-specific forgiveness of others is negatively related to various physiological indices, such as stress-induced, blood pressure reactivity (Lawler et al., 2003), diastolic mean arterial pressure (Lawler et al., 2003), heart rate (Lawler et al., 2003; Witvliet et al., 2001; Witvliet, Worthington, Root, Sato, Ludwig, & Exline, 2008), blood pressure (Lawler et al., 2003; Witvliet et al., 2001), eyebrow tension (Witvliet et al., 2008), rate pressure product (Lawler et al., 2003), rate pressure product reactivity (Lawler et al., 2003), and positively related to sleep quality (Lawler et al., 2005). Researchers have also found that situation-specific forgiveness is negatively related to self-reported physical symptoms (Bono et al., 2008; Lawler et al., 2005), number of medications taken (Lawler et al., 2005), and somatic complaints (Lawler et al., 2005).



Similarly, it has been found that dispositional forgiveness of others is negatively related to depression (Breen et al., 2010; Brown, 2003; Krause & Ellison, 2003; Friedberg, Suchday, & Srinivas, 2009; Lawler et al., 2005; Lawler-Row & Piferi, 2006; Maltby, Macaskill, & Day, 2001; Mauger, Freeman, McBride, Perry, Grove, & McKinney, 1992; Seybold, Neumann, & Chi, 2001; Sternthal. Williams, Musick, & Buck, 2010; Thompson et al., 2005, Study 3b; Toussaint, Williams, Musick, & Everson 2008a; Toussaint, Williams, Musick, & Everson 2008b; Tse & Cheng, 2006; Tse & Yip, 2009; Webb et al. 2008; Witvliet, Phipps, Feldmen, & Beckham, 2004), anxiety (Exline et al., 1999; Friedberg et al., 2009; Maltby et al., 2001; Mauger et al., 1992; Seybold et al., 2001; Sternthal et al., 2010; Thompson et al., 2005, Study 3b), death anxiety (Krause & Ellison, 2003), psychological distress (Toussaint & Jorgensen, 2008; Toussaint, Williams, Musick, & Everson 2001), Posttraumatic Stress Disorder (Witvliet et al., 2004), tension (Lawler et al., 2005), and perceived stress (Friedberg et al., 2009; Lawler et al., 2003; Lawler et al., 2005; Lawler-Row & Piferi, 2006). Dispositional forgiveness of others has been positively associated with life satisfaction (Breen et al., 2010; Krause & Ellison, 2003; Thompson et al., 2005, Study 3b; Toussaint et al., 2001; Toussaint & Friedman, 2008; Toussaint & Jorgensen, 2008), happiness (Toussaint & Friedman, 2008), affect balance (Toussaint & Friedman, 2008), and subjective psychological well-being (Lawler-Row & Piferi, 2006; Tse & Yip, 2009).

In terms of physical health, researchers have found that dispositional forgiveness of others is positively related to self-reported general health (Lawler et al., 2005; Toussaint et al., 2001; Wilson et al. 2008), sleep quality (Lawler et al., 2005), and to better cholesterol profiles (Friedberg et al. , 2009). It has been reported that dispositional

forgiveness of others is negatively related to various physiological indices, such as stress-induced blood pressure reactivity (Lawler et al., 2003), blood pressure (Friedberg, Suchday, & Shelov, 2007; Lawler et al., 2003), number of medications taken (Lawler et al., 2005), and somatic complaints (Lawler et al., 2005).

To summarize, past research has suggested that both situation-specific forgiveness and dispositional forgiveness of others are positively associated with mental and physical health, such that individuals reporting higher levels of forgiveness of others have also tended to report better mental and physical health. The findings of the research that have employed physiological indices as outcome variables are particularly promising in that they suggested that situation-specific and dispositional forgiveness of others were associated with objective measures of health that did not share common method variance with self-reports of forgiveness and were also not as susceptible to the effects of social desirability as the self-report measures (Hoyt & McCullough, 2005).

### **Forgiveness of Self and Health**

It has been noted that the concept of self-forgiveness has received limited attention not only within the context of research on forgiveness in couples but also within the larger forgiveness research literature as a whole (Fincham et al., 2006; Wohl, DeShea, & Wahkinney, 2008). Fincham et al. made the observation that, although self-forgiveness

may seem unimportant in a dyadic context, it likely plays an important role in maintaining connectedness between partners in the aftermath of marital transgression. Just as interpersonal unforgiveness may drive a wedge between partners, so might unforgiveness of the self keep partners estranged, as the

perpetrator withdraws from his/her partner and becomes consumed by guilt and self-destructive thoughts (p. 424).

Hall and Fincham (2005) have argued that self-forgiveness is essential to healthy functioning and well-being. They have suggested that the consequences of not forgiving the self may be greater than those associated with a lack of forgiveness of others because difficulty forgiving the self may lead to self-destructive behaviours or self-estrangement; however, few studies have examined the potential mental and physical costs of not forgiving the self (Hall & Fincham, 2005).

Worthington et al. (2007) have hypothesized that self-forgiveness and forgiveness of others may differentially affect physical and mental health. Whereas low levels of self-forgiveness are likely associated with impaired self-care, depression, and anxiety, and may negatively impact motivation to rely on other coping mechanisms, such as seeking social support, according to these authors, forgiveness of others is more likely to be effective in influencing health because of its utility as a coping mechanism against the chronic, maladaptive stress of unforgiveness. Thompson et al. (2005) speculate about the salubrious effects of forgiveness on health, but do not differentiate between the targets of forgiveness in proposing that forgiveness of others, self, and situations are coping processes used by people to overcome the distress of transgressions.

As noted previously, Toussaint and Friedman (2008a) found that all three targets of dispositional forgiveness were positively related to well-being and forgiveness of self was the strongest predictor. In explaining this finding, they reasoned that because people are more critical of themselves than other individuals, “lack of self-forgiveness may have a dramatic downside for well-being, but for those who achieve it, the well-being payoffs

are equally pronounced” (p. 650).

Although less research has been conducted that has included forgiveness of self as a predictor of health outcomes than research that has included forgiveness of others, the studies that have been published have also tended to support the beneficial health effects of self-forgiveness. All of the published research examining the association between self-forgiveness and mental and physical health among non-romantic relationship partners has conceptualized self-forgiveness as a disposition, rather than exploring self-forgiveness for a single, specific transgression. This research has suggested that dispositional self-forgiveness is negatively related to depression (Breen et al., 2010; Exline et al., 1999; Ingersoll-Dayton, Torges, & Krause, 2010; Maltby et al., 2001; Mauger et al., 1992; Seybold et al., 2001; Toussaint et al., 2001; Toussaint et al. 2008a; Toussaint et al. 2008b; Webb et al., 2008; Witvliet et al., 2004), anxiety (Exline et al., 1999; Maltby et al., 2001; Mauger et al., 1992; Seybold et al., 2001; Sternthal et al., 2010; Witvliet et al., 2004), mood disturbance (Friedman, Romero, Elledge, Chang, Kalidas, & Dulay, Lynch, & Osborne, 2007; Romero, Kalidas, Elledge, Chang, Liscum, & Friedman, 2006), psychological distress (Toussaint et al., 2001), perceived stress (Seybold et al., 2001), and Posttraumatic Stress Disorder (Witvliet et al., 2004). This research has also shown that dispositional forgiveness of self is positively related to life satisfaction (Breen et al., 2010; Toussaint et al., 2001; Toussaint & Friedman, 2008), happiness (Toussaint & Friedman, 2008), affect balance (Toussaint & Friedman, 2008), and quality of life (Friedman et al., 2007; Romero et al., 2006).

Seybold et al. (2001), Toussaint et al. (2001), and Wilson et al. (2008) have been the only researchers who have examined self-forgiveness as a predictor of physical

health. Toussaint et al. found a significant, positive relationship between self-forgiveness and physical health in young and middle-aged participants, but not in older participants and Seybold et al. found that self-forgiveness was negatively related to physical complaints. As noted previously, Wilson et al. found that forgiveness of the self was a significant predictor of perceived physical health over and above the effects of dispositional forgiveness of others.

Although research has not specifically examined the relationship between self-forgiveness and well-being among romantic relationship partners, Tangney et al.'s (2005) research has suggested that while self-forgiveness may have had beneficial effects for the individual, self-forgiveness did not appear to have relationship-enhancing effects. Similar to past research, Tangney et al. found that dispositional self-forgiveness was positively associated with psychological well-being and negatively associated with psychological distress. However, across two independent samples, Tangney et al. found that individuals reporting higher levels of dispositional self-forgiveness also tended to appear more narcissistic, self-centred, and insensitive than those reporting lower levels of dispositional self-forgiveness. Moreover, self-forgiving individuals not only felt little remorse for their transgressions or empathy for their victims, but they were also more aggressive towards others when provoked to anger. Tangney et al. suggested that these features of self-forgiving individuals may cause distress to others in their interpersonal network. However, if, as Strelan (2007) has suggested, self-forgiveness requires individuals to take responsibility for their part in transgressions and not to place blame upon others, self-forgiveness could have positive effects within romantic relationships because forgiving the self following an interpersonal transgression could potentially

maintain connectedness between relationship partners and minimize self-destructive thoughts and emotions (Fincham et al., 2006). It appears that there is an inconsistency between Tangney et al.'s and Strelan's operational definitions of self-forgiveness in that Strelan emphasized taking responsibility for actions as a key component of the self-forgiveness process; whereas Tangney et al. operationalized self-forgiveness in terms of self-centred motivations and an apparent lack of insight into personal responsibility for actions. This inconsistency in operational definitions of self-forgiveness is likely related to Tangney et al.'s and Strelan's divergent hypotheses concerning the effects of self-forgiveness on romantic relationship partners.

To summarize, past research has suggested that dispositional self-forgiveness is positively associated with self-reports of mental and physical health, such that individuals reporting higher levels of self-forgiveness have also tended to report better mental and physical health. Unfortunately, there has been a lack of research that has employed physiological indices as outcome variables. Arguments have been raised promoting the positive role that self-forgiveness may play in the maintenance of health and well-being in romantic relationships and cautioning against the potentially negative effects of self-forgiveness on individuals involved in romantic relationships.

### **Forgiveness of Situations and Health**

Forgiveness of situations can occur when an individual's positive assumptions are violated and the individual reacts negatively to these situations (Thompson et al., 2005). Such situations are varied, but generally refer to uncontrollable and/or negative circumstances, such as chronic illnesses or natural disasters (Macaskill, 2008; Thompson et al., 2005). It should be noted that, while the constructs of forgiveness of others and

forgiveness of self have been generally accepted by forgiveness researchers, there has been some controversy concerning the concept of forgiveness of situations (Macaskill, 2008). Specifically, Macaskill has argued that, rather than forgiving situations, such as physical illnesses or natural disasters, individuals actually simply overcome their anger and accept these situations. However, others have argued that forgiveness of situations and acceptance are related, but not identical constructs. Breen et al. (2010) noted that

acceptance refers to the willingness to openly experience thoughts, feelings, physical sensations, and life events. Acceptance allows individuals to experience events fully and respond according to situational demands (p. 933).

They argued that, because an inherent component of forgiveness includes embracing “negative events while responding with intention and flexibility” (p. 933), acceptance and forgiveness should be related. Indeed, Breen et al. found a significant correlation between self-reported dispositional forgiveness of situations and acceptance (as well as significant relationships between acceptance and dispositional forgiveness of self and others); however, acceptance only explained 25% of the variance in forgiveness of situations, supporting the notion that these are related, yet unique constructs.

Macaskill (2008) also argued that because a situation “is not a moral agent that can be held responsible for its actions, a situation is, rationally, an inappropriate target to forgive” (p. 41). However, Thompson et al. (2001) have countered this argument by commenting that,

in instances in which one person might blame God (and potentially forgive God), another person might blame “the world,” “fate,” “life,” or the specific situation such as cancer or an accident. Thus, we consider forgiveness of situations to be a

component of dispositional forgiveness, which is related to, but distinct from, forgiveness of self and others (p. 11).

The counterargument raised by Thompson et al. (2001) highlights that targets of unforgiveness can be specific events or intangible concepts, such as fate. Although in real world settings, it may be more common for people to express forgiveness of self and forgiveness of others than forgiveness of situations, forgiving situations also appears to be a valid response to perceived transgressions. In addition, given that I chose to use a measure of forgiveness that was assumed to measure forgiveness of situations, the convention of referring to forgiveness of situations that was established by Thompson et al. was used in my research.

The scant amount of available research in this area has suggested that dispositional forgiveness of situations is negatively related to depression (Breen et al., 2010; Thompson et al., 2005; Webb et al., 2008) and anxiety (Thompson et al., 2005), and that dispositional forgiveness of situations is positively related to life satisfaction (Breen et al., 2010; Thompson et al., 2005; Toussaint & Friedman, 2008), happiness (Toussaint & Friedman, 2008), and affect balance (Toussaint & Friedman, 2008).

At present, there only appears to be one published study on the relationship between forgiveness of situations and physical health outcomes. DeWall, Pond, and Bushman (2010) found a negative relationship between diabetic symptoms and forgiveness of situations. The lack of research examining forgiveness of situations as a correlate of physical health is surprising given the relevance that forgiveness of situations could have in the case of physical illnesses. For example, individuals experiencing a chronic illness may blame other events and circumstances for the onset of their ill health



(Strelan, 2007; Thompson et al., 2005). Although a large body of research has examined the mental and physical health correlates of dispositional forgiveness of others, relatively little research has focused on self-forgiveness and even less research has focused on forgiveness of situations. Thus, an aim of the present study was to extend the previous research on the forgiveness-health relation by examining other-forgiveness, self-forgiveness, and forgiveness of situations as predictors of mental and physical health.

### **Romantic Relationship Theory and Research**

My proposed model, which suggests that a partner's tendencies towards forgiveness is positively associated with her/his own health outcomes and is also positively associated with her/his partner's mental and physical health was predicated upon concepts derived from interdependence theory (Thibaut & Kelley, 1986), such as the basis of dependence, which "describes the way partners affect one another's outcomes" (Rusbult & Van Lange, 2003, p. 355) and interpersonal dispositions, which refer to "actor-specific inclinations to respond to particular situations in a specific manner across numerous partners" (Rusbult & Van Lange, 2003, p. 367). Although a significant amount of research in psychology has focused on intrapersonal processes, a strong argument can be made for the study of interpersonal and interdependent processes (Kenny et al., 2006). For example, researchers (Cook & Kenny, 2005; Kenny & Cook, 1999; Kenny et al., 2006) have suggested that, within the context of romantic relationships, one partner's cognitions, emotions, and behaviours can influence the other partner's psychological and physical outcomes. This premise of interdependence has guided the current research.

That one partner's characteristics and traits have the potential to impact another's

outcome suggests that these traits are justly depicted as being relational and interdependent in nature (Kenny & Cook, 1999; Kenny et al., 2006). In describing the interdependent nature of the forgiveness process, Hannon, Rusbult, Finkel, and Kamashiro (2010) noted that,

Interdependence theory describes immediate, gut-level reactions as *given preferences*, in that they are self-oriented, asocial, and focus on the here and now (Kelley et al., 2003). People depart from self-oriented, given preferences as a result of *transformation of motivation*, a psychological process whereby victims take into account considerations extending beyond direct self-interest, including long-term goals, social dispositions and values, or concern for a partner's well-being. The modified preferences resulting from transformation are termed *effective preferences*; these preferences guide behaviour (p. 254).

Historically, research on romantic relationships in the field of psychology has typically been limited by the reliance on self-report responses from only one member of the romantic relationship (Robbins, Caspi, & Moffitt, 2000). This individual-level approach to the study of dyadic relationships is largely due to the fact that, until recently, many of the statistical techniques available to relationship researchers were based upon the assumption of independence (Kashy & Grotevant, 1999). Although valuable, especially when dyadic analysis techniques were not readily available, the individual approach to couples research and analysis neglects potential partner effects (Kenny et al., 2006). Statistical techniques have now been developed to address and control for the mutual influences inherent in dyadic data (Kenny & Cook, 1999; Kenny et al., 2006).

When nonindependence is determined as I would predict in an interdependent

process, such as forgiveness, the dyadic data analysis techniques developed by Kenny et al. (2006) should be implemented as a framework to analyze the data. However, other less than optimal techniques have frequently been used in the literature. These strategies, as outlined by Kenny et al., include ignoring the nonindependence, which can result in biased tests of statistical significance, discarding the data from one dyad member, collecting data from only one member of the dyad, treating the data as if they were collected from two separate samples, and, in experimental situations, preventing “nonindependence from occurring by ensuring that there is no social interaction between participants” (p. 47). Discarding the data from one dyad member and collecting data from only one member of the dyad results in a loss of precision, does not allow for the measurement of dyadic effects, and is problematic because different results would likely be obtained if a different member of the dyad were disregarded or ignored in the data collection and analysis process. Treating the data as if they were collected from two separate samples, as is often done with male and female members of a romantic relationship because they can easily be differentiated by their sex, presumes that there are sex differences “when in fact there may be no such differences” (p. 47). This strategy also results in a loss of power. The experimental approach to preventing nonindependence from occurring often takes the form of interacting with a computer simulation program or a research confederate, essentially taking the ‘social’ out of social sciences” (p. 47). Kenny et al. conclude their discussion of less than optimal data analytic strategies with the explicit statement that, “Researchers need to confront the reality of dyadic data and reject these individualistic strategies” (pp. 47-48).

In conclusion, the present dyadic research was guided by concepts developed

from interdependence theory, which highlight the dependent nature of dyadic interactions and the consequences of a person's actions on her partner's outcomes. In the past, researchers interested in analyzing dyadic data have implemented less-than-optimal methodology that did not take into account the dependent nature of their data.

Fortunately, data analysis techniques have now been developed that control for nonindependence and can be used with both members of a romantic dyad. In order to extend research on the forgiveness-health relationship within the context of long-term romantic relationships, these techniques were implemented in the present research.

### **Forgiveness and Health in Romantic Relationships**

As indicated earlier, forgiveness occurs at both the intrapersonal and interpersonal level (Baumeister, Exline, & Sommer, 1998; Breen et al., 2010; Miller & Worthington, 2010) and can have consequences for individuals and their relationships (Wallace, Exline, & Baumeister, 2008). Generally, the models of forgiveness that have been applied to research on couples focus on the individuals who have been betrayed rather than on the interaction between the partners (Gordon, Baucom, & Snyder, 2001). Specifically, with regard to health research, the majority of research studies in the literature have focused on the association between forgiveness and health in isolation from the interpersonal context in which the association occurs.

Given that some researchers (e.g., Hoyt & McCullough, 2005) have argued that forgiveness is solely an interpersonal process, it seems important to consider the association between forgiveness and health within interpersonal relationships. For example, it is possible that a forgiving disposition in one relationship partner would affect the health of the other partner. Thus, examining the effects of forgiveness on health

within the context of dyadic relationships would contribute to the growing body of literature in this area. Moreover, although most couples have to work through inevitable and intentional betrayals, the use of forgiveness is a common theme reported by couples that have been successful in coping with such transgressions (Gordon et al., 2001).

From an interpersonal standpoint, it has been argued that the tendency to forgive others may circumvent a vicious cycle of interpersonal events that could lead to depression. Coyne's (1976) interactional theory of depression suggests that patients experiencing depression are less likely to let go of negative interpersonal events, such as perceived transgressions, and are more likely to exhibit maladaptive social behaviours, which may "prevent them from receiving rewards from their social partners, and lead to depression" (Tse & Yip, 2009, p. 367). The tendency towards maladaptive behaviours could create a cycle of interpersonal events that is related to depression and encompasses interpersonal rejection and maladaptive behaviours. These negative interpersonal events could prevent individuals who experience depressive symptoms from forming and maintaining meaningful social relationships. A lack of supportive relationships could place these individuals at risk to become overly stressed when facing negative life events and could promote further depression (Tse & Yip, 2009).

Researchers have begun to address the issue of the interpersonal nature of forgiveness and health. Six studies have examined the relationship between forgiveness of others and physical (Berry & Worthington, 2001) and mental health (Berry & Worthington, 2001; DiBlasio & Benda, 2008; Karremans, Van Lange, Ouwerkerk, & Kluwer, 2003; Miller & Worthington, 2010; Rye & Pargament, 2002) within romantic dyads, and one study (Wohl et al., 2008) examined the relationship between situation-

specific self-forgiveness and mental health within the context of romantic relationships.

In the first of these studies, Berry and Worthington (2001) examined the association between dispositional forgiveness and health among individual members of a romantic dyad. They examined correlations between dispositional forgiveness, forgiveness-related personality traits, relationship quality, cortisol reactivity, and physical and mental health. Participants were 39 undergraduate students (19 men, 20 women) involved in romantic relationships, who were happy or unhappy with their relationship. Participants provided a baseline salivary cortisol sample prior to imagining a typical relationship event for 5 minutes. In the fifth minute of the imagery task, participants provided a second salivary cortisol sample. Salivary cortisol was used as an indicator of health because high levels of cortisol have been linked to a host of physical ailments (Sapolsky, 1999). Following the relationship imagery task, participants completed self-report measures of trait anger, dispositional forgiveness of others (assessed using the Trait Unforgiveness-Forgiveness Scale, TUF; Berry & Worthington, 2001), scenario-based dispositional forgiveness of others (assessed using the Transgression Narrative Test of Forgiveness, TNTF; Berry, Worthington, Parrott, O'Connor, & Wade, 2001), love and liking for the relationship partner, happiness with the relationship, and physical and mental health (assessed using the SF-36; Ware et al., 2000).

Of particular relevance to the present research, when forgiveness was assessed using the TUF, Berry and Worthington (2001) found that dispositional forgiveness of others was related to all of the health variables of interest. That is, dispositional forgiveness of others was negatively related to baseline cortisol and post-imagery cortisol, such that individuals reporting higher levels of dispositional forgiveness also

experienced less cortisol secretion at baseline and following imagery of a typical relationship event. Moreover, dispositional forgiveness of others was positively related to physical and mental health. When dispositional forgiveness was assessed using a scenario based measure, Berry and Worthington found that dispositional forgiveness of others was positively related to mental health, but was not related to the other health measures.

In order to assess the relative contribution of personality and relationship variables to cortisol reactivity and health, Berry and Worthington (2001) performed regression analyses with two factors, Loving Relationship and Forgiving Personality, as predictor variables. The first factor, Forgiving Personality, consisted of the personality variables, with dispositional forgiveness loading positively on this factor and trait anger loading negatively on this factor. The second factor, Loving Relationship, consisted of the relationship variables (e.g., love and liking for the relationship partner, happiness with the relationship), which loaded positively on this factor. Neither factor score predicted baseline cortisol levels. However, both factor scores were significant predictors of cortisol reactivity (residualized gain scores in cortisol levels) and mental health. That is, both individuals with higher scores on the Forgiving Personality factor and the Loving Relationship factor experienced less cortisol reactivity when recalling a typical relationship event, such as talking to their partner, and reported better mental health. Forgiving Personality, but not Loving Relationship, was also a significant predictor of physical health, such that individuals reporting higher scores on the Forgiving Personality factor also reported better physical health.

To summarize, these results are consistent with the hypothesis that dispositional

forgiveness would be positively associated with mental and physical health and negatively related to cortisol reactivity when recalling a transgression within a romantic relationship. The latter finding that dispositional forgiveness was associated with baseline cortisol reactivity as well as cortisol reactivity during recall of a relationship event is intriguing given that overproduction of cortisol has been hypothesized to mediate the relationship between social stress and health (Sapolsky, 1999). Thus, cortisol reactivity may be another mechanism through which dispositional forgiveness is associated with health. Moreover, as noted earlier, the use of physiological outcomes, such as cortisol, provides a unique health outcome measure that does not share method variance with self-report measures of situation-specific and dispositional forgiveness.

Berry and Worthington (2001) alluded to the role that the personality traits of both partners in a relationship may play in mediating the adverse effects of negative interpersonal events on health, and note that one focus of their study was to examine "how couples cope with interpersonal transgressions within the relationship" (p. 447). However, they neglected the dyad/relationship by focusing solely on one partner's reports of forgiveness and health.

In an intervention study of forgiveness, Rye and Pargament (2002) were interested in the effects of forgiving a romantic relationship partner on mental health among 58 individuals who had been hurt in a dating relationship. Rye and Pargament included only one member of the dating couple (the female partner) in their study. Rye and Pargament explained that they only included the female member of the romantic relationship in their study because they were concerned that women may not have felt comfortable disclosing sensitive information in a group that included men. They



compared the effects of a secular intervention targeted at forgiveness of a relationship partner, a religiously integrated adaptation of this forgiveness intervention, and a no-intervention control group on reports of situation-specific and dispositional forgiveness and mental health. Participants were randomly assigned to the secular, religious, or control condition.

Results indicated that participants in the forgiveness conditions reported higher levels of situation-specific forgiveness and forgiveness knowledge at post-test and follow-up than participants in the control group. Participants in the control group did not report improvements in situation-specific forgiveness at post-intervention; however, their levels of situation-specific forgiveness had improved by follow-up (although participants in the forgiveness groups still improved significantly more over time than did participants in the control group). After applying a Bonferroni correction, existential well-being was the only mental health variable that was affected by the forgiveness interventions. However, without the correction, there were significant improvements in levels of depression, hope, and religious well-being among participants who underwent the forgiveness interventions relative to control participants. Neither hostility nor anxiety was affected by the forgiveness interventions. It is unclear whether dispositional forgiveness was related to the mental health outcomes because, although Rye and Pargament (2002) included measures of dispositional forgiveness, they did not report the correlations between dispositional forgiveness and the mental health variables. When Rye was contacted about these correlations, he indicated that he did not have this information available (personal communication, October 7, 2008).

Although the quantitative results did not generally support the hypothesis that

facilitating forgiveness of a romantic relationship partner would affect mental health outcomes, the qualitative results supported this prediction, such that some of the individuals who underwent either the religiously-integrated or the secular forgiveness intervention reported at post-test that they were happier, more confident, and more at peace than before the intervention. Thus, regardless of whether the forgiveness intervention had a religious component or not, the forgiveness interventions did appear to affect participants' subjective reports of happiness and well-being. However, it is possible that the qualitative reports and consequent findings were affected by demand characteristics when participants were directly asked about their emotional state that may not have emerged when participants were completing the self-report scales.

Given that Berry and Worthington (2001) found a significant dispositional forgiveness-health association and Karremans et al. (2003) found a significant relationship between partner-specific forgiveness and health, and that the aforementioned studies included both men and women, it is also possible that the exclusion of men may have affected the results of the research by Rye and Pargament (2002).

DiBlasio and Benda (2008) conducted two studies investigating the effects of a brief (3-hour) forgiveness intervention on facilitating situation-specific forgiveness and marital satisfaction, and decreasing depression among married couples. In the first study, 44 married couples were randomly assigned to one of three conditions. These conditions included a forgiveness intervention, an alternative intervention that focused on problem-solving, and a control condition. Prior to the intervention and 2 weeks post-intervention, participants completed self-report measures of situation-specific forgiveness, marital satisfaction, and depression. Results indicated that couples who underwent the

forgiveness therapy reported higher levels of situation-specific forgiveness and marital satisfaction, and lower levels of depression than participants in the control group. Participants in the problem-solving group also reported lower levels of depression than participants in the control group. DiBlasio and Benda suggested that discussion of offenses and problem-solving, rather than forgiveness per se, may facilitate communication and buffer the emotional impact of offenses, leading to decreased depression.

In a second study, DiBlasio and Benda (2008) examined the effects of a forgiveness intervention on situation-specific forgiveness, marital satisfaction, and depression among married Christians. They hypothesized that these couples would be particularly amenable to a forgiveness intervention because of the prominence of interpersonal and divine forgiveness within the Christian faith. In contrast to Study 1, in which participants were randomly assigned to control or treatment conditions, only one group (forgiveness therapy) was evaluated. Couples completed situation-specific forgiveness, marital satisfaction, and depression self-report measures prior to the forgiveness therapy and 2 weeks following the therapy. Results indicated significant, positive changes from pre-test to post-test in situation-specific forgiveness and marital satisfaction and significant decreases in depression.

DiBlasio and Benda (2008) extended the work by Rye and Pargament (2002) by including both members of the marital relationship in their experimental analyses of situation-specific forgiveness and mental health; however, they ignored the dyadic nature of their data by simply averaging the scores of the husbands and wives who participated in their studies. Moreover, DiBlasio and Benda did not provide mean scores or

correlations between situation-specific forgiveness, marital satisfaction, and depression separately for the men and women in these studies. Thus, it is unclear whether dyadic effects or even sex differences existed on any of the outcome variables included in their studies.

In a series of studies, Karremans et al. (2003) investigated the relationship between forgiveness and psychological well-being. Of particular relevance to the present study are the findings of Study 4 which, in contrast to the studies of Rye and Pargament (2002) and Berry and Worthington (2001), included data from both members of a romantic relationship (119 marital couples). Both members of the dyad completed self-report measures of commitment, partner-forgiveness (forgiving the partner for a given offense), dispositional forgiveness of others (excluding the partner), and life satisfaction. Karremans et al. acknowledged that their data were not statistically independent and addressed this problem by analyzing "the data at the individual level separately for men and women" (p. 1023). For both men and women, the relationship between partner-specific forgiveness and life satisfaction was significant, such that individuals reporting higher levels of partner-specific forgiveness also reported higher levels of life satisfaction; whereas the relationship between dispositional forgiveness of others and life satisfaction was not significant. The approach Karremans et al. used to analyze their data, treating the data as if they were collected from two separate samples (i.e., analyzing the data separately for men and women), is problematic because this strategy not only results in a loss in power for the statistical analyses (Kenny et al., 2006; Kenny & Cook, 1999), but also biases the observed effects if there are unestimated partner effects (Kenny et al., 2006). It was also of interest that although Karremans et al. (2003) found a

significant relationship between a given member's partner-specific forgiveness and his/her own health, they did not find that a given member's level of dispositional forgiveness was significantly associated with his/her own health. Inconsistent findings often suggest the possibility that moderator variables may be affecting the relationship between variables of interest (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004). As will be discussed in the following section, foremost among the variables that potentially moderate the relationship between dispositional forgiveness and health is the sex of the research participant.

Miller and Worthington (2010) examined potential sex-related differences in marital forgiveness and perceptions of partner's forgiveness among both members of recently married couples (N= 622 couples). They also examined the relationships between sex, marital satisfaction, marital forgiveness, and self-reported mental health (depression, anxiety, hostility, and stress) among the dyads. Participants completed self-report measures of depression, anxiety, hostility, marital satisfaction, marital forgiveness, frequency of spousal transgressions, seriousness of spousal transgressions, perceived spousal forgiveness, marital commitment, offense-specific spousal empathy, and weekly stress. Each member of the dyad completed the questionnaires separately in the researchers' lab. Miller and Worthington hypothesized that men would report higher levels of marital forgiveness and situation-specific empathy than women.

This hypothesis was based upon the reasoning that, in early marriage, men may use global sentiments, such as marital satisfaction, when forgiving; whereas women were thought to use event-specific attributions when forgiving. They hypothesized that,

when forgiving, it is possible that there may be a trend for husbands to rely on

overall relationship sentiment, which typically decreases over time (see Kurdek, 2005). In contrast, when forgiving, wives may rely on event-specific factors, which may vary based on each individual transgression. If this is the case, we would expect men to be more forgiving in early marriage and then for the sex difference to decrease or perhaps over time result in a trend reversal with women being more forgiving in marriage than men (p. 20).

After controlling for marital satisfaction and seriousness and frequency of transgressions, Miller and Worthington (2010) found sex differences in marital forgiveness and state empathy, with men reporting higher levels of marital forgiveness and state empathy than women. They also hypothesized that sex, marital quality (i.e., satisfaction and commitment), transgression-related variables (i.e., severity and frequency of offenses in the marriage), and marital forgiveness would account for variance in mental health problems (i.e., depression, anxiety, hostility, and stress). Separate hierarchical multiple regression analyses were conducted for the mental health outcomes. Sex was entered on the first step of the analyses based on the rationale that there are documented sex differences in mental health. Transgression related variables were entered in the second step because “if an individual perceives that his or her spouse commits serious and/or frequent transgressions, the individual may be more likely to experience symptoms (p. 18). On the third step of the regression analyses, they entered the marital quality variables. In the final step, marital forgiveness was entered as a predictor. After controlling for sex, marital quality, and transgression-related variables, marital forgiveness was negatively associated with depression and hostility.

Although Miller and Worthington (2010) controlled for the potential effect that

sex differences, transgression-related variables, and marital quality may have exerted on mental health, they did not control for the nonindependence of the partners' scores. By ignoring the nonindependence of their data, Miller and Worthington (2010), violated the assumption of independence of observations and did not implement the appropriate statistical analysis strategy in analyzing the relationship between forgiveness and mental health.

In examining the construct validity of a newly developed measure of situation-specific self-forgiveness, Wohl et al. (2008) recruited participants whose romantic partners had terminated their relationship (N= 60, 42 women, 18 men). Wohl et al. hypothesized that the extent to which individuals blamed themselves for the dissolution of their relationships would be associated with depression. They further predicted that the association between self-blame and depression would be mediated by self-forgiveness, such that individuals reporting lower levels of self-blame also would tend to report lower levels of depression, in part because they were reporting higher levels of situation-specific self-forgiveness. Wohl et al. also explored the relationships between situation-specific self forgiveness, guilt, dispositional forgiveness, life satisfaction, and self-esteem. Participants completed self-report measures of situation-specific self-forgiveness, self-blame, guilt, state self-esteem, satisfaction with life, depressive symptoms, and dispositional forgiveness.

Wohl et al. (2008) found that situation-specific self-forgiveness was negatively related to self-blame for the termination of the romantic relationship and to depression. Also of interest, the relationship between dispositional forgiveness of others and situation-specific self-forgiveness was not significant; however, dispositional forgiveness

of others was negatively associated with depression and positively associated with life satisfaction. Mediation analyses indicated that the observed positive relationship between self-blame and depression disappeared when situation-specific self-forgiveness was included in the model.

By focusing on self-forgiveness, Wohl et al. (2008) extended the previous research on forgiveness and health within the context of romantic relationships; however, like Rye and Pargament (2002) and Berry and Worthington (2001), they only included one member of the relationship in their study. In the rationale for Study 2, Wohl et al. noted that in order to validate their measure of state self-forgiveness, they were interested in “a specific context in which people are likely to view themselves as having behaved in a manner that brings about a painful event” (p. 3). Thus, individuals who had experienced an unwanted dissolution of their romantic relationships served as ideal candidates for their research given that “in the aftermath of a hurtful event, people are likely to think about what they could have done to have avoided the event” (Wohl et al., 2008, p. 3). Nonetheless, the inclusion of both relationship partners could add to the literature examining forgiveness, relationships, and well-being.

Although not focusing specifically on romantic relationships, Tse and Yip (2009) demonstrated the interpersonal nature of the relationship between dispositional forgiveness of others and psychological well-being in a self-report questionnaire study. Tse and Yip recruited 139 participants to complete measures of psychological well-being, interpersonal adjustment, and dispositional forgiveness of others. Psychological well-being was operationally defined using a latent variable with measures of depression, positive affect, optimism, and self-efficacy as indicators. Interpersonal adjustment was



“defined as the ability of a person to establish positive relationships with others and receive support from them” (p. 366). Dispositional forgiveness of others was operationalized using the Forgiveness of Others subscale of the HFS. Tse and Yip proposed a mediated model of the relationship between dispositional forgiveness of others and psychological well-being in which interpersonal adjustment mediated the forgiveness-well-being relationship. This model was supported by their data. Although the focus of this study was clearly interpersonal in nature, Tse and Yip took an individual approach to study design and data analysis. Nonetheless, these results point to an interpersonal mechanism by which dispositional forgiveness may affect health and well-being.

In summary, the past research by Berry and Worthington (2001), Karremans et al. (2003), Rye and Pargament (2002), DiBlasio and Benda (2008), Miller and Worthington (2010), Wohl et al. (2008), and Tse and Yip (2009) has contributed to the growing literature on forgiveness and health by attempting to focus on how the interpersonal nature of forgiveness can have a salubrious effect on health. However, these studies are flawed, in some cases, by their inappropriate use of dyadic data when both members of the relationship were included and, in other cases, by their failure to include both members of the romantic relationship (Kenny et al., 2006). Wohl et al., Rye and Pargament and Berry and Worthington only included one member of the romantic dyad; Karremans et al. treated the data from the male and female members of the couple as if they had been collected from separate samples of individuals; and DiBlasio and Benda (2008) ignored partner effects by averaging the data from husbands and wives across the dyad. Miller and Worthington included both partners’ data in regression analyses;

however, they ignored the nonindependence of partners' scores by inappropriately analyzing their dyadic data. Due to the use of these flawed research methods, it is not entirely clear what the implications of these studies would be for the dispositional forgiveness-health relationship within romantic relationships. In the present research, I attempted to extend these results by analyzing the data using an appropriate statistical framework, such as the APIM, that controlled for nonindependence between men's and women's forgiveness and health scores.

### **Sex Differences**

It has been noted by Fehr, Gelfand, and Nag (2010) and Miller et al. (2008) that although sex is almost always measured as a demographic variable, it is rarely a significant focus of many investigations on forgiveness. In addition, Miller et al. have advocated studying sex differences in self-forgiveness as an issue in need of further clarification in future research. Thus, the present study contributed to the larger body of literature on dispositional forgiveness by including measures of the under-represented targets of forgiveness and by specifically focusing on sex differences through an examination of heterosexual couples.

Several studies (Exline, Baumeister, Zell, Kraft, & Witvliet, 2008; Lawler-Row & Piferi, 2006; Orathinkal, Vansteenwegen, & Burggraeve, 2008; Shackelford, Buss, & Bennett, 2002) have found that men report lower levels of forgiveness than women, although sex differences in forgiveness have not always been found (Berry & Worthington, 2001; Lawler et al., 2003; McCullough, Bellah, Kilpatrick, & Johnson, 2001; Sutton, McLeland, Weeks, Cogswell, & Miphouvieng, 2007; Toussaint & Webb, 2005b; Wohl et al., 2008).

Some authors (Fincham et al., 2006) have argued that sex differences on forgiveness measures, in which women report higher levels of forgiveness than men, are consistent with sex-related power differences in society. Fincham et al., for example, speculated that when individuals commit offences against their partners, they are exerting power over their partners, and the victims' decision to seek revenge for these transgressions can be viewed as a reassertion of their power. From this perspective, Fincham et al. hypothesized that "where a clear power imbalance exists in a relationship, the more powerful partner is likely to find it harder to forgive" (p. 423). They added that, in typical Western relationships, men generally have more power than women and that this power differential should lead women in relationships to be more forgiving than men and that men in relationships may find it harder to forgive. Because men generally have more power and they find it more difficult to forgive, men's forgiveness may have a greater impact on the couple's relationship than women's forgiveness.

Miller et al. (2008) speculated that sex differences in forgiveness may exist in some part because men and women tend to adopt different moral reasoning styles. They base this speculation on both Kohlberg's (1984) and Gilligan's (1993) theories of reasoning about moral dilemmas which posit that women tend to value relationships more than men (Gilligan termed this the ethic of care) and that men are more interested in justice-restoring acts than women. Given that women are more interested in relationship maintenance, in the event of a transgression, they may forgive to serve this end whereas men may seek revenge or engage in other acts to exact justice that do not necessarily include forgiving responses. Miller et al. also posited that sex differences in coping styles may be related to sex differences in forgiveness. It has been shown that women are

more likely to engage in tend-and-befriend coping styles which would allow for more occasions to forgive than the fight-or-flight responses that are more common among men. In addition, they argued that women's coping styles have been found to be more emotion-focused than men's coping styles and this may facilitate forgiveness in women. Miller et al. concluded that women's tendency to be more forgiving than men

might be due to personal qualities such as valuing relationships, or to personality or dispositional qualities, such as agreeableness and empathy. Almost certainly, women's ethic of care plays a role, but the nature and strength of the role that ethic of care plays are not well specified (Miller et al., p. 865).

Fehr et al. (2010) have presented an alternative explanation for sex differences in forgiveness. They made an analogy between the research on sex differences in forgiveness and the research on empathy that has generally shown that women are more empathic than men. They reasoned that because women are generally more empathic than men, it is possible that women are also more forgiving than their male counterparts. However, they noted that some data examining sex differences in empathy suggest that this difference may be driven by "self-report biases rather than underlying behavioural response patterns, casting some doubt upon the gender-forgiveness relationship" (p. 902).

Miller et al. (2008) summarized the literature on sex differences in forgiveness using a meta-analysis. They also examined several relevant methodological variables that they hypothesized could potentially moderate the sex-forgiveness relationship. These methodological moderators included sample type, target of forgiveness, type of forgiveness, actual versus hypothetical transgressions, measurement modality, type of forgiveness measure, published versus non-published, validated or non-validated

forgiveness measures, and U.S. versus non-U.S. sample. Miller et al. found a small to moderate effect size across the studies that was generally not moderated by any of the aforementioned methodological variables, such that women tended to be more forgiving than men. One variable, type of forgiveness measure, moderated the relationship between sex and forgiveness, such that women reported higher levels of forgiveness than men when the measures included some assessment of vengeance; however, sex differences did not emerge when the measures did not tap into vengeance. Miller et al. speculated that items in the vengeance scales may have primed gender roles.

Fehr et al. (2010) extended the meta-analysis conducted by Miller et al. (2008) by including an additional 45 effects that were not part of Miller et al.'s meta-analysis; by limiting their meta-analysis of sex differences to studies that evaluated situation-specific forgiveness of a single transgressor by a single victim; and, by comparing data from studies that only reported a nonsignificant sex effect with the Fail-scale  $k$ . Fehr et al. did not find any sex differences in forgiveness. This nonsignificant effect cuts across both responses to self-report questionnaire measures of forgiveness and verbal descriptions of forgiveness.

Other than Miller and Worthington's (2010) study that I summarized earlier (see section on forgiveness and health within romantic relationships), there have been very few studies (Toussaint et al., 2008a; Whited, Wheat, & Larkin, 2010) that reported sex differences in the relationship between forgiveness and health as more than an afterthought. It should be noted that Miller and Worthington did not actually examine sex differences in the forgiveness-mental health relation, but used sex as a control variable when they were examining the relationship between forgiveness and health

rather than as a moderator of this relationship. Although not a primary focus of their research, when investigating the effects of forgiveness and apology on cardiovascular measures of reactivity and recovery following a standardized interpersonal transgression, Whited et al. found a significant interaction between sex and apology on cardiovascular recovery. For women, receiving an apology was associated with faster cardiovascular recovery in response to the interpersonal offence than not receiving an apology from the transgressor whereas receiving an apology had a negative effect on men's cardiovascular recovery in that this interaction effect was reversed. Whited et al. did not find any sex differences in dispositional forgiveness. Although Whited et al. found that dispositional forgiveness was associated with cardiovascular health, they did not find that sex moderated this relationship.

Toussaint et al. (2008a) examined sex differences in the relationship between dispositional forgiveness and depression in a nationally representative sample of 1423 American respondents. Toussaint et al. found sex differences in forgiveness of others, such that women reported higher levels of forgiveness of others than men. Toussaint et al. did not find sex differences in self-forgiveness. Toussaint et al. found a significant, negative relationship between self-forgiveness and depression for both men and women; however, the forgiveness of others-depression relation was significant for women only. These results suggest that sex could potentially moderate the forgiveness-depression relation for some targets of forgiveness (i.e., forgiveness of others), but not others (i.e., self-forgiveness). However, this work was preliminary and has not been replicated.

Because few studies have focused on sex differences in the forgiveness-health literature (Orathinkal et al., 2008) and the results of two meta-analyses (Fehr et al., 2010;

Miller et al., 2008) provided conflicting results as to the presence of sex differences in forgiveness, the analyses examining sex differences in the relationship between dispositional forgiveness and health within romantic dyads were considered exploratory in nature.

### **The Present Study**

In this study, the dispositional forgiveness scores of partners in a romantic relationship were used to predict their own as well as their partners' physical and mental health. Both members of the relationship (297 couples) completed an extensive questionnaire assessing personality traits, relationship variables, and physical and mental health. As noted earlier, the model contained actor effects, which predicted that the actor's level of dispositional forgiveness would influence his or her own physical and mental health outcomes. The model also included partner effects, which predicted that the actor's level of dispositional forgiveness would influence his or her partner's health, and vice-versa. The presence of both actor and partner effects would suggest that both relationship partners' dispositional forgiveness has an effect on the individual's health. Figure 1, presented earlier, depicts the model that was tested.

One way to analyze such actor and partner effects simultaneously is through the APIM (Cook & Kenny, 2005; Kenny et al., 2006). 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). The key elements of the APIM are actor effects and partner effects (Cook & Kenny, 2005; Kenny et al., 2006). As noted by Kenny et al., "an actor effect occurs when a person's score on a predictor variable affects that same

person's score on an outcome variable; a partner effect occurs when a person's score on a predictor variable affects his or her partner's score on an outcome variable" (Kenny et al., 2006, p. 145). Kenny et al. note that "an actor effect is like an intrapersonal effect in that it refers to one person and a partner effect is like an interpersonal effect in that it refers to two people" (p. 146). In the present research, the actor effect estimated the effect of one partner's level of dispositional forgiveness on his/her own mental and physical health. The partner effect estimated the effect of one partner's level of dispositional forgiveness on his/her partner's mental and physical health.

I made use of the APIM in my research with couples because, when analyzing dyadic data, ignoring the nonindependence often inherent in dyadic data can have important consequences for statistical significance testing (Kenny et al., 2006). Nonindependence can bias tests of statistical significance by resulting in statistical significance tests that are either too liberal, resulting in too many Type I errors, or too conservative, resulting in too many Type II errors (Kenny et al., 2006). Such bias has obvious implications for statistical significance testing and the interpretations that can be offered based upon these tests of statistical significance.

Unlike traditional statistical techniques, which are based upon the assumption of independence of observations, the APIM is the most suitable statistical technique for analyzing data from romantic relationship partners whose responses have been assumed to be somewhat dependent upon each other. The APIM is currently considered the best approach for analyzing dyadic data as it permits the researcher to account for variance within and between dyads by analyzing both actor and partner effects simultaneously. The APIM allows researchers to examine mixed independent variables in which variation



in scores can exist not only between different dyads, but also within dyads on the predictor variable (Kenny et al., 2006). As an example, dispositional forgiveness is a mixed variable because the two partners' dispositional forgiveness scores can differ from each other and the overall dispositional forgiveness scores of the dyad can also differ from the other dyads' overall dispositional forgiveness scores.

When analyzing dyadic data, distinguishability must also be taken into account. Distinguishability refers to whether or not members of a dyad can be differentiated by some variable, such as sex (Kenny et al., 2006). Different techniques are required for distinguishable (e.g., heterosexual couples) and indistinguishable dyads (e.g., homosexual couples) (Kenny et al., 2006). Because the couples involved in the current research were all heterosexual and the individual respondents could, therefore, be distinguished by their sex, the most parsimonious way to estimate and test the APIM was by using structural equation modeling (SEM) (Kenny et al., 2006; West, Popp, & Kenny, 2008). Of the statistical strategies available for estimating the APIM (multiple regression, multilevel modeling, and SEM), SEM is the simplest statistical technique because the model can be estimated using the appropriate software (Kenny et al., 2006). Unlike multiple regression, which does not test if the two actor effects or partner effects differ, does not compare the magnitude of the actor and partner effects for each individual, and does not pool effects across both members of the dyad, SEM allows for the estimation and testing of more than one equation simultaneously. SEM also allows for specification of relationships between parameters in the different equations (Cook & Kenny, 2005). Although multilevel modeling shares the aforementioned properties, SEM is the most efficient method available to analyze the APIM when latent variables are modeled or the

predictor variables have measurement error (Kenny et al., 2006). Thus, the APIM, tested using SEM, was used to examine actor and partner effects in the relationship between dispositional forgiveness and health. The following primary research questions were addressed:

1. Is one partner's level of dispositional forgiveness of others, self, and situations related to her/his own physical and mental health?
2. Is one partner's level of dispositional forgiveness of others, self, and situations related to the other partner's physical and mental health?

Based on the body of literature investigating the forgiveness-health relationship, it was predicted that each partner's level of dispositional forgiveness of others, self, and situations would be positively associated with the physical and mental health of both the actor and the partner in the dyad.

As noted by West et al. (2008) and Robbins et al. (2006), with dyadic data, there is more to the study of sex differences than whether men and women differ in their scores on a particular variable. In addition to the sex of the respondent effect, relationship researchers must also consider the sex of the partner effect as well. Sex differences can thus take three forms: differences in the actor effect, differences in the partner effect, and differences in the actor by partner interaction (West et al., 2008). West et al. also note that dyadic analysis of sex differences could be strengthened by recent statistical advances such as the APIM (Cook & Kenny, 2005; Kenny et al., 2006). Thus, the following questions were also addressed in this study; however, because of inconsistent findings as to sex differences in forgiveness, no hypotheses were formulated:

1. Are women more forgiving than men?

2. Do men and women differ in terms of the actor effects of dispositional forgiveness on health? As an example, it may be that the relationship between dispositional forgiveness and health is significant for women, but not men.
3. Do men and women differ in terms of the partner effects of dispositional forgiveness on health? As an example, it may be that the male partner's level of forgiveness is associated with the female partner's health, but that the female partner's level of forgiveness is not associated with the male partner's health.

It should be noted that the past research studies that have examined sex differences have tended to focus on forgiveness of others rather than forgiveness of self and forgiveness of situations. Thus, the examination of sex differences in multiple targets of forgiveness was exploratory.

The present research extended previous research on dispositional forgiveness and health that has used the individual as the unit of analysis by focusing on the dyadic nature of this relationship. The cross-over effects of dispositional forgiveness on health that may exist within couples were examined by evaluating the potential effect of each partner's dispositional forgiveness on their own as well as their partner's physical and mental health.

## Method

## Method

The data for this research were collected as part of a larger project (The Niagara Couples Study). The study was approved by the Research Ethics Board at Brock University in St. Catharines, Ontario (see Appendix A for the Research Ethics Clearance Form).

### Participants

In total, 297 heterosexual couples completed the survey. Ages ranged from 18 to 66 for women ( $M = 28.86$ ,  $SD = 9.90$ ) and from 18 to 75 for men ( $M = 30.93$ ,  $SD = 11.31$ ). With respect to relationship status, there was some inconsistency between partners about the status of the relationship, with 15.2% of couples reporting an incongruent relationship status. In examining the inconsistencies between these partners, it appeared that the discrepancy was often not serious. For example, in the majority of cases, one partner may have reported that he/she was involved in a dating relationship; whereas, the other partner reported that he/she was involved in a serious relationship. Table 1 presents the percentage of men and women endorsing the various categories of relationship status.

Table 1

*Percentage of Men and Women Endorsing Relationship Status Categories*

Relationship status	Men	Women
Married	31.3	31.1
Serious relationship	31.3	29.6
Cohabiting	22.2	21.9
Engaged	7.7	7.4
Dating	5.4	6.7
Separated	.7	.1
Divorced	0	.3
Widowed	0	.3
Unattached	.3	0
No response	.1	1.3

The length of relationship ranged from 3 months to 530 months for both men and women; however, the average length of the relationship reported by respondents varied between women ( $M = 74.57$  months,  $SD = 92.04$  months) and men ( $M = 74.37$  months,  $SD = 92.85$  months).

**Recruitment**

Both members of a romantic relationship were recruited for participation in an online study. Participants were recruited through advertisements promoting a study of

health, trauma, and intimacy. The advertisements also stated the selection criteria which included being at least 18 years of age, being in a relationship for at least 6 months, having computer literacy skills, and possession of an e-mail account. The advertisements were placed in counselling centers, newspapers, in the community, and around the Brock University campus. Advertisements were also placed on the Canadian Psychological Association listserve and on various internet groups (e.g., Facebook). Participants were also recruited via word of mouth. Advertisements included contact information for a research assistant.

### **Procedure**

Participants contacted the research assistant and the research assistant collected contact information for both members of the couple. The research assistant e-mailed each participant a link to a closed-access, internet-based questionnaire. After granting informed consent, each participant was assigned an identification number, which was required to access the questionnaire. Participants completed the online survey in the setting of their choice. Each member of the couple was instructed to complete the self-report measures separately and the participants were instructed not to discuss the questionnaire until after they had both completed the questionnaire. Participants were informed that their identification number would be linked to their name in order to facilitate financial compensation for their completion of the questionnaire; however, following payment, the name and identification number would no longer be linked, ensuring anonymity. After both members of the couple had completed the survey, the couple received \$50 Canadian; however, participants were allowed to receive \$25 each upon request. The survey took each participant approximately 45 minutes to complete.

## Measures

**Dispositional forgiveness.** The Heartland Forgiveness Scale (HFS; Thompson et al., 2005), an 18-item questionnaire contains three 6-item subscales assessing Forgiveness of Others, Forgiveness of Self, and Forgiveness of Situations (see Appendix B). Half of the items are negatively phrased and half of the items are positively phrased. Participants respond to each item using the following response scale: 1 = Almost Always False of Me, 3 = More Often False of Me, 5 = More Often True of Me, 7 = Almost Always True of Me. After reverse-scoring the nine negatively phrased items, responses are summed to yield a score for each subscale. Higher scores on the HFS subscales reflect higher levels of dispositional forgiveness of self, others, and situations.

Internal consistency coefficients (Cronbach's  $\alpha$ ) for the Forgiveness of Others subscale range from .78 to .81; for the Forgiveness of Self subscale range from .72 to .75; and, for the Forgiveness of Situations subscale range from .77 to .82 (Thompson et al., 2005). Thompson et al. report 3-week test-retest reliability for the HFS Total score of  $r = .82$  and 9-month test-retest reliability of  $r = .77$ , suggesting that this measure is relatively stable over time.

The HFS is the only measure that I was aware of that captured all three targets of dispositional forgiveness in a single measure. As noted, Thompson et al. (2005) have reported adequate validity and reliability for this measure; however, there has been limited, if any, research available that has actually replicated the factor structure of the HFS. Thus, another objective of this research was to replicate the factor structure of the HFS in an independent sample of individuals involved in a romantic relationship.

**Mental and physical health measures.** The Short Form-36 Health Survey (SF-



36; Ware et al., 2000) is a 36-item self-report measure designed to assess general mental and physical health. The SF-36 assesses eight health concepts: (1) Physical Functioning, (2) Role-Physical, (3) Bodily Pain, (4) General Health, (5) Social Functioning, (6) Role-Emotional, (7) Vitality, and (8) Mental Health. Raw scores on the SF-36 scales are transformed, as directed by Ware et al., to yield scores on a 0 to 100 scale. The SF-36 is a copyrighted scale and it is, therefore, not permitted to present the individual items of the SF-36; however, a general description of the eight scales is provided.

The Physical Functioning scale consists of 10 items and taps into limitations in the performance of physical activities, including activities of daily self-care. A mean score for the Physical Functioning scale is calculated across the 10 items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on this scale reflect better Physical Functioning. Test-retest reliabilities range from  $r = .81$  to  $.90$  for the Physical Functioning scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.88$  to  $.94$  (Ware et al., 2000).

The Role-Physical scale taps into limitations in work activities or other daily activities as a result of physical health problems and consists of four items. A mean score for the Role-Physical scale is calculated across the four items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on this scale reflect less interference with daily tasks because of physical health problems. Test-retest reliabilities range from  $r = .60$  to  $.69$  for the Role-Physical scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.76$  to  $.96$  (Ware et al., 2000).

The Bodily Pain scale assesses limitations due to bodily pain and consists of two items. Each item is recoded as directed by Ware et al. (2000). A mean score for the

Bodily Pain scale is calculated across the two items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on this scale reflect less bodily pain. Test-retest reliabilities range from  $r = .43$  to  $.78$  for the Bodily Pain scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.78$  to  $.88$  (Ware et al., 2000).

The General Health scale assesses perception of health and subjective prognosis for health problems and consists of five items. Negatively phrased items are recoded as directed by Ware et al. (2000). A mean score for the General Health scale is calculated across the five items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on the General Health scale reflect better perceptions of general health. Test-retest reliabilities range from  $r = .80$  to  $.83$  for the General Health scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.80$  to  $.95$  (Ware et al., 2000).

The Social Functioning scale taps into interference with normal social activities as a result of emotional and physical problems. This scale consists of two items. A mean score for the Social Functioning scale is calculated across the two items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on the Social Functioning scale reflect better social functioning. Ware et al. (2000) report test-retest reliability of  $r = .60$  for the Social Functioning scale and internal consistency (Cronbach's  $\alpha$ ) ranging from  $.63$  to  $.85$ .

The Role-Emotional scale taps into difficulties with work activities and other daily activities as a result of emotional problems and consists of three items. A mean score on the Role-Emotional scale is calculated across the three items and this mean score

is transformed to yield a standardized score that falls between 0 and 100. Higher scores on this scale reflect less interference with daily tasks because of emotional problems. Test-retest reliabilities range from  $r = .60$  to  $.63$  for the Role-Emotional scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.80$  to  $.96$  (Ware et al., 2000).

The Vitality scale measures feelings of fatigue and contains four items. A mean score on the Vitality scale is calculated across the four items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on the Vitality scale reflect more vitality. Test-retest reliabilities for the Vitality scale is somewhat weaker ranging from  $r = .68$  to  $.80$  and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.62$  to  $.96$  (Ware et al., 2000).

The Mental Health scale assesses a continuum of emotional states ranging from nervousness to peacefulness and contains five items. Positively phrased items are recoded as directed by Ware et al., 2000. A mean score on the Mental Health scale is calculated across the five items and this mean score is transformed to yield a standardized score that falls between 0 and 100. Higher scores on the Mental Health scale reflect better perceptions of mental health. Test-retest reliabilities range from  $r = .75$  to  $.80$  for the Mental Health scale and internal consistency (Cronbach's  $\alpha$ ) ranges from  $.67$  to  $.95$  (Ware et al., 2000).

The SF-36 includes one additional item assessing reported health transition. However, this item was excluded from data analyses due to the large number of variables already available in the present data set to assess mental and physical health and because I did not develop any hypotheses regarding self-reported health transition.

## Results

## **Results**

### **Data Analysis**

Data analysis was organized into seven steps:

1. The first step involved preparing the data for subsequent analyses. Data preparation included structuring the data set, data verification, and handling issues associated with missing data, outliers, normality, and nonlinearity.
2. Sex differences were tested.
3. Nonindependence was assessed.
4. Confirmatory factor analyses were performed to determine whether the factor structure and fit of the model of dispositional forgiveness proposed by Thompson et al. (2005) and of the model for conceptualizing the SF-36 proposed by Anagnostopoulos, Dimitris, and Tountas (2009), Hann and Reeves (2008), and Hays, Sherbourne, and Mazel (1993) could be replicated.
5. The latent variables for dispositional forgiveness and health were pieced together using the jigsaw method (Bollen, 2000) for the different targets of dispositional forgiveness.
6. The intraindividual model of dispositional forgiveness and health was tested separately for men and women for the three targets of dispositional forgiveness.
7. The APIM was tested for the three targets of dispositional forgiveness, and sex differences were examined during the dyadic analyses.

### **Data Preparation**

#### **Structure of the Dataset**

As required for estimating the APIM using SEM, the data were structured at the

dyad-level (Kenny et al., 2006). In contrast to the individual-level structure, in which each member of the dyad has a single record, in the dyad-level structure, there is a single record for each dyad and the dyad rather than the individual is considered the unit of analysis (Kenny et al., 2006). That is, the male and female partners' demographic information and scores on the forgiveness and health variables were structured to comprise a single record in the data set.

### **Data Verification**

Prior to running the main data analyses, the SPSS data set was cleaned using the procedures outlined by Tabachnick and Fidell (2001). The data set was screened for accuracy by verifying that all of the values were within range and by verifying that the means and standard deviations of the variables of interest were plausible.

### **Outliers**

Data were examined for outliers. Standardized scores that were more than 3.29 standard deviations beyond the mean were initially classified as potential univariate outliers (Tabachnick & Fidell, 2001). Two women were identified as marginal outliers on the Bodily Pain scale of the SF-36 and one man was identified as a potential outlier on the Forgiveness of Self scale. In addition, one woman was identified as an outlier on both the Mental Health and Vitality scales of the SF-36. The frequency distributions of the Bodily Pain, Mental Health, Vitality, and Forgiveness of Self scales were inspected to determine whether the potential outliers were connected to the distribution (Tabachnick & Fidell, 2001). The apparent outliers identified appeared connected to the distribution and these cases were retained for subsequent data analyses because in large samples, a few outliers are expected (Tabachnick & Fidell, 2001). Issues relating to multivariate

outliers and multivariate normality were not addressed during the data preparation phase. Multivariate outliers and multivariate normality were examined when I developed measurement models of dispositional forgiveness and health. As discussed below, I dealt with issues related to multivariate normality and multivariate outliers by using the bootstrapping method.

### **Normality**

Data were screened for normality. Given that I analyzed data from dyads, preliminary analyses were done separately for men and women. The use of separate data screening procedures for men and women was based on the rationale that there were potential sex differences, so the outliers and distribution of variables may be defined differently for the two sexes. If necessary to reduce skewness or kurtosis, an appropriate transformation was performed on the data (Tabachnick & Fidell, 2001).

In addition to inspecting the histograms with the normal distribution overlay, kurtosis and skewness statistics with  $z$ -scores greater than 1.96 were considered potentially non-normal (Tabachnick & Fidell, 2001). With the exception of the Physical Functioning scale, all of the HFS subscales and the SF-36 health scales appeared to be normally distributed based upon their histograms and statistical indicators. Several transformations were applied to the scores of the Physical Functioning scale. The best transformation for both the men and women's scores on the Physical Functioning scale was an odd-power polynomial transformation in which the Physical Functioning scale was cubed for both men and women. This transformation improved the skewness value from -2.15 to -1.37 for men and from -2.52 to -1.49 for women. The kurtosis value was improved from 4.49 to .75 for men and from 6.16 to 1.14 for women. Higher scores on

the Physical Functioning scale were indicative of better physical functioning.

### **Linearity**

To assess whether the assumption of linearity was satisfied, the bivariate plots between the forgiveness scales and the health measures were inspected. For all of the bivariate plots, the scatter was oval, suggesting that the variables were linearly related (Tabachnick & Fidell, 2001).

### **Missing Data**

For the SF-36 scales, Ware et al. (2000) recommend replacing the missing data with the mean, calculated from the available data for that individual, if the case is missing less than 50% of the data on a single scale. If a case is missing more than 50% of its data on a single scale, Ware et al. recommend deleting the case. One man was missing more than 50% of data on the Bodily Pain scale; six men were missing more than 50% of data on the Social Functioning scale; one woman was missing more than 50% of missing data on the Role Emotional scale, and eight women were missing more than 50% of data on the Social Functioning scale. It should be noted that the Social Functioning scale only consists of two items; therefore, missing one item on this scale would constitute missing 50% of the data according to Ware et al.'s criterion. I did not follow Ware et al.'s criteria for handling missing data because, as described below, I decided to impute missing data.

Although Thompson et al. (2005) did not provide recommendations for handling missing data on the HFS, the same procedure that was used with the SF-36 scales was employed in that missing data were imputed using the expectation maximization algorithm. Inspection of missing data across the individual scales of the HFS indicated that one woman was missing more than 50% of data on the Forgiveness of Situations



scale; one man was missing more than 50% of data on the Forgiveness of Situations scale; one woman was missing more than 50% of data on the Forgiveness of Self scale; and one woman was missing more than 50% of data on the Forgiveness of Others scale.

Missing data ranged across variables from 0% of cases to 2.6% of the cases missing at least one of the individual items on the Social Functioning scale of the SF-36. Because the percentage of cases missing data was less than 5%, the potential problems associated with missing data were not considered serious (Tabachnick & Fidell, 2001), and the expectation maximization algorithm was used to estimate and impute missing data. As noted by Tabachnick and Fidell and by Kline (2005), rather than deleting cases from analyses, imputing data outperforms traditional methods of handling missing data, such as listwise deletion or mean substitution.

### **Descriptive Statistics**

Means, standard deviations, the result of *t*-tests to examine sex differences, and measures of internal consistency (Cronbach's alpha) are presented in Table 2. There were no sex differences for any of the dispositional forgiveness variables; however, sex differences emerged for the Role-Emotional, Vitality, Social Functioning, Mental Health, and General Health scales of the SF-36 in that women reported higher levels of Role-Emotional, Vitality, Social Functioning, Mental Health, and General Health than men.

Table 2

*Means, Standard Deviations, and Internal Consistencies (alpha), and Results of t-tests Examining Sex Differences*

Variable	<i>M</i>		<i>SD</i>		Cronbach's $\alpha$	
	M	F	M	F	M	F
Forgiveness of Self	29.59	29.93	6.88	6.35	.80	.74
Forgiveness of Others	28.58	29.43	6.59	6.32	.76	.76
Forgiveness of Situations	29.10	29.85	6.69	6.57	.80	.79
Physical Functioning	88.85	89.51	17.67	19.06	.91	.93
Role-Physical	80.14	81.65	33.85	31.37	.88	.83
Role-Emotional	71.80	77.21**	39.35	35.37	.86	.80
Bodily Pain	75.80	76.84	23.09	23.23	.85	.82
Vitality	60.33	61.14*	19.58	19.00	.80	.78
Social Functioning	77.09	82.51**	25.36	22.37	.84	.79
Mental Health	59.11	64.93*	19.16	18.47	.84	.81
General Health	67.75	73.19**	22.66	18.90	.83	.79

*Note.* \* $p < .05$ , \*\* $p < .001$  indicate significant sex differences.

### **Nonindependence**

Because the members of the dyads in the present research were distinguished by sex of the respondent and the variables are assumed to be measured at the interval-level of measurement, the most appropriate statistic to assess nonindependence was the Pearson correlation coefficient ( $r$ ). Table 3 presents correlations between men's forgiveness and mental and physical health and the correlations between women's

forgiveness and mental and physical health (that is, the correlations are presented by sex). Table 4 presents correlations between the men's forgiveness, physical and mental health and women's forgiveness, mental and physical health (that is, the correlations are presented between sex).

As presented in Table 3, for women, Forgiveness of Self was positively associated with mental health and physical health with the exception of the Role-Physical, and Physical Functioning scales of the SF-36. For men, Forgiveness of Self was positively associated with all of the physical and mental health variables. For women, Forgiveness of Others was positively associated with all of the physical and mental health variables, with the exception of the Role-Physical scale of the SF-36. For men, Forgiveness of Others was positively associated with all of the physical and mental health variables. For both men and women, Forgiveness of Situations was positively associated with all of the physical and mental health variables. In addition, for both men and women, all of the dispositional forgiveness scales were positively correlated with each other.

Table 3

*Correlations within Sex*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Forgiveness-Self	---	.48**	.61**	.13*	.09	.24**	.19**	.44**	.32**	.40**	.28**
2. Forgiveness-Others	.39**	---	.66**	.19**	.07	.19**	.24**	.34**	.24**	.34**	.28**
3. Forgiveness-Situations	.68**	.49**	---	.17**	.12**	.18**	.18**	.44**	.36**	.42**	.30**
4. Physical Functioning	.23**	.15**	.21**	---	.39**	.14*	.42**	.25**	.29**	.24**	.42**
5. Role-Physical	.20**	.12*	.22**	.52**	---	.36**	.46**	.27**	.10	.30**	.26**
6. Role-Emotional	.22**	.20**	.29**	.17**	.44**	---	.35**	.40**	.22**	.49**	.21**
7. Bodily Pain	.21**	.18**	.22**	.50**	.55**	.18**	---	.41**	.45**	.41**	.46**
8. Vitality	.38**	.29**	.43**	.27**	.40**	.50**	.41**	---	.55**	.73**	.48**
9. Social Functioning	.28**	.25**	.37**	.38**	.52**	.61**	.47**	.56**	---	.48**	-.32**
10. Mental Health	.43**	.33**	.51**	.23**	.38**	.50**	.35**	.74**	.62**	---	.41**
11. General Health	.25**	.24**	.35**	.45**	.41**	.24**	.52**	.41**	.44**	.47**	---

*Note.* Correlations for men appear below the diagonal.

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

Table 4

*Correlations across Sex*

	Women	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
	Men											
1. Forgiveness-Self		.16**	.05	.03	.08	.02	.03	.08	.14*	.10	.11	.15**
2. Forgiveness-Others		.19**	.13*	.12*	.02	.10	.07	.03	.16**	.17**	.16***	.09
3. Forgiveness-Situations		.18**	.03	.00	.04	.08	.07	.09	.13*	.12*	.10	.09
4. Physical Functioning		.10	.03	.02	.11	.02	.06	.05	.03	.02	.07	.03
5. Role-Physical		.08	.01	.01	.12*	.10	.13*	.09	.10	.14*	.08	.09
6. Role-Emotional		.08	.07	.03	.02	.03	.14**	.05	.12*	.16**	.13*	.04
7. Bodily Pain		.09	.03	.06	.13*	.06	.13*	.08	.11	.15**	.14*	.14*
8. Vitality		.14*	.02	.07*	.11	.05	.14*	.18**	.25**	.20***	.21**	.17**
9. Social Functioning		.14**	.06	.10	.05	.03	.17**	.10	.14*	.23**	.13*	.05
10. Mental Health		.13*	.02	.08	.01	.00	.11	.13*	.19**	.19**	.19**	.10
11. General Health		.12*	.01	.06	.12*	.06	.10	.14*	.13**	.12*	.16**	.17**

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

As demonstrated in Table 4, with respect to the correlations between the female and male partners' scale scores, correlations were generally significant and positive, with the exception of the Forgiveness of Situations scale and the Role-Physical and Bodily Pain scales of the SF-36. Correlations across sex ranged from  $r = .00$  for the correlation between men's and women's Forgiveness of Situations, to  $r = .25$  for the correlation between men's and women's scores on the Vitality scale of the SF-36. In addition, Kenny et al. (2006) recommend using canonical correlation analysis to assess nonindependence when multiple measures are used. Results of the canonical correlation analysis, as shown in Table 5, indicate that one of the five canonical dimensions was statistically significant at the  $p < .001$  level. Dimension 1 had a canonical correlation of  $R_c = .30$ ,  $p < .001$ , between the sets of variables, confirming the nonindependence between partners.

Table 5

*Tests of Canonical Dimensions*

Dimension	Canonical Correlation	F	Hypothesized df	Error df
1	.30	2.12*	25	1067.66
2	.22	1.61	16	880.49
3	.17	1.25	9	703.50
4	.10	.74	4	580
5	.03	.22	1	291

Note. \*  $p < .001$

Table 6 presents the standardized canonical coefficients for the first dimension across the sets of variables. The first canonical dimension is most strongly influenced by Mental Health (-.59), Forgiveness of Others (-.50), and Forgiveness of Situations (-.20).

Table 6

*Standardized Canonical Coefficients for Dimension 1*

Variable	Dimension 1
Physical Health	-.02
Mental Health	-.59
Forgiveness of Self	.04
Forgiveness of Others	-.50
Forgiveness of Situations	-.20

### Measurement Models

This step of data analysis involved testing measurement models for the variables of interest. All models were tested using maximum likelihood estimation in AMOS 18.0 (Arbuckle, 2010). I evaluated the fit of the models using the  $\chi^2/\text{df}$ , the Goodness-of-Fit index (GFI), the Tucker-Lewis index (TLI), the Comparative Fit index (CFI), the Root Mean Square Error of Approximation (RMSEA) with a 90% confidence interval, Hoeltler's critical  $N$ , and the Standardized Root Mean Square Residual (SRMR). The target values that indicate a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004) are included in the tables that follow,

along with their corresponding goodness-of-fit indices. The measurement portion of the intraindividual and dyadic models was tested using the jigsaw piecewise technique in which each latent variable model was evaluated and modified separately before combining the latent variables in the structural model (Bollen, 2000).

In developing the measurement models, modification indices were examined to see if the fit could be improved. Only modifications that made substantive sense were implemented.

### **Dispositional Forgiveness**

I used confirmatory factor analyses to attempt to replicate the model of dispositional forgiveness specified by Thompson et al. (2005), depicted in Figure 2. I tested the factor structure of this model separately for men and women. The model was structured along two dimensions (forgiveness target and valence) such that it included six 3-item, first order latent variables (Self Positive, Self Negative, Other Positive, Other Negative, Situation Positive, and Situation Negative). Each forgiveness target (i.e., Forgiveness of Others, Forgiveness of Self, and Forgiveness of Situations) served as a second-order latent variable and the valence of the items (Positive Valence or Negative Valence) also served as a second-order factor. That is, each first order latent variable was an indicator of either the second-order factor, Positive Valence or Negative Valence, depending on the wording of the items that made up the first-order latent variable and was also an indicator of its corresponding second-order forgiveness target latent variable (i.e., Forgiveness of Others, Forgiveness of Self, or Forgiveness of Situations). The



Forgiveness of Others, Forgiveness of Self, and Forgiveness of Situations latent variables were allowed to correlate, whereas the Negative Valence and Positive Valence latent variables were not allowed to correlate. In order to set the scale of the latent variables, the factor loadings of the first indicator of each latent variable were fixed to 1.0 and all of the residual path coefficients were constrained to 1.0.

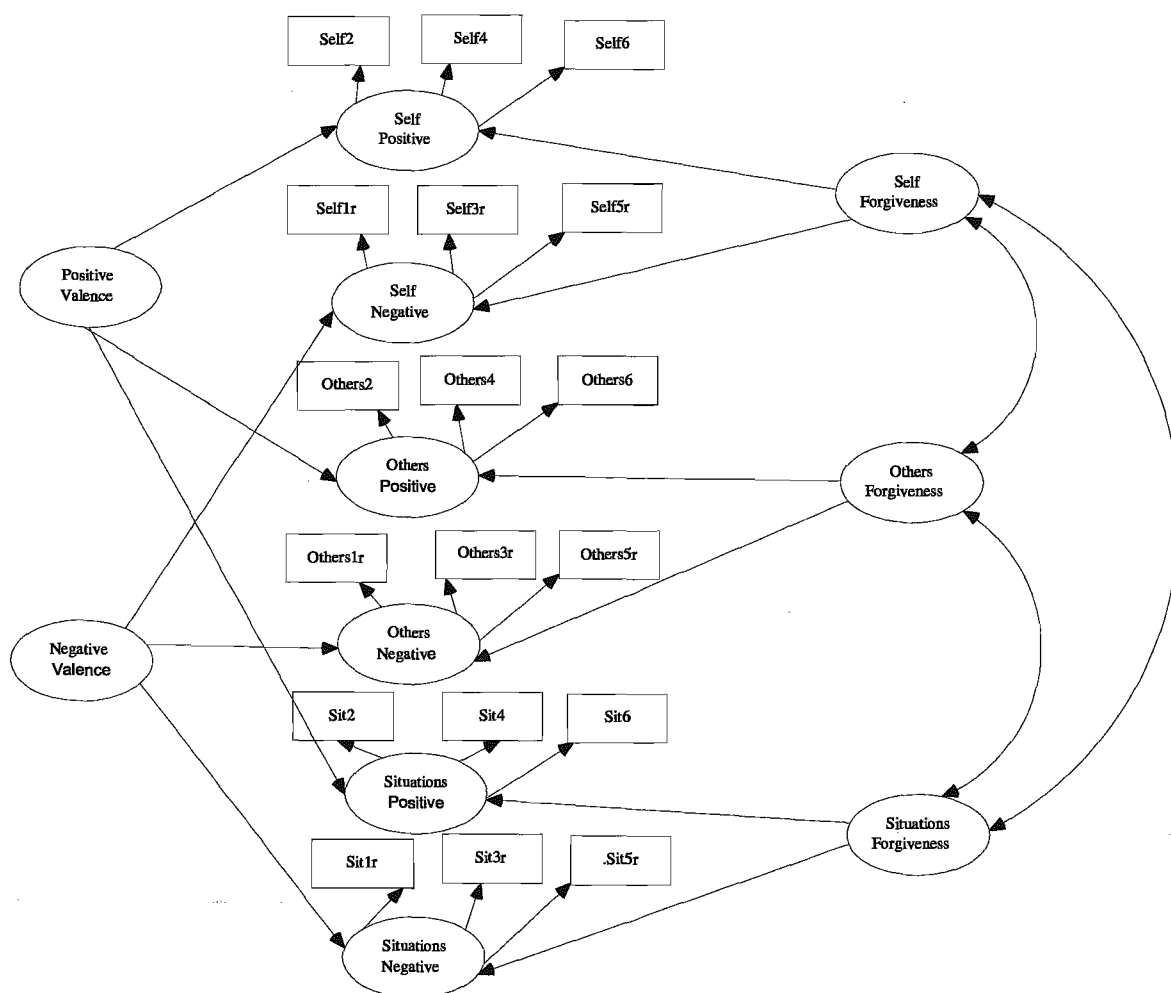


Figure 2. Measurement model for the HFS. The indicators (observed scores) are shown in rectangles and the latent variables are shown in ovals. Item names that contain an r indicate reverse scoring.

Thompson et al. (2005) reported that the separation of positive and negative valence items was necessary because, in a previous specification of the model that did not account for the systematic variance due to valence of the item wording, they did not find adequate fit. Thompson et al. reported that the alternative model that included the systematic variance due to item valence provided an excellent fit to the data.

In testing the second-order latent variable model advocated by Thompson et al. (2005), for men and women, a negative residual error variance for the first-order latent variable representing Forgiveness of Others and Positive Valence was observed. Although large and significant negative residual error variances can indicate improper model specification, small, nonsignificant, negative residual error variances can emerge in the middle level of multilevel models. Given that this residual error variance was small ( $-.15$  for men and  $-.14$  for women) and nonsignificant, it was fixed to zero (Bmuthen, 2005).

With respect to multivariate normality, problematic skewness and kurtosis values were evident for the measure of dispositional forgiveness for both men and women. Given that multivariate normality was not achieved, the decision was made to include hypothesis tests derived from the Maximum-Likelihood bootstrap in addition to the hypothesis tests derived using Maximum-Likelihood. Including the results of both hypothesis tests derived using Maximum Likelihood and those derived from bootstrapping allowed for analysis of the relative stability of the model to variability attributable to sampling. Bootstrapping is a re-sampling procedure in which

the original sample gives rise to multiple additional ones... by which the original sample is considered to represent the population. Multiple subsamples of the same size as parent sample are then drawn randomly, *with replacement*, from the population and provide the data for empirical investigation of the variability of parameter estimates and indices of fit (Byrne, (2001, pp. 268-269).

Given that multivariate normality can result in biased estimates of standard errors, the bootstrapping procedure “allows researchers to assess the stability of parameter estimates and thereby report their values with a greater degree of accuracy” (Byrne, 2001, p. 270).

Testing the HFS with a confirmatory factor analysis resulted in an acceptable fit for both women and men. Table 7 presents the goodness-of-fit indices for these models. Although modification indices were examined, none of the recommended modifications either made substantive sense or improved model fit to a significant degree.

Table 7

*Goodness-of-Fit Indices for the for the Confirmatory Factor Analysis of HFS for Men and Women*

Fit Index	Women	Men	Target Value
$\chi^2$	226.77*	226.06*	<i>ns</i>
df	129	129	
$\chi^2/df$	1.76	1.75	< 2
GFI	.92	.92	close to .95
TLI	.96	.96	close to .95
CFI	.96	.95	close to .95
RMSEA	.05	.05	< .08
90 % C. I.	.04 - .06	.04 - .06	.00 to .08
Hoeltler's $N$	205	205	> 200
SRMR	.05	.05	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$

Table 8 presents the Beta-weights and associated standard errors derived using bootstrapping. Beta-weights derived using Maximum-Likelihood were not presented because these estimates were identical to those obtained using bootstrapping and AMOS does not provide standard errors to test these estimates. *B*-weights and associated standard errors derived using Maximum-Likelihood and

bootstrapping are also presented.

Table 8

*Standardized ( $\beta$ ) and Unstandardized (B) Factor Loadings for the HFS for Women and Women*

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Forgiveness of Self</b>					
Positive Valence					
HFS item 1	.67 (.04)	1.00		1.00	
HFS item 3	.72 (.11)	1.04	.09	1.04	.09
HFS item 5	.70 (.10)	1.03	.09	1.03	.09
<b>Women's Forgiveness of Self</b>					
Negative Valence					
HFS item 2	.76 (.05)	1.00		1.00	
HFS item 4	.84 (.09)	1.06	.08	1.06	.09
HFS item 6	.65 (.10)	.80	.08	.80	.10
<b>Women's Forgiveness of Others</b>					
Positive Valence					
HFS item 8	.81 (.05)	1.00		1.00	
HFS item 10	.85 (.11)	1.07	.10	1.07	.11
HFS item 12	.79 (.09)	1.13	.08	1.13	.09
<b>Women's Forgiveness of Others</b>					
Negative Valence					
HFS item 7	.73 (.04)	1.00		1.00	
HFS item 9	.80 (.09)	1.06	.08	1.06	.09
HFS item 11	.62 (.09)	.80	.08	.80	.09
<b>Women's Forgiveness of Situations</b>					
Positive Valence					
HFS item 14	.73 (.05)	1.00		1.00	
HFS item 16	.86 (.08)	1.15	.07	1.15	.08
HFS item 18	.76 (.08)	1.18	.08	1.18	.08

Table 8 continued...

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
Women's Forgiveness of Situations					
Negative Valence					
HFS item 13	.74 (.05)	1.00		1.00	
HFS item 15	.81 (.09)	1.06	.08	1.06	.09
HFS item 17	.71 (.09)	.92	.08	.92	.10
Men's Forgiveness of Self					
Positive Valence					
HFS item 1	.72 (.04)	1.00		1.00	
HFS item 3	.69 (.08)	.86	.07	.86	.08
HFS item 5	.81 (.09)	1.03	.08	1.03	.08
Men's Forgiveness of Self					
Negative Valence					
HFS item 2	.75 (.03)	1.00		1.00	
HFS item 4	.76 (.07)	.94	.07	.94	.07
HFS item 6	.78 (.07)	1.04	.08	1.04	.08
Men's Forgiveness of Others					
Positive Valence					
HFS item 8	.64 (.05)	1.00		1.00	
HFS item 10	.66 (.10)	1.03	.10	1.03	.10
HFS item 12	.63 (.11)	.84	.08	.84	.08
Men's Forgiveness of Others					
Negative Valence					
HFS item 7	.78 (.04)	1.00		1.00	
HFS item 9	.80 (.10)	1.07	.08	1.07	.08
HFS item 11	.62 (.11)	.80	.08	.80	.08
Men's Forgiveness of Situations					
Positive Valence					
HFS item 14	.79 (.04)	1.00		1.00	
HFS item 16	.83 (.08)	1.10	.07	1.10	.07
HFS item 18	.58 (.11)	.80	.08	.80	.08

Table 8 continued...

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
Men's Forgiveness of Situations					
Negative Valence					
HFS item 13	.80 (.04)	1.00			
HFS item 15	.81 (.08)	.98	.07	.98	.07
HFS item 17	.70 (.08)	.87	.07	.87	.07

*Note.* All  $B$ s and  $\beta$ s tested with standard errors derived using bootstrap estimation were significant at  $p < .005$  and all  $B$ s tested with standard errors derived using Maximum-Likelihood (ML) estimation were significant at  $p < .001$ .

It should be noted that when Thompson et al. (2005) validated the HFS they did so using separate analyses for Forgiveness of Self, Forgiveness of Others, and Forgiveness of Situations. They did not use the latent variable model that was developed during their confirmatory factor analysis of the HFS. I decided to follow their approach in my analyses of the APIM. In addition, because Forgiveness of Self, Forgiveness of Others, and Forgiveness of Situations were significantly correlated, the effects of forgiveness on health might disappear if all three targets were included in the same model as result of this redundancy. Given that no published research to date has tested these three targets of forgiveness within a single model and the practice has been to evaluate the targets of forgiveness separately, I developed individual models predicting health from the three targets of forgiveness. In addition, the second order latent variable model was too complex to include in the APIM (i.e., the model would not be identified); therefore, I tested the fit of three separate latent variables (Forgiveness of Self, Forgiveness of Others, and Forgiveness of Situations).

The tests for the fit of the three forgiveness latent variables indicated that these variables were best represented by including the single items of the HFS subscales as

indicators of their respective forgiveness target latent variables and by allowing for correlated error terms between various items. For each of the forgiveness latent variables, modification indices indicated that the error terms for the positively-worded items should be allowed to covary. This made sense because the shared relationships among these indicators were likely a function of shared measurement variance (i.e., all items were positively phrased in contrast to the remaining items that were negatively phrased). As when I evaluated the second-order model specified by Thompson et al. (2005), the data were not multivariate normal as indicated by problematic skewness and kurtosis values for both men and women. Given this multivariate nonnormality, I used bootstrapping for parameter estimation. Table 9 presents the goodness-of-fit indices for confirmatory factor analysis of the Forgiveness of Self latent variable for men and women. As indicated in Table 7, the model provided an adequate fit to the data.



Table 9

*Goodness-of-Fit Indices for the Confirmatory Factor Analysis of the Forgiveness of Self subscale of the HFS for Men and Women*

Fit Index	Women	Men	Target Value
$\chi^2$	7.80	13.15*	<i>ns</i>
df	6	6	
$\chi^2/df$	1.30	2.19	< 2
GFI	.99	.99	close to .95
TLI	.99	.97	close to .95
CFI	.99	.98	close to .95
RMSEA	.03	.06	< .08
90 % C. I.	.00 - .09	.01 - .11	.00 to .08
Hoeltler's $\chi^2/N$	475	282	> 200
SRMR	.03	.02	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$

Table 10 presents the Beta-weights and associated standard errors derived using bootstrap for the Forgiveness of Self latent variable. Beta-weights derived using Maximum-Likelihood were not presented because these estimates were identical to those obtained using bootstrapping and AMOS does not provide standard errors to test these estimates. *B*-weights and associated standard errors

derived using Maximum-Likelihood and bootstrapping are also presented.

Inspection of Table 8 reveals that all of the path coefficients were statistically significant. Although all of the path coefficients were significant, some of these were small. Inspection of the path coefficients suggests weaker loadings of positively phrased items. As noted previously, this source of method variance was taken into account by allowing correlated error terms among the items that were positively phrased.

Table 10

*Standardized ( $\beta$ ) and Unstandardized ( $B$ ) Factor Loadings for the Forgiveness of Self subscale of the HFS for Women and Men*

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Forgiveness of Self</b>					
Positive items					
HFS item 1	.26 (.07)	1.00		1.00	
HFS item 3	.26 (.07)	1.02	.28	1.02	.66
HFS item 5	.24 (.07)	.96	.26	.96	.50
<b>Women's Forgiveness of Self</b>					
Negative items					
HFS item 2	.74 (.06)	3.51	.87	3.51	2.06
HFS item 4	.87 (.04)	3.86	.96	3.86	2.21
HFS item 6	.63 (.06)	2.76	.70	2.76	1.65
<b>Men's Forgiveness of Self</b>					
Positive items					
HFS item 1	.44 (.07)	1.00		1.00	
HFS item 3	.25 (.07)	.51	.12	.51	.15
HFS item 5	.36 (.08)	.75	.12	.75	.17
<b>Men's Forgiveness of Self</b>					
Negative items					
HFS item 2	.70 (.05)	1.80	.27	1.80	.45
HFS item 4	.77 (.04)	1.84	.27	1.84	.37
HFS item 6	.80 (.05)	2.07	.30	2.07	.44

*Note:* All  $\beta$ s and  $B$ s with standard errors derived using bootstrapping estimation were significant at  $p < .005$  and all  $B$ s tested with standard errors derived using Maximum-Likelihood estimation were significant at  $p < .001$ .

Table 11 presents the goodness-of-fit indices for the Forgiveness of Others latent variable for men and women. As indicated in Table 11, the model provided an adequate fit to the data.

Table 11

*Goodness-of-Fit Indices for the Confirmatory Factor Analysis of the Forgiveness of Others subscale of the HFS for Men and Women*

Fit Index	Women	Men	Target Value
$\chi^2$	13.67	33.01*	<i>ns</i>
df	6	6	
$\chi^2/\text{df}$	2.28	5.46	< 2
GFI	.98	.97	close to .95
TLI	.96	.85	close to .95
CFI	.98	.94	close to .95
RMSEA	.07	.12	< .08
90 % C. I.	.02 -.11	.08 -.17	.00 to .08
Hoeltler's $\chi^2/N$	271	114	> 200
SRMR	.03	.04	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$

Table 12 presents the Beta-weights and associated standard errors derived using bootstrap for the Forgiveness of Others latent variable. *B*-weights and associated standard errors derived using Maximum-Likelihood and bootstrapping are also presented. Inspection of Table 12 reveals that all of the path coefficients were statistically significant; however, some of the path coefficients were small.

Similar to the results of the confirmatory factor analysis of the Forgiveness of Self, latent variable, inspection of the path coefficients suggests weaker loadings of positively phrased items.

Table 12

*Standardized ( $\beta$ ) and Unstandardized ( $B$ ) Factor Loadings for the Forgiveness of Others subscale of the HFS for Women and Men*

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
Women's Forgiveness of Others					
Positive items					
HFS item 1	.18 (.07)	1.00		1.00	
HFS item 3	.50 (.06)	2.82	.95	2.82	2.29
HFS item 5	.33 (.07)	1.63	.51	1.63	1.23
Women's Forgiveness of Others					
Negative items					
HFS item 2	.66 (.05)	3.84	1.40	3.84	3.08
HFS item 4	.90 (.05)	5.27	1.91	5.27	1.71
HFS item 6	.58 (.05)	3.34	1.23	3.34	2.87
Men's Forgiveness of Others					
Positive items					
HFS item 1	.28 (.07)	1.00		1.00	
HFS item 3	.39 (.07)	1.45	.33	1.45	.42
HFS item 5	.38 (.07)	1.21	.27	1.21	.33
Men's Forgiveness of Others					
Negative items					
HFS item 2	.75 (.05)	3.06	.72	3.06	1.01
HFS item 4	.85 (.05)	3.57	.83	3.57	1.21
HFS item 6	.61 (.06)	2.47	.60	2.47	.82

*Note:* All  $\beta$ s and  $B$ s with standard errors derived using bootstrapping estimation were significant and all  $B$ s tested with standard errors derived using Maximum-Likelihood estimation were significant at  $p < .01$ .

Table 13 presents the goodness-of-fit indices for the confirmatory factor

analysis of the Forgiveness of Situations latent variable for men and women. As indicated in Table 13, the model provided an adequate fit to the data.

Table 13

*Goodness-of-Fit Indices for the Confirmatory Factor Analysis of the Forgiveness of Situations subscale of the HFS for Men and Women*

Fit Index	Women	Men	Target Value
$\chi^2$	4.27	8.57	<i>ns</i>
df	6	6	
$\chi^2/\text{df}$	1	1.43	< 2
GFI	.99	.99	close to .95
TLI	1.00	.99	close to .95
CFI	1.00	1.00	close to .95
RMSEA	.00	.04	< .08
90 % C. I.	.00 - .07	.00 - .09	.00 to .08
Hoeller's <i>N</i>	759	436	> 200
SRMR	.02	.03	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

Table 14 presents the Beta-weights and associated standard errors derived using bootstrap for the Forgiveness of Situations latent variable. *B*-weights and associated standard errors derived using Maximum-Likelihood and bootstrapping are also presented. Inspection of Table 14 reveals that all of the path coefficients

were statistically significant; however, some of the path coefficients were small.

Similar to the results of the confirmatory factor analyses of the Forgiveness of Self and Forgiveness of Others, latent variables, inspection of the path coefficients suggests weaker loadings of positively phrased items.

Table 14

*Standardized ( $\beta$ ) and Unstandardized ( $B$ ) Factor Loadings for the Forgiveness of Situations subscale of the HFS for Women and Men*

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Forgiveness of Situations</b>					
Positive items					
HFS item 1	.35 (.07)	1.00		1.00	
HFS item 3	.45 (.07)	1.13	.17	1.13	.22
HFS item 5	.31 (.07)	.97	.18	.97	.22
<b>Women's Forgiveness of Situations</b>					
Negative items					
HFS item 2	.76 (.06)	2.47	.45	2.47	.61
HFS item 4	.83 (.05)	2.56	.47	2.56	.69
HFS item 6	.67 (.05)	2.06	.39	2.06	.57
<b>Men's Forgiveness of Situations</b>					
Positive items					
HFS item 1	.40 (.07)	1.00		1.00	
HFS item 3	.39 (.06)	1.03	.14	1.03	.17
HFS item 5	.33 (.08)	.92	.18	.92	.19
<b>Men's Forgiveness of Situations</b>					
Negative items					
HFS item 2	.81 (.04)	2.57	.41	2.57	.55
HFS item 4	.81 (.05)	2.48	.39	2.48	.59
HFS item 6	.71 (.05)	2.21	.36	2.21	.47

*Note:* All  $\beta$ s and  $B$ s with standard errors derived using bootstrapping estimation were significant at  $p < .005$  and all  $B$ s tested with standard errors derived using Maximum-Likelihood estimation were significant at  $p < .001$ .

## **Physical and Mental Health**

The SF-36 has been used in numerous studies of physical and mental health (Jordan-Marsh, 2002). Although the SF-36 is considered the gold standard for subjective ratings of health and is designed to be administered in a standardized manner, there does not appear to be consistency with respect to scoring the SF-36, particularly when attempts are made to group the scales along the lines of physical and mental health. It was noted by Jordan-Marsh, that this instrument is usually scored by either calculating two component scores, the Physical Component Summary (PCS) and the Mental Component Summary (MCS), or by calculating the eight individual scale scores. There does not, however, appear to be consistency as to the most appropriate algorithm to implement when calculating PCS and MCS. According to one algorithm for the construction of mental health and physical health summary measures (Hays et al., 1993), the PCS includes the Physical Functioning, Role-Physical, Bodily Pain, and General Health scales whereas the MCS includes the Social Functioning, Role-Emotional, Vitality, and Mental Health scales.

Although the developers of the SF-36 (Ware et al., 2000) suggest using the individual scales of the SF-36 for some purposes, there is a fundamental discrepancy in their calculation of PCS and MCS. To calculate PCS and MCS, Ware et al. (2000) extracted the factor weights for these component scores through an orthogonal factor analysis that implicitly assumed that the PCS and MCS scores were independent in the general population (Hann & Reeves, 2008). In order to obtain a total PCS score as per Ware et al., the factor weight was multiplied by the



z-score for its corresponding SF-36 scale and a sum was calculated from the eight products. The same procedure was used to obtain the MCS. It is of note that the scoring formula for the PCS includes both positive weights (Physical Functioning, Role-Physical, Bodily Pain, General Health, and Vitality) and negative weights (Social Functioning, Role-Emotional, and Mental Health). Similarly, the scoring formula for the MCS includes both positive weights (Vitality, Social Functioning, Role-Emotional, and Mental Health) and negative weights (Physical Functioning, Role-Physical, Bodily Pain, and General Health). In both cases, the negatively weighted scales drive down the scores of their respective components, which can lead to discrepancies when interpreting results derived from the SF-36 scale scores as compared with the component summaries (Farivar, Cunningham, & Hays, 2007). These discrepancies can include, for example, improved health as indicated by subscale scores over time and, simultaneously, deteriorated health according to component summary scores.

In addition to inconsistencies between information contained in scale scores and component summaries, as suggested by Hann and Reeves (2008), an operational definition of health that neglects the large body of research that suggests that mental and physical health are interdependent is not valid. This notion of the interplay between physical and mental health is also more consistent with the biopsychosocial model of health (Suls & Rothman, 2004) that guided the present research, whereas the independent, mutually exclusive conceptualization of mental and physical health proposed by Ware et al. (2000) is more consistent with a biomedical approach to health (Anagnostopoulos, Niakas, & Tountas, 2009).

Moreover, as was aptly noted by Taft, Karlsson, and Sullivan (2001), the algorithm for calculating PCS and MCS developed by Ware et al., necessitates perfect scores of 100 on the scales falling in their respective health cluster and scores of 0 on the remaining scales in order to achieve an optimal level of either physical health or mental health. Largely due to the orthogonal rotation of the physical health and mental health factors, the formula for PCS implies that “perfect physical health in PCS terms is attainable only when mental health falls flat on the floor” (Taft et al., 2001, p. 416). The same is true when considering perfect estimates of MCS and the inverse is true when considering estimates of poor physical and mental health (Taft et al., 2001).

With respect to the issue of physical and mental health interdependence, correlated PCS and MCS scores have been supported by several large-scale research studies, including a study by Farivar et al. (2007) in which the physical health and mental health factors were allowed to correlate. In their analysis of the responses of 6931 randomly selected patients from the southwestern United States, who completed the SF-36, Farivar et al. found a correlation of  $r = .62$  between the physical health and mental health factors. Hann and Reeves (2008) also examined the validity of Ware’s original model of health status, which is represented by two independent component scores. They compared this model with several alternative models, some of which conceptualized PCS and MCS as independent components and some of which conceptualized PCS and MCS as correlated factors.

Hann and Reeves (2008) reanalyzed the data from two large-scale data sets from the UK. They evaluated the construct validity of Ware et al.’s (2000) original

factor structure (Model 1), which posited that Physical Functioning, Role-Physical and Bodily Pain were functions of PCS alone; Role Emotional, Social Functioning, and Mental Health were functions of MCS alone and that Vitality and General Health were functions of both. A second model that Ware et al. posited allowed “for a secondary (i.e., important but minor) influence of Physical Health on Social Functioning” (Hann & Reeves, 2008, p. 415) was evaluated (Model 2).

Confirmatory factor analyses were used to examine the fit of these models and these orthogonal models were compared to corresponding oblique models, in which PCS and MCS were allowed to correlate. Hann and Reeves also evaluated the fit of a three component model specified by Keller et al. (1998), which replicated Model 2, except that Vitality and General Health constituted a third component of health termed “general well-being” (p. 415) and allowed for intercorrelations among the three components.

For both of the data sets, the orthogonal solution to Model 1 showed the poorest fit to the data, followed by the orthogonal solution to Model 2. These orthogonal models “were easily outperformed by all three oblique solutions” (Hann & Reeves, 2008, p. 418). As noted by Hann and Reeves, the superiority of these solutions was most likely related to the magnitude of the correlation between MCS and PCS, which was greater than .50 in every correlated model for both data sets. In comparing the fit indices of the estimated models, Hann and Reeves found that the oblique form of Model 2 (i.e., two components, MCS and PCS, with a secondary influence of Physical Health on Social Functioning) was the best solution overall.

Hann and Reeves (2008) also performed exploratory factor analysis on the data from four condition-specific subgroups (arthritis, back pain, heart disease, and mental illness). Based on the results of the exploratory factor analysis, they formulated a reduced model of health status that excluded Social Functioning, General Health, and Vitality. General Health, Social Functioning, and Vitality were excluded from the reduced model because Hann and Reeves found that the latent variables for these scales differed significantly as a function of the disease group and, thus, component scores that were calculated including these scales would likely contain systematic error variance related to the patients' underlying medical condition rather than their health-related quality of life. The final, reduced model proposed by Hann and Reeves was an oblique model with Physical Functioning, Role-Physical, and Bodily Pain as functions of PCS and Role-Emotional and Mental Health as functions of MCS. However, because this model was not nested within the larger eight scale model, the improvement in fit of the reduced model was not evaluated.

Anagnostopoulos et al. (2009) also reported that the Physical Health and Mental Health factors were significantly positively correlated. They found a correlation of  $r = .85$  between obliquely rotated Physical Health and Mental Health factor components among a sample of 1005 Greek participants. In a second, independent sample of 1426 Greek participants, Anagnostopoulos et al. used SEM to evaluate the alternative models of factor structure of the SF-36 proposed by Hays et al. (1993) and Ware et al. (2000). They found the best fit for a correlated model in which all eight scales of the SF-36 were allowed to load on both the

Physical Health and Mental Health factors. It should be noted that the model proposed by Hays et al. in which Role-Physical, Physical Functioning, Bodily Pain, and General Health served as indicators of Physical Health and Role-Emotional, Social Functioning, Vitality, and Mental Health served as indicators of Mental Health also provided a good fit to the data although the model in which the eight scales were permitted to cross-load was statistically superior. In addition, Hays et al.'s model does not permit negative factor loadings as the scales load on only one factor. Although the former model fit the data better than the latter, this model was less parsimonious as it contained cross-loadings on the Physical Health and Mental Health factors. Moreover, a better model is expected when indicators are allowed to load on multiple latent variables (Anagnostopoulos et al., 2009). Cross-loadings are also problematic to use in SEM because it is very likely that their use will lead to identification errors. If cross-loadings are included in a model, the analyst should solve all identification equations by hand to ensure that this is not a problem. It is necessary to solve the equations by hand because part of the model may not be identified and SEM software will often provide a solution without warning about the identification issues. Anagnostopoulos et al. did not report whether or not they solved the identification equations by hand.

Another problem of cross-loadings is that allowing indicators to load on more than one latent variable in SEM suggests poor discriminant validity (Farrell, 2010). One possibility for handling this problem is to eliminate cross-loading indicators (Farrell, 2010); however, when removing offending indicators, it is important to consider the trade-offs between the number of indicators to assess a

latent variable and the benefit of construct coverage, and the benefit of a measurement model that performs well and includes indicators that discriminate between theoretical constructs (Farrell, 2010). Finally, of note, Anagnostopoulos et al. (2009) found that the model that did not allow the Physical Health and Mental Health latent variables to correlate provided the worst fit to the data and explicitly recommend not using PCS and MCS scores calculated using an orthogonal rotation.

To summarize, the results from this collection of research on the structure of the SF-36 indicated that allowing PCS and MCS to correlate significantly improved model fit over the corresponding, traditional model in which the Physical Health and Mental Health latent variables were uncorrelated and, although the reduced five-factor model of health status that was developed by Hann and Reeves (2008) fit the data well, improvements in this model's fit could not be evaluated. This reduced model, therefore, did not have much research support. It appears that although the SF-36 scales perform well at the univariate level, Ware et al.'s (2000) conceptualization at the multivariate level, particularly with respect to their formula for calculating the PCS and MCS scores did not appear to perform well psychometrically and was not supported by the overwhelming body of evidence relating physical and mental health.

In order to replicate a model of the SF-36 that allowed for a correlation between physical health and mental health in a new Canadian sample, I evaluated the fit of the model advocated by Hays et al. (1993). Although based on statistical grounds, Anagnostopoulos et al. (2009) concluded that a correlated model in which

all eight scales of the SF-36 were allowed to load on both the Physical Health and Mental Health factors provided the best fit to the data as I argued previously, the model advocated by Hays et al. (1993) was superior in terms of theoretical grounds because it did not allow for cross-loadings.

Although Hann and Reeves (2008) argued that there was a good case for using the reduced five-factor model in terms of superior model fit and nonnegative factor coefficients, they were not able to compare the fit of this model with a model that contained all eight scales of the SF-36 because it was not nested. Moreover, given that I was not aggregating SF-36 scores from specific disease subgroups in my research but was focusing on subjective health in the general population, the universality of the factor structure across disease subgroups was not a primary concern in the present research. Therefore, I decided to evaluate the model specified by Hays et al. (1993) using SEM. Thus, in arriving at my measurement model of health as assessed by the SF-36, I evaluated the research examining several different latent variable models. Although several models appeared to provide adequate fit, the final determinant of which model of health to incorporate in the APIM was based on both statistical and theoretical significance.

The factor structure of the model of health suggested by Hays et al. (1993) is depicted in Figure 3. The model includes two correlated latent variables (i. e., Physical Health and Mental Health). The indicators for the two latent variables were the eight scales of the SF-36. As shown in Figure 3, Bodily Pain, Role-Physical, General Health, and Physical Functioning were used as indicators of Physical Health; Mental Health, Social Functioning, Vitality, and Role-Emotional

were used as indicators of Mental Health. In order to set the scale of the Physical Health and Mental Health latent variables, the factor loading of the first indicator of each latent variable was fixed to 1.0 and all of the residual path coefficients were constrained to 1.0.

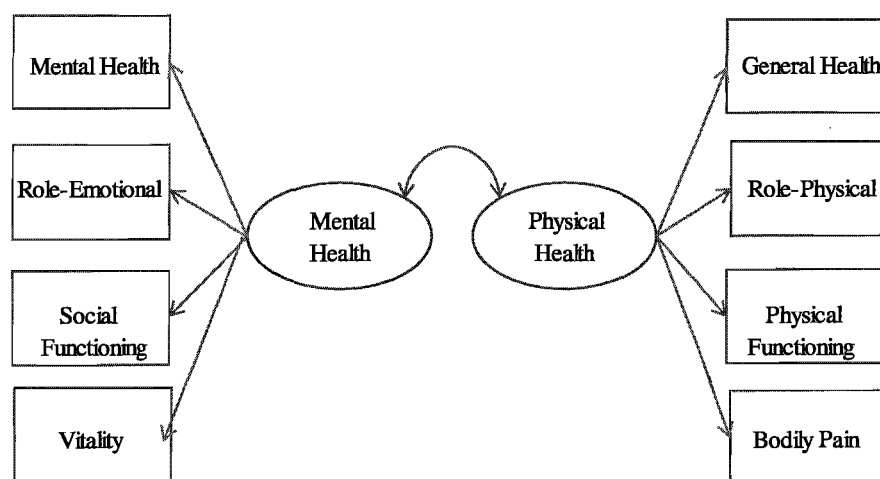


Figure 3. Measurement model for the SF-36. The indicators are shown in rectangles, and the latent variables are indicated by ovals.

With respect to multivariate normality, problematic skewness and kurtosis values were evident for the SF-36 for both men and women. Given the multivariate nonnormality of the SF-36, I decided to use bootstrapping in order to derive parameter estimates.

Testing the SF-36 with a confirmatory factor analysis resulted in a marginally adequate fit for women and men. Examination of the modification indices suggested allowing for correlated error terms between several pairs of scales. I decided to allow correlated error terms between all of the pairs of scales



suggested by the modification indices that would significantly improve model fit. Essentially, all of the modifications made theoretical sense as all of the scales of the SF-36 were tapping into subjective ratings of mental and physical health which are assumed to be correlated at both a theoretical and measurement level. In total, seven pairs of error terms were allowed to covary for both men and women. The  $\chi^2$  difference test for women,  $\chi^2(1) = 79.23, p. < .001$ , and men,  $\chi^2(1) = 105.07, p. < .001$ , indicated that the model was significantly improved with the addition of these covariances. Table 15 presents the goodness-of-fit indices for men and women for the initial model without correlated error terms (Model 1, denoted M1) and for the final measurement model that included the seven pairs of correlated error terms (Model 2, denoted M2). It is also of note that the correlation between the Physical Health and Mental Health latent variables was significant for men ( $r = .61, p < .001$ ) and for women ( $r = .62, p < .001$ ).

Table 15

*Goodness-of-Fit Indices for the Confirmatory Factor Analysis of the SF-36 Initial Model (M1) and Modified Model (M2)*

Fit Index	Women		Men		Target Value
	M1	M2	M1	M2	
$\chi^2$	98.21**	18.98**	137.28**	32.21**	ns
df	19	12	19	12	
$\chi^2/df$	5.17	1.58	19	2.68	< 2
GFI	.91	.98	.90	.97	close to .95
TLI	.86	.98	.64	.96	close to .95
CFI	1.00	.99	.86	.98	close to .95
RMSEA	.12	.04	.15	.07	< .08
90 % C. I.	.10 -.14	.00 -.08	.12 -.17	.04 -.10	.00 to .08
Hoeltler's N	91	328	65	194	> 200
SRMR	.07	.04	.07	.04	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

Table 16 presents the Beta-weights and associated standard errors derived using bootstrap for the SF-36. B-weights and associated standard errors derived using Maximum-Likelihood and bootstrapping are also presented. All of the factor loadings were significant and appeared acceptable in magnitude.

Table 16

*Standardized ( $\beta$ ) and Unstandardized ( $B$ ) Factor Loadings for the SF-36 for Women and Men*

Latent variable and indicator	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Physical Health</b>					
Bodily Pain	.70 (.05)	1.00		1.00	
Role-Physical	.61 (.06)	1.17	.16	1.17	.16
Physical Functioning <sup>3</sup>	.59 (.06)	10488.05	1265.38	10488.05	1434.41
General Health	.69 (.05)	1.80	.10	1.80	.10
<b>Women's Mental Health</b>					
Role-Emotional	.55 (.05)	1.00		1.00	
Social Functioning	.62 (.05)	.71	.07	.71	.07
Mental Health	.82 (.03)	.77	.08	.77	.09
Vitality	.89 (.03)	.86	.09	.86	.10
<b>Men's Physical Health</b>					
Bodily Pain	.80 (.04)	1.00		1.00	
Role-Physical	.62 (.04)	1.74	.18	1.74	.21
Physical Functioning <sup>3</sup>	.75 (.06)	11349.94	1152.24	11349.94	1370.16
General Health	.68 (.05)	1.09	.12	1.09	.14
<b>Men's Mental Health</b>					
Role-Emotional	.58 (.05)	1.00		1.00	
Social Functioning	.71 (.03)	.81	.08	.81	.08
Mental Health	.89 (.03)	.75	.07	.75	.08
Vitality	.83 (.04)	.72	.07	.72	.08

*Note.* Physical Functioning<sup>3</sup> refers to the transformed (cubed) scores on the Physical Functioning scale of the SF-36. All estimates were significant at  $p < .001$ .

### Testing Paths between Dispositional Forgiveness and Health

#### Model Identification

The intraindividual and dyadic models were identified by fixing the factor loading of the first indicator of each latent variable (i.e., Forgiveness of Self, Forgiveness of Others, Forgiveness of Situations, Mental Health, and Physical

Health) to 1.0. Moreover, each of the latent variables had at least three indicators in order to ensure an identified model.

### **Model Specification**

Specification of the models was based upon past research and theory regarding the forgiveness-health relationship. The targets of dispositional forgiveness (i.e., Self, Others, and Situations) were specified in separate models as latent predictor variables, and Mental Health and Physical Health were specified as correlated, outcome variables. The specification of the dispositional forgiveness latent variables was consistent with the theoretical view of Thompson et al. (2005) that “forgiveness (as measured by the HFS) is composed of three separate constructs of forgiveness of self, others, and situations” (p. 328). The specification of Physical Health and Mental Health as correlated factors was based upon the empirical and theoretical work of Hays et al. (1993), Taft et al. (2001), Farivar et al. (2007), Hann and Reeves (2008), and Anagnostopoulos et al. (2009) that was previously described.

### **Testing the Intraindividual Model of Dispositional Forgiveness and Health**

When an acceptable fit of the measurement models for the SF-36 and the HFS had been established, the intra-individual model of dispositional forgiveness predicting health outcomes were tested separately for men and women. Sex differences were examined during the dyadic analyses described below.

In six separate models, structural paths were examined between each of the forgiveness latent variables (i.e., Self, Others, and Situations) and the health outcomes (i.e., Mental Health and Physical Health). The analyses were also

conducted separately for men and women in order to examine the intraindividual model of forgiveness and health. Figure 4 presents the hypothesized models I tested.

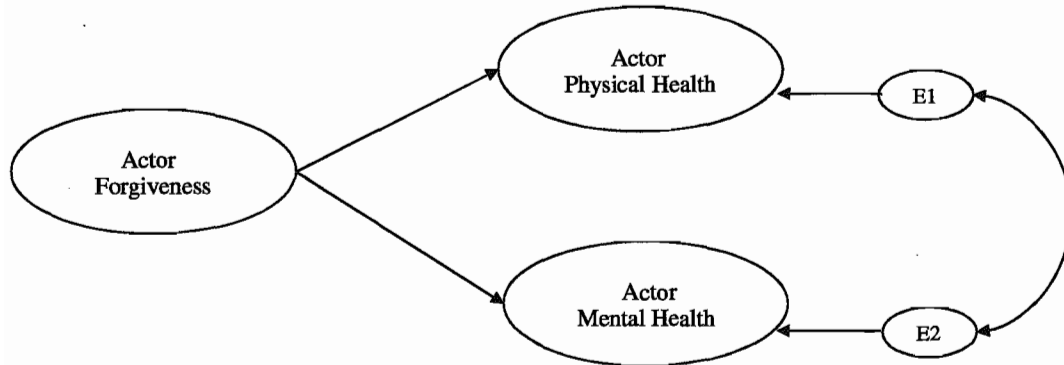


Figure 4. Hypothesized intraindividual model of dispositional forgiveness and mental and physical health analyzed separately for women and men.

As noted previously, given the multivariate nonnormality of the HFS and SF-36, I decided to use bootstrapping to derive parameter estimates. Results of the analyses indicated that the paths from all of the forgiveness latent variables to both Mental Health and Physical Health were significant and positive. Figures 5 and 6 include the standardized regression weights from each of the forgiveness variables to the Mental Health and Physical Health latent variables for women and men. For ease of interpretation, the indicator variables have been omitted from the diagrams. Tables 17 to 19 present the goodness-of-fit indices for the three intraindividual models of health that I tested. Table 20 presents the Beta-weights and associated standard errors derived using bootstrapping for the parameters in these models. *B*-weights and associated standard errors derived using Maximum-Likelihood and bootstrapping are also presented. As depicted in Figures 5 and 6, I found

significant positive relationships between Forgiveness and Mental and Physical Health, as well as significant covariance between Mental and Physical Health.

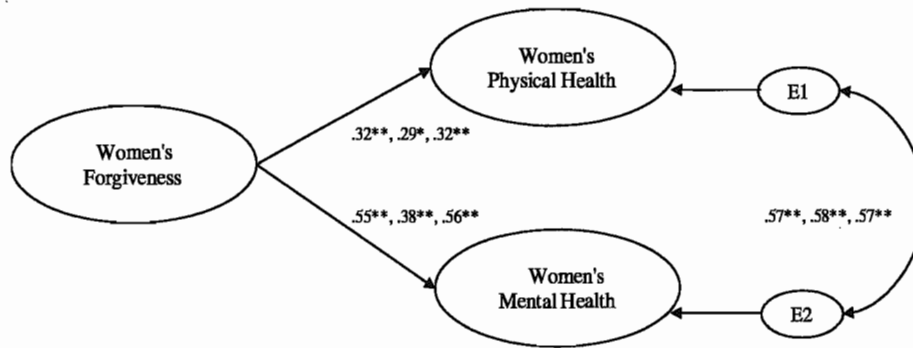


Figure 5. Intraindividual model of dispositional forgiveness and health for women.

Standardized regression weights are shown for Forgiveness of Self as predictor, followed by Forgiveness of Others as predictor, followed by Forgiveness of Situations as predictor.

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

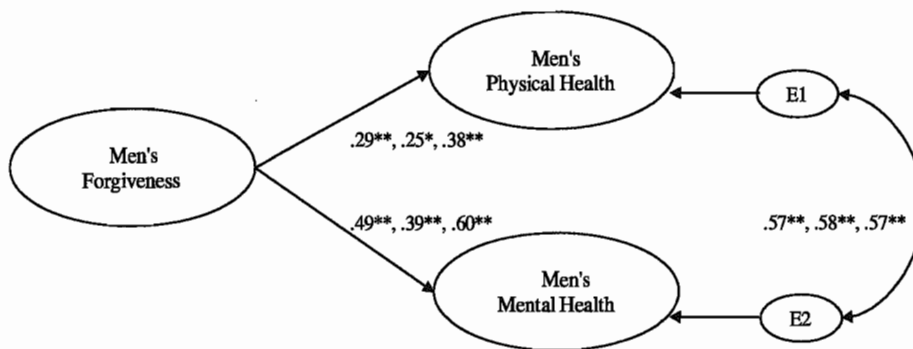


Figure 6. Intraindividual model of dispositional forgiveness and health for men.

Standardized regression weights are shown for Forgiveness of Self as predictor, followed by Forgiveness of Others as predictor, followed by Forgiveness of Situations as predictor.

Situations as predictor.

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

Table 17

*Goodness-of-Fit Indices for the Path from Forgiveness of Self to Mental and Physical Health for Women and Men*

Fit Index	Women	Men	Target Value
$\chi^2$	86.09**	124.66**	<i>ns</i>
df	64	64	
$\chi^2/\text{df}$	1.34	1.95	< 2
GFI	.94	.94	close to .95
TLI	.97	.95	close to .95
CFI	.98	.97	close to .95
RMSEA	.04	.05	< .08
90 % C. I.	.00 - .05	.04 - .07	.00 to .08
Hoeltler's <i>N</i>	288	199	> 200
SRMR	.03	.05	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$

Table 18

*Goodness-of-Fit Indices for the Path from Forgiveness of Others to Mental and Physical Health for Women and Men*

Fit Index	Women	Men	Target Value
$\chi^2$	89.30**	114.54**	<i>ns</i>
df	64	64	
$\chi^2/df$	1.39	1.79	< 2
GFI	.96	.95	close to .95
TLI	.97	.95	close to .95
CFI	.98	.97	close to .95
RMSEA	.04	.05	< .08
90 % C. I.	.02 - .05	.04 - .07	.00 to .08
Hoeltler's $N$	278	217	> 200
SRMR	.05	.05	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$



Table 19

*Goodness-of-Fit Indices for the Path from Forgiveness of Situations to Mental and Physical Health for Women and Men*

Fit Index	Women	Men	Target Value
$\chi^2$	77.29**	96.61**	ns
df	64	64	
$\chi^2/\text{df}$	1.21	1.50	< 2
GFI	.96	.96	close to .95
TLI	.98	.97	close to .95
CFI	.99	.98	close to .95
RMSEA	.03	.04	< .08
90 % C. I.	.00 - .05	.02 - .05	.00 to .08
Hoeltler's N	321	257	> 200
SRMR	.03	.05	< .05

*Note.* GFI = Goodness-of-fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation, SRMR. Target value indicates a well-fitting model (Byrne, 2001; Schumacker & Lomax, 2004).

\* $p < .001$

Table 20

*Standardized ( $\beta$ ) and Unstandardized (B) Path Coefficients from Forgiveness to Mental and Physical Health for Men and Women*

Forgiveness target → Health	$\beta$ (SE)	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Forgiveness of Self</b>					
Women's Physical Health	.32 (.08)**	13.43*	4.38	13.43**	6.19
Women's Mental Health	.55 (.06)**	28.52**	7.76	28.52**	12.11
<b>Women's Forgiveness of Others</b>					
Women's Physical Health	.29 (.07)**	15.47*	6.31	15.47**	12.06
Women's Mental Health	.38 (.08)**	23.86*	8.95	23.86**	15.96
<b>Women's Forgiveness of Situations</b>					
Women's Physical Health	.32 (.08)**	9.55**	2.64	9.55**	3.06
Women's Mental health	.56 (.05)**	19.74**	4.23	19.74**	5.16
<b>Men's Forgiveness of Self</b>					
Men's Physical Health	.29 (.06)**	6.20**	1.68	6.20	2.16**
Men's Mental health	.49 (.08)**	15.01**	2.92	15.01	3.22**
<b>Men's Forgiveness of Others</b>					
Men's Physical Health	.25 (.07)*	8.82*	3.06	8.82*	3.84
Men's Mental Health	.39 (.07)**	20.17**	5.70	20.17**	7.33
<b>Men's Forgiveness of Situations</b>					
Men's Physical Health	.38 (.07)**	10.13**	2.31	10.13**	2.64
Men's Mental Health	.60 (.05)**	23.42**	4.34	23.42**	4.58

Note. \* $p < .01$ , \*\* $p < .001$

### **Dyadic Model Estimation**

In the previous analyses, I was able to replicate past research establishing a positive relationship between dispositional forgiveness of self, others, and situations and mental and physical health outcomes. The final stage of the data analyses entailed examining actor and partner effects within the same model.

As with the intra-individual analyses, separate models were tested for dispositional forgiveness of self, dispositional forgiveness of others, and dispositional forgiveness of situations. This entailed estimating the APIM that was presented earlier in Figure 1. As depicted in Figure 1, the fully saturated model includes the actor effects of forgiveness on health, the partner effects of forgiveness on health, and the conjoint effects of forgiveness on health. Following Kenny and Cook, the two exogenous variables (Forgiveness) were allowed to correlate and the residual variances of the endogenous variables (Mental and Physical Health) were allowed to correlate.

When Forgiveness of Self was used to predict Mental and Physical Health, the APIM fit the data reasonably well [ $\chi^2(317) = 443.58, p < .001; \chi^2/df = 1.40$ ; GFI = .91; TLI = .95; CFI = .96; RMSEA = .04, CI = .03-.05; Hoeltler's  $N = 240$ ; SRMR = .05]. Examination of Figure 7 reveals significant individual effects of men's and women's Forgiveness of Self on their own Physical and Mental Health (i.e., actor affects). There were no significant partner effects from Forgiveness of Self to Physical Health or Mental Health for either men or women. That is, men's Forgiveness of Self was not related to women's Physical and Mental Health, and women's Forgiveness of Self was not related to men's Mental Health and Physical Health. As depicted in Figure 7, there was a significant relationship between the Forgiveness of Self scores for each partner and between the residuals of the Physical Health variable for partners. The relationship between the residuals of the Mental Health variable was not significant. The significant correlation between the Forgiveness of Self scores indicated a relationship composition effect (i.e., that the

partners are, to some degree, similar in their levels of Forgiveness of Self). The significant correlation between the residuals of men's and women's Physical Health was an indicator of nonindependence that was not accounted for by the APIM (Kenny et al., 2006). Also depicted in the diagram was the significant relationship between Physical Health and Mental Health for women and for men, supporting my hypothesis that these latent variables were not independent and were positively associated with each other. Table 21 presents the unstandardized and standardized regression weights for the actor and partner effects of Forgiveness of Self in the APIM and compares the original standard errors to the standard errors produced by bootstrapping, along with the significance of the parameter for each standard error.

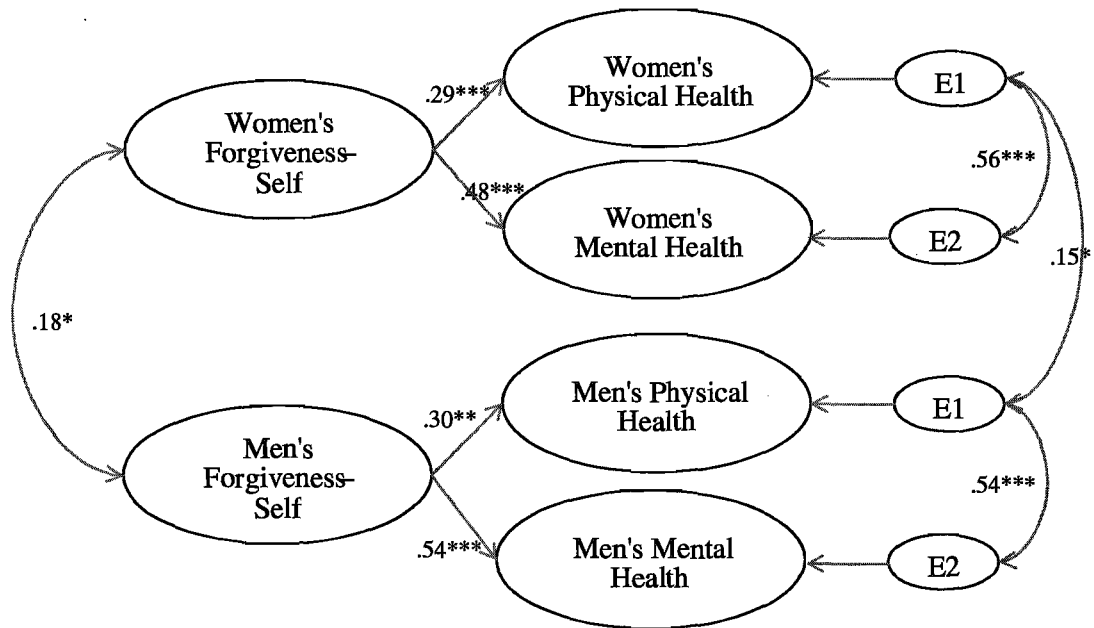


Figure 7 APIM for Forgiveness of Self and Health. Nonsignificant paths were excluded from the figure for ease of interpretation.

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

Table 21

*Standardized ( $\beta$ ) and Unstandardized (B) Path Coefficients for the APIM from Forgiveness of Self to Mental and Physical Health for Men and Women*

Effect → Health	$\beta$ (SE)	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Physical Health</b>					
Female Actor Effect	.30 (.08)*	13.27*	4.48*	13.27	6.10
Male Partner Effect	.07 (.07)	3.20	1.74	3.20	2.06
<b>Women's Mental Health</b>					
Female Actor Effect	.54 (.06)*	27.24**	7.47**	27.24	11.69
Male Partner Effect	.11 (.06)	1.72	1.69	1.72	1.88
<b>Men's Physical Health</b>					
Male Actor Effect	.29 (.08)	6.81**	1.92**	6.81	2.40
Female Partner Effect	.03 (.08)	1.16	3.19	1.16	4.09
<b>Men's Mental Health</b>					
Male Actor Effect	.48 (.06)	14.84**	2.93**	14.84	3.34
Female Partner Effect	.09 (.07)	4.32	3.79	4.32	4.71

Note. \* $p < .01$ , \*\* $p < .001$

These results indicated whether partner effects and/or actor effects were significant in the APIM; they did not, however, indicate if there was a significant sex difference between the actor effects or whether there was a significant sex difference between the partner effects. In order to determine whether the Forgiveness of Self actor effects were significantly different, the actor paths were first constrained to equality and the model fit was re-examined. When the actor paths to Physical Health were constrained to equality the chi-square statistic was  $\chi^2(318) = 446.10, p < .001$ . This did not result in a significantly diminished fit,  $\chi^2 \text{ Difference}(1) = 2.12, p > .05$ , indicating that the relationship between Forgiveness

of Self and Physical Health was the same for men and women. When the actor paths for Mental Health were constrained to equality, the chi-square statistic was  $\chi^2(318) = 447.42, p < .001$ . This did not result in a significantly diminished fit,  $\chi^2 \text{ Difference } (1) = 3.74, p > .05$ , indicating that the relationship between Forgiveness of Self and Mental Health was the same for men and women. Given that partner effects in the APIM that used Forgiveness of Self to predict Mental Health and Physical Health were not significant, sex differences in the partner effects were not examined.

When Forgiveness of Others was used to predict Mental and Physical Health, the APIM fit the data reasonably well [ $\chi^2(318) = 437.82, p < .001$ ; GFI = .91; TLI = .95; CFI = .96; RMSEA = .04, CI = .03 - .04, Hoeltzer's  $N = 244$ ; SRMR = .05]. Examination of Figure 8 reveals significant individual effects of men's and women's Forgiveness of Others on their own Physical and Mental Health (i.e., actor effects). I also found a significant partner effect for men in that men's Forgiveness of Others was positively associated with their female partner's Mental Health. The partner effect from men's Forgiveness of Others to women's Physical Health was not significant. There were no significant partner effects from women's Forgiveness of Others to either men's Mental or Physical Health. In addition, as depicted in Figure 8, there was a significant relationship between the residuals of men's and women's Physical Health and between the residuals of men's and women's Mental Health scores; however, the relationship between the Forgiveness of Other scores for each partner was not significant. The correlation between the residuals of the health variables was an indicator of nonindependence

that was not accounted for by the APIM (Kenny et al., 2006). Also depicted in the diagram is the significant relationship between Physical Health and Mental Health, again supporting my hypothesis that these latent variables are not independent and are positively associated with each other. Table 22 presents the unstandardized and standardized regression weights for the actor and partner effects of Forgiveness of Self in the APIM and compares the original standard errors to the standard errors produced by bootstrapping, along with the significance of the parameter for each standard error.



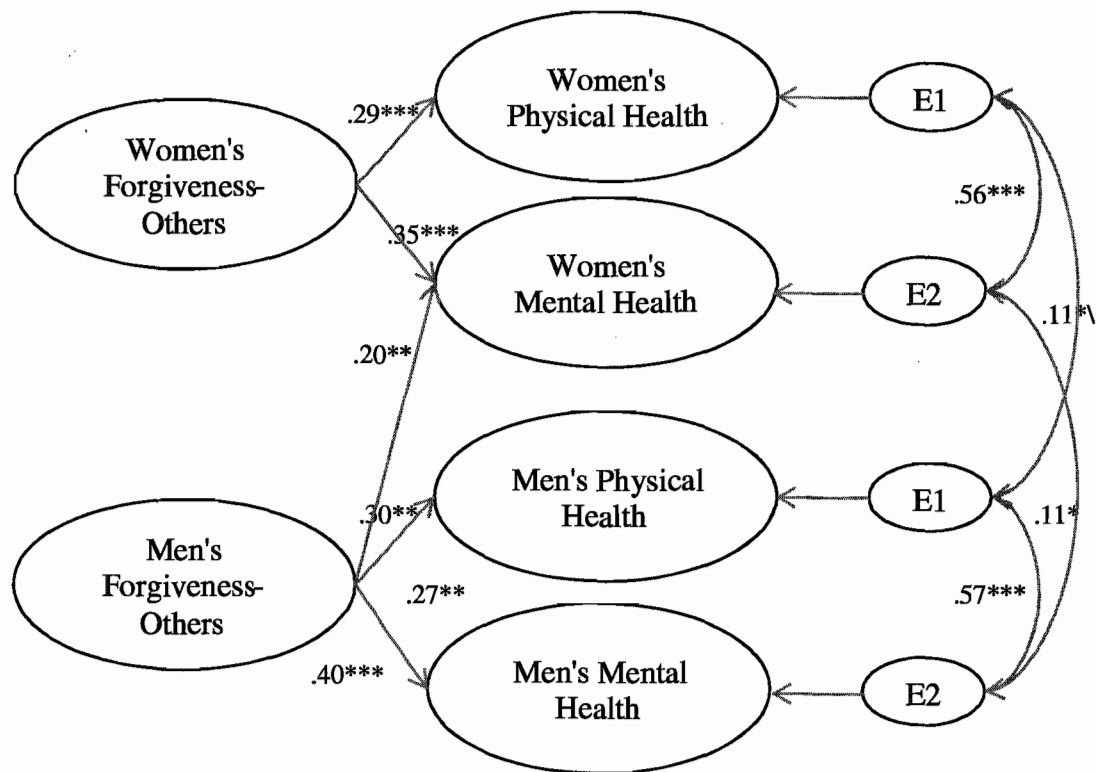


Figure 8. APIM for Forgiveness of Others and Health. Nonsignificant paths were excluded from the figure for ease of interpretation...

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

Table 22

*Standardized ( $\beta$ ) and Unstandardized (B) Path Coefficients for the APIM from Forgiveness of Others to Mental and Physical Health for Men and Women*

Effect → Health	$\beta$ (SE)	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Physical Health</b>					
Female Actor Effect	.29 (.07)	15.22*	6.25	15.22	11.76
Male Partner Effect	.01 (.07)	.21	2.61	.21	2.86
<b>Women's Mental Health</b>					
Female Actor Effect	.35 (.07)	21.98**	8.39	21.98	14.56
Male Partner Effect	.20 (.07)	8.61**	3.52	8.61	4.4
<b>Men's Physical Health</b>					
Male Actor Effect	.27 (.07)	9.24**	3.13	9.24	4.09
Female Partner Effect	.06 (.08)	2.90	3.51	2.90	5.08
<b>Men's Mental Health</b>					
Male Actor Effect	.40 (.07)	20.22***	5.7	20.22	7.39
Female Partner Effect	.00 (.06)	.18	4.82	.18	6.39

Note. \* $p < .01$ , \*\* $p < .001$

To address sex differences in the relationship between Forgiveness of Others and Physical Health, the actor paths to Physical Health for Forgiveness of Others were constrained to equality, yielding a chi-square statistic of  $\chi^2(318) = 437.82$ ,  $p < .001$ . This did not result in a significantly diminished fit of the APIM,  $\chi^2(1) = .90$ ,  $p > .05$ , indicating that the relationship between Forgiveness of Others and Physical Health was the same for men and women. Similarly for Mental Health, when the actor paths to Mental Health were constrained to equality, the chi-square statistic was  $\chi^2(318) = 437.85$ ,  $p < .001$ . This did not result in a significantly diminished fit of the APIM,  $\chi^2(1) = .03$ ,  $p > .05$ , indicating that the

relationship between Forgiveness of Others and Mental Health was the same for men and women. Potential sex differences in the partner effects were not examined because there were no partner effects for Physical Health and the effect of the female partner's Forgiveness of Others on her male partner's Mental Health were not significant.

Given that the partner effect from male partner Forgiveness of Others to female partner Mental Health was significant, it was possible to determine whether the actor and partner effects were equivalent. The actor and partner effects were constrained to equality in order to determine whether women's Mental Health was conjointly influenced by the actor effect of women's Forgiveness of Others and the partner effects of men's Forgiveness of Others. This was in contrast to the former analyses which controlled for the effects of the dyad member in isolation from the other members. For women's Mental Health, when the actor and partner effects of Forgiveness of Others were constrained to equality, the chi-square statistic was  $\chi^2(318) = 362.11, p < .001$ . Comparing this chi-square statistic with the chi-square statistic obtained in my former analysis of the APIM resulted in a significantly diminished fit of the APIM,  $\chi^2(1) = 11.59, p < .001$ , and suggested that the models were not equal. As such, it appears that the actor and partner effects of Forgiveness of Others on women's Mental Health were significantly different from each other.

When Forgiveness of Situations was used to predict Mental Health and Physical Health, the APIM fit the data reasonably well [ $\chi^2(317) = 350.52, p = .095$ ; GFI = .92; TLI = .98; CFI = .99; RMSEA = .02, CI = .00 - .03; Hoeltler's  $N = 304$ ; SRMR = .05]. Examination of Figure 9 reveals significant individual effects

of men's and women's Forgiveness of Situations on their own Physical and Mental Health (i.e., actor effects). I also found a significant partner effect for men in that men's Forgiveness of Situations was positively associated with their female partner's Mental Health. The partner effect from men's Forgiveness of Situations to women's Physical Health was not significant. There were no significant partner effects of Forgiveness of Situations for women. That is, women's Forgiveness of Situations was not related to men's Physical and Mental Health. As depicted in Figure 9, there was no relationship between the Forgiveness of Situations scores for the partners. There were no significant relationships between the residuals of the Physical and Mental Health latent variables for men and women, suggesting that nonindependence in Physical and Mental Health were accounted for by the APIM. Also depicted in the diagram was the significant relationship between Physical Health and Mental Health for both women and men, again supporting my hypothesis that these latent variables were not independent and were positively associated with each other. Table 23 presents the unstandardized and standardized regression weights for the actor and partner effects of Forgiveness of Self in the APIM and compares the original standard errors to the standard errors produced by bootstrapping, along with the significance of the parameter for each standard error.

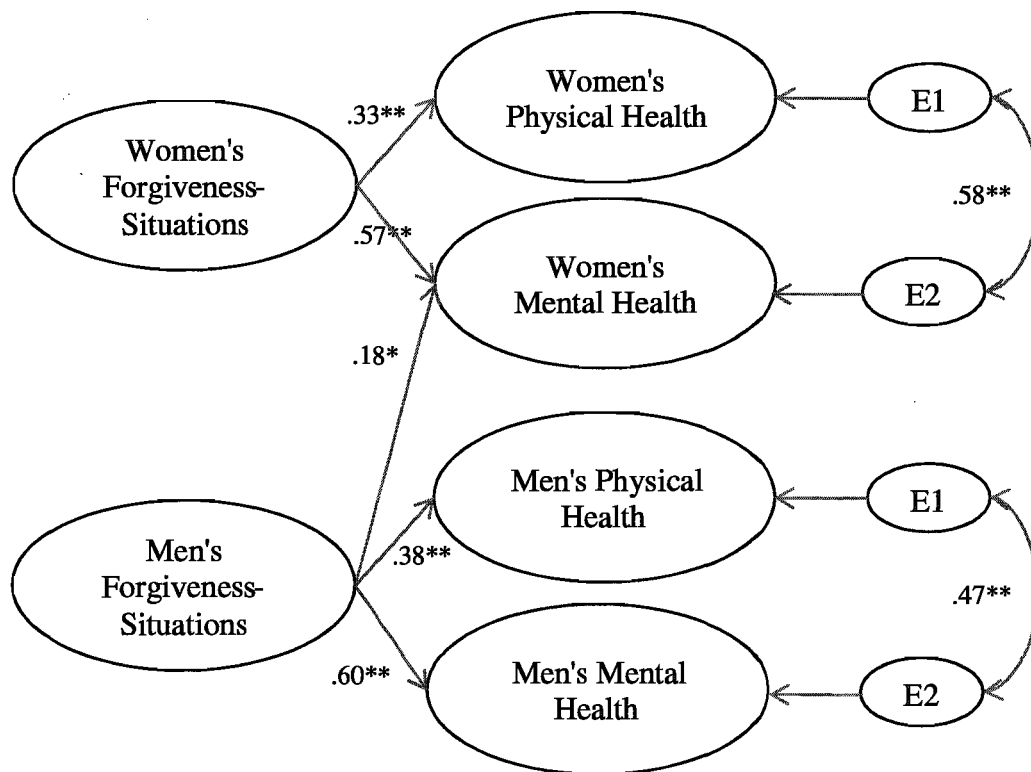


Figure 9. APIM for Forgiveness of Situations and Health. Nonsignificant paths were excluded from the figure for ease of interpretation.

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

Table 23

*Standardized ( $\beta$ ) and Unstandardized ( $B$ ) Path Coefficients for the APIM from Forgiveness of Situations to Mental and Physical Health for Men and Women*

Effect → Health	$\beta$ ( $SE$ )	$B_{ML}$	$SE_{ML}$	$B_{bootstrap}$	$SE_{bootstrap}$
<b>Women's Physical Health</b>					
Female Actor Effect	.33 (.08)*	10.23**	2.79	10.23*	3.38
Male Partner Effect	.11 (.07)	5.53	2.19	5.53	2.57
<b>Women's Mental Health</b>					
Female Actor Effect	.55 (.06)*	19.17**	4.14	19.17*	4.9
Male Partner Effect	.18 (.06)*	3.27*	2.17	3.27*	2.13
<b>Men's Physical Health</b>					
Male Actor Effect	.37 (.07)*	11.16**	2.58	11.16*	3.05
Female Partner Effect	.10 (.06)	.24	2.17	.24	2.75
<b>Men's Mental Health</b>					
Male Actor Effect	.60 (.05)*	22.83**	4.24	22.83*	4.63
Female Partner Effect	.01 (.07)	3.87	2.50	3.87	3.08

*Note.* \* $p < .01$ , \*\* $p < .001$

To address sex differences in the relationship between Forgiveness of Situations and Physical Health, the actor paths to Physical Health for Forgiveness of Situations were constrained to equality, yielding a chi-square statistic of  $\chi^2(318) = 350.56, p = .010$ . This did not result in a significantly diminished fit of the APIM,  $\chi^2(1) = .04, p > .05$ , indicating that the relationship between Forgiveness of Situations and Physical Health was the same for men and women. Similarly for Mental Health, when the actor paths to Mental Health were constrained to equality, the chi-square statistic was  $\chi^2(318) = 350.91, p = .099$ . This did not result in a significantly diminished fit of the APIM,  $\chi^2(1) = .39, p > .05$ . These results indicate that the relationship between Forgiveness of Situations and Mental Health was the same for men and women.

Given that the partner effect from male partner Forgiveness of Situations to female partner Mental Health was significant, it was possible to determine whether the actor and partner effects were equivalent. The actor and partner effects were constrained to equality in order to determine whether women's Mental Health was conjointly influenced by the actor effect of women's Forgiveness of Situations and the partner effects of men's Forgiveness of Situations. This was in contrast to the former analyses which controlled for the effects of the dyad member in isolation from the other members. For women's Mental Health, when the actor and partner effects of Forgiveness of Situations were constrained to equality, the chi-square statistic was  $\chi^2(318) = 362.11, p < .001$ . Comparing this chi-square statistic with the chi-square statistic obtained in my former analysis of the APIM resulted in a significantly diminished fit of the APIM,  $\chi^2(1) = 11.59, p < .001$ , and suggested

that the models were not equal. As such, it appears that the actor and partner effects of Forgiveness of Situations on women's Mental Health were significantly different from each other.



## Discussion

## Discussion

In this study, the dispositional forgiveness scores of partners in a romantic relationship were used to predict their own, as well as their partners', physical and mental health. With respect to the actor effects of dispositional forgiveness on mental and physical health, I found that individuals reporting higher levels of dispositional forgiveness, whether the target was the self, others, or situations, also tended to report higher levels of mental and physical health. I was able to replicate the past research that has found that dispositional forgiveness of others is a positive correlate of mental health (Breen et al., 2010; Brown, 2003; Exline et al., 1999; Friedberg et al., 2009; Krause & Ellison, 2003; Lawler et al., 2005; Lawler-Row & Piferi, 2006; Lawler et al.; Maltby et al., 2001; Mauger et al., 1992; Seybold et al., 2001; Sternthal et al., 2010; Thompson et al., 2005, Study 3b; Toussaint & Friedman, 2008; Toussaint & Jorgensen, 2008; Toussaint et al., 2001; Toussaint et al., 2008a; Toussaint et al., 2008b; Tse & Cheng, 2006; Tse & Yip, 2009; Webb et al. 2008; Wilson et al. 2008; Witvliet et al., 2004) and physical health (Friedberg et al., 2007; Friedberg et al. , 2009; Lawler et al., 2005; Lawler et al., 2003; Toussaint et al., 2001).

I was also able to replicate the past research that suggests that dispositional forgiveness of self is positively associated with mental health (Breen et al., 2010; Exline et al., 1999; Friedman et al., 2007; Ingersoll-Dayton et al., 2010; Maltby et al., 2001; Mauger et al., 1992; Romero et al., 2006; Seybold et al., 2001, Sternthal et al., 2010; Toussaint & Friedman, 2008; Toussaint et al., 2001; Toussaint et al., 2008a; Toussaint et al., 2008b; Webb et al., 2008; Witvliet et al., 2004) and

physical health (Seybold et al., 2001; Toussaint et al., 2001; Wilson et al., 2008) and that dispositional forgiveness of situations is positively associated with mental health (Breen et al., 2010; Thompson et al., 2005; Toussaint & Friedman, 2008; Webb et al., 2008).

The results of my research were also consistent with past research in the forgiveness-health literature that suggests that when various targets of dispositional forgiveness are assessed, the weakest predictor of health is forgiveness of others and the strongest predictors are forgiveness of self and forgiveness of situations (Breen et al. 2010; Toussaint & Friedman , 2008; Webb et al., 2008; Wilson et al., 2008). Consistent with this research, I found that forgiveness of others appeared to be a weaker predictor of mental and physical health for men and women than forgiveness of situations or forgiveness of self. As recommended by Wilson et al., I replicated their results using a well-validated index of health and my results lend support to the idea that targets of dispositional forgiveness other than forgiveness of others may have “superior predictive power” (Wilson et al., 2008, p. 801) when predicting health.

For men and women, the largest forgiveness-health correlations tended to exist between forgiveness of situations and mental and physical health. This is a particularly noteworthy finding given that, in general, researchers have tended to downplay the effects of forgiveness of situations on health by focusing primarily on the relationship between forgiveness of others and health and, to a lesser extent, the forgiveness of self-health relation. As noted previously, I could only locate a handful of studies that examined forgiveness of situations as a correlate of mental

health and I could only locate one published report that examined forgiveness of situations as a correlate of physical health. I commented previously on the importance that the study of forgiveness of situations may have in the case of chronic physical illnesses where individuals may blame events outside of their control for the onset of a disease. In addition to the theoretical relevance of conceptualizing forgiveness of situations as a predictor of health, the results of my research suggest a strong empirical basis for focusing on the relationship between forgiveness of situations and health. This is an advance, given the lack of research examining forgiveness of situations in the forgiveness-health literature.

With respect to partner effects, I had predicted positive partner effects from all targets of dispositional forgiveness (i.e., self, others, situations) to mental and physical health. There was limited support for this hypothesis in that many of the predicted partner effects were not significant; however, I found a partner effect for forgiveness of others and for forgiveness of situations such that men's forgiveness of others and forgiveness of situations was positively associated with women's mental health. No other partner effects were significant. That I did not find partner effects for forgiveness of self is somewhat consistent with the work of Tangney et al. (2004), presented earlier in this dissertation. To review, Tangney et al. speculated that, although forgiveness of self may be positively associated with an individual's own health outcomes, there may be detrimental effects for the partner because the individual's self-centred tendencies and potential for lack of remorse and empathy could cause the partner psychological distress. It should be noted that I did not find that self-forgiveness negatively impacted the mental and physical

health of dyad members, nor did I find any positive effects of forgiveness of self on relationship members as has been suggested by Fincham et al. (2006). Thus, in my research, it did not appear that there were any positive or negative effects of self-forgiveness on relationship partners.

With respect to the bivariate correlations between men and women, although there was a significant relationship between the partners' forgiveness of self scores and partner's forgiveness of others scores, I did not find a significant relationship between the partners' levels of forgiveness of situations. Although the positive relationship between men's and women's forgiveness of self scores and men's and women's forgiveness of others scores was expected, in retrospect, that I did not find a significant relationship between the forgiveness of situations scores is not surprising given that forgiveness of situations was the only target of forgiveness that was not primarily interpersonal in nature. This is consistent with Kenny et al.'s (2006) presumption that the amount of nonindependence between dyad members largely depends upon the variable that is assessed, with variables that are more relational in nature having larger correlations between dyad members.

Why were there partner effects from men, but not from women? It is possible that sex differences in self construals could explain this finding. It has been suggested that men generally tend to have independent self construals and to view the self as "autonomous, distinct, and separated from others" (Toussaint et al., 2008a, p. 486), whereas women tend to have interdependent self construals and view themselves as being connected with and "less differentiated from others"

(Toussaint et al, 2008a, p. 486). Given the interpersonal nature of independent and interdependent self construals, these potential sex differences may significantly affect the relationship between forgiveness and mental health (Toussaint et al., 2008a). It is also possible that men were less perceptive of their female partner's acts and expressions of forgiveness and that these sex differences in perceptions of forgiveness could explain these results. Miller and Worthington (2010) found that wives were more likely than their husbands to perceive their spouses as forgiving, suggesting that there may be some merit in assessing sex differences in perceptions of partner forgiveness when assessing the relationship between dispositional forgiveness and health in dyads. However, it should be noted that, in the Miller and Worthington study, men actually reported higher levels of marital forgiveness than women.

Although I did not examine the mechanisms linking men's forgiveness of others and men's forgiveness of situations with women's mental health, there are several possible variables that may mediate this association. It is possible that unforgiving men treat their female partners in a manner that is detrimental to their mental health (Ingersoll-Dayton et al., 2010). As an example, it may be that men who are less forgiving reduce their amount of contact with their female partners and reduce the level of social support available to them which may lead to feelings of isolation and being alone (Ingersoll-Dayton et al, 2010). Irrespective of the mechanism involved, my results suggest that not all targets of dispositional forgiveness relate to mental health similarly for men and women in romantic relationships.

When the actor and partner effects of dispositional forgiveness on health were compared, I found that they were significantly different and that the actor effects for forgiveness of others and forgiveness of situations on mental health were stronger than the partner effects. I was not able to compare the actor and partner effects of forgiveness of self as there were no significant partner effects for this target of forgiveness. Taken together, these results suggest that, although partner effects existed in the relationship between men's dispositional forgiveness of others, men's dispositional forgiveness of situations, and women's mental health, actor effects were stronger than partner effects and were robust predictors of mental health and physical health for all targets of dispositional forgiveness.

I was also interested in assessing sex differences in dispositional forgiveness and sex differences in the relationship between dispositional forgiveness and health. I did not make any predictions regarding sex differences because the past research has yielded inconsistent results. With respect to sex differences in dispositional forgiveness of self, others, and situations, consistent with the recent meta-analysis findings of Fehr et al. (2010), I did not find any differences between men and women on any of the dispositional targets of forgiveness. My results were consistent with Fehr et al. despite the differences in level of forgiveness and target of forgiveness that were studied. As noted earlier, Fehr et al. limited their meta-analysis to studies in which single victims reported their levels of situation-specific forgiveness towards a single transgressor and my study focused on another level of forgiveness (i.e., dispositional) and included multiple targets (i.e., self, others, and situations). Miller et al. found that neither

forgiveness type (e.g., trait, state, marital) nor target of forgiveness (e.g., forgiveness of romantic partner, forgiveness of others, forgiveness of self) significantly moderated the relationship between sex and forgiveness. Thus, the results of analyses examining sex differences in situation-specific forgiveness of a single transgressor and sex differences in dispositional forgiveness across diverse targets should yield similar results as neither type nor target of forgiveness has been found to be a significant moderator of the sex-forgiveness relationship. Fehr et al. speculated that,

one possible explanation for dissemination of the belief that gender relates to forgiveness is the file drawer effect (Rosenthal, 1979). Because gender is almost always measured but seldom a point of focus, authors may have historically emphasized their gender findings only when they align with the popular belief that women are more forgiving than men” (p. 907).

This speculation also appeared relevant within the context of my research results.

At the level of the individual, I did not find sex differences in the relationship between dispositional forgiveness and health because, as noted previously, I found that dispositional self-forgiveness, other-forgiveness, and situation-forgiveness were positively associated with mental and physical health for men and women and when I compared these effects in the APIM, there were no sex differences between men and women for any of the targets of dispositional forgiveness. That is, I found that the relationships between self-forgiveness, other-forgiveness, and situation-forgiveness and mental and physical health were the same for men and women. As noted in the Introduction, I could only locate two



studies that have examined sex as a moderator of the forgiveness-health relationship. My results are consistent with Whited et al. (2010) in that although they found a relationship between forgiveness and health, dispositional forgiveness did not interact with sex in predicting health outcomes.

However, the lack of sex differences in my research is inconsistent with some of the results of Toussaint et al. (2008a). Similar to my work, Toussaint et al. found no differences between men and women with respect to the relationship between depression and self-forgiveness; however, they found that the relationship between depression and other-forgiveness was significant for women only. There were important differences between the participants in my sample and the participants recruited by Toussaint et al. The most significant difference is that all of the participants in my study were involved in a long-term significant relationship, whereas Toussaint et al. recruited a nationally representative sample in which participants undoubtedly varied in terms of their relationship status. It is possible that there are significant differences between single women and married women, for example, with respect to their mental health status and these differences may have an impact on research examining the relationship between forgiveness and health.

At the dyadic level, as noted previously, I did not find sex differences in partner effects for self-forgiveness nor did I find sex differences in the partner effects when forgiveness of situations and others were used to predict physical health. In contrast, I found a sex difference between men and women with respect to the partner effects of forgiveness of situations and other-forgiveness on mental

health. Men's levels of forgiveness of situations and forgiveness of others were positively associated with women's mental health; however, there was no effect of women's dispositional forgiveness of self or dispositional forgiveness of situations on men's mental health. I had speculated earlier in this dissertation that based on potential power-related sex differences in forgiveness (Fincham et al., 2006), men's forgiveness may have a greater impact within the couple's relationship than women's forgiveness and my results support this speculation. These results are somewhat consistent with the research of Toussaint et al. (2008a) into sex differences in the relationship between forgiveness and depression. They found that women who reported higher levels of forgiveness-seeking were more likely to report symptoms of depression. There was no relationship between forgiveness-seeking and depression for men. Although Toussaint et al. did not focus on couples in their research; it may be that women with higher levels of forgiveness-seeking also experience low levels of forgiveness-granting by their partners and are at greater risk for mental health problems.

As noted earlier in this dissertation, my dyadic model was predicated upon the principles of interdependence theory (Thibaut & Kelley, 1986) in that I assumed that individuals in romantic relationships transition from self-serving given preferences to effective preferences. When effective preferences are established, individuals develop a greater sense of concern for their partners' well-being and these preferences guide their behaviour (Hannon et al., 2010). I showed that the pattern of relationships for forgiveness and mental health varied for women and men when partner effects were evaluated. The partner effects that I found in

which men's other-forgiveness and forgiveness of situations were associated with their female partners' mental health outcomes suggests that these phenomena are justly depicted as being relational and interdependent in nature (Kenny & Cook, 1999; Kenny et al., 2006).

That only men's forgiveness of others and men's forgiveness of situations was related to women's mental health, and not vice-versa may exist in some part because of the different moral reasoning styles adopted by men and women. As noted earlier in this dissertation, Miller et al.'s (2008) speculation that sex differences in forgiveness may be a function of sex differences in moral reasoning styles was rooted in Kohlberg's (1984) and Gilligan's (1993) theories of reasoning about moral dilemmas which posit that women tend to value relationships more than men (Gilligan termed this the ethic of care) and that men were more interested in justice-restoring acts than women. My sex-related partner effects of other-forgiveness and situations-forgiveness were also consistent with these moral reasoning theories. It may be that because women are generally more interested in relationship maintenance, they may find it particularly distressing when their male partners are not forgiving of their transgressions because it may signal dissolution of the relationship. This would also explain the lack of partner effect for self-forgiveness.

It is also possible that sex differences in women's perceptions of their partners' forgiveness could assist in explaining the partner effects of men's forgiveness of situations and others on women's mental health. Miller et al. (2008) noted that men and women may have different perceptions of a transgression,

which could lead to differences in forgiveness and serve as a moderator of the sex-forgiveness relation. They noted that the majority of studies that evaluated sex differences did not also examine perceptions of the transgression as the researchers were mostly interested in showing that men and women were not different in forgiveness so that they could collapse the data across male and female participants. The one study (Sani et al., 2001) that spoke to sex differences in perceptions of transgressions used functional magnetic resonance imaging to evaluate sex differences in forgiving and unforgiving responses. Brain activity was measured at baseline as men and women imagined either forgiving or not forgiving hypothesized offences. Sani et al. found differential patterns of brain activity between men and women during baseline and while imagining the hypothesized transgression. They also found that men and women differed from each other in their pattern of brain activation patterns when imagining forgiving the transgression and not forgiving the transgression by holding a grudge. Based on these differential patterns of brain activation, Sani et al. concluded that there are functional differences in the way that men and women process and react to transgressions, which may lead to differential responding to hurtful events.

That I found robust effects of dispositional forgiveness on health is consistent with Coyne's (1976) interactional theory of depression and the argument that the tendency to forgive may circumvent a vicious cycle of interpersonal events that could lead to depression. Coyne's interactional theory of depression suggests that depression is negatively related to letting go of negative interpersonal events, such as perceived transgressions, and is also associated with maladaptive social

behaviours. As elaborated upon earlier, this tendency towards maladaptive behaviours could create a cycle of interpersonal events related to depression that creates stress and perpetuates further depression (Tse & Yip, 2009).

### **Measurement Issues Relating to the Assessment of Dispositional Forgiveness and Self-Reported Health**

In addition to investigating the above noted partner effects, actor effects, and sex differences in the forgiveness-health relationship in a dyadic context, a secondary objective of this research included addressing several measurement issues with respect to assessing dispositional forgiveness and health. As noted earlier in this dissertation, the Heartland Forgiveness Scale (HFS; Thompson et al., 2005) was the only measure, to my knowledge, that tapped into all three targets of dispositional forgiveness in a single measure. The authors (Thompson et al., 2005) reported adequate validity and reliability for this measure; however, there has been limited, if any, research available that has actually replicated the factor structure of the HFS. In my research, I was able to replicate the factor structure of the HFS in an independent sample of individuals involved in a romantic relationship.

I decided to measure dispositional forgiveness rather than relationship partner forgiveness because I wanted to ensure consistency across the variables of interest in terms of the level of measurement. Ensuring that independent variables (dispositional forgiveness targets) and dependent variables (mental and physical health) were operationalized at the same level of measurement (global) reduced irrelevant variability (Hoyt & McCullough, 2005). An alternative approach would have been to include several different measures of forgiveness that tapped into the

multiple levels of forgiveness. In a recent study predicting forgiveness from diabetic symptoms, DeWall et al. (2010) used multiple measures of situation-specific and dispositional forgiveness based upon the rationale that because forgiveness is a multifaceted construct and that forgiveness has yet to be fully understood by researchers, several measures and modes of assessing forgiveness should be implemented in order to ensure that results are not an artefact of any particular forgiveness measure. In that study, forgiveness of situations, dispositional forgiveness, and forgiveness of several hypothetical scenarios were assessed using questionnaires. Forgiving behaviours were also assessed using the Prisoner's Dilemma Game. DeWall et al. found that diabetic symptoms significantly predicted less forgiveness across all measures used in their study. It could be argued that diabetic symptoms are not a global indicator of health and are more situation-specific, and that DeWall et al.'s approach, especially with respect to assessing situation-specific forgiveness, was well-suited to this predictor variable. Nonetheless, the approach taken by DeWall et al. of implementing multiple measures of forgiveness is appealing given the lack of a gold standard measure of forgiveness and the need for further understanding of the construct. This approach would be well advised in future research designs. Similarly, we agree with Breen et al.'s (2010) recommendation that the use of time-series (e.g., daily diary, longitudinal) designs to assess dispositional forgiveness will also be fruitful and informative.

I was also able to replicate the factor structure of the SF-36 that was demonstrated and recommended by Hann and Reeves (2008) and others. A

fundamental measurement issue was also addressed as to whether or not physical health and mental health should be operationalized as independent or related constructs. Of particular interest in this regard, I found significant, large, positive correlations between mental health and physical health in all of the models that I tested. These results were consistent with the work of other researchers who have rejected Ware et al.'s (2000) conceptualization of mental health and physical health as independent constructs (Anagnostopoulos et al., 2009; Farivar et al., 2007; Hann & Reeves, 2008). These results were also consistent with the biopsychosocial model of health (Suls & Rothman, 2004) that guided my research, and lend further support to the operationalization of mental health and physical health as related variables.

Although the SF-36 has been considered the gold standard for assessing subjective ratings of health-related quality of life and is a well-validated and reliable measure (Jordan-Marsh, 2002), operationalizing physical and mental health with the SF-36 in my research was somewhat problematic. Scores on the Physical Functioning scale was not normally distributed and it appeared that there was a restricted range of responses. The most problematic scales tapped into limitations in functioning due to physical health problems and exhibited ceiling effects. The distributions of these scales raise the question of how important dispositional forgiveness is when physical health limitations are studied in a non-clinical, community sample. Use of a clinical sample in future should offset the restricted range of scores and reduce the probability of ceiling effects.

### **Limitations and Future Research**

Several limitations and suggestions for future research examining the relationship between dispositional forgiveness and health in long-term, romantic dyads are noteworthy.

My study was limited in that I relied on self-report data. Although self-report measures are the most common method of data collection in the field of forgiveness research (Hoyt & McCullough, 2005), self-report data are problematic when all variables of interest have been assessed via self-report because observed correlations may result from method covariance (Hoyt & McCullough, 2005). As noted by Hoyt and McCullough, in order to avoid “mono-method covariance” (Cook & Campbell, 1979, p. 65, as cited in Hoyt & McCullough, 2005), forgiveness researchers should consider supplementing their self-report measures of forgiveness with data from other sources, such as life events data, observer ratings, and data from experimental situations. Within the context of a study assessing forgiveness, Hoyt and McCullough (2005) suggested that life events data, for example, could consist of compliance with an alimony repayment schedule in a study of divorced couples. Observational data could consist of romantic partners’ ratings of their partners’ level of forgiveness, and experimental data could be obtained from existing experimental research methods, such as defections in the Prisoner’s Dilemma game (Hoyt & McCullough, 2005). With respect to the measurement of health, the repeated use of ambulatory measures, such as blood pressure, over time could assist in clarifying the influence of forgiveness on health (Harris et al. 2006) and provide a less subjective assessment of health. I implemented an alternative approach to reduce error variance with self-report



measures by modeling forgiveness and health as latent variables using SEM with multiple indicators (Hoyt & McCullough, 2002).

It is unclear to what extent the results of my research would generalize to other types of relationships, such as friendships or sibling relationships that may not share the characteristics that are typical in romantic relationships, such as continued contact, significant investment in the relationship, and relationship commitment (Miller & Worthington, 2010). These relationship characteristics may have amplified the magnitude of the partner effects that I found and the magnitude of the forgiveness of self and forgiveness of others correlations, and such partner effects may not exist in any other types of relationships. Nonetheless, given that I found some significant partner effects and that the partners' scores for forgiveness of self and forgiveness of others were positively correlated, nonindependence must be taken into account when researchers specifically examine the forgiveness-health relationship, as well as when researchers examine other correlates of forgiveness in general in a dyadic context.

Frazier et al. (2004) have argued that when outcome-predictor relations are weaker than expected, moderator variables could be introduced to explain why the relationship may be strong for some individuals but not others. There are also many factors that could moderate the relationship between dispositional forgiveness and health. Research has shown that the positive effects of forgiveness on marital satisfaction are a function of the frequency of negative interpersonal interactions (McNulty, 2008) and it may also be the case that forgiveness has the most salubrious effects when there is a small number of negative interactions. In

order to have a more stringent test of the conditions under which dispositional forgiveness positively affects health in a romantic relationship context, future researchers in this area would benefit from including a measure assessing frequency and severity of transgressions to determine their potential moderating effects. As an example, McNulty found that marital forgiveness was positively associated with marital satisfaction over time among partners whose spouses engaged in infrequent negative behaviour; however, there was a negative relationship over time between marital forgiveness and marital satisfaction among partners whose spouses frequently engaged in negative behaviours. McNulty concluded that forgiving a partner may be more beneficial within relatively healthy relationships than in those relationships that are troubled. It was suggested that interventions designed to promote forgiveness may be effective in increasing satisfaction when partners are not engaging in negative behaviours, but marital satisfaction could deteriorate when partners continue to engage in behaviours that would warrant forgiveness.

Dispositional forgiveness, on its own, is not enough to ensure positive health outcomes (Miller & Worthington, 2010). Miller et al. (2008) have suggested several dispositional variables that could potentially moderate the sex-forgiveness relationship, such as agreeableness, neuroticism, trait empathy, rumination, vengefulness, attachment styles, and religiosity. These potential moderating variables also appear relevant in addressing the partner effects and actor effects of forgiveness on mental and physical health. As noted by Miller and Worthington (2010),

future studies addressing forgiveness and sex will need to continue to go beyond main effects of sex and forgiveness because it may be more helpful to think about sex differences in forgiveness as having different implications for men or women depending on certain situations and variables (p. 20).

An alternative way to view interaction effects in my APIM could have been to view forgiveness as a moderator of the partner-oriented effects on mental and physical health (Cook & Kenny, 1999). It may be that dyads require only one partner to exhibit high levels of dispositional forgiveness in order for both partners to report better health outcomes. As noted by Cook and Kenny, if such a partner-oriented effect existed, the strategy would be to use only the score from the partner who reported the highest score on the predictor variable (dispositional forgiveness in my particular case). To elaborate upon Cook and Kenny, this method of analyzing the data would not be a main effect model because in some cases the female partner may report higher levels of forgiveness and in other cases the male partner may report higher levels of dispositional forgiveness. This potential partner-oriented interaction effect seems reasonable and plausible when examining dispositional forgiveness as the existence of one forgiving partner in a relationship may lead to fewer negative interactions and stress, and better mental and physical health.

Within the context of a study on romantic relationships, it was possible that the length of the relationship could be related to the relationship between dispositional forgiveness and health. It could be argued that more forgiving

individuals would be predicted to report longer relationships as they have been able to forgive and get over offences, which would suggest an ability to maintain relationships. Although not a research question in the present study, I ran a post-hoc correlation analysis between all of the dispositional forgiveness variables and length of the relationship. This analysis did not yield any significant results and, thus, I did not consider evaluating length of the relationship as a moderator of the relationship between dispositional forgiveness and health. A similar potential correlate of the forgiveness-health relationship in romantic relationships would be relationship type. Given the differences in the numbers of individuals who endorsed the different categories of romantic relationship type, I did not examine relationship type as a moderator in my research; however, “empirical research consistently shows that married individuals enjoy better mental health than persons in all other types of relationships” (Braithwaite, Fincham, & Lambert, 2009, p. 377). In the future, researchers should either focus solely on one relationship type by recruiting only married or dating relationship partners, for example, or attempt to collect data from relatively equal and large numbers of dyads involved in different types of relationships to ensure relatively equal numbers and enough participants to include relationship type as a variable in an APIM of forgiveness and health.

Although I chose to use the HFS to operationalize dispositional forgiveness based upon its valid and reliable assessment of the three targets of dispositional forgiveness of interest (Thompson et al., 2005), Wilson et al. (2008) have raised concerns about this measure particularly when assessing the relation between

dispositional forgiveness and health. They commented that although the association between self-forgiveness and health was stronger than the association between other-forgiveness and health in their research, this may have been a spurious finding based upon operational definition of dispositional forgiveness of self and dispositional forgiveness of others as assessed by the HFS. They made the reasonable point that the HFS was limited in terms of the small number of items and the inadequate differentiation of forgiveness experiences. As an example of the differentiation issue, they noted that “the self-forgiveness items in this scale do not differentiate between unforgiveness of self related to transgressions against others versus transgressions against the self” (p. 801). Although these are valid points, at the time of data collection, the HFS was considered the best available measure of dispositional forgiveness of self, dispositional forgiveness of others, and dispositional forgiveness of situations. In addition, as noted earlier, the results of my research were consistent with past research that has compared the effects of self-forgiveness with other-forgiveness in the forgiveness-health literature (Breen et al. 2010; Toussaint & Friedman, 2008; Webb et al., 2008; Wilson et al., 2008).

It should be noted that the salubrious effects of forgiveness on health may take years to accumulate (Worthington et al., 2007; Worthington & Scherer, 2005) and the effects of forgiveness on health in romantic relationships may also build (or diminish) over time. In future studies on the relationship between forgiveness and health within romantic relationships, researchers are advised to assess longitudinal changes across romantic relationships.

At a more general level, the results of my research were certainly open to an

interpretation of reverse causation in that it is possible that poor health outcomes may lead to reductions in overall tendencies towards forgiveness. Tse and Cheng (2006) have noted that the causal direction of the relationship between forgiveness and health is not straightforward and have provided an explanation for how negative health outcomes may inhibit forgiveness. Specifically, with respect to depression, Tse and Cheng speculated that rumination is associated with less likelihood of forgiveness (Brown & Phillips, 2005) and that depressed individuals may negatively interpret and distort past events, leading to reductions in forgiveness.

If research establishes a predictive relationship between the targets of forgiveness that I have included in my research (i.e., self, other, situations) and health, it may be fruitful to examine whether the negative affective mechanisms linking forgiveness with health differ according to the type of forgiveness target (Wilson et al., 2008). Wilson et al. argued that, given their shared negative association with health and forgiveness, shame and guilt may serve a similar mediating role in the self-forgiveness-health association as hostility and interpersonal anger serve in the forgiveness of others-health relationship. They suggested that, “future research may show that forgiveness-induced reductions in guilt and shame have health consequences for those who struggle to forgive themselves” (pp. 801-802).

It should also be noted that although longitudinal research will assist in establishing a prospective link between forgiveness and health, determination of causal effects will necessitate experimental research, such as false feedback

regarding transgressor behaviour or the use of priming techniques (Hannon et al., 2010). However, as noted by Hannon et al., “these methods often require a trade-off between control and artificiality. In the case of real romantic relationships, there are also ethical problems associated with manipulating betrayal or amends, particularly when we seek to study severe betrayal incidents” (p.276).

Finally, in addition to limitations of cross-sectional research with respect to drawing inferences about the causal direction of associations between variables, cross-sectional studies are also limited as there may be long-term costs of forgiveness that are not detected when forgiveness and outcome variables of interest are measured concurrently (McNulty, 2008).

In elaborating upon the negative effects of dispositional forgiveness, McNulty (2008) has noted that personal accountability may be diminished by forgiving transgressors, which could reduce transgressors’ motivation to change their negative behaviour and could lead to more problems within the relationship over time. This possibility seems particularly relevant within the context of romantic relationships in which partners’ behaviours are mutually influenced by their partners’ actions and where there is the possibility for a variety of transgressions and responses to these transgressions. Within the context of an abusive relationship, forgiveness has been found to significantly predict female partners’ intention to return to their abusive partners (Gordon, Burton, & Porter, 2004). As argued by Wade (2010),

forgiveness comes with many misconceptions, some of which can be very damaging to clients in unhealthy or hurtful relationships. For example,

many people think that forgiveness necessarily includes reconciling with the offending person. Understood this way, encouraging a person to “forgive” a harmful and potentially dangerous partner would be sending them back into an unsafe situation. By properly understanding forgiveness, clients and therapists can work toward a healthy resolution of past hurts that includes the emotional and physical benefits of forgiveness without exposing clients to re-injury or revictimization (p. 2).

### **Theoretical and Applied Implications**

Despite its limitations, this research had several basic and applied implications. At a broad level, sex differences in the partner effects of dispositional forgiveness may affect the way that men and women respond to forgiveness interventions. Different techniques may need to be used in order to achieve optimal forgiveness among men and women (Miller et al. 2008). The finding that men’s other- and situation-forgiveness was positively associated with women’s mental health has the potential for application in a therapeutic context. Therapists may be able to enhance the likelihood of forgiveness among unforgiving male partners by drawing their attention to the deleterious effects that a general tendency towards unforgiveness could have not only on their own level of functioning, but also on their significant others. In addition, when research supports the health effects of forgiveness following interpersonal and intrapersonal transgressions, treatment and preventative measures incorporating forgiveness become viable (Toussaint & Webb, 2005b).

In terms of the theoretical significance of this research, given that there



were sex-related partner effects on mental health for forgiveness of situations and other-forgiveness, and that interdependence among the study variables was supported, future researchers should be encouraged to include potential actor and partner effects in their working models of forgiveness and health in romantic relationships. As noted by Kashy and Grotevant (1999), it is vital that relationship researchers learn and apply the statistical techniques developed for dyadic data analysis in their research with couples. Moreover, the presence of the aforementioned partner effects and interdependence among study variables supports the interpersonal nature of forgiveness that has been hypothesized by other researchers (e.g., Hoyt & McCullough, 2005; Baumeister et al., 1998). That the partner effect of self-forgiveness on mental health or physical health was not significant for men or women potentially validates the practice of taking an intrapersonal approach to assessing dispositional forgiveness in addition to the interpersonal approach.

The presence of actor effects, that is, the association between one individual's dispositional forgiveness score and his or her health score, has replicated the past research that has found that dispositional forgiveness is associated with physical and mental health at the intrapersonal level. The presence of partner effects for dispositional forgiveness and forgiveness of situations extends the previous research and demonstrates the interpersonal effects of dispositional forgiveness on mental health.

As noted throughout this dissertation, forgiveness has been conceptualized as a psychological process that can truly be depicted as relational and dyadic in

nature; however, I was not able to locate any articles in the forgiveness literature as a whole that have capitalized upon the statistical advantages offered by using the APIM. Thus, the present research has contributed to the large body of forgiveness literature by using the APIM as a framework for analyzing nonindependent data and highlights the utility of its use with certain targets of dispositional forgiveness and its correlates.

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doi: 10.1007/s10865-007-9105-8

**Appendix A**  
**Research Ethics Clearance Form**




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**Brock University**


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 Research Services  
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 St. Catharines, Ontario  
 Canada L2S 3A1

 Telephone (905) 688-5650 ext 2035  
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**DATE:** May 31, 2005  
**FROM:** Linda Rose-Krasnor, Chair  
 Research Ethics Board (REB)  
**TO:** Stan Sadava, Psychology  
 Nancy DeCOURVILLE  
**FILE:** 04-392 - SADAVA  
**TITLE:** The Brock University Social Health Study

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The Brock University Research Ethics Board has reviewed the above research proposal.

**DECISION:** Accepted as clarified

However, you may want to add on consent that participants are free to withdraw at any time before pressing "submit". After submitting, data is anonymous and therefore cannot be withdrawn.

This project has received ethics clearance for the period of May 31, 2005 to June 01, 2008 subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance may be extended upon request. *The study may now proceed.*

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written approval from the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to <http://www.brocku.ca/researchservices/forms> to complete the appropriate form *Revision or Modification to an Ongoing Application*.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form *Continuing Review/Final Report* is required.

Please quote your REB file number on all future correspondence.



## Appendix B

### The Heartland Forgiveness Scale (HFS; Thompson et al., 2005)

## Appendix B

### The Heartland Forgiveness Scale (HFS; Thompson et al., 2005)

In the course of our lives negative things may occur because of our own actions, the actions of others, or circumstances beyond our control. For some time after these events, we may have negative thoughts or feelings about ourselves, others, or the situation. Think about how you typically respond to such negative events.

Next to each of the following items write the number (from the 7-point scale below) that best describes how you typically respond to the type of negative situation described. There are no right or wrong answers. Please be as open as possible in your answers.

1	2	3	4	5	6	7
Almost Always	More Often			More Often		Almost Always
False of Me	False of Me			True of Me		True of Me

#### Forgiveness of Self

1. Although I feel bad at first when I mess up, over time I can give myself some slack.
2. I hold grudges against myself for negative things I've done.
3. Learning from bad things that I've done helps me get over them.
4. It is really hard for me to accept myself once I've messed up.
5. With time I am understanding of myself for mistakes I've made.
6. I don't stop criticizing myself for negative things I've felt,

thought, said, or done.

#### Forgiveness of Others

7. I continue to punish a person who has done something that I think is wrong.

8. With time I am understanding of others for the mistakes they've made.

9. I continue to be hard on others who have hurt me.

10. Although others have hurt me in the past, I have eventually been able to see them as good people.

11. If others mistreat me, I continue to think badly of them.

12. When someone disappoints me, I can eventually move past it.

#### Forgiveness of Situations

13. When things go wrong for reasons that can't be controlled, I get stuck in negative thoughts about it.

14. With time I can be understanding of bad circumstances in my life.

15. If I am disappointed by uncontrollable circumstances in my life, I continue to think negatively about them.

16. I eventually make peace with bad situations in my life.

17. It's really hard for me to accept negative situations that aren't anybody's fault.

18. Eventually I let go of negative thoughts about bad circumstances

that are beyond anyone's control.