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ADULT ATTACHMENT AND RELATIONSHIP SATISFACTION IN COUPLES FACING  
MULTIPLE SCLEROSIS

by

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B.A., McGill University, 2009

A thesis

presented to Ryerson University

in partial fulfillment of the  
requirements for the degree of

Master of Arts

in the Program of

Psychology

Toronto, Ontario, Canada, 2012

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*To my mom, dad, Becky and Sam: Thank you for your unwavering support and  
unconditional love*

# **Adult Attachment and Relationship Satisfaction in Couples Facing Multiple Sclerosis**

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Master of Arts

Psychology

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## **Abstract**

Multiple sclerosis (MS) is a debilitating neurological disorder associated with significant relationship distress. Although greater insecure attachment (dysfunctional internal working models that guide one's approach to relationships) has been associated with worse relationship satisfaction, this association has been overlooked in MS. The actor-partner interdependence model was used to evaluate the effects of one's own (actor) and one's partner's (partner) attachment on dyadic adjustment, and whether they differed by sex or role. The effect of matching of attachment between partners (dyadic attachment) was evaluated, and hostility was examined as a mediator of effects. 110 MS couples completed self-report questionnaires. Results showed significant actor and partner effects of greater insecure attachment on worse dyadic adjustment, and sex emerged as a moderator. Dyadic attachment was significantly related to dyadic adjustment. Hostile conflict partially mediated actor and partner effects of insecure attachment. Implications for the greater attachment literature and relevance to MS are discussed.

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Multiple Sclerosis (MS) is the most common neurological disorder affecting young adults in Canada, with three more people diagnosed with the disorder every day (MS Society of Canada, 2012). The most common form of MS is relapsing-remitting, accounting for approximately 80-85% of diagnosed individuals, which is characterized by a wide range of possible physical symptoms that onset and abate unpredictably. In addition to individual psychological distress suffered from the disorder, research has indicated significant distress in couples facing this chronic illness (Dennison, Moss-Morris, & Chalder, 2009). The present study examined predictors of relationship satisfaction in MS patients and their partners. Specifically, the current investigation assessed the relationship between adult attachment and dyadic adjustment. Guided by a dyadic framework, the present study examined the extent to which an individual's attachment related to their own dyadic adjustment, the extent to which an individual's attachment related to their partner's dyadic adjustment, and whether these relationships differed according to role (patient versus partner) and sex (male versus female). Furthermore, the effect of similarity or dissimilarity of attachment within couples, also known as dyadic attachment, on dyadic adjustment was examined. Finally, because conflict has been identified as both an outcome of insecure attachment and a predictor of relationship distress, hostile conflict was investigated as a potential mediator of the relationship between attachment and dyadic adjustment.

### **Multiple Sclerosis**

MS is a chronic neurological disorder that attacks the myelin sheath, or the protective covering, of the central nervous system nerves. The disorder is usually diagnosed between 15 and 40 years of age, and is three times more likely to occur in women than men. Additionally, the condition is often disabling due to its chronic yet unpredictable course, and the severity of

symptoms. Common symptoms of MS include fatigue, pain, numbness, muscle weakness, cognitive impairment, difficulty walking, difficulty speaking or swallowing, and optic neuritis (MS Society of Canada, 2012).

However, the negative effects of MS transcend physical impairment, with widespread social and psychological effects. Specifically, the negative impact of MS on romantic relationships has been increasingly documented in the scientific literature (McCabe, 2002; Perrone, Gordon, & Tschopp, 2006; Pflieger, Flachs, & Koch-Henriksen, 2010). Compared with the general population, people with MS have significantly lower relationship satisfaction (McCabe, 2002; 2004) and are more likely to experience divorce or separation (Pflieger et al., 2010). At two-year follow-up the probability of remaining in the same relationship was 33% for MS patients, compared to 53% for normal controls (Pflieger et al., 2010). Abandonment by the unaffected partner is particularly prominent when the affected partner is female (Glantz et al., 2009). Furthermore, the negative consequences of a MS diagnosis affect both members of the dyad; for example, partners have been shown to report significantly worse dyadic adjustment than the patients themselves (McCabe & McDonald, 2007; Woollett & Edelmann, 1988). Partners of individuals with MS have additionally reported concern about social isolation and declining relationship quality (Bogosian, Moss-Morris, Yardley, & Dennison, 2009; Forbes, While, & Mathes, 2007). Given the high rates of relationship dissatisfaction, partner abandonment, and caregiver strain in the MS population, it is of great importance to understand the nature of the factors that contribute to relationship quality for both patients and their partners.

In the existing MS literature, important predictors of greater relationship satisfaction have included increased social support (O'Connor, McCabe, & Firth, 2008), greater sexual functioning (McCabe, McKern, McDonald, & Vowels, 2003), better cognitive functioning

(McCabe, 2002), decreased physical symptoms (McPheters & Sandberg, 2010), and lower levels of depression (King & Arnett, 2005; McPheters & Sandberg, 2010). Partner-reported relationship satisfaction has been negatively associated with patient-reported cognitive impairment, fatigue, and depression (King & Arnett, 2005), as well as partner-reported caregiver strain (Perrone et al., 2006). Partner-reported relationship satisfaction has also been positively associated with love and communication (Perrone et al., 2006).

Although extensive, the existing research on predictors of relationship satisfaction in the MS population has rarely examined adult attachment. A single dissertation examined the effects of adult attachment on relationship quality and reactions to receiving care among a sample of MS patients (Litke, 2007). Briefly, as will be elaborated upon later, this study found that greater anxious and avoidant attachment was associated with poorer response to receiving care from others (such as anger and resentment), greater dissatisfaction with support received from others, and less relationship quality and satisfaction (Litke, 2007).

Drawing from the general literature on intimate relationships, attachment appears to bear a strong association with relationship quality. In fact, a 2002 review article reported that there had been 43 published articles since 1988 verifying the link between attachment and general relationship satisfaction (Mikulincer, Florian, Cowan, & Cowan, 2002). Adult attachment has also been associated with specific processes in intimate relationships including communication, social support, conflict resolution, interpersonal aggression, relationship maintenance, and interpersonal beliefs and expectations (Mikulincer & Shaver, 2007). The theoretical basis of attachment presumes a causal role of attachment in relationship satisfaction, and the empirical literature appears to support this direction of causality (Collins, Cooper, Albino, & Allard, 2002; Klohnen & Bera, 1998; Mikulincer et al., 2002).

In summary, MS is a chronic, debilitating illness that negatively affects relationship adjustment for both members of the dyad. Despite an exhaustive literature on contributors to relationship satisfaction in the MS literature, adult attachment has been largely overlooked. This is particularly surprising given the empirical and theoretical strength of attachment theory in understanding relationship satisfaction in the greater relationship literature. What follows is a brief orientation to adult attachment theory, followed by an introduction to its application in health populations, specifically the utility of attachment in understanding dyadic adjustment in chronically ill samples. Finally, the relationship of hostile conflict to both attachment and dyadic adjustment will be reviewed.

### **Attachment Theory**

Adult attachment theory proposes that individuals internalize working models of relationships based on their early experiences with caregivers. Through these early interactions, individuals form expectations, beliefs, and emotions regarding significant others, the nature of intimate relationships, the viability of seeking support, and successful coping strategies when encountering a threat (Mikulincer & Shaver, 2007).

Attachment style has been conceptualized both categorically and continuously. Bartholomew and Horowitz (1991) proposed what is now the familiar conceptualization of adult attachment with two dimensions and four categories. Continuous conceptualizations have considered two dimensions: avoidant and anxious attachment (Bartholomew & Horowitz, 1991). High scores on the avoidant dimension refer to the extent that an individual is uncomfortable with intimacy and dependence, prefers self-reliance, and engages in deactivating coping strategies (Mikulincer & Shaver, 2007). Deactivating coping strategies include behaviours such as the denial of threats to the self and to the relationship, rejection of personal weakness,

dismissal of the need for an attachment figure, avoidance of negative thoughts or emotions, and minimization of activities that encourage closeness and intimacy (Mikulincer & Shaver, 2007). High scores on the anxious dimension refer to the extent that an individual: worries about the reliability and dependability of their partner, doubts their own self-worth and value to their partner, and engages in hyper-activating strategies (Mikulincer & Shaver, 2007). Hyper-activating strategies entail behaviours aimed at gaining attention and a response from partners they perceive as unresponsive. For example, hyperactivating strategies include clinging or controlling behaviour, exaggerated weakness or need for help, excessive dependence on their partner for comfort, and intensified expressions of distress (Mikulincer & Shaver, 2007).

Categorically, there are three primary attachment style or prototypes that can be understood from the continuous model: secure attachment in which individuals are low on both avoidant and anxious dimensions, avoidant attachment in which individuals are low on anxious but high on avoidant dimensions, and anxious attachment in which individuals are high in anxious and low on avoidant dimensions. Some research, including Bartholomew and Horowitz's (1991) conceptualization of attachment, has integrated a fourth category of fearful attachment in which individuals are high on both anxious and avoidant dimensions. However, this category has been inconsistently utilized as it is considered to be quite rare; it is found predominantly in abused or severely traumatized populations, and is often therefore subsumed by the avoidant attachment category (Mikulincer & Shaver, 2007).

**Health populations.** Attachment theory posits that the attachment system is activated by environmental threats, such as illness or uncertainty, which arouse the need for seeking support from others. With this in mind, adult attachment theory has been applied within health populations to understand illness behaviour and psychological adjustment. For example, it has



been suggested that attachment affects symptom reporting and healthcare utilization. Specifically, female outpatients with an anxious attachment style have been demonstrated to report significantly more physical symptoms, more doctor visits, and more primary care costs than individuals with secure, avoidant, or fearful attachment styles (Ciechanowski, Walker, Katon, & Russo, 2002). Furthermore, insecure attachment (high scores on the anxious or avoidant attachment dimensions) has been associated with poor adherence to medication and self-care regimens in patients with diabetes (Ciechanowski et al., 2004). Insecure attachment has also been linked to psychological distress in chronic illness populations such as cancer (Cicero, Lo Coco, Gullo, & Lo Verso, 2009), pain (Ciechanowski, Sullivan, Jensen, Romano, & Summers, 2003), inflammatory bowel disease (Gick & Sirois, 2010), and diabetes (Turan, Osar, Turan, Ilkova, & Damci, 2003).

Additionally, insecure attachment has been shown to negatively affect relationship satisfaction in individuals with a congenital physical disability (Hwang, Johnston, & Smith, 2007), in couples coping with infertility (Bayley, Slade, & Lachen, 2009; Mikulincer, Horesh, Levy-Shiff, Manovich, & Shalev, 1998), and in couples facing cancer (Porter, Keefe, David, Rumble, Scipio, & Garst, 2012). For example, in a study of couples coping with lung cancer, avoidant attachment was negatively associated with marital quality for both patients and spouses (Porter et al., 2012). As previously noted, the sole study of adult attachment in the MS population is a dissertation that included 68 patients and 27 spouses; within this sample there were 19 couples, that is, both the patient and spouse from the same dyad returned their questionnaires (Litke, 2007). Results indicated that avoidant attachment was associated with worse overall relationship quality, and both anxious and avoidant attachments were associated with negative relationship processes such as decreased trust, acceptance, and intimacy (Litke,

2007). Although this study highlighted the usefulness of the attachment framework for understanding interpersonal processes in couples facing MS, it was limited by a small number of couples. Additionally it was not able to capitalize on the statistical and conceptual advantages of studying dyadic data, as statistical analyses appropriate for nested data (the individual participants as nested within the couple) were not used.

In addition to gaining insight into illness behavior and distress, attachment theory is a particularly useful framework for understanding caregiving; attachment can be used to explain interpersonal behaviour and adjustment to the caregiving process (Fenney & Hohaus, 2001). For example, attachment has been used to understand difficulty with caregiving in spouses of cancer patients; avoidant attachment has been associated with greater difficulty with providing emotional care, and secure attachment has been associated with less difficulty with providing tangible and instrumental care (Kim & Carver, 2007). Additionally, anxious attachment has been associated with greater depression in caregivers of cancer patients (Kuscu et al., 2009). Despite these advances in the behavioural medicine field and the utility of attachment theory in understanding relationship processes, this concept has been surprisingly overlooked in MS, a population that reports high degrees of relationship distress.

**Relationship satisfaction.** As previously mentioned, in the larger attachment literature the link between attachment and relationship satisfaction has been well documented. Studies have consistently indicated that greater secure attachment is associated with significantly more relationship satisfaction, and greater anxious and avoidant attachment has been associated with significantly more relationship distress (Mikulincer & Shaver, 2007). Secure attachment has been associated with relationship enhancing processes such as optimistic beliefs about love, greater intimacy, high levels of commitment, and effective communication. Greater avoidant

attachment has been associated with processes that undermine relationship quality such as the belief that love does not exist, the need to place boundaries on intimacy, low levels of commitment, and emotional control during communication (Mikulincer & Shaver, 2007). Greater anxious attachment has also been associated with relationship aggravating processes such as the belief that relationships are destructive, intrusive behavior, low levels of commitment paired with strong desire for commitment, and coercive and conflict-driven communication styles (Mikulincer & Shaver, 2007).

Attachment theory postulates that attachment drives relationship satisfaction; because attachment orientations are believed to derive from early childhood experiences, they exist temporally prior to romantic relationships and relationship satisfaction (Mikulincer & Shaver, 2007). Empirically, results have supported the causal role of attachment in relationship quality, as research has been found that secure attachment longitudinally predicts greater relationship stability and greater relationship satisfaction over time compared with insecure attachment (Collins et al., 2002; Klohnen & Bera, 1998; Mikulincer et al., 2002). Furthermore, attachment has been shown to longitudinally predict relational behaviours such as relationship commitment, conflict, and social support (Arriaga, Reed, Goodfriend, & Agnew, 2006; Campbell, Simpson, Boldry, & Kashy, 2005). For example, results from a 6-year prospective longitudinal study indicated that greater secure attachment at baseline predicted greater relationship satisfaction and better relational behaviours, such as more effective problem solving, at follow-up (Collins et al., 2002).

**Cross-dyadic effects of attachment.** The effect of attachment on relationship satisfaction is best understood as a dyadic effect, because each member of the couple has their own attachment style. A dyadic approach presumes that an individual's outcome will be

influenced by both their own and their partner's attachment. Research supports the merit of the dyadic approach as couple-level analyses have indicated significant cross-dyad effects (e.g., Banse, 2004; Kane, Jaremka, Guichard, Ford, Collins, & Feeney, 2007; Mikulincer et al., 1998). For example, in couples coping with the transition to parenthood, spouses of securely attached individuals reported more intimacy and affection than spouses of insecurely attached individuals (Paley, Cox, Harter, & Margand, 2002). Additionally, partners of cancer patients reported significantly more relationship distress when their partner reported greater avoidant attachment (McLean et al., 2011).

Although evidence of sex-linked patterns has been detected, the results have been inconsistent. Some research suggests that women's attachment affects men's satisfaction but not vice-versa (Kachadourian, Fincham, & Davila, 2004). Other research suggests that anxious, not avoidant, attachment predicts partners' outcome, regardless of partner sex (Feeney, 2002). Additional research suggests that women's satisfaction is negatively affected by men's avoidant attachment, and men's satisfaction is negatively affected by women's anxious attachment (Kane et al., 2007). Alternatively, research has also suggested that women are more negatively affected by men's anxious than men's secure or avoidant attachment, while men are more negatively affected by women's avoidant or anxious attachment than women's secure attachment (Mikulincer et al., 1998). Finally, a recent study demonstrated a significant interaction between sex, role, and avoidant attachment in predicting relationship distress in cancer caregivers, such that greater avoidant attachment in male patients negatively affected relationship satisfaction for female caregivers, but female patient avoidant attachment did not negatively affect relationship satisfaction for male caregivers (McLean et al., 2011). In summary, research appears to support the dyadic approach, as there are significant cross-dyadic effects. Although the literature

regarding the effect of partner sex is inconsistent, this vast array of outcomes highlights the importance of taking sex into consideration for the current study.

**Dyadic attachment.** The dyadic approach also postulates that there will be an interaction within the dyad that affects the outcome of each member. Research on matching of attachment styles has investigated the relative effects of congruence or dissimilarity of spouses' attachment styles. Secure-secure pairings, or secure dyads, are most common, with studies indicating rates of approximately 55% (Alexandrov, Cowan, & Cowan, 2005) to 70% (Senchak & Leonard, 1992) of study dyads endorsing this pattern. The prevalence of insecure-insecure pairings, or insecure dyads, has been found to range from about 6.2% (Senchak & Leonard, 1992) to 14% (Alexandrov et al., 2005). Finally, rates of secure-insecure pairings, or mixed dyads, have ranged from roughly 23% (Senchak & Leonard, 1992) to 32% (Alexandrov et al., 2005).

As expected, secure dyads experience the most adaptive outcomes, with greater intimacy and relationship satisfaction, than mixed or insecure dyads (Mikulincer & Shaver, 2007; Senchak & Leonard, 1992). Domingue and Mollen (2009) demonstrated that secure dyads engaged in significantly more mutually constructive communication and less demand-withdraw, mutual avoidance, and withholding communication patterns than insecure or mixed dyads, which did not differ from one another.

Generally, secure dyads exhibit the greatest relationship satisfaction, followed by mixed dyads, and insecure dyads experience the least satisfaction (Dickstein, Seifer, St Andre, & Schiller, 2001). However, evidence is mixed, as some research has found that at least one secure partner is enough to buffer the negative effect of insecure attachment (Ben-Ari & Lavee, 2005; Cohen et al., 1992; Volling, Notaro, & Larsen, 1998). For example, in couples facing cancer, insecure dyads exhibited significantly worse marital quality, while mixed and secure dyads did

not significantly differ (Porter et al., 2012). Alternatively, research has also indicated that it is the individual's own attachment style that drives one's own relationship outcomes, and dyadic attachment does not add additional significant information (Wampler, Shi, Nelson, & Kimball, 2003).

In summary, it appears that secure dyads experience the most adaptive outcomes and insecure dyads experience the least adaptive outcomes; the effect of mixed dyads on couples' outcomes warrants further exploration. Furthermore, this question has yet to be examined in an MS population. As previously iterated, the strong evidence for the robust effect of adult attachment on relationship satisfaction suggests that this concept would be particularly useful for the MS population in which relationship distress is highly prevalent. Additionally, the disabling nature of MS necessitates a great deal of interpersonal dependency in this population. As an unhelpful approach to interpersonal dependence is a hallmark feature of insecure attachment, the interaction of different orientations to dependence will be particularly relevant for MS couples.

### **Hostile Conflict**

Hostile conflict can be defined as sharp or malicious conflict with one's spouse. For example, it has been defined as frequency of behaviour such as criticizing, shouting at, mocking, belittling, and insulting one's partner during arguments (Guerrero, Farinelli, & McEwan, 2009; Lorenz, Hraba, & Pechacova, 2001; Rodrigues & Rogge, 2012). Similar constructs that have been measured in the literature include trait anger, such as the tendency to experience anger and frustration (Renshaw, Blais, & Smith, 2010; Baron et al., 2007), trait aggression, such as tendencies towards physical and verbal aggressiveness (Muris, Meesters, Morren, & Moorman, 2004), and frequency of disagreements, such as how often spouses disagree about various aspects of marital life (Brassard, Lussier, & Shaver, 2009). Additionally, hostility has been

measured as one's tendency towards bitterness and resentment (Muris et al., 2004; Meesters & Muris, 2002).

**Attachment.** Expressions of anger and hostility, and conflict behaviour have been examined extensively in the attachment literature. Secure attachment has been linked to decreased hostility (Li et al., 2008; Meesters & Muris, 2002). Furthermore, secure attachment has been associated with more assertive expressions of anger and less aggressive, passive-aggressive (defined as behaviour that indirectly expresses anger in a destructive manner), and avoidant expressions of anger (Guerrero et al., 2009).

Anxious attachment has been associated with more aggressive and passive-aggressive expressions of anger (Guerrero et al., 2009), trait anger (Troisi & D'Argenio, 2004), and hostility (Muris et al., 2004). For example, hostile behaviour has been shown to mediate the relationship between greater anxious attachment and greater interpersonal violence (Lawson & Malnar, 2011). In MS patients, anxious attachment was shown to be significantly associated with greater anger in response to receiving support from a caregiver (Litke, 2007). Additionally, Saavedra, Chapman, and Rogge (2010) demonstrated that hostile conflict (sharp or malicious conflict such as nagging or yelling) moderated the association between anxious attachment and relationship satisfaction, such that anxious attachment was most strongly associated with relationship dissatisfaction for individuals with high hostile conflict behaviour; the same study failed to find a significant moderating role for avoidantly attached individuals.

There appears to be a complex relationship between avoidant attachment and anger; research has indicated that avoidant attachment may be more strongly associated with suppression of anger rather than expressions of anger (Mikulincer & Shaver, 2007). Avoidant attachment has also been associated with more avoidance of displays of anger and with

significantly less use of passive-aggressive behaviour (Guerrero et al., 2009). Furthermore, some research has failed to find a significant association between avoidant attachment and aggression (Fournier, Brassard, & Shaver, 2011) or hostility (Li et al., 2008). However, there is also evidence that individuals who are avoidantly attached are more hostile and aggressive than securely attached individuals (Muris et al., 2004; Troisi & D'Argenio, 2004). For example, avoidant attachment has been associated with greater hostile dominant behaviour including vindictive, domineering, and intrusive behaviours (Lawson & Malnar, 2011).

**Dyadic adjustment.** Hostility and anger also appear to play a role in influencing dyadic adjustment (Baron, Smith, Butner, Nealey-Moore, Hawkins, & Uchino, 2007; Lorenz, Hrabá, & Pechacova, 2001; Renshaw et al., 2010). Research has indicated that there are significant effects of one's own hostility on one's own marital outcomes, and that there are also significant cross-dyadic effects. For example, cross-sectional analyses of healthy marital couples indicated that greater hostility and anger was associated with worse marital satisfaction, both for oneself and for one's partner (Baron et al., 2007; Renshaw et al., 2010). Furthermore, an individual's own marital instability, measured by self-report to questions such as whether the respondent had seriously discussed divorce/separation, was related to greater hostility reported by their partner (Lorenz et al., 2001). Additionally, changes in an individual's own marital instability was predicted by changes in hostility over time, as reported by their partner (Lorenz et al., 2001). In summary, hostility appears to have a significant, negative effect on dyadic adjustment, of both the individual respondent and across dyad members.

**Health populations.** Hostility has been examined itself as a significant psychological outcome in individuals with chronic illnesses such as HIV/AIDS (Meng et al., 2008) and arthritis (Treharne, Lyons, Booth, Mason, & Kitas, 2004). For example, younger participants were found



to exhibit significantly greater hostility in response to disability and impairment associated with rheumatoid arthritis than older participants (Treharne et al., 2004). Hostility has also been studied as a significant predictor of health outcomes in chronically ill populations. Significant negative associations have been documented between hostility and health outcomes such as pain in sexual pain patients (Desrosiers et al., 2008), air flow in asthma patients (Schmaling, Afari, Hops, Barnhart, & Buchwald, 2009), cardiovascular heart disease risk factors such as metabolic syndrome and inflammation (Elovainio et al., 2011; Skodova et al., 2008), and immune-related inflammation in healthy adults (Janicki-Deverts, Cohen, & Doyle, 2010; Kendall-Tackett, 2010). Furthermore, hostility has been shown to play an important role in the psychological adjustment to chronic physical illnesses; for example, negative associations have been found between hostility and quality of life in cancer (Paika et al., 2010) and systemic sclerosis patients (Hyphantis et al., 2007). The present literature has shown that hostility has been associated with worse psychological, and physical, adjustment to chronic illness, however its association with worse relational adjustment has yet to be examined.

In summary, insecure attachment has been shown to be associated with increased hostility, which in turn has been associated with less dyadic adjustment. The role of hostility as mediator between attachment and dyadic adjustment has never been investigated. Additionally, despite the important role of hostility in health outcomes and the psychological adjustment to chronic illness, hostility in couples facing MS has been largely unexamined.

### **Effects of Role and Partner Sex**

Mixed results have been found regarding the effect of role (patient versus partner) on psychological adjustment to a chronic illness. Specifically, some studies have found a main effect of role, with caregivers experiencing greater distress than patients (Langer, Abrams, &

Syrjala, 2003), and others have found the opposite, with patients experiencing greater distress than caregivers (Rohrbaugh et al., 2002). Meanwhile, additional studies have failed to identify role as a significant factor in the psychological adjustment to chronic illness (Hagedoorn, Sanderman, Bolks, Tuinstra, & Coyne, 2008).

These mixed findings may be a result of the failure to consider the moderating effect of sex. In Hagedoorn and colleagues' (2008) comprehensive meta-analysis of studies of distress in couples facing cancer, it was concluded that sex displays a more important effect in accounting for differences in psychological distress than role; specifically, females were found to experience greater psychological distress than males, regardless of whether they were the cancer patient or caregiving spouse. Additional studies have found an interaction effect such that female caregivers experience the greatest distress compared to female patients, male patients, and male caregivers (Hodges, Humphris, & Macfarlane, 2005; Langer et al., 2003). Most relevant to dyadic adjustment, it was demonstrated that female partners of patients recovering from stem cell transplantation endorsed significantly less marital satisfaction than male partners (Langer et al., 2003; Langer, Yi, Storer, & Syrjala, 2010). The intricate relationship between role and sex poses a particular complication in the current study, as role and sex are confounded. Women are more than three times more likely to develop MS than men (MS Society of Canada, 2012); therefore the patients in the current study are more likely to be female while the partners are more likely to be male. To address this challenge, both sex and role will be investigated in the present study as well as the potential for an interaction between these factors, however it should be noted that power is limited due to this confounding effect.

## **Summary**

In summary, MS is a chronic, debilitating illness that impacts the psychosocial adjustment, particularly the dyadic adjustment, of both the affected patient and their partner. Adult attachment has been demonstrated to be useful in understanding relationship satisfaction in the general population and in other health populations, however this framework has yet to be applied to a population of couples facing MS. Evidence of significant cross-dyad associations, that is, the predictors of one dyad member significantly affecting the outcome of the other dyad member, as well as the demonstrated importance of the interaction of attachment between partners, has highlighted the utility and effectiveness of the dyadic approach. Furthermore, despite strong evidence supporting the associations between insecure attachment and greater hostility, the mediational effect of hostility on attachment and dyadic adjustment has been limited; and, despite the central role of hostility in health psychology research, the effect of this construct in MS patients and their partners has gone widely unevaluated.

## **Aims**

The present study sought to apply attachment theory to the dyadic adjustment of MS patients and their partners, within a dyadic framework, for the first time.

**Aim 1: To examine the association between individual attachment and dyadic adjustment.**

*Hypothesis 1.* It was expected that an individual's own avoidant and anxious attachment dimensions would be negatively associated with their own dyadic adjustment.

*Hypothesis 2.* It was predicted that an individual's partner's attachment would be associated with his or her own dyadic adjustment, such that higher scores on avoidant or anxious dimensions by one's partner would be associated with less dyadic adjustment in the individual.

***Exploratory Question 1.*** The moderating influences of role and sex were explored in regard to the association between one's own attachment and one's own dyadic adjustment, and in regard to the association between one's partner's attachment and one's own adjustment. As these questions have not been previously explored in this population, no specific hypotheses were advanced.

**Aim 2: To examine the association between dyadic attachment style and dyadic adjustment.**

***Hypothesis 3.*** It was expected that secure dyads would report significantly higher levels of dyadic adjustment than insecure dyads.

***Exploratory Question 2.*** As the literature has been inconsistent in regard to the effect of mixed dyads on dyadic adjustment, exploratory analyses were conducted.

**Aim 3: To examine hostile conflict as a mediator between individual attachment and dyadic adjustment.**

***Hypothesis 4.*** It was hypothesized that hostile conflict would mediate the relationship between one's own anxious attachment and one's own dyadic adjustment. Specifically, it was expected that the relationship between anxious attachment and dyadic adjustment would be significantly attenuated once hostile conflict was accounted for in the model.

***Hypothesis 5.*** It was further hypothesized that greater hostile conflict would mediate the relationship between one's partner's anxious attachment and one's own dyadic adjustment. Similarly, it was expected that the relationship between anxious attachment and dyadic adjustment would be significantly attenuated once hostile conflict was accounted for in the model.

*Exploratory Question 3.* As the literature has been inconsistent in reference to the association between avoidant attachment and hostile conflict, no specific hypotheses were advanced. Exploratory analyses examined hostile conflict as a mediator between one's own dyadic adjustment and both one's own avoidant attachment and one's partner's avoidant attachment.

## **Method**

### **Participants**

Participants were recruited from St. Michael's Hospital Multiple Sclerosis Clinic and from the community. Prior to conducting this research, permission was granted from the Ryerson University and St. Michael's Hospital Research Ethics Boards. For the hospital recruitment, research staff approached patients in the clinic waiting room during clinic hours, provided basic information about the study, and, if interested, obtained informed consent. If the patient's partner was at the clinic, he or she was informed about the study, and if interested, provided informed consent to participate. If the partner was not present, the patient was provided with a study informational sheet to give to his or her partner. The patient also provided the partner's contact information for research staff, who subsequently made follow-up contact with the partner to gauge study interest and obtain informed consent.

For the community recruitment, research staff contacted local chapters of the MS Society of Canada. Information about the study was disseminated through methods such as emailing listservs, advertising in newsletters, informing support group members, and posting flyers. Interested participants from the community called a toll-free phone number, and a member of the research staff assessed eligibility and obtained informed consent over the phone.

Participants were eligible for the study if they were over 18 years of age, partnered for at least 6 months, and could read and speak English. Participants were only considered eligible if both members of the dyad agreed to participate. Additionally, the patient was required to have a diagnosis of MS. This was assessed by asking each patient whether a doctor had ever diagnosed him or her with MS. Participants were excluded if: 1) their doctor recommended against participation (for those recruited in clinic), 2) one member of the dyad refused participation, or 3) both members of the dyad had a diagnosis of MS. In total, three couples were considered ineligible: one because they could not read nor speak English, one because one of the dyad members was not interested, and one because the couple decided to separate. For the purpose of the present study, gay and lesbian couples were excluded (n=6) as sex was investigated as a within-dyad variable; that is, a variable that varies between dyad members but remains consistent across couples.

## **Procedure**

After providing informed consent, each couple was assigned a study ID number to maintain confidentiality. Each participant completed a set of questionnaires individually (i.e., not as a couple; couples were also instructed to not share their responses with one another). Participants had the option of completing their questionnaire online or receiving it by mail. Sixty-six percent (n=77) of patients and 64% (n=71) of partners chose to complete the survey online, while 34% (n=40) of patients and 36% (n=40) of partners chose to complete the survey by paper. The online questionnaire was completed by logging onto Novi, which is an online survey software securely housed at Ryerson University. Alternatively, if preferred, participants were mailed a paper copy version of the questionnaire package along with a pre-addressed and stamped envelope for returning the completed survey. All completed questionnaires were stored

in a secure location at Ryerson University. Each participant received a forty dollar gift card for completion of the questionnaire.

## **Measures**

As part of a larger study on couples facing MS, patients and their partners each completed a questionnaire package with measures assessing relationship dynamics, illness adjustment, quality of life, and other related constructs. For the purpose of the present investigation, only the measures that assessed the key constructs of adult attachment, dyadic adjustment, and hostile conflict were utilized.

**Adult attachment.** Attachment was assessed using the Experiences in Close Relationships Questionnaire-Revised (ECR-R; Fraley, Waller, & Brennan, 2000). This 18-item self-report measure assessed attachment on two continuous subscales: anxious and avoidant attachment. High scores on either subscale indicate greater insecure attachment on that dimension, while low scores represent greater security. Participants were asked to rate each item on a Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly). The ECR-R has demonstrated adequate reliability, excellent validity, and a high degree of short-term stability (Ravitz, Maunder, Hunter, Sthankiya, & Lancee, 2010; Sibley, Fischer, & Liu, 2005; Sibley & Liu, 2004). Cronbach's alpha has been demonstrated to be approximately 0.90 and test-retest reliability has been found to be between 0.50 and 0.75 (Ravitz et al., 2010). The ECR-R in the present study was found to have strong reliability with Cronbach's alpha coefficients of .91 for patients and .90 for partners.

Although intended to conceptualize attachment style continuously, the ECR-R has also been used to derive theoretically congruent categorical attachment styles based on the combination of participant's scores on the anxious and avoidant dimensions (Cordon, Brown, &

Gibson, 2009; Domingue & Mollen, 2009; Evans & Wertheim, 2005; Govender, Cassimjee, Schoeman, & Meyer, 2009). As previously noted and as outlined in Table 1, Bartholomew and Horowitz (1991) proposed that individuals were considered securely attached if they were low on both avoidant and anxious dimensions, anxiously attached if they were high on the anxious dimension and low on the avoidant dimension, avoidantly attached if they were high on the avoidant dimension and low on the anxious dimension, and fearfully attached if they were high on both the avoidant and anxious dimensions. Consistent with previous research that has used the ECR-R categorically, participants were categorized into one of four attachment styles using a K-means cluster analysis (Ben-Ari & Lavee, 2005; Dominue & Mollen, 2009).

Table 1

*Attachment Styles Derived From the Two Dimensions of the ECR-R*

	Low Anxious	High Anxious
Low Avoidant	Secure Attachment	Anxious Attachment
High Avoidant	Avoidant Attachment	Fearful Attachment

**Dyadic adjustment.** Dyadic adjustment was assessed using the Dyadic Adjustment Scale (DAS; Spanier, 1976). This 32-item self-report measure assesses dyadic adjustment with four subscales: dyadic consensus, dyadic satisfaction, dyadic cohesion, and affectional expression, along with a total score of dyadic adjustment (Spanier, 1976). The DAS has demonstrated good validity and reliability with Cronbach's alpha coefficients ranging from .73 to .94 for each of the subscales and .96 for the total score (Spanier, 1976). More recently, a reliability generalization meta-analysis (a meta-analytic technique that characterizes the reliability of a measure across a wide variety of applications) of the DAS indicated good reliability of the total score with a mean Cronbach's alpha coefficient of .915. Specifically, analyses indicated that 30 studies with reliability estimates under .50 would be necessary to bring



the reliability of the DAS below the acceptable limit of .69 (Graham, Liu, & Jeziorski, 2006). For the purpose of this study, only the total DAS score was used as the outcome variable. The DAS total score in the present study showed strong reliability with Cronbach's alpha coefficients of .88 for patients and .89 for partners.

**Hostile conflict.** Hostile conflict was assessed with the Aversive Interactions Scale-Hostile Conflict subscale (AIS-HC; Rodrigues & Rogge, 2012). This measure includes nine statements of hostile conflict such as "I swore at my partner", "I belittled my partner", and "I have mocked my partner". Participants reported how often they engaged in this behaviour and how often their partner engaged in this behaviour (e.g., "My partner did this to me") in the past year, comprising two subscales and a total of 18 items. Participants rated the frequency of each behaviour as 'never', 'not in last year', 'once', 'twice', '3-5 times', '6-10 times', '11-20 times', or '20+ times'. The measure demonstrated good reliability, with a Cronbach's alpha coefficient of .94 (Rodrigues & Rogge, 2012). For the purpose of the present study, only self-reported hostile conflict that the individual engaged in (e.g., "I did this to my partner.") was used as the mediator variable. The self-reported AIS-HC in the present study demonstrated strong reliability with Cronbach's alpha coefficients of .92 for patients and .87 for partners.

### **Data Analytic Strategy**

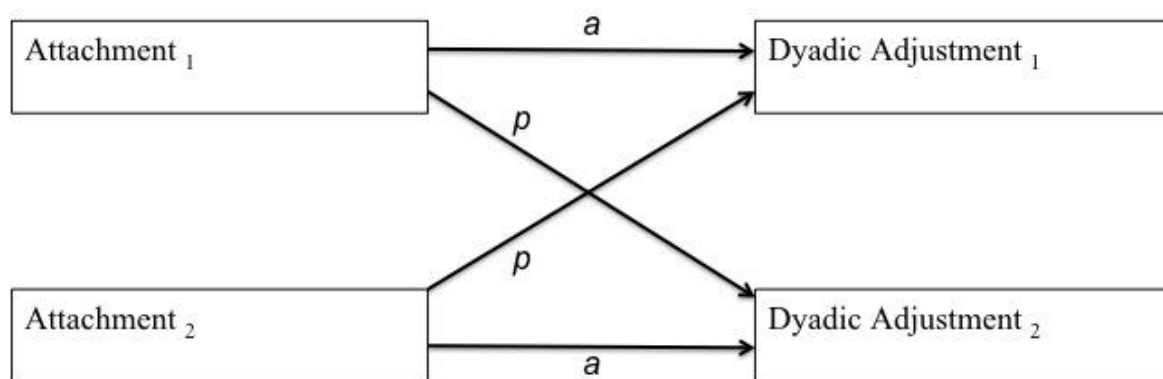
Historically, relationship research has approached data analysis at an individual level, using standard statistical methods such as multiple regression analyses; however this approach is limited both conceptually and statistically. Conceptually, dyadic data provides a unique opportunity to study truly relational phenomenon and the relative influence of both dyad members; however by implementing individual level analyses, only research questions at an individual level may be examined. Statistically, by using individual level analyses on dyads, the

fundamental assumption of independence for standard statistical methodologies is violated. Responses from each dyad member are nested within the couple. Put another way, the score of one participant will provide some information about the score of another participant because their ratings are not independent.

Ignoring non-independence and using standard statistical methods for dyadic data results in biased standard errors and loss of degrees of freedom (Kenny, Kashy, & Cook, 2006). Whether the bias is too liberal or too conservative depends on the type of independent variable being examined and the direction of the relationship between dyad members (positive or negative) (Kenny et al., 2006). It has been argued that using standard statistical methodology instead of analyses for nested data is done at the expense of important learning opportunities. The actor-partner interdependence model (APIM) developed by Kenny and colleagues (2006) allows for the examination of dyadic data by taking non-independence into consideration. In APIM, it is assumed that responses of members of the dyad are likely to be more related to one another than to any other participant that is not within their dyad. Furthermore, the dyad is the level of analysis, not the individual.

With regard to typical covariates to include in the analytic model, the literature does not show a consistent, reliable association between pertinent demographic variables such as age, education, and duration of relationship, and the outcome variable of dyadic adjustment (Dillaway & Broman, 2001; Fowers, 1991; Le, Dove, Agnew, Korn, & Mutso, 2010; Levenson, Carstensen, & Gottman, 1993). Therefore, we examined potential covariates, such as age, education, relationship duration, time since diagnosis, MS type, employment, and ethnicity, and their association with the outcome variable. If significant relationships were detected, those variables were included in the models as covariates.

**The APIM Model.** APIM analyses make use of multilevel modeling (MLM) in order to estimate all the model parameters in a single equation. The basic APIM model is displayed in Figure 1. The effects represented by  $a$  are called actor effects. Actor effects are the influence of one's own predictor variable on one's own outcome variable. For example, the actor effect refers to the effect of one's own attachment on one's own dyadic adjustment. The effects represented by  $p$  are called partner effects. Partner effects represent the influence of one's partner's predictor variable on one's own outcome variable. The term partner refers to the other member of the dyad rather than the individual of the dyad without MS; to avoid confusion, from now on, the term *spouse* will be used to refer to the caregiving partner of the MS patient, and the term *partner* will refer to the *other member of the dyad* in APIM analysis. For example, the partner effect refers to the effect of partner attachment on actor dyadic adjustment; that is, one's partner's attachment on one's own dyadic adjustment. Therefore, each member of the dyad is both an actor and a partner. MLM allows for the estimation of actor effects and partner effects simultaneously in a single analysis using the Statistical Package for the Social Sciences (SPSS).



*Figure 1.* The actor-partner interdependence model  
 $a$  = actor effect,  $p$  = partner effect  
<sub>1</sub> = one member of the dyad, <sub>2</sub> = other member of the dyad

Dyads are considered distinguishable if there is a consistent within-dyad variable: a variable that differs between dyad members but this variance is the same across the sample of dyads. Dyads in the present study may be distinguished by sex (male versus female) or role (patient versus spouse). For distinguishable dyads, there are four different paths that are evaluated: two actor paths and two partner paths (Kenny et al., 2006). The APIM model for distinguishable dyads, using role (patient versus spouse) as an example of a distinguishing factor, is displayed in Figure 2. The actor and partner paths are always clarified by referring to the outcome variable. For example, the patient actor effect ( $a_{patient}$ ) refers to the influence of the patient's predictor variable on the patient's outcome variable. Whereas the patient partner effect ( $p_{patient}$ ) refers to the influence of the spouse's predictor variable on the patient's outcome variable. The APIM model with distinguishable dyads necessitates two distinct analyses: the interaction model and the two-intercept model.

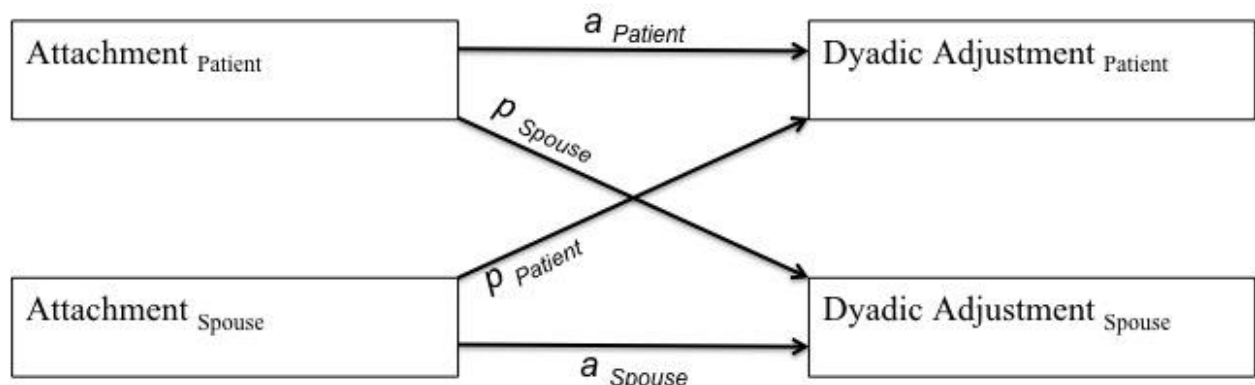


Figure 2. The actor-partner interdependence model: Distinguishable dyads  
a = actor effect, p = partner effect

**Interaction model.** For the interaction model, the actor and partner predictor variables and the distinguishing variables are entered as main effects, along with the interaction between the distinguishing variable and each of the actor and partner predictor variables (Kenny et al., 2006). See Appendix A for sample syntax for SPSS of the interaction model. The results of this analysis display the overall actor and partner effects, averaged across the members of the dyad.

The interaction terms display whether or not the main effects, the actor and partner effects, differ according to the distinguishing factor (i.e., patient versus spouse or male versus female).

Therefore, the interaction model provides information about whether or not the actor and partner effects are significant and whether the magnitude of the estimated main effects are significantly different according to the distinguishing variable. For example, if the interaction term between actor attachment and role was found to be significant, this finding would indicate that the magnitude of the actor effects are significantly different for patients compared to spouses.

***Two-intercept model.*** The two-intercept model is an extension of the interaction model, however it allows for heterogeneity of variance across levels of the distinguishing variable (Kenny et al., 2006). That is, it allows for different variances between men and women or between patients and spouses. The purpose of the two-intercept model may be considered akin to decomposing a significant interaction in standard regression models, if the interaction term is a dichotomous, between-subjects variable. In the two-intercept model, the distinguishing factor is coded as a repeated measures variable, which allows for the significance of the actor and partner effects to be presented separately for each member of the dyad, split according to the distinguishing factor. See Appendix A for sample syntax of the two-intercept model. The two-intercept model provides information about whether or not the actor and partner effects, divided according to the distinguishing factor, are significantly different from zero. For example, if, as before, there was a significant interaction between the actor effect and role, role would be entered as the repeated measures variable and the results would show the significance of the patient actor, spouse actor, patient partner, and spouse partner effects.

**Effect size.** The method to determine the amount of variance explained that is recommended in APIM, is termed the pseudo  $R^2$  (Kenny et al., 2006). The pseudo  $R^2$  can be calculated according to the following formula:

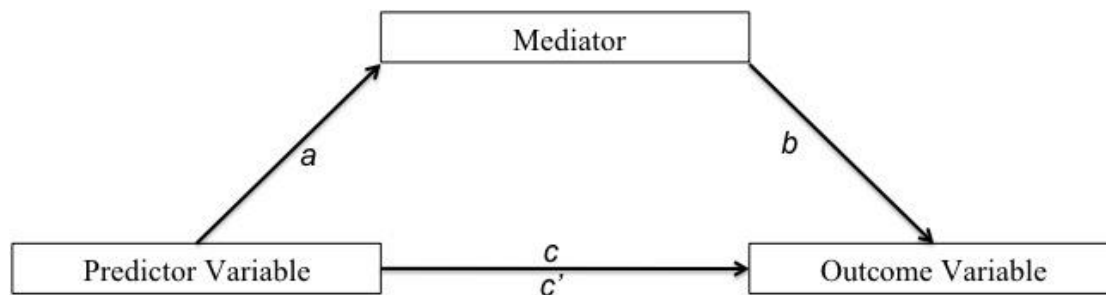
$$R^2 = 1 - \frac{S_{dd} + S_e^2}{S_{dd'} + S_e'^2}$$

It is calculated using the dyad covariance ( $S_{dd}$ ) and error variance ( $S_e^2$ ) of the final model with fixed effects and of the unrestricted model, without any fixed effects. The unrestricted model, also known as the empty model, is represented as prime in the above equation.

**Mediation.** The standard APIM model can be extended to include a mediator variable; this has been termed API mediation model or APIMeM (Ledermann, Macho, & Kenny, 2011). In APIMeM, tests of mediation follow a modified version of the Baron and Kenny steps of mediation. The Baron and Kenny steps involve testing the significance of four paths, the paths from the predictor variable to the mediator (path  $a$ ), the mediator to the outcome variable (path  $b$ ), the predictor variable to the outcome variable (path  $c$ ), and the same path after taking the mediator into consideration (path  $c'$ ). These paths are shown in Figure 3. In APIMeM, mediation occurs under circumstances in which path  $ab$  is significant and the  $c'$  path is smaller than the  $c$  path (Ledermann et al., 2011). MLM is used to assess the significance of each path and a Sobel test<sup>1</sup> is used to determine whether the  $ab$  path is significantly different from zero, that is, whether mediation has occurred (Kenny et al., 2006).

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<sup>1</sup> Sobel tests are used to assess for mediation as opposed to bootstrapping for the present study. Although bootstrapping has been used for APIMeM before, it can only be done through structural equation modeling (Ledermann et al., 2011). Bootstrapping is not current possible in SPSS. Consistent with the published literature on APIMeM (Manne & Badr, 2010; Riggs, Cusimano, & Benson, 2011), and personal communication with David A. Kenny, the decision was made to use Sobel testing to assess for mediation in the present study.



*Figure 3.* Baron and Kenny paths for mediation

$a$  = effect of the predictor variable on the mediator,  $b$  = effect of the mediator on the outcome variable,  $c$  = effect of the predictor variable on the outcome variable,  $c'$  = effect of the predictor variable on the outcome variable after accounting for the mediator

These paths become more complex in APIMeM as actor and partner effects can each be mediated by actor or partner mediators. For distinguishable dyads, there are four effects to be mediated (two actor and two partner effects) and each has two possible paths of indirect effects, resulting in eight possible paths of mediation. These paths are displayed in Figure 4, using role as the example of a distinguishing variable: actor predictor to actor mediator to actor outcome for both dyad members (i), actor predictor to partner mediator to actor outcome for both dyad members (ii), partner predictor to actor mediator to actor outcome for both dyad members (iii), and partner predictor to partner mediator to actor outcome for both dyad members (iv).

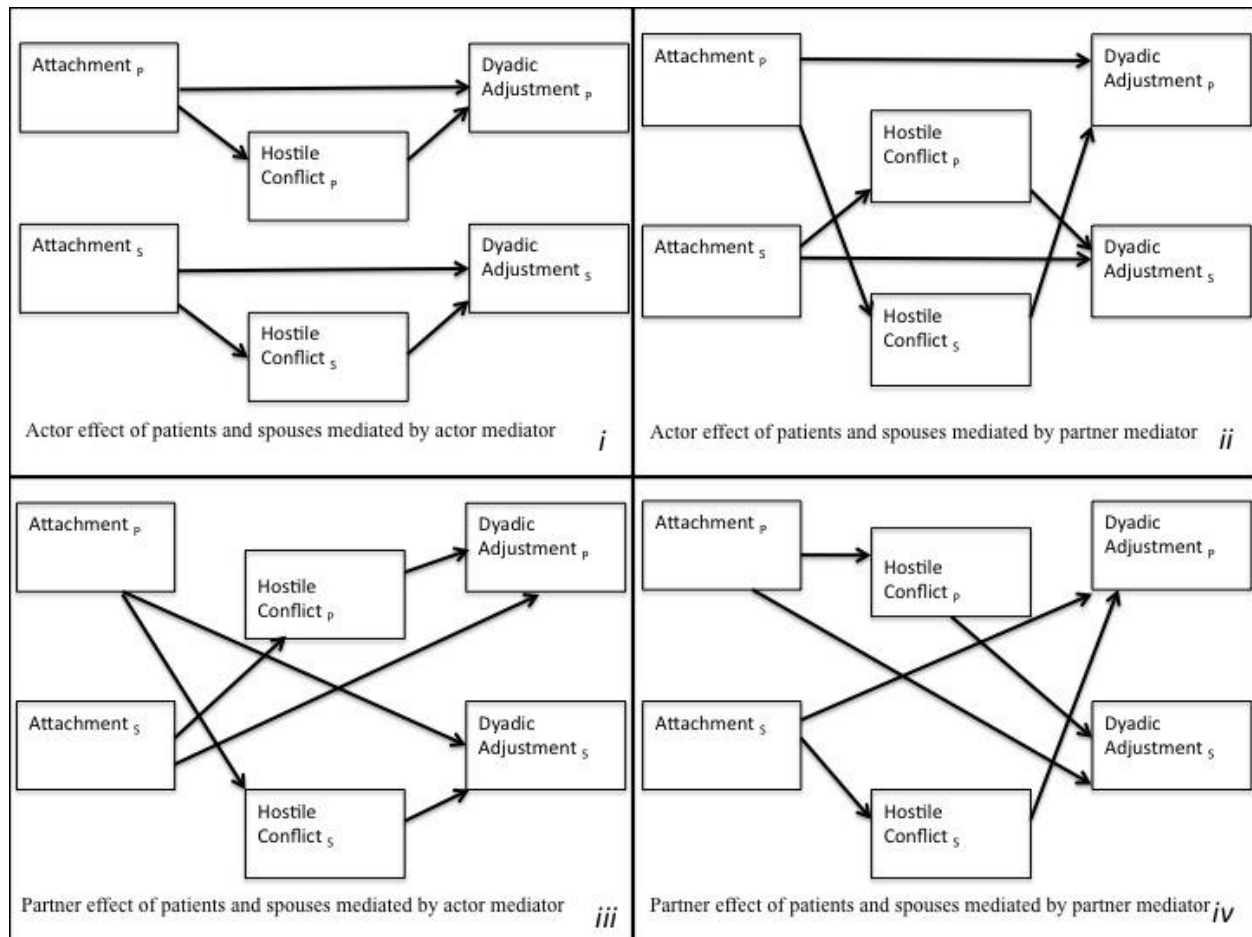


Figure 4. APIMeM for distinguishable dyads  
<sub>p</sub> = patient, <sub>s</sub> = spouse

**Aim 1.** It was expected that there would be significant actor (Hypothesis 1) and partner (Hypothesis 2) effects for both avoidant and anxious attachment, such that higher scores on avoidant or anxious dimensions would be associated with worse dyadic adjustment. The moderating influences of role and sex were explored (Exploratory Question 1).

**Associated analyses for Aim 1.** To estimate the actor and partner effects of avoidant or anxious attachment on dyadic adjustment, MLM of the interaction and two-intercept models were used. Avoidant and anxious attachment were analyzed in separate analyses. Each set of analyses began with the interaction model to determine the significance of the actor (Hypothesis 1) and partner effects (Hypothesis 2), and whether or not these effects were moderated by sex or



role (Exploratory Question 1). The fixed effects, or predictor variables, were sex, role, actor attachment, partner attachment, and their interactions. Five two-way interaction terms were created between sex and role and for sex and role with each of the actor and partner attachment terms, as well as two three-way interactions between sex, role, and each of the actor and partner attachment scores. Results of these interaction analyses reveal whether the overall actor and partner effects of attachment on dyadic adjustment are significant, and whether these actor and partner effects are moderated by sex and/or role.

If one or both of these moderating influences were significant, then a two-intercept analysis was conducted to decompose the interaction effects (Exploratory Question 1). If, for example, role was found to significantly interact with actor attachment, role would be entered as the repeated measures variable, and the fixed effects would be sex, role, role by actor attachment, and role by partner attachment. If neither of the moderating influences were significant, a two-intercept analysis was deemed unnecessary, as there would be no interactions necessitating decomposition (Kenny et al., 2006).

**Aim 2.** It was expected that secure dyads would experience significantly greater dyadic adjustment than insecure dyads (Hypothesis 3). The dyadic adjustment for mixed dyads compared to secure and insecure dyads was also explored (Exploratory Question 2).

*Associated analyses for Aim 2.* The extant literature on categorical and dyadic attachment styles has consistently utilized an ANOVA approach (Ben-Ari & Lavee, 2005; Domingue & Mollen, 2009; Govender et al., 2009; Volling et al., 1998) for the analysis of this relationship. As described earlier, on page 21, a K-means cluster analysis was conducted on the anxious and avoidant dimensions of the ECR-R to derive theoretically congruent categorical attachment styles. From the individual attachment styles, dyads were categorized as “secure”

(pairings of secure-secure attachment styles), “insecure” (pairings of insecure-insecure attachment styles), or “mixed” (pairings of secure-insecure attachment styles). Given that this is a categorical variable and a between-subjects analysis, a one-way analysis of variance (ANOVA) was conducted with dyadic attachment style as the grouping variable and dyadic adjustment as the outcome variable (Hypothesis 3 and Exploratory Question 2). If a significant effect was found, post-hoc analyses, Bonferroni or Games-Howell if the Levene’s test for heterogeneity of variance was non-significant or significant respectively, were used to investigate the differences between the dyadic attachment groups.

**Aim 3.** It was hypothesized that greater hostile conflict would mediate the relationship between greater actor anxious attachment and worse actor dyadic adjustment (Hypothesis 4). It was further hypothesized that greater hostile conflict would mediate the relationship between greater partner anxious attachment and worse actor dyadic adjustment (Hypothesis 5). Exploratory analyses examined hostile conflict as a mediator between greater actor and partner avoidant attachment and worse actor dyadic adjustment (Exploratory Question 3).

*Associated analyses for Aim 3.* APIMeM was used to assess whether hostile conflict mediated the association between attachment and dyadic adjustment. The significance of the *ab* paths was assessed using Sobel tests to examine whether mediation had occurred. Avoidant (Exploratory Question 3) and anxious (Hypotheses 4 and 5) attachment were assessed in separate analyses. Dyad members were distinguished according to the moderator determined to be significant from the interaction analysis under Aim 1. If there were no significant interactions in Aim 1, analyses were averaged across dyad members.

## Results

### Descriptive Statistics and Preliminary Analyses

110 couples were recruited for the present study ( $N = 220$ ). Six couples were excluded because they were not in heterosexual relationships (one gay and five lesbian couples), for a total of 104 couples ( $N=208$ ). Approximately 70% of patients were female and 30% were male. Table 2 displays the demographics of the present sample, separated according to role (patient versus spouse). The average age of participants was 44.3 for patients and 45.7 for spouses. Average duration of relationship was approximately 18 years, with relationship duration ranging from 7 months to 46 years. Participants had, on average, been diagnosed with MS approximately 9 years prior to the study; however, there was a high degree of variability. The majority of the sample was Caucasian and highly educated. Sixty eight percent of spouses reported full-time employment compared to only 24% of patients. In contrast, 44% of patients reported being on disability, compared to only 1% of spouses.

To determine important covariates to be included in the statistical models, the correlations between dyadic adjustment and age, months since diagnosis, and duration of relationship were examined. A significant correlation was found for age,  $r = .20$ ,  $p = .004$ ; non-significant correlations were found for both months since diagnosis,  $r = .01$ ,  $p = .894$ , and duration of relationship,  $r = .08$ ,  $p = .287$ . Therefore, age was included as a covariate in the subsequent analyses. One-way analyses of variance found non-significant effects on dyadic adjustment for education,  $F = .51$ ,  $p = .732$ , employment,  $F = .35$ ,  $p = .845$ , ethnicity,  $F = 1.53$ ,  $p = .207$ , and MS type,  $F = .04$ ,  $p = .990$ . Therefore, no further covariates were included in subsequent analyses.

Table 2  
Sample Demographics

	Patients	Spouses
	Mean (SD)	
<b>Age, years</b>	44.3 (11.6)	45.7 (12.6)
<b>Relationship length, years</b>	18.4 (12)	18.4 (12)
<b>Time since diagnosis, months</b>	119.34 (105.13)	118.92 (97.45)
	Frequency	
<b>Sex</b>	70% Female	30% Female
	30% Male	70% Male
<b>Education</b>	19% High School or Less	27% High School or Less
	25% Some College/University	35% Some College/University
	44% College/University	31% College/University
	12% Graduate School	6% Graduate School
<b>Employment</b>	24% Working Full-time	68% Working Full-time
	14% Working Part-time	13% Working Part-time
	8% Retired	11% Retired
	44% Disability	1% Disability
	8% Not Employed	8% Not Employed
<b>Ethnicity</b>	87% Caucasian	93% Caucasian
	2% Aboriginal	3% Asian
	2% Asian	3% Other
	4% Other	
<b>MS Type</b>	70% Relapsing Remitting	

11% Secondary Progressive

8% Primary Progressive

2% Progressive Relapsing

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Table 3 displays the means, standard deviations, and intercorrelations between the predictor, mediator, and outcome variables. Prior to conducting the APIM analyses, all predictor variables were centered by subtracting the mean value of the variable, as seen in Table 3, across each observation. This centering is recommended to allow for more straightforward interpretation of the results (Kenny et al., 2006).

Table 3

Means, Standard Deviations, and Intercorrelations between Primary Study Variables

	Patient DAS	Patient ECR	Patient ECR	Patient	Spouse DAS	Spouse ECR	Spouse ECR	Spouse AIS
		Avoidant	Anxious	AIS		Avoidant	Anxious	
<b>Patient DAS</b>	109.54 (17.24)							
<b>Patient ECR</b>	-.50**	2.69 (1.19)						
<b>Avoidant</b>								
<b>Patient ECR</b>	-.43**	.62**	2.98 (1.51)					
<b>Anxious</b>								
<b>Patient AIS</b>	-.66**	.30**	.23*	17.75 (15.50)				
<b>Spouse DAS</b>	.44**	-.12	-.23*	-.39**	109.84 (17.13)			
<b>Spouse ECR</b>	-.16	.07	.15	.10	-.53**	2.71 (1.21)		
<b>Avoidant</b>								
<b>Spouse ECR</b>	-.29**	.20*	.29**	.24*	-.53**	.56**	2.68 (1.39)	
<b>Anxious</b>								
<b>Spouse AIS</b>	-.41**	.08	.23*	.59**	-.50**	.24*	.40**	17.13 (13.79)

Note. Mean (Standard Deviation) along the diagonal. DAS = dyadic adjustment scale, ECR = experiences in close relationships scale revised, AIS = aversive interactions scale. †  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$ .

## **Aim 1: To Examine the Association between Individual Attachment and Dyadic Adjustment**

It was hypothesized that actor attachment scores would be associated with actor relationship satisfaction, such that higher scores of actor avoidant or anxious attachment would be associated with less actor dyadic adjustment. It was further hypothesized that actor dyadic adjustment would also be a function of partner attachment scores, such that greater partner avoidant or anxious attachment would be associated with less actor dyadic adjustment. Avoidant and anxious attachment were analyzed in separate models, and each model additionally examined the moderation effects of role and sex. MLM for APIM was used to estimate significance.

**Avoidant attachment.** An interaction model was run to determine the significance of the actor and partner effects, and whether these effects were moderating by sex or role. The main effects of age, sex, role, actor avoidant attachment, and partner avoidant attachment, as well as the interaction terms of sex by role, sex by actor avoidant attachment, sex by partner avoidant attachment, role by actor avoidant attachment, role by partner avoidant attachment, sex by role by actor avoidant attachment, and sex by role by partner avoidant attachment were entered as fixed effects. The results of the interaction model are displayed in Table 4. Results demonstrated a significant effect for age,  $b=.27$ ,  $p=.006$ , such that older age was associated with greater dyadic adjustment. There was also a significant actor effect,  $b= -7.32$ ,  $p= .001$ , and marginally significant partner effect,  $b=-1.76$ ,  $p=.057$ . These results support Hypotheses 1 and 2; greater actor and partner avoidant attachment were associated with less actor dyadic adjustment. These overall actor and partner effects are displayed in Figure 5. Additionally, there was a significant interaction between sex and partner avoidant attachment,  $b= 1.92$ ,  $p=.041$ , indicating that the

magnitude of the partner effect significantly differed between males and females. These results provide support for the hypothesis that sex moderates the negative relationship between avoidant attachment and dyadic adjustment; on the other hand, role does not have a statistically significant moderating influence.

*Table 4*

APIM Interaction Model Estimating Effects of Avoidant Attachment on Dyadic Adjustment

	<i>b</i>	<i>t</i>	<i>p</i>
Age	.27	2.82	<b>.006</b>
Sex	-.20	-.23	.821
Role	.18	.20	.839
Actor Avoidant Attachment	-7.28	-7.87	<b>.001</b>
Partner Avoidant Attachment	-1.76	-1.92	<b>.057</b>
Sex*Role	.47	.35	.729
Sex*Actor Avoidant Attachment	-1.39	-1.49	.139
Sex*Partner Avoidant Attachment	1.92	2.06	<b>.041</b>
Role*Actor Avoidant Attachment	.52	.56	.580
Role*Partner Avoidant Attachment	-.88	-.95	.343
Sex*Role*Actor Avoidant Attachment	-.82	-.89	.377
Sex*Role*Partner Avoidant Attachment	.23	.25	.806

Note. Bold indicates statistical significance



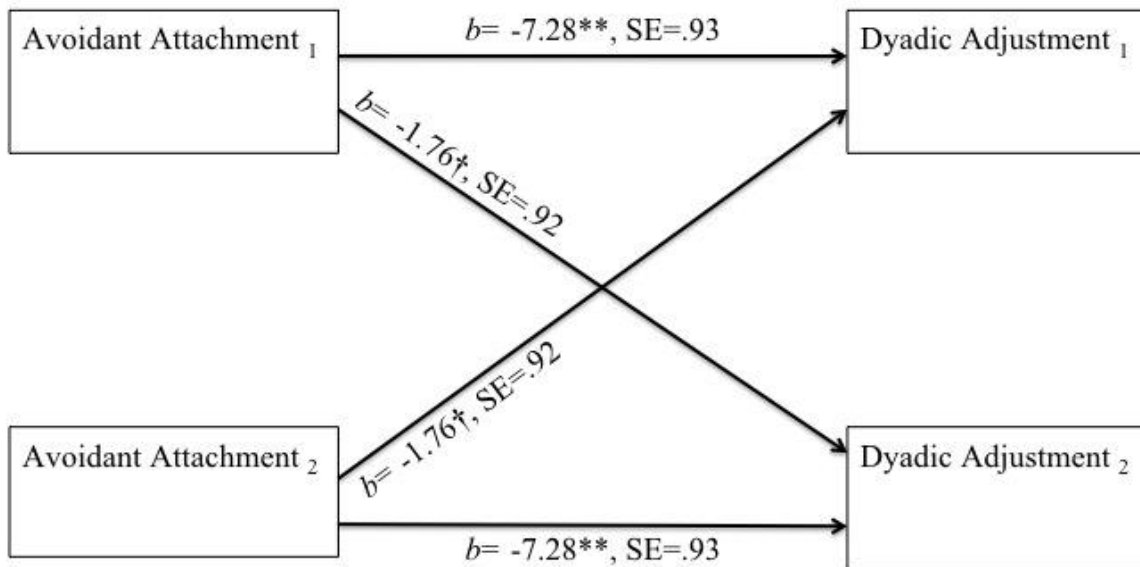


Figure 5. APIM estimating effects of avoidant attachment on dyadic adjustment for interaction model

<sub>1</sub> = first member of the dyad, <sub>2</sub> = second member of dyad.

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$

A follow-up two-intercept analysis was conducted to evaluate the significance of the actor and partner effects separately for males and females. Age, sex, role, sex by actor avoidant attachment, and sex by partner avoidant attachment were entered as fixed effects. The results of the two-intercept analysis are displayed in Table 5. The results indicated significant actor effects for both females,  $b = -6.16, p = .001$ , and males,  $b = -8.90, p = .001$ . That is, for both males and females, the more one endorsed avoidant attachment, the less dyadic adjustment one reported. For females, there was also a significant partner effect,  $b = -3.45, p = .007$ . That is, the more their partners endorsed avoidant attachment, the less dyadic adjustment females reported, regardless of role. The partner effect was not significant for males,  $b = -.11, p = .924$ . These associations are displayed in Figure 6. The pseudo  $R^2$  for this model is .274 for females and .378 for males; that is, the effects of age, sex, role, actor avoidant attachment, and partner avoidant attachment account for 27.4% of the variance in dyadic adjustment for females and 37.8% of the variance in dyadic adjustment for males.

Table 5

APIM Two-Intercept Model Estimating Effects of Avoidant Attachment on Dyadic Adjustment for Males and Females Separately

	<i>b</i>	<i>t</i>	<i>p</i>
Age	.27	2.91	<b>.004</b>
Female	97.30	22.04	<b>.001</b>
Male	96.80	21.30	<b>.001</b>
Role	.32	.37	.714
Female Actor Avoidant Attachment	-6.16	-5.33	<b>.001</b>
Male Actor Avoidant Attachment	-8.90	-7.24	<b>.001</b>
Female Partner Avoidant Attachment	-3.45	-2.71	<b>.007</b>
Male Partner Avoidant Attachment	-.11	-.10	.924

Note. Bold indicates statistical significance

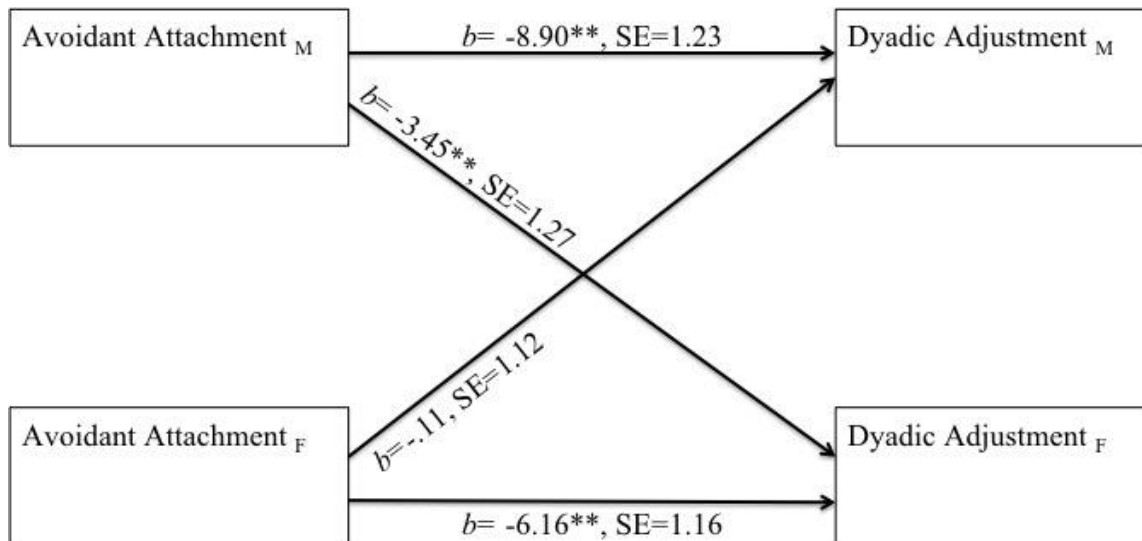


Figure 6. APIM estimating effects of avoidant attachment on dyadic adjustment for dyads distinguishable by sex

<sub>M</sub> = male <sub>F</sub> = female

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$

Taken together, the interaction and two-intercept models demonstrated significant actor and marginally significant partner effects. This supports the hypotheses that the more one

endorses an avoidant attachment style, the less dyadic adjustment one reports, and that the more one's partner endorses an avoidant attachment style, the less dyadic adjustment one reports. Although there was no evidence to support the moderating influence of role, sex significantly moderated the partner effect. The magnitudes of female and male partner effects were significantly different, such that the partner effect was stronger for predicting female outcomes than male outcomes. Worse female dyadic adjustment was significantly associated with greater partner avoidant attachment, whereas male dyadic adjustment was not significantly related to their partner's avoidant attachment. The actor effects were significant for both males and females, such that greater actor avoidant attachment was associated with worse actor dyadic adjustment.

**Anxious attachment.** An interaction model was run to determine the significance of the actor and partner effects of anxious attachment and whether these effects were moderated by sex or role. The main effects of age, sex, role, actor anxious attachment, and partner anxious attachment, as well as the interaction terms of sex by role, sex by actor anxious attachment, sex by partner anxious attachment, role by actor anxious attachment, role by partner anxious attachment, sex by role by actor anxious attachment, and sex by role by partner anxious attachment were entered as fixed effects. The results are displayed in Table 6. The results demonstrated significant overall actor,  $b=-5.37$ ,  $p=.001$ , and partner effects,  $b=-1.91$ ,  $p=.036$ . These results support Hypotheses 1 and 2; greater actor and partner anxious attachment was associated with worse actor dyadic adjustment. The results did not support a significant moderating influence of either sex or role. This model is displayed in Figure 7. As no significant moderators were found, a two-intercept analysis was deemed unnecessary. The pseudo  $R^2$  for this

model is .218; that is, the effects of age, sex, role, actor anxious attachment, and partner anxious attachment accounted for 21.8% of the variance in dyadic adjustment among couples facing MS.

*Table 6*

APIM Interaction Model Estimating Effects of Anxious Attachment on Dyadic Adjustment

	<i>b</i>	<i>t</i>	<i>p</i>
Age	.11	1.02	.309
Sex	-.16	-.16	.870
Role	-1.24	-1.25	.213
Actor Anxious Attachment	-5.37	-6.02	<b>.001</b>
Partner Anxious Attachment	-1.91	-2.11	<b>.036</b>
Sex*Role	.00	.00	1.000
Sex*Actor Anxious Attachment	-.45	-.46	.649
Sex*Partner Anxious Attachment	-.21	-.21	.833
Role*Actor Anxious Attachment	-.84	-.85	.403
Role*Partner Anxious Attachment	-.21	-.21	.833
Sex*Role*Actor Anxious Attachment	-.64	-.73	.467
Sex*Role*Partner Anxious Attachment	1.12	1.26	.209

Note. Bold indicates statistical significance

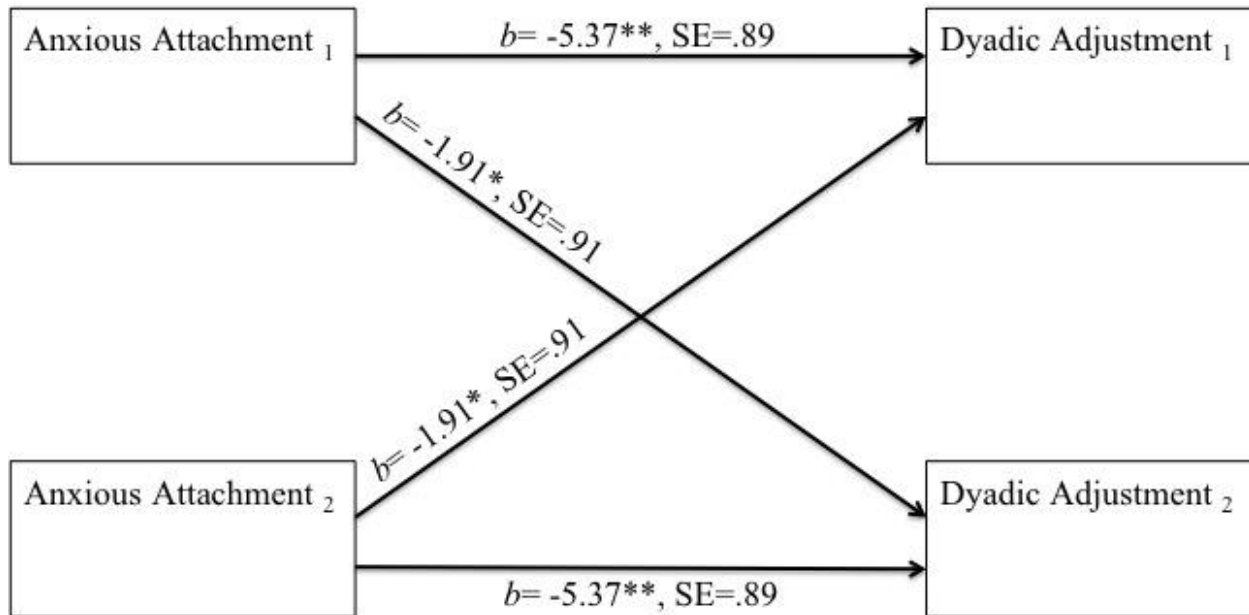


Figure 7. APIM estimating effects of anxious attachment on dyadic adjustment averaged across dyad members

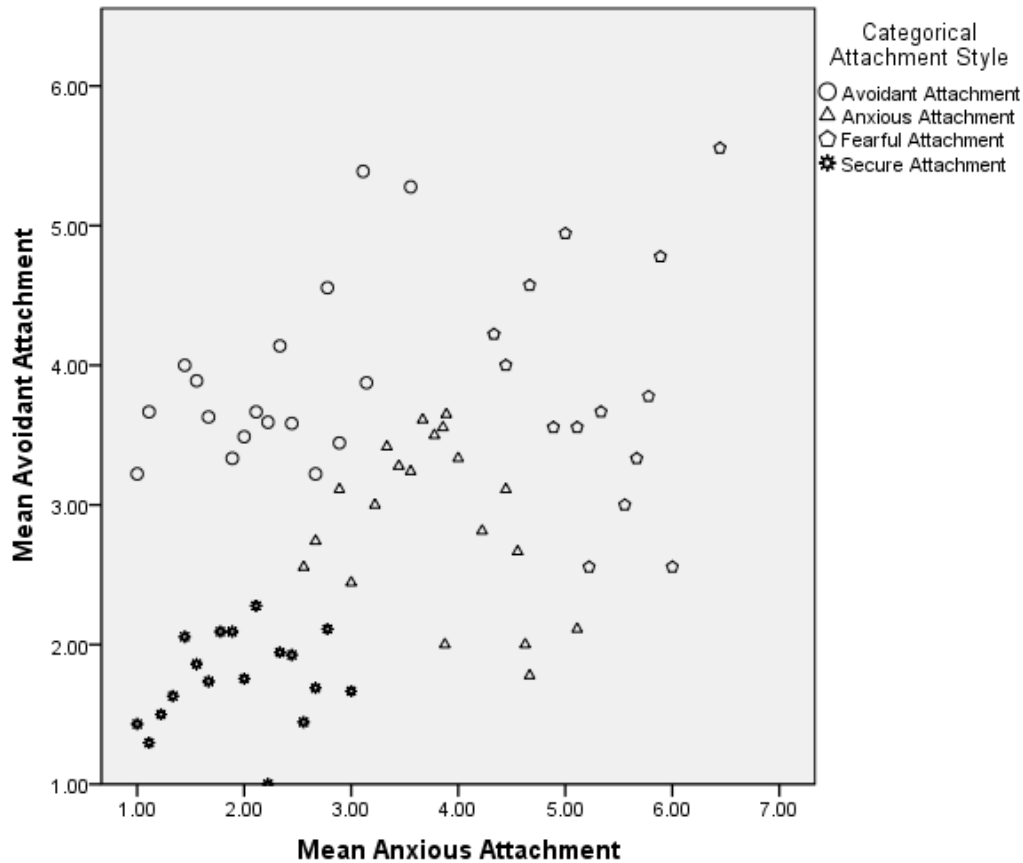
<sub>1</sub> = one member of the dyad, <sub>2</sub> = other member of the dyad

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$

## Aim 2: To Examine the Association between Dyadic Attachment and Dyadic Adjustment

It was hypothesized that secure dyads would report significantly greater dyadic adjustment compared to insecure dyads. As the previous research was inconsistent with regards to the effect of mixed dyadic attachment on relationship satisfaction, no hypotheses in this regard were proposed.

The results of the K-mean cluster analysis to categorize individuals into categorical attachment styles are shown in Figure 8. Twelve point one percent ( $n=25$ ) of individuals were classified as fearful (high on both avoidant and anxious attachment dimensions), 18% ( $n=37$ ) were classified as avoidant (high on avoidant and low on anxious attachment dimensions), 24.8% ( $n=51$ ) were classified as anxious (high on anxious and low on avoidant attachment dimensions), and 44.2% ( $n=91$ ) were classified as secure (low on both avoidant and anxious attachment dimensions). From these categories, dyadic attachment style was assigned with 26.2% ( $n=27$ ) of dyads categorized as secure, 35.9% ( $n=37$ ) as insecure, and 35.9% ( $n=37$ ) as mixed.



*Figure 8.* Categorical attachment variables along anxious and avoidant attachment dimensions from K-mean cluster analysis

Consistent with the published literature (Ben-Ari & Lavee, 2005; Domingue & Mollen, 2009; Govender et al., 2009; Volling et al., 1998), a one-way analysis of variance was conducted with dyadic attachment style as the predictor and dyadic adjustment as the outcome variable. The results indicated that dyadic attachment style was significantly related to dyadic adjustment,  $F(2, 197)=25.82, p=.001$ . The means and standard deviations are displayed in Table 7. The Levene's test of homogeneity of variance revealed significant heterogeneity of variance. Therefore, Games-Howell post-hoc analyses were utilized; these analyses revealed that secure dyads had significantly greater dyadic adjustment than both mixed dyads,  $M_{\text{Difference}}=11.67, SE=2.45, p=.001$ , and insecure dyads,  $M_{\text{Difference}}=19.85, SE=2.54, p=.001$ . Additionally, mixed dyads had

significantly greater dyadic adjustment than insecure dyads,  $M_{\text{Difference}}=8.18$ ,  $SE=2.72$ ,  $p=.009$ .

These results provide support for Hypothesis 3: secure dyads reported significantly greater dyadic adjustment than insecure dyads. Addressing Exploratory Question 2, there was evidence that mixed dyads reported significantly less dyadic adjustment than secure dyads, but significantly greater dyadic adjustment than insecure dyads.

*Table 7*

Dyadic Adjustment of Couples According to Dyadic Attachment; Means, Standard Deviations

	Mean	Standard Deviation
Secure Dyad	121.31	11.53
Mixed Dyad	109.64	15.92
Insecure Dyad	101.46	17.07

### **Aim 3: To Examine Hostile Conflict as a Mediator between Attachment and Dyadic Adjustment**

It was hypothesized that hostile conflict would mediate the negative association between actor and partner anxious attachment and dyadic adjustment. No specific hypotheses were advanced regarding hostile conflict as a mediator between avoidant attachment and dyadic adjustment.

**Avoidant attachment.** MLM with sex as a distinguishing variable was used to test the 8 potential paths of mediation specified by APIMeM. Age, sex, and role were entered as fixed effects in each step. In the first step of the mediation model, the effects of actor and partner avoidant attachment on actor hostile conflict were evaluated (the “a” paths). There were significant actor effects for both males,  $b=2.50$ ,  $p=.019$ , and females,  $b=2.78$ ,  $p=.008$ . That is, greater male avoidant attachment was significantly associated with greater male hostile conflict, and greater female avoidant attachment was significantly associated with greater female hostile

conflict. However, the partner effects for hostile conflict were not significant, neither for males,  $b=.68, p=.484$  nor for females,  $b=.92, p=.426$ .

In the second step of testing mediation, the effects of actor and partner hostile conflict on actor dyadic adjustment (the “b” paths) were evaluated. There were significant actor effects of hostile conflict on dyadic adjustment for males,  $b=-.32, p=.006$ , and females,  $b=-.66, p=.001$ . That is, greater male hostile conflict was associated with worse male dyadic adjustment, and greater female hostile conflict was associated with worse female dyadic adjustment. The partner effects of hostile conflict on dyadic adjustment were non-significant for males,  $b=-.17, p=.135$ , nor females,  $b=-.05, p=.645$ .

In the third step of testing mediation, the effects of actor and partner avoidant attachment on actor dyadic adjustment were evaluated (the “c” paths). This step reiterated the results found under Aim 1. That is, without accounting for hostile conflict, there were significant actor effects for both males,  $b=-9.31, p=.001$ , and females,  $b=-6.00, p=.001$ , such that greater male and female avoidant attachment was associated with worse male and female dyadic adjustment, respectively. For females, there was also a significant partner effect,  $b=-3.62, p=.005$ , such that without accounting for hostile conflict, greater male avoidant attachment was associated with worse female dyadic adjustment. For males, the partner effect was non-significant,  $b=.28, p=.805$ .

In the final step of testing mediation, the effects of actor and partner avoidant attachment on actor dyadic adjustment after accounting for hostile conflict (the c’ paths), were evaluated. For the c’ paths, the actor effects of avoidant attachment on dyadic adjustment were reduced but remained significant after accounting for hostile conflict for both males,  $b=-8.12, p=.001$ , and females,  $b=-4.12, p=.001$ . That is, male avoidant attachment continued to be significantly



associated with male dyadic adjustment after accounting for hostile conflict, as did female avoidant attachment continue to be significantly associated with dyadic adjustment. The female partner effect was also reduced but remained significant after accounting for hostile conflict,  $b = -2.30$ ,  $p = .037$ ; that is, male avoidant attachment continued to be significantly associated with female dyadic adjustment after accounting for hostile conflict. The male partner effect of avoidant attachment on dyadic adjustment remained non-significant after accounting for hostile conflict,  $b = .98$ ,  $p = .342$ .

The results of the Sobel test are displayed in Table 8. For both sexes, the actor effect was mediated by the actor variable, as displayed in Figure 9. For females, the effect of actor avoidant attachment on actor dyadic adjustment was significantly mediated by actor hostile conflict,  $Z = -2.45$ ,  $p = .014$ . That is, for females, the relationship between greater avoidant attachment and worse dyadic adjustment was significantly attenuated by greater hostile conflict. Thirty-one percent of the effect of actor avoidant attachment on dyadic adjustment was mediated by hostile conflict for females. For males, there was evidence of marginally significant mediation; there was a trend indicating that the effect of actor avoidant attachment on actor dyadic adjustment was mediated by actor hostile conflict,  $Z = -1.80$ ,  $p = .072$ . Eleven percent of the effect of actor avoidant attachment on dyadic adjustment was mediated by hostile conflict, for males. The effect of partner avoidant attachment on female actor dyadic adjustment was not significantly mediated by actor hostile conflict,  $Z = -.79$ ,  $p = .429$ , nor partner hostile conflict,  $Z = -.45$ ,  $p = .650$ . Taken together, these results have provided partial support for the mediating role of self-reported hostile conflict in the association between avoidant attachment and dyadic adjustment.

Table 8

Sobel Test of Hostile Conflict as a Mediator between Avoidant Attachment and Dyadic Adjustment

	Indirect Effects	SE	Z	p
Actor-Actor: Female	$X_F \rightarrow M_F \rightarrow Y_F$	.75	-2.45	<b>.014</b>
Actor-Actor: Male	$X_M \rightarrow M_M \rightarrow Y_M$	.44	-1.80	<b>.072</b>
Partner-Partner: Female	$X_F \rightarrow M_M \rightarrow Y_F$	.09	-.39	.700
Partner-Partner: Male	$X_M \rightarrow M_F \rightarrow Y_M$	.23	-.71	.481
Actor-Partner: Female	$X_M \rightarrow M_M \rightarrow Y_F$	.29	-.45	.650
Actor-Partner: Male	$X_F \rightarrow M_F \rightarrow Y_M$	.37	-1.31	.189
Partner-Actor: Female	$X_M \rightarrow M_F \rightarrow Y_F$	.77	-.79	.429
Partner-Actor: Male	$X_F \rightarrow M_M \rightarrow Y_M$	.32	-.68	.496

Note. X = Predictor, M = Mediator, Y = Outcome, F = Female, M = Male. Bold indicates statistical significance

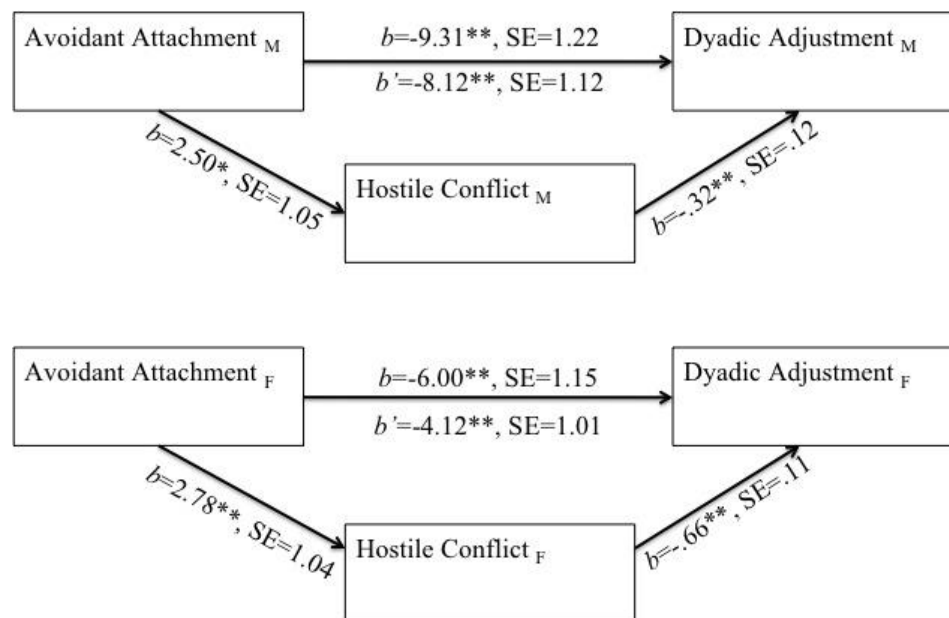


Figure 9. Actor effect of avoidant attachment on dyadic adjustment mediated by actor hostile conflict

b' = estimate for c' path

M = Male, F = Female

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$

**Anxious attachment.** In line with the APIM analysis under Aim 1 that demonstrated that there were no significant moderating effects of sex or role in the relationship between anxious attachment and dyadic adjustment, the mediational effects were averaged across dyad members. MLM was used to examine the paths specified by APIMeM. Age, sex, role, and the interaction between sex and role were entered as fixed effects in each step. In the first step of the mediation model, the effects of actor and partner anxious attachment on actor hostile conflict were evaluated (the “a” paths). Both the actor,  $b=2.34, p=.001$ , and partner,  $b=1.33, p=.031$ , effects were significant. That is, greater actor anxious attachment was significantly associated with greater actor hostile conflict, and greater partner anxious attachment was significantly associated with greater actor hostile conflict.

In the second step of testing mediation, the effects of actor and partner hostile conflict on actor dyadic adjustment (the “b” paths) were evaluated. There was a significant actor effect of hostile conflict on dyadic adjustment  $b=-.58, p=.001$ . That is, greater actor hostile conflict was significantly associated with worse actor dyadic adjustment. The partner effects of hostile conflict on dyadic adjustment was not significant,  $b=-.05, p=.516$ .

In the third step of testing mediation, the effects of actor and partner anxious attachment on actor dyadic adjustment were evaluated (the “c” paths). This step reiterated the results found under Aim 1. That is, without accounting for hostile conflict, there was a significant actor effect,  $b=-5.38, p=.001$ , such that greater actor anxious attachment was associated with worse actor dyadic adjustment. There was also a marginally significant partner effect,  $b=-1.57, p=.051$ , such that without accounting for hostile conflict, greater partner anxious attachment was associated with worse actor dyadic adjustment.

In the final step of testing mediation, the effects of actor and partner anxious attachment on actor dyadic adjustment after accounting for hostile conflict (the  $c'$  paths), were evaluated. For the  $c'$  path, the actor effect of anxious attachment on dyadic adjustment was reduced but remained significant after accounting for hostile conflict,  $b=-3.91, p=.001$ . That is, the effect of greater anxious attachment on worse dyadic adjustment was significantly attenuated by greater hostile conflict. The partner effect was no longer marginally significant after accounting for hostile conflict,  $b=-.56, p=.454$ ; that is, once hostile conflict was accounted for, greater partner anxious attachment was no longer significantly associated with worse actor dyadic adjustment.

The results of the Sobel test are displayed in Table 9. Both the actor and partner effects were significantly mediated by actor hostile conflict, as displayed in Figure 10. The results indicated significant mediation of the actor effect by actor hostile conflict,  $Z=-3.17, p=.002$ . That is, the relationship between greater actor anxious attachment and worse actor dyadic adjustment was significantly attenuated by greater hostile conflict. Twenty-seven percent of the effect of actor anxious attachment on actor dyadic adjustment was mediated by actor hostile conflict. The results also demonstrated significant mediation of the partner effect by actor hostile conflict,  $Z=-2.10, p=.036$ . That is, the relationship between greater partner anxious attachment and worse actor dyadic adjustment was significantly attenuated by greater hostile conflict. Sixty-two percent of the effect of partner anxious attachment on actor dyadic adjustment was mediated by actor hostile conflict. These results have provided support for Hypotheses 4 and 5, indicating that hostile conflict significantly mediated the association between anxious attachment and dyadic adjustment. Interestingly, actor, as opposed to partner, hostile conflict, significantly mediated the partner effect.

Table 9

Sobel Test of Hostile Conflict as a Mediator between Anxious Attachment and Dyadic Adjustment

	Indirect Effects	SE	Z	p
Actor-Actor	$X_1 \rightarrow M_1 \rightarrow Y_1$	.43	-3.17	<b>.002</b>
Partner-Partner	$X_1 \rightarrow M_2 \rightarrow Y_1$	.11	-.62	.533
Actor-Partner	$X_2 \rightarrow M_2 \rightarrow Y_1$	.19	-.64	.522
Partner-Actor	$X_2 \rightarrow M_1 \rightarrow Y_1$	.37	-2.10	<b>.036</b>

Note. X = Predictor Variable, M = Mediator Variable, Y = Outcome Variable, <sub>1</sub> = Dyad Member 1, <sub>2</sub> = Dyad Member 2. Bold indicates statistical significance.

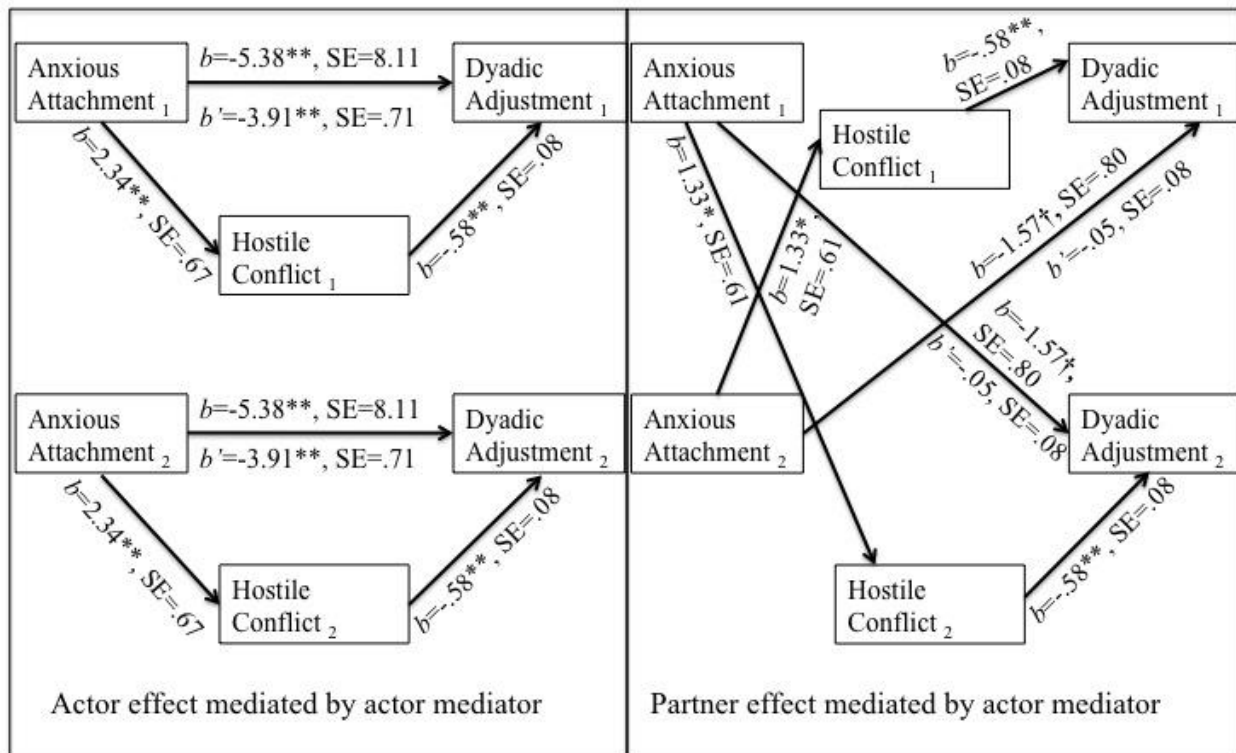


Figure 10. Actor and partner effects of anxious attachment on dyadic adjustment mediated by actor hostile conflict

<sub>1</sub> = one member of the dyad, <sub>2</sub> = the other member of the dyad

†  $p < .1$ , \*  $p < .05$ , \*\*  $p < .01$ .  $b'$  = estimate for  $c'$  path.

## **Discussion**

### **Summary of Findings**

In summary, the aim of the present study was to use attachment theory to gain greater insight into processes that account for relationship distress in couples facing MS. The results of the present study underscore the importance of attachment to understanding intimate processes in the MS population. Individuals who were characterized by a preference for excessive self-reliance, discomfort with intimacy and dependence, and tendency to engage in behaviours such as underemphasizing their emotions (i.e., avoidant attachment), reported significantly worse dyadic adjustment regardless of sex or role. An individual's own hostile conflict mediated the significant relationship between greater avoidant attachment and worse dyadic adjustment for females, but not males. Additionally, female partners of avoidantly attached individuals reported significantly worse dyadic adjustment regardless of role; the processes underlying this relationship were not explained by hostile conflict.

Individuals who were characterized by an inability to trust that others will provide the support that they need, excessive interpersonal dependence, hypervigilance to cues of abandonment, and intensified expressions of distress (i.e., anxious attachment), reported significantly worse dyadic adjustment regardless of sex or role. Greater hostile conflict significantly mediated the association between greater anxious attachment and worse dyadic adjustment. Additionally, partners of anxiously attached individuals reported significantly worse dyadic adjustment regardless of sex or role. An individual's own hostile conflict also mediated the association between his or her partner's anxious attachment and his or her own dyadic adjustment.

Categorically, dyadic adjustment significantly differed depending on the pairings of attachment styles. Secure dyads reported significantly greater dyadic adjustment than both mixed and insecure dyads, and mixed dyads reported significantly greater dyadic adjustment than insecure dyads. The results of the present study highlight the applicability and utility of attachment in understanding the high rates of relationship distress in MS, and suggest that there are unique ways in which attachment works in the MS population that may differ from the general population. Attachment theory proposes that these processes are particularly relevant to MS populations as the attachment system is believed to be activated by stress and unpredictability. These findings also underscore hostile conflict as an important construct in attachment and in MS that requires further examination. The outcomes of the present study suggests a number of potential avenues for intervention for relationship distress in MS couples, and help to create a picture for understanding the complex underlying processes.

### **The Specific Relevance of Attachment for MS Patients and Their Spouses**

While many of the results of the present study add new information to the greater literature on adult attachment, the most significant contribution of the present study is that it is among the very first to examine attachment in MS. Attachment is particularly relevant to MS, compared to the general population, as it was originally conceptualized as a psychological system that is activated in response to threats, making the detrimental effects of insecure attachment particularly potent under stress. Three kinds of situations are hypothesized to trigger the attachment system: environmental conditions such as financial strain, conditions that threaten an attachment relationship such as divorce or separation, and individual conditions such as ill health (Feeney, 2008). Therefore, there are many facets of MS that pose a threat to the attachment system including the illness itself and the associated financial strain (Hakim et al.,

2000). Additionally, MS may be perceived as a threat to the attachment relationship for the MS patients if they are aware of the high rates of partner abandonment (Pfleger et al., 2010), and for the spouse if they perceive, for example, the emotional absence of the patient due to high rates of cognitive impairment (Baumstarck-Barrau et al., 2011), physical absence of the patient due to chronic fatigue (Brown et al., 2009), or intimate absence of the patient due to sexual dysfunction (Zorzon et al., 2001) as a loss. Hence MS can create a unique set of circumstances, in which it is expected that the attachment system would be activated, and the negative effect of insecure attachment would be particularly relevant and potent to the marital relationship.

Additionally, the high levels of disability and unpredictability associated with MS, and the subsequent interdependence of MS couples, creates a situation that would be particularly distressing for insecurely attached individuals. Difficulty with dependence is a hallmark feature of both avoidant and anxious attachment, and the caregiving literature has identified unhelpful strategies of insecurely attached individuals that would be particularly maladaptive for MS couples. For example, individuals high in avoidant attachment respond to their partner's signals of distress with less empathy and compassion, provide less physical comfort, and are less able to pick up on nonverbal cues (Collins & Ford, 2010; Millings & Walsh, 2009; Simpson & Rholes, 2010). Furthermore, greater avoidant attachment has been shown to be associated in prior research with significantly more interpersonal stress and distancing behaviour in response to a hypothetical encounter with an individual with a physical disability (Vilchinsky, Findler, & Werner, 2010). On the other hand, individuals high in anxious attachment tend to respond with greater empathy than their avoidant counterparts, but fail to adjust their response according to the distress signaled by their partners, reflecting a pattern of compulsive and intrusive caregiving (Collins & Ford, 2010; Millins & Walsh, 2009). Moreover, greater anxious attachment has been



associated with significantly more negative emotions, more interpersonal stress, and less positive cognitions, in response to a hypothetical encounter with an individual with a physical disability (Vilchinsky et al., 2010). In conclusion, attachment may be particularly meaningful to the MS population given the detrimental effects of the illness on relationship adjustment (McCabe, 2002; Perrone et al., 2006; Pfleger et al., 2010) and the utility of attachment in understanding intimate processes (Feeney, 2008; Mikulincer & Shaver, 2007).

### **Findings of the Present Study**

**Representativeness of the study sample.** The couples in the present study appeared representative of the MS population in general. In the present study, 70% of the sample was diagnosed with the relapsing-remitting type of MS. Although this proportion is slightly lower than the average rate of 80-85% reported by the MS Society of Canada (2012), it is consistent with other research studies of MS that have reported their samples to be comprised of about 73-74% relapsing-remitting type (i.e., Beiske et al., 2008; Christodoulou, et al., 2009). The gender ratio in the present study was also representative of the general MS population as 70% of the patients were female and 30% were male. This is consistent with reports from the MS Society of Canada (2012), epidemiological research (Ahlgren, Oden, & Lycke, 2011), and other research studies on MS (O'Connor et al., 2008) that have found rates of incidence to disproportionately affect women by about 2 to 1.

The reported means on the ECR-R are also consistent with the greater literature. In the present study, on a scale from 1-7, the mean for avoidant attachment was 2.7 for both patients and spouses, and the mean for anxious attachment was 3.0 for patients and 2.7 for spouses. These results are consistent with the greater literature on healthy adults (Domingue & Mollen, 2009; Lavy, Mikulincer, & Shaver, 2010), as well as other samples of health populations such as

couples coping with infertility (Bayley et al., 2009). Likewise, in Litke's dissertation (2007), the only other examination of attachment in MS couples, the avoidant means were 3.0 for patients and 2.6 for spouses, and the anxious means were 3.6 for patients and 2.7 for spouses. Indeed, direct comparisons of attachment ratings for people with physical disabilities compared to healthy adults have shown no significant differences (Hwang et al., 2007).

Finally, the mean DAS score was 110 for both patients and spouses, reflecting a largely satisfied sample. Although this average may appear to be discrepant with research indicating high rates of relationship dissatisfaction and marital separation in MS, it is actually consistent with other research studies that have used the DAS with MS samples. For example, in a study of the correlates of dyadic adjustment in MS couples, mean DAS scores were reported to be 112.8 for patients and 110.2 for spouses (McPheters & Sandberg, 2010). Moreover, although a mean of 110 appears to be only somewhat lower than that of healthy adult populations, reporting, for example, a mean DAS score of 116 (Boesch, Cerqueira, Safer, & Wright, 2007), 26.5% of the present sample falls under the cut-off of 100 (Spanier, 1976) for clinically significant relationship distress (n=54). This is in contrast to samples of healthy adults, as well as other chronic illness samples such as cancer, in which only between 5-15% of the sample tends to fall below the clinical cut-off (Assh & Byers, 1990; Badr & Carmack Taylor, 2008; Boesch et al., 2007). Therefore, although, on average, the present study did not represent clinically significant relationship distress, the proportion of distressed couples appeared to be higher than studies of healthy adults.

**Aim 1: APIM analysis of the effect of attachment on dyadic adjustment.**

*Actor effects of avoidant and anxious attachment on dyadic adjustment.* The results of the APIM analyses confirmed Hypothesis 1: there were significant actor effects of avoidant and

anxious attachment on dyadic adjustment. These outcomes are consistent with the vast adult attachment literature that has demonstrated a reliable association between one's own attachment and one's own dyadic adjustment (Mikulincer et al., 2002). Additionally, they add to the burgeoning literature that has validated the importance of individual attachment to dyadic adjustment using dyadic analyses (i.e., Kane et al., 2007; Mondor, McDuff, Lussier, & Wright, 2011). Using dyadic data analysis, these studies notably account, statistically and conceptually, for the interdependent nature inherent to both attachment and dyadic adjustment. For example, a study of 305 heterosexual, dating university students found significant actor effects of avoidant and anxious attachment on dyadic adjustment using APIM analyses (Kane et al., 2007). The specific relevance of attachment to MS has already been addressed, and it is noteworthy that consistent results were found in this unique population.

***Partner effects of avoidant and anxious attachment on dyadic adjustment, in general.***

The present study found a significant partner effect for anxious attachment and a marginally significant partner effect for avoidant attachment, providing partial support for Hypothesis 2. These results are consistent with the greater couples literature, which has found significant cross-dyadic effects of attachment on relationship satisfaction and quality (i.e., Banse, 2004; Kane et al., 2007; Mondor et al., 2011; Riggs et al., 2011). Although many of these cross-dyadic effects were examined using standard statistical methods such as multiple regression (Banse, 2004; Carnelley, Pietromonaco, & Jaffe, 1996), growing research is using dyadic data analysis to account for interdependence between dyad members (Kane et al., 2007).

***Sex as a moderator of actor and partner effects.*** The present study found a significant moderating effect of sex but not role. These results are consistent with the findings of general psychological distress in the health psychology literature: an authoritative meta-analysis of

distress in couples facing cancer found that sex was a more significant predictor of distress than role, with females reporting more distress than males regardless of if they were the patient or the spouse (Hagedoorn et al., 2008). This is also consistent with a longitudinal study of couples facing cancer in which, regardless of role, female distress tended to increase over time while male distress decreased (Badr & Carmack Taylor, 2008). Although the relative effects of both gender and role have not been examined in the MS literature before, these results are also consistent with studies from MS spouses which have shown that females report greater distress than males (Pakenham, 2001).

Sex was found to be a significant moderator of partner, but not actor, effects. This fits with the larger relationship literature, which has reliably shown sex to be a significant moderator of partner effects (Kane et al., 2007; Mondor et al., 2011). For example, in Kane and colleagues' (2007) study of the effect of attachment on relationship satisfaction in dating relationships, there was a significant effect of sex on partner, but not actor, effects. In the present study, females were found to be more adversely affected by their partner's insecure attachment than males. This is also consistent with research in the greater couples literature showing that females are more negatively affected by relationship variables, such as communication, than males (Badr & Acitelli, 2005). Although there are a number of possible explanations, one way that this gender effect may be understood is through findings from the caregiving literature. It has been shown that when males endorse greater avoidant attachment, they provide less frequent emotional care, whereas female avoidant attachment is unrelated to the frequent provision of emotional care (Kim & Carver, 2007). Therefore, in the present study, it is possible that when males report greater avoidant attachment they engage in less supportive caregiving behaviour, which results in

worse dyadic adjustment for their partners, whereas females engage in supportive behaviour regardless of their avoidant attachment.

On the other hand, the present study found that sex only moderated the partner effect of avoidant, and not anxious, attachment. This is in contrast to the greater literature that has found sex effects for both avoidant and anxious attachment. Typically, female dyadic adjustment has been found to be negatively affected by male avoidant attachment, consistent with the above findings from the present study, whereas male dyadic adjustment has been found to be negatively affected by female anxious attachment (Kane et al., 2007; Collins & Read, 1990).

The discordance between the results of the present study and the greater literature suggests that the detrimental effects of anxious attachment may be different in this unique population. According to the conceptual model, anxiously attached individuals respond to threats with hyperactivating strategies such as relentlessly signaling distress and excessive dependence on others (Mikulincer & Shaver, 2007). Evidence of such strategies can be found from a study of healthy adults, which showed that anxious attachment was associated with more intrusive interpersonal behaviour, regardless of sex (Lavy et al., 2010). Given the chronicity and unpredictability of MS, it is possible that the overbearing, intrusive strategies of anxious attachment within this illness context are disruptive enough to negatively affect females as well as males. Another possible explanation is that anxious attachment is associated with more global difficulty in the face of chronic illness for both sexes. For example, among both male and female cancer patients, greater anxious, but not avoidant, attachment was associated with greater hopelessness and anxious preoccupation, and less 'fighting spirit' (Cicero et al., 2009).

*Variance of dyadic adjustment accounted for with actor and partner effects of avoidant and anxious attachment.* Descriptively, in the present study, avoidant attachment appeared to

explain more variance in dyadic adjustment (27% for females and 38% for males) than anxious attachment (22% averaged across sexes). This is consistent with the larger literature, which has shown that avoidant attachment is a stronger predictor of relationship satisfaction than anxious attachment (Kane et al, 2007; Mondor et al., 2011; Shaver, Schachner, & Mikulincer, 2005). In a study of distressed and non-distressed couples, avoidant attachment was a significantly stronger predictor of one's own lower relationship satisfaction than anxious attachment for distressed, but not non-distressed, couples (Mondor et al., 2011). This is in line with the sizeable proportion of the present sample reporting clinically significant relationship distress. These results suggest that the deactivated strategies of avoidant attachment, such as excessive self-reliance and discomfort with intimacy, have a more detrimental effect on dyadic adjustment than the hyperactivating strategies of anxious attachment.

## **Aim 2: Effect of dyadic attachment style on dyadic adjustment.**

*Descriptive statistics of categorical and dyadic attachment styles.* In the present study, 44% of participants were categorized as secure, 25% as anxious, 18% as avoidant, and 12% as fearful. The proportion of participants falling into each category is consistent with a study that used a prototype assessment of categorical attachment, in which participants were asked to choose which description best reflects their approach to relationships (Feeney & Hohaus, 2001). However, there appears to be proportionally less individuals categorized as secure in the present sample when comparing the results of the present study to others that have used the K-means cluster analysis (Domingue & Mollen, 2009; Brennan, Clark, & Shaver, 1998). For example, a study of 43 healthy adults reported that 65% of their sample was classified as secure, 22% as anxious, 8% as avoidant, and 6% as fearful (Domingue & Mollen, 2009). The meaning of these results will be addressed further below.

In the present study, 26% of dyads were classified as secure, 36% as insecure, and 36% as mixed. This is largely inconsistent with the greater literature in which secure dyads are the most common (Ben-Ari & Lavee, 2005; Cohn, Silver, Cowan, Cowan, & Pearson, 1992). For example, in a study of 248 healthy Israeli couples, 40% of the dyads were categorized as secure, 32% as mixed, and 29% as insecure (Ben-Ari & Lavee, 2005). Therefore, there were a notably lower proportion of secure dyads in the present study sample compared to the general literature.

One possible explanation for this difference is methodological. It may be that this discrepancy is due to constructing attachment styles from a dimensional measure, rather than using Hazen and Shaver's (1990) forced choice paradigm or a structured assessment such as the Adult Attachment Interview (George, Kaplan, & Main, 1985; Hesse, 2008). It is also possible that this effect is due to recruitment bias. It may be that couples who volunteered to participate in a study on the effects of MS on romantic relationships were more distressed than couples who declined to participate, and, as mixed and insecure pairings report significantly greater relationship distress, secure dyads may have been undersampled.

Finally, this finding may be a true difference in the MS population compared to the general population, reflecting a significant implication of attachment in MS. For example, it is possible that the stress of an MS diagnosis causes a shift from secure to insecure attachment. This interpretation would find support from longitudinal studies with adolescents (Allen, McElhaney, Kuperminc, & Jodl, 2004) and adults (Cozzarelli, Karafa, Collins, & Tagler, 2003) in which stressful life events such as poverty, depression, abuse, and miscarriages predicted greater shifts towards insecurity. On the other hand, this interpretation would be at odds with the finding, as previously iterated, that the individual attachment styles of the present study appear to be consistent with research that have used prototype and interview modes of assessment. These

discrepancies highlight the challenge in the attachment literature posed by the various modalities and tools for assessing a single construct, and how to interpret contradictory findings.

***Relationship of dyadic attachment styles with dyadic adjustment.*** Secure dyads reported significantly more dyadic adjustment than insecure dyads, consistent with results from the healthy couples literature (Alexandrov et al., 2005; Domingue & Mollen, 2009; Senchak & Leonard, 1992). For the exploratory analyses, it was found that mixed dyads reported significantly less dyadic adjustment than secure dyads, but reported significantly better dyadic adjustment than insecure dyads. This is consistent with prior studies of healthy couples, in which having at least one secure member in the dyad appeared to only somewhat buffer the negative effects of an insecure partner (Ben-Ari & Lavee, 2005; Cohen et al., 1992; Volling et al., 1998). Only limited data exist on dyadic attachment in illness populations; for example, Porter and colleagues (2012) examined dyadic attachment in couples facing cancer, and found analogous results to the present study. The matching of attachment styles between dyad members seems particularly relevant in these populations in which interpersonal dependence is heightened, and the success of the dyad is related to coping together as a couple (Badr, Carmack, Kashy, Cristofanilli, & Revenson, 2010; Papp & Witt, 2010).

**Aim 3: Hostile conflict as a mediator of the relationship between attachment and dyadic adjustment.**

***Hostile conflict in general.*** Overall, the present study iterated the importance of hostile conflict to both insecure attachment and dyadic adjustment. This is consistent with the greater literature that has suggested these important trends. For example, in healthy young adults, anxious and avoidant males and females displayed significantly less positive and more negative conflict behaviour than secure individuals (Creasey, 2002). Moreover, a meta-analysis of



observed couple conflict behaviour found a robust, moderate effect size of  $d = -.63$  of greater hostility on lower levels of relationship satisfaction (Woodin, 2011). In the present study, participants were asked to rate their frequency of engaging in different types of hostile conflict behaviour (i.e., “I swore at my partner,” “I have mocked my partner,” and “I did something to spite my partner”). This is in contrast to other studies that measured conflict by asking participants to rate the frequency of disagreements in areas of marital life such as household tasks or sexual interactions (Brassard, Lussier, & Shaver, 2009); by coding observable negative behaviour such as demanding or dominating behaviour in a conversation (Woodin, 2011); or by measuring self-reported affect such as trait anger (Baron et al., 2007; Renshaw et al., 2010). These differences in measurement are crucial to understanding how the greater literature provides relevant supporting research, but also differs from the construct at hand in important ways.

***Effects of actor and partner hostile conflict on dyadic adjustment.*** As expected, the more frequently an individual reported engaging in hostile conflict, the worse dyadic adjustment he or she reported. Surprisingly, the present study found that there were no significant effects of partner hostile conflict on actor dyadic adjustment. That is, frequency of hostile conflict reported by one’s partner was unrelated to one’s own dyadic adjustment. This is discordant with the other studies that have found significant cross-dyadic effects of trait anger on relationship quality (Baron et al., 2007; Renshaw et al., 2010). It is possible that, since our measure of hostile conflict is self-reported, a discrepancy exists between self-reported behaviour and what was perceived by one’s partner. Alternatively, it is also possible that trait anger reflects a diffuse construct that is actually capturing a wide range of negative behaviour and affect, which might

account for the partner effects found in other studies. By contrast, the measure used in the present study may reflect a narrower range of highly specific marital interactions.

***Hostile conflict as a mediator of the actor and partner effects of avoidant attachment on dyadic adjustment.*** Analyses indicated that the actor effect of avoidant attachment on dyadic adjustment for females was significant mediated by actor hostile conflict; that is, for females, greater hostile conflict accounted for 31% of the effect of greater avoidant attachment on worse dyadic adjustment. However, the same pattern was only marginally significant for males, as hostile conflict accounted for only 11% of the same effect. Finally, the results of the present study showed that neither one's own nor one's partner's hostile conflict significantly mediated the negative effect of male avoidant attachment on female dyadic adjustment.

Interestingly, a study of healthy French-Canadian couples found that conflict, measured by perceived frequency of disagreements on different aspects of married life, mediated the actor effect of avoidant attachment on marital satisfaction for both males and females (Brassard, Lussier, & Shaver, 2009), while the current study only found this for women. The discrepancy of the present findings and greater literature may be attributable to the unique effects of *hostile* conflict. In a meta-analysis of studies involving observed conflict behaviour in couples, Woodin (2011) found a small but significant effect size of  $d = -.16$  indicating that females exhibited significantly greater hostility than males. Therefore, it is possible that, for the present study, there was a more substantial mediating effect of hostile conflict for females compared to males because there was greater variability of hostility in females compared to males. Support for this gender effect of hostility can also be found from a study of 122 married couples, in which greater female hostility prospectively predicted worse female dyadic adjustment, while greater male hostility failed to significantly predict worse male dyadic adjustment (Baron et al., 2007). The

present study is not only the first study to examine *hostile* conflict as a mediator of the relationship between avoidant attachment and dyadic adjustment; it adds important information to the literature on gender effects in hostile conflict.

***The relationship between hostile conflict and avoidant attachment, in general.***

Mediation aside, the present study showed a significant actor effect of avoidant attachment on hostile conflict for both males and females: males and females who reported higher scores on avoidant attachment, reported significantly more frequent hostile conflict. In contrast, the greater literature has failed to find a significant relationship between avoidant attachment and trait tendency towards hostile conflict (Guerrero et al., 2009; Muris et al., 2004). These studies have measured how characteristic behaviours, such as criticizing their partner, are of participants by asking them to rate statements on a scale from ‘like me’ to ‘unlike me.’ This discrepancy may indicate that *frequency* of *hostile* conflict was related to avoidant attachment in the current study in a way that has not been captured by other research measuring conflict quite differently. Our finding is, however, supported by studies that have examined just the hostility component of anger. Those studies reported that avoidant attachment was associated with significantly greater hostility than secure attachment (Mikulincer, 1998; Muris et al., 2004). Moreover, other research has shown greater avoidant attachment to be significantly associated with more frequent marital attacking behaviour such as, “[I] say or do something to hurt [my partner’s] feelings” (Marchand, 2004).

***Hostile conflict as a mediator of actor and partner effects of anxious attachment on dyadic adjustment.*** Hostile conflict significantly mediated the actor effect of anxious attachment, with one’s own hostile conflict accounting for 27% of the variance in the relationship between greater anxious attachment and worse dyadic adjustment. Actor hostile conflict also significantly

mediated the partner effect of anxious attachment, with one's own hostile conflict accounting for 62% of the variance in the negative effect of one's partner's anxious attachment on one's own dyadic adjustment. This is similar to a study of 581 healthy couples, which found the negative relationship between anxious attachment and relationship satisfaction to be significantly mediated by greater aggressive and passive-aggressive emotional communication (Guerrero et al., 2009). Additionally, in a study of dating couples, one's own and one's partner's conflict behaviour significantly mediated the partner effect of anxious attachment on dyadic adjustment (Brassard et al., 2009).

### **Limitations**

The present findings should be considered carefully in light of several study limitations. First, there are a few limitations regarding the generalizability of the sample. Specifically, the sample appears to be highly educated and overwhelmingly Caucasian, with 76.5% of sample reporting some college or university education or higher and 90% of the sample endorsing a Caucasian ethnicity. This is somewhat surprising given the recruitment strategy of the present study. Forty-one percent of the sample dyads were recruited from St. Michael's Hospital MS clinic, a large inner-city hospital in Toronto. On the other hand, 59% of the sample dyads were recruited from the community through the MS Society of Canada's listservs, email blasts, and support groups; although the local chapters are accessible, it is possible that couples who seek out information and support through the MS Society of Canada are more highly educated. However, these results are also representative of a wide problem across research areas, in which there is an under-representation of low income, less educated, and minority samples (Yancey, Ortega, & Kumanyika, 2006). Additionally, the overrepresentation of well-educated, Caucasian

participants is consistent with other MS studies (Christodoulou et al., 2008; Chwastiak, Ehde, Gibbon, Sullivan, Bowen, & Kraft, 2002; Gay, Vrignaud, Garitte, & Meunier, 2010).

A second limitation involves the statistical approach used for Aim 2. Despite explicating the rationale for choosing a dyadic data approach for Aims 1 and 3, the decision was made to use standard statistical methods, specifically an ANOVA, for Aim 2. In making this decision, the results of Aim 2 are subject to the same limitations espoused for the greater literature on attachment and couples: violation of the assumption of independence, inability to account for the unique effects of each dyad member individually, and conceptual research questions that can only be addressed at the individual and not dyadic level. On the other hand, although there is a way to potentially assess dyadic attachment using APIM analyses, it is not theoretically congruent with attachment theory. Specifically, using the product approach, it is possible to test the interaction between actor and partner predictors (such as actor and partner avoidant attachment and actor and partner anxious attachment). However, these analyses would only provide the information about the combination between a single dimension of attachment; if, for example one individual was high on attachment avoidance and the other was low, there is no information about whether the individual who was low on avoidant attachment was also low on anxious attachment, representing a mixed dyad, or was high on anxious attachment, representing an insecure dyad. With this in mind, testing dyadic attachment using the product approach in APIM, although novel, would not produce results that are theoretically applicable or congruent with attachment theory. Additionally, one of the strengths of using an ANOVA analysis is that the results are directly comparable with the greater literature. Majority of the literature that has examined dyadic attachment style has used the ANOVA approach (Ben-Ari & Lavee, 2005; Domingue & Mollen, 2009; Govender et al., 2009; Volling et al., 1998); the dimensional

approach to dyadic attachment has not been integrated into the general attachment literature the way that individual attachment dimensions have.

A third limitation is that MS-related exacerbations were not assessed. Although MS is a chronic illness, the nature of relapsing-remitting MS is that symptoms onset and abate unpredictably (MS Society of Canada, 2012). The psychological effects of this disabling, unpredictable, and incurable illness are understood to be widespread and persistent (McCabe & McDonald, 2007; McPheters & Sandberg, 2010; Schwartz & Frohner, 2005). Therefore, it is not uncommon for studies of MS to not explicitly account for whether or not patients were experiencing relapse or remission at the time of the study (McCabe & McDonald, 2007; McPheters & Sandberg, 2010; Tsivgoulis et al., 2007). However, if the attachment system is activated under threat, it is plausible that the negative effects of insecure attachment on dyadic adjustment would have been relatively more powerful during relapse compared to remission. Additionally, given that intensified expressions of distress is one of the hyperactivating strategies characterizing anxious attachment, it is possible that during remission, compared to relapse, greater partner anxious attachment would be more strongly associated with worse actor dyadic adjustment due to the larger disconnect between actual threat and communicated distress. The relationship of MS-related exacerbations to the attachment system and dyadic adjustment should be examined in future research.

Finally, a fourth limitation is in reference to methodology. The present study was cross-sectional in nature; thus, the results reflect significant relationships, but cannot be used to infer causation. A longitudinal study may have captured the dynamic nature of how these constructs mutually affect one another over time, and may have provided insight into the temporal relationships between the constructs of attachment, hostile conflict, and dyadic adjustment.

Additionally, the constructs in the present study were assessed with self-report measures. Although this provided the benefit of assessing self-perceptions, it did not allow for the assessment of the dynamic nature of marital interactions. A study that used an observational or daily diary methodology may have captured interaction patterns providing unique insight into the processes underlying the significant relationships.

### **Clinical Implications**

The dyadic findings support the notion that clinicians working with MS patients should consider the couple and what each member of the dyad is bring to the experience. Indeed, there appeared to be proportionally more couples reporting clinically significant relationship distress in the present sample than the general population. Results of the current study can be used to inform case conceptualization and treatment targets in the therapy of MS couples. The existing literature on the implications of attachment for clinical work with adults is extensive, and a thorough review is clearly beyond the scope of the present study. However, generally, attachment has been applied to clinical practice through a few different directions: attachment has been used to predict treatment outcomes and treatment matching (McBride, Atkinson, Quilt, & Bagby, 2006); it has been used to understand therapeutic processes such as alliance building, alliance ruptures, and counter-transference (Mallinckrodt, Daly, & Wang, 2009); and patterns of behaviour, cognition, and affect that are associated with insecure attachment have been identified as possible mechanisms throughout which to achieve therapeutic change (Cobb & Davila, 2009). The present study most closely informs the latter approach of integrating attachment theory into clinical practice by informing case formulation and mechanisms of change.

McBride and Atkinson (2009) enumerated ways in which adult attachment theory and research complements cognitive-behavioural therapy, and they argued that knowledge about

attachment is useful for case formulation, particularly in making initial inferences about underlying schemas. Attachment theory and research can provide a useful framework for informing patterns of behaviours that cause and maintain dysfunctional adjustment, which forms the basis for hypotheses about appropriate treatment targets and interventions (McBride & Atkinson, 2009). The current findings support the appropriateness of administering a brief self-report attachment inventory that can then be incorporated into case formulation. For example, if the ECR-R shows that an individual is high in anxious attachment, the therapist may hypothesize that the individual holds core beliefs about the self as weak, helpless, and unloved (McBride & Atkinson, 2009; Mikulincer & Shaver, 2007). On the other hand, if the ECR-R shows that an individual is high in avoidant attachment, the therapist may hypothesize that the individual holds core beliefs about others as unresponsive or unavailable (McBride & Atkinson, 2009; Mikulincer & Shaver, 2007).

The present study has also suggested that hostile conflict should be considered as a possible mechanism of therapeutic change. Cobb and Davila (2009) suggested that attachment theory implies that therapeutic change can be achieved through targeting behaviours, cognitions, and emotions that are associated with greater insecure attachment and that serve to maintain psychological vulnerabilities. For example, an individual who is high in attachment anxiety may engage in excessive reassurance seeking, hypervigilance to abandonment cues, and a “hopeless” cognitive pattern in which they take responsibility for failures and attribute negative experiences to stable, internal traits (Cobb & Davila, 2009; Mikulincer & Shaver, 2007). The present study supports this notion and suggests that hostile conflict may be a relevant mechanism for change. Particularly for couples in which one or both dyad members endorse high anxious attachment, it is suggested that hostile conflict is a mechanism that reinforces attachment-related vulnerability



to relationship distress; and that this pattern can be interrupted by targeting hostile conflict.

Additionally, the present study interestingly suggests that when one dyad member reports greater anxious attachment, both their own and their partner's hostile conflict would be useful treatment targets. Clinicians may consider assessing hostile conflict with a simple self-report measure in their initial assessment for case formulation and treatment planning, and throughout treatment as an outcome of treatment response.

### **Future Directions**

The present study has demonstrated the relevance and applicability of adult attachment to relationship processes in couples with MS. One of the greatest strengths of attachment is its comprehensive theoretical framework, which has been largely upheld by empirical research in the general literature. Future research in MS should continue to examine the attachment framework and capitalize on its strong theoretical foundation to understand the processes that underlie the widespread relationship distress in MS couples. For example, future studies should directly examine the assumption of attachment theory that the system is activated, and therefore has a more prominent effect, when there is a threat to the attachment system by comparing the effect of attachment on dyadic adjustment in healthy couples to MS couples. A direct comparison will allow for the assessment of whether or not the presence of an illness moderates the magnitude of the association between insecure attachment and dyadic adjustment. Moreover, the results of the present study failed to find a significant moderating effect of sex on partner anxious attachment, which was discrepant with the greater research on attachment. This finding needs replication in an MS sample, and a direct comparison to a healthy sample would allow for a more conclusive understanding of whether anxious attachment differentially effects dyadic adjustment in this unique population. Future studies should also consider comparing MS couples

to couples facing other chronic illnesses that are not characterized by the same degree of disability, uncertainty, and/or relationship distress, in order to gain greater insight into the factors that contribute to creating threat to the attachment system.

The present study also found unique results regarding the mediating effect of hostile conflict. As was previously noted, the significant actor effect of avoidant attachment on greater hostile conflict for both sexes was discordant with the greater literature. It was hypothesized that the effects of the present study that are discrepant with the greater literature may be understood by examining hostile conflict as a distinct construct from marital disagreements, trait anger, and trait aggression. Future studies would benefit from breaking down hostile conflict into its cognitive, emotional, and behavioural components (Muris et al., 2004) in order to understand the distinct roles of these constructs in the association between attachment and dyadic adjustment. This may be a particularly relevant line of research to MS populations considering the amount of variance in the partner anxious attachment effect accounted for by hostile conflict, and the possibility, that the partner anxious attachment effect may be unique to MS populations.

Despite the important findings of hostile conflict as a mediator of anxious, and to a lesser degree, avoidant attachment, the greater literature on the negative relationship between insecure attachment and dyadic adjustment provides a number of other mediators that may be relevant to understanding this association in MS populations. As previously discussed, the care-giving and care-receiving literature may be particularly relevant for MS couples, considering the great deal of disability associated with the illness. For example, the provision of physical, emotional, tangible, and instrumental support may help elucidate the distinct processes by which avoidant in contrast to anxious attachment negatively affects dyadic adjustment. Greater avoidant attachment has been associated with less provision of tangible support and more difficulty with emotional

support (Kim & Carver, 2007), whereas greater anxious attachment has been associated with increased provision of support but less ability to provide support without becoming controlling (Millings & Walsh, 2009). Additionally, when an individual is high in anxious attachment, compared to secure attachment, their partner has been reported to provide less emotional support (Feeney & Hohaus, 2001). The literature on dyadic adjustment in chronically ill samples has also consistently demonstrated dyadic coping to be a significant predictor of dyadic adjustment (Badr et al., 2010), however its association with attachment has yet to be examined.

Another possible direction of future research may be to examine in greater detail the configuration of dyadic attachment reported in the present study. Specifically, it appeared as though there were fewer secure dyads in the present study compared to the general population, and it was hypothesized that this may represent a true difference in the MS population. Future studies should consider a longitudinal study of attachment in couples facing MS to determine whether attachment security shifts over time as a result of the stress associated with the illness.

## References

- Ahlgren, C., Odén, A., & Lycke, J. (2011). High nationwide prevalence of multiple sclerosis in Sweden. *Multiple Sclerosis Journal*, 17, 901–908. doi:10.1177/1352458511403794
- Alexandrov, E. O., Cowan, P. A., & Cowan, C. P. (2005). Couple attachment and the quality of marital relationships: Method and concept in the validation of the new couple attachment interview and coding system. *Attachment & Human Development*, 7, 123-152. doi:10.1080/14616730500155170
- Allen, J. P., McElhaney, K. B., Kuperminc, G. P., & Jodl, K. M. (2004). Stability and change in attachment security across adolescence. *Child Development*, 75, 1792–1805. doi:10.1111/j.1467-8624.2004.00817.x
- Arriaga, X. B., Reed, J. T., Goodfriend, W., & Agnew, C. R. (2006). Relationship perceptions and persistence: Do fluctuations in perceived partner commitment undermine dating relationships? *Journal of Personality and Social Psychology*, 91, 1045-1065. doi:10.1037/0022-3514.91.6.1045
- Assh, S. D., & Byers, E. S. (1996). Understanding the co-occurrence of marital distress and depression in women. *Journal of Social and Personal Relationships*, 13, 537–552. doi:10.1177/0265407596134004
- Badr, H., & Acitelli, L. K. (2005). Dyadic adjustment in chronic illness: Does relationship talk matter? *Journal of Family Psychology*, 19, 465–469. doi:10.1037/0893-3200.19.3.465
- Badr, H., & Carmack Taylor, C. L. (2008). Effects of relationship maintenance on psychological distress and dyadic adjustment among couples coping with lung cancer. *Health Psychology*, 27, 616–627. doi:10.1037/0278-6133.27.5.616
- Badr, H., Carmack, C. L., Kashy, D. A., Cristofanilli, M., & Revenson, T. A. (2010). Dyadic

- coping in metastatic breast cancer. *Health Psychology*, 29, 169–180.  
doi:10.1037/a0018165
- Banase, R. (2004). Adult attachment and marital satisfaction: Evidence for dyadic configuration effects. *Journal of Social and Personal Relationships*, 21, 273-282.  
doi:10.1177/0265407504041388
- Baron, K. G., Smith, T. W., Butner, J., Nealey-Moore, J., Hawkins, M. W., & Uchino, B. N. (2007). Hostility, anger, and marital adjustment: Concurrent and prospective associations with psychosocial vulnerability. *Journal of Behavioral Medicine*, 30, 1-10.  
doi:10.1007/s10865-006-9086-z
- Bartholomew, K. & Horowitz, L.M. (1991). Attachment styles among young adults: A test of a four category model. *Journal of Personality and Social Psychology*, 61, 226-244.
- Baumstarck-Barrau, K., Simeoni, M.-C., Reuter, F., Klemina, I., Aghababian, V., Pelletier, J., & Auquier, P. (2011). Cognitive function and quality of life in multiple sclerosis patients: A cross-sectional study. *BMC Neurology*, 11, 17. doi:10.1186/1471-2377-11-17
- Bayley, T. M., Slade, P., & Lashen, H. (2009). Relationships between attachment, appraisal, coping and adjustment in men and women experiencing infertility concerns. *Human Reproduction*, 24, 2827–2837. doi:10.1093/humrep/dep235
- Beiske, A. G., Svensson, E., Sandanger, I., Czujko, B., Pedersen, E. D., Aarseth, J. H., & Myhr, K. M. (2008). Depression and anxiety amongst multiple sclerosis patients. *European Journal of Neurology*, 15, 239–245. doi:10.1111/j.1468-1331.2007.02041.x
- Ben-Ari, A., & Lavee, Y. (2005). Dyadic characteristics of individual attributes: Attachment, neuroticism, and their relation to marital quality and closeness. *The American Journal of Orthopsychiatry*, 75, 621-631. doi:10.1037/0002-9432.75.4.621

- Boesch, R. P., Cerqueira, R., Safer, M. A., & Wright, T. L. (2007). Relationship satisfaction and commitment in long-term male couples: Individual and dyadic effects. *Journal of Social and Personal Relationships*, 24, 837–853. doi:10.1177/0265407507084186
- Bogosian, A., Moss-Morris, R., Yardley, L., & Dennison, L. (2009). Experiences of partners of people in the early stages of multiple sclerosis. *Multiple Sclerosis*, 15, 876-884. doi:10.1177/1352458508100048
- Brassard, A., Lussier, Y., & Shaver, P. R. (2009). Attachment, perceived conflict, and couple satisfaction: Test of a mediational dyadic model. *Family Relations*, 58, 634–646. doi:10.1111/j.1741-3729.2009.00580.x
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment Theory and Close Relationships* (pp. 46–76). New York, NY: Guilford Press.
- Brown, R. F., Valpiani, E. M., Tennant, C. C., Dunn, S. M., Sharrock, M., Hodgkinson, S., & Pollard, J. D. (2009). Longitudinal assessment of anxiety, depression, and fatigue in people with multiple sclerosis. *Psychology and Psychotherapy: Theory, Research and Practice*, 82, 41–56. doi:10.1348/147608308X345614
- Campbell, L., Simpson, J. A., Boldry, J., & Kashy, D. A. (2005). Perceptions of conflict and support in romantic relationships: The role of attachment anxiety. *Journal of Personality and Social Psychology*, 88, 510-531. doi: 10.1037/0022-3514.88.3.510
- Carnelley, K. B., Pietromonaco, P. R., & Jaffe, K. (1996). Attachment, caregiving, and relationship functioning in couples: Effects of self and partner. *Personal Relationships*, 3, 257–277. doi:10.1111/j.1475-6811.1996.tb00116.x
- Christodoulou, C., Melville, P., Scherl, W. F., Macallister, W. S., Abensur, R. L., Troxell, R. M.,

- & Krupp, L. B. (2009). Negative affect predicts subsequent cognitive change in multiple sclerosis. *Journal of the International Neuropsychological Society*, *15*, 53–61.  
doi:10.1017/S135561770809005X
- Chwastiak, L., Ehde, D. M., Gibbons, L. E., Sullivan, M., Bowen, J. D., & Kraft, G. H. (2002). Depressive symptoms and severity of illness in multiple sclerosis: Epidemiologic study of a large community sample. *American Journal of Psychiatry*, *159*, 1862–1868.  
doi:10.1176/appi.ajp.159.11.1862
- Cicero, V., Lo Coco, G., Gullo, S., & Lo Verso, G. (2009). The role of attachment dimensions and perceived social support in predicting adjustment to cancer. *Psycho-Oncology*, *18*, 1045–1052. doi:10.1002/pon.1390
- Ciechanowski, P., Russo, J., Katon, W., Von Korff, M., Ludman, E., Lin, E.,.... Bush, T. (2004). Influence of patient attachment style on self-care and outcomes in diabetes. *Psychosomatic Medicine*, *66*, 720-728. doi:10.1097/01.psy.0000138125.59122.23
- Ciechanowski, P., Sullivan, M., Jensen, M., Romano, J., & Summers, H. (2003). The relationship of attachment style to depression, catastrophizing and health care utilization in patients with chronic pain. *Pain*, *104*, 627-637. doi:10.1016/S0304-3959(03)00120-9
- Ciechanowski, P., Walker, E. A., Katon, W., & Russo, J. (2002). Attachment theory: A model for health care utilization and somatization. *Psychosomatic Medicine*, *64*, 660-667.  
doi:10.1097/01.PSY.00000021948.90613.76
- Cobb, R. J., & Davila, J. (2009). Internal working models and change. In J. H. Obegi & E. Berant (Eds.), *Attachment Theory and Research in Clinical Work With Adults* (pp. 209–233). New York, NY: Guilford Press.

- Cohn, D. A., Silver, D. H., Cowan, C. P., & Cowan, P. A., & Pearson, J. (1992). Working models of childhood attachment and couple relationships. *Journal of Family Issues*, 13, 432-449. doi:10.1177/019251392013004003
- Collins, N. L., & Ford, M. B. (2010). Responding to the needs of others: The caregiving behavioral system in intimate relationships. *Journal of Social and Personal Relationships*, 27, 235–244. doi:10.1177/0265407509360907
- Collins, N. L., & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology*, 58, 644–663. doi:10.1037/0022-3514.58.4.644
- Collins, N. L., Cooper, M. L., Albino, A., & Allard, L. (2002). Psychosocial vulnerability from adolescence to adulthood: A prospective study of attachment style differences in relationship functioning and partner choice. *Journal of Personality*, 70, 965-1008.
- Cordon, S. L., Brown, K. W., & Gibson, P. R. (2009). The role of mindfulness-based stress reduction on perceived stress: Preliminary evidence for the moderating role of attachment style. *Journal of Cognitive Psychotherapy*, 23, 258-569. doi:10.1891/0889-8391.23.3.258
- Cozzarelli, C., Karafa, J. A., Collins, N. L., & Tagler, M. J. (2003). Stability and change in adult attachment styles: Associations with personal vulnerabilities, life events, and global construals of self and others. *Journal of Social and Clinical Psychology*, 22, 315–346. doi:10.1521/jscp.22.3.315.22888
- Creasey, G. (2002). Associations between working models of attachment and conflict management behavior in romantic couples. *Journal of Counseling Psychology*, 49, 365–375. doi:10.1037/0022-0167.49.3.365



- Dennison, L., Moss-Morris, R., & Chalder, T. (2009). A review of psychological correlates of adjustment in patients with multiple sclerosis. *Clinical Psychology Review*, 29, 141-153.  
doi:10.1016/j.cpr.2008.12.001
- Desrosiers, M., Bergeron, S., Meana, M., Leclerc, B., Binik, Y. M., & Khalifé, S. (2008). Psychosexual characteristics of vestibulodynia couples: Partner solicitousness and hostility are associated with pain. *Journal of Sexual Medicine*, 5, 418-427.
- Dickstein, S., Seifer, R., St Andre, M., & Schiller, M. (2001). Marital attachment interview: Adult attachment assessment of marriage. *Journal of Social and Personal Relationships*, 18, 651-672. doi:10.1177/0265407501185005
- Dillaway, H., & Broman, C. (2001). Race, class, and gender differences in marital satisfaction and divisions of household labor among dual-earner couples. *Journal of Family Issues*, 22, 309 -327. doi:10.1177/019251301022003003
- Domingue, R., & Mollen, D. (2009). Attachment and conflict communication in adult romantic relationships. *Journal of Social and Personal Relationships*, 26, 678-696.  
doi:10.1177/0265407509347932
- Elovainio, M., Merjonen, P., Pulkki-Råback, L., Kivimäki, M., Jokela, M., Mattson, N., ... Keltikangas-Jarvinen, L.(2011). Hostility, metabolic syndrome, inflammation and cardiac control in young adults: The young finns study. *Biological Psychology*, 87, 234-240.  
doi:10.1016/j.biopsycho.2011.03.002
- Evans, L., & Wertheim, E. H. (2005). Attachment styles in adult intimate relationships: Comparing women with bulimia nervosa symptoms, women with depression and women with no clinical symptoms. *European Eating Disorders Review*, 13, 285-293.  
doi:10.1002/erv.621

- Feeney, J. A. (2002). Attachment, marital interaction, and relationship satisfaction: A diary study. *Personal Relationships*, 9, 39-55. doi:10.1111/1475-6811.00003
- Feeney, J. A. (2008). Adult romantic attachment: Developments in the study of couple relationships. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 456–481). New York, NY: Guildford Press.
- Fenney, J. A., & Hohaus, L. (2001). Attachment and spousal caregiving. *Personal Relationships*, 8, 21-39. doi:10.1111/j.1475-6811.2001.tb00026.x
- Forbes, A., While, A., & Mathes, L. (2007). Informal carer activities, carer burden and health status in multiple sclerosis. *Clinical Rehabilitation*, 21, 563-575.  
doi:10.1177/0269215507075035
- Forbes, A., While, A., Mathes, L., & Griffiths, P. (2006). Health problems and health-related quality of life in people with multiple sclerosis. *Clinical Rehabilitation*, 20, 67–78.  
doi:10.1191/0269215506cr880oa
- Fournier, B., Brassard, A., & Shaver, P. R. (2011). Adult attachment and male aggression in couple relationships: The demand-withdraw communication pattern and relationship satisfaction as mediators. *Journal of Interpersonal Violence*, 26, 1982–2003.  
doi:10.1177/0886260510372930
- Fowers, B. J. (1991). His and her marriage: A multivariate study of gender and marital satisfaction. *Sex Roles*, 24, 209-221. doi:10.1007/BF00288892
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, 78, 350-365. doi:10.1037/0022-3514.78.2.350

- Gay, M.C., Vrignaud, P., Garitte, C., & Meunier, C. (2010). Predictors of depression in multiple sclerosis patients. *Acta Neurologica Scandinavica*, 121, 161–170. doi:10.1111/j.1600-0404.2009.01232.x
- George, C., Kaplan, N., & Main, M. (1985). Adult attachment interview: Interview protocol. Unpublished Manuscript, University of California at Berkley.
- Gick, M. L., & Sirois, F. M. (2010). Insecure attachment moderates women's adjustment to inflammatory bowel disease severity. *Rehabilitation Psychology*, 55, 170-179. doi:10.1037/a0019358
- Glantz, M. J., Chamberlain, M. C., Liu, Q., Hsieh, C.-C., Edwards, K. R., Van Horn, A., & Recht, L. (2009). Gender disparity in the rate of partner abandonment in patients with serious medical illness. *Cancer*, 115, 5237–5242. doi:10.1002/cncr.24577
- Govender, C., Cassimjee, N., Schoeman, J., & Meyer, H. (2009). Psychological characteristics of FMS patients. *Scandinavian Journal of Caring Sciences*, 23, 76-83. doi:10.1111/j.1471-6712.2007.00592.x
- Graham, J. M., Liu, Y. J., & Jeziorski, J. L. (2006). The dyadic adjustment scale: A reliability generalization meta-analysis. *Journal of Marriage and Family*, 68, 701-717. doi:10.1111/j.1741-3737.2006.00284.x
- Guerrero, L. K., Farinelli, L., & McEwan, B. (2009). Attachment and relational satisfaction: The mediating effect of emotional communication. *Communication Monographs*, 76, 487-514. doi:10.1080/03637750903300254
- Hagedoorn, M., Sanderman, R., Bolks, H. N., Tuinstra, J., & Coyne, J. C. (2008). Distress in couples coping with cancer: A meta-analysis and critical review of role and gender effects. *Psychological Bulletin*, 134, 1-30. doi:10.1037/0033-2909.134.1.1

- Hakim, E. A., Bakheit, A. M., Bryant, T. N., Roberts, M. W., McIntosh-Michaelis, S. A., Spackman, A. J., Martin, J. P., et al. (2000). The social impact of multiple sclerosis: A study of 305 patients and their relatives. *Disability & Rehabilitation*, 22, 288–293. doi:10.1080/096382800296755
- Hazan, C. & Shaver, P. (1987) Romantic Love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, 52, 511-524.
- Hesse, E. (2008). The Adult Attachment Interview: Protocol, method of analysis, and empirical studies. In J. Cassidy & P.R. Shaver (Eds), *Handbook of attachment: Theory, research, and clinical applications*. (pp. 552-589). New York, NY: Guilford Press.
- Hodges, L. J., Humphris, G. M., & Macfarlane, G. (2005). A meta-analytic investigation of the relationship between the psychological distress of cancer patients and their carers. *Social Science & Medicine*, 60, 1-12. doi:10.1016/j.socscimed.2004.04.018
- Hwang, K., Johnston, M., & Smith, J. K. (2007). Romantic attachment in individuals with physical disabilities. *Rehabilitation Psychology*, 52, 184-195. doi:10.1037/0090-5550.52.2.184
- Hyphantis, T. N., Christou, K., Kontoudaki, S., Mantas, C., Papamichael, G., Goulia, P.,... Mavreas, V. (2008). Disability status, disease parameters, defense styles, and ego strength associated with psychiatric complications of multiple sclerosis. *International Journal of Psychiatry in Medicine*, 38, 307-327.
- Hyphantis, T. N., Tsifetaki, N., Siafaka, V., Voulgari, P. V., Pappa, C., Bai, M., .... Drosos, A. A. (2007). The impact of psychological functioning upon systemic sclerosis patients' quality of life. *Seminars in Arthritis and Rheumatism*, 37, 81-92. doi:10.1016/j.semarthrit.2007.03.008

- Janicki-Deverts, D., Cohen, S., & Doyle, W. J. (2010). Cynical hostility and stimulated Th1 and Th2 cytokine production. *Brain*, 24, 58-63. doi:10.1016/j.bbi.2009.07.009
- Kachadourian, L. K., Fincham, F., & Davila, J. (2004). The tendency to forgive in dating and married couples: The role of attachment and relationship satisfaction. *Personal Relationships*, 11, 373-393. doi:10.1111/j.1475-6811.2004.00088.x
- Kane, H. S., Jaremka, L. M., Guichard, A. C., Ford, M. B., Collins, N. L., & Feeney, B. C. (2007). Feeling supported and feeling satisfied: How one partner's attachment style predicts the other partner's relationship experiences. *Journal of Social and Personal Relationships*, 24, 535 -555. doi:10.1177/0265407507079245
- Kendall-Tackett, K. (2010). Depression, hostility, posttraumatic stress disorder, and inflammation: The corrosive health effects of negative mental states. In Kendall-Tackett (Ed.), *The psychoneuroimmunology of chronic disease: Exploring the links between inflammation, stress, and illness* (pp. 113-131). Washington, DC: American Psychological Association.
- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York, NY: Guilford Press.
- Kirkpatrick, L. A. & Hazan, C. (1994). Attachment styles and close relationships: A four-year prospective study. *Personal Relationships*, 1, 123-142.
- Kim, Y., & Carver, C. S. (2007). Frequency and difficulty in caregiving among spouses of individuals with cancer: Effects of adult attachment and gender. *Psycho-Oncology*, 16, 714-723. doi:10.1002/pon.1110
- King, K. E., & Arnett, P. A. (2005). Predictors of dyadic adjustment in multiple sclerosis. *Multiple Sclerosis*, 11, 700 -707. doi:10.1191/1352458505ms1212oa

- Klohn, E. C. & Bera, S. (1998). Behavioral and experiential patterns of avoidantly and securely attached women across adulthood: A 31 year longitudinal perspective. *Journal of Personality and Social Psychology*, 74, 211-223.
- Kuscu, M. K., Dural, U., Onen, P., Yaşa, Y., Yayla, M., Basaran, G., ... Bekiroğlu, N. (2009). The association between individual attachment patterns, the perceived social support, and the psychological well-being of Turkish informal caregivers. *Psycho-Oncology*, 18, 927-935. doi:10.1002/pon.1441
- Langer, S., Abrams, J., & Syrjala, K. (2003). Caregiver and patient marital satisfaction and affect following hematopoietic stem cell transplantation: A prospective, longitudinal investigation. *Psycho-Oncology*, 12, 239-253. doi:10.1002/pon.633
- Langer, S., Yi, J. C., Storer, B. E., & Syrjala, K. (2010). Marital adjustment, satisfaction and dissolution among hematopoietic stem cell transplant patients and spouses: A prospective, five-year longitudinal investigation. *Psycho-Oncology*, 19, 190-200. doi:10.1002/pon.1542
- Lavy, S., Mikulincer, M., & Shaver, P. R. (2010). Autonomy–proximity imbalance: An attachment theory perspective on intrusiveness in romantic relationships. *Personality and Individual Differences*, 48, 552–556. doi:10.1016/j.paid.2009.12.004
- Lawson, D. M., & Malnar, S. G. (2011). Interpersonal problems as a mediator between attachment and intimate partner violence. *Journal of Family Violence*, 26, 421–430. doi:10.1007/s10896-011-9376-2
- Le, B., Dove, N. L., Agnew, C. R., Korn, M. S., & Mutso, A. A. (2010). Predicting nonmarital romantic relationship dissolution: A meta-analytic synthesis. *Personal Relationships*, 17, 377-390. doi:10.1111/j.1475-6811.2010.01285.x

- Ledermann, T., Macho, S., & Kenny, D. A. (2011). Assessing mediation in dyadic data using the actor-partner interdependence model. *Structural Equation Modeling: A Multidisciplinary Journal*, 18, 595–612. doi:10.1080/10705511.2011.607099
- Levenson, R. W., Carstensen, L. L., & Gottman, J. M. (1993). Long-term marriage: Age, gender, and satisfaction. *Psychology and Aging*, 8, 301-313. doi:10.1037/0882-7974.8.2.301
- Li, T.-G., Li, J., Qin, H.-P., Guo, X.-F., Wang, X.-N., & Liu, Z.-P. (2008). Adult attachment and mental health in Chinese college students. *Chinese Mental Health Journal*, 22, 740-743.
- Litke, K. L. (2007). Care receiving: The relationship between attachment and reactions to being helped, relationship functioning, and perceived quality of life in a sample of individuals with multiple sclerosis. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 67, 6066.
- Lorenz, F. O., Hraba, J., & Pechacova, Z. (2001). Effects of spouse support and hostility on trajectories of Czech couples' marital satisfaction and instability. *Journal of Marriage and Family*, 63, 1068-1082. doi:10.1111/j.1741-3737.2001.01068.x
- Mallinckrodt, B., Daly, K., & Wang, C. C. D. C. (2009). An attachment approach to adult psychotherapy. In J. H. Obegi & E. Berant (Eds.), *Attachment Theory and Research in Clinical Work With Adults* (pp. 234–268). New York, NY: Guilford Press.
- Manne, S. & Badr, H. (2010). Intimacy processes and psychological distress among couples coping with head and neck or lung cancers. *Psycho-Oncology*, 19, 941-954. doi:10.1002/pon.1645.
- Marchand, J. F. (2004). Husbands' and wives' marital quality: The role of adult attachment orientations, depressive symptoms, and conflict resolution behaviors. *Attachment & Human Development*, 6, 99–112. doi:10.1080/14616730310001659575

- McBride, C. & Atkinson, L. (2009). Attachment theory and cognitive-behavioral therapy. In J. H. Obegi & E. Berant (Eds.), *Attachment Theory and Research in Clinical Work With Adults* (pp. 434–458). New York, NY: Guilford Press.
- McBride, C., Atkinson, L., Quilty, L. C., & Bagby, R. M. (2006). Attachment as moderator of treatment outcome in major depression: A randomized control trial of interpersonal psychotherapy versus cognitive behavior therapy. *Journal of consulting and clinical psychology, 74*, 1041–1054. doi:10.1037/0022-006X.74.6.1041
- McCabe, M. P. (2002). Relationship functioning and sexuality among people with Multiple Sclerosis. *Journal of Sex Research, 39*, 302-309. doi:10.1080/00224490209552154
- McCabe, M. P. (2004). Exacerbation of symptoms among people with multiple sclerosis: Impact on sexuality and relationships over time. *Archives of Sexual Behavior, 33*, 593-601. doi:10.1023/B:ASEB.0000044743.41613.fc
- McCabe, M. P., & McDonald, E. (2007). Perceptions of relationship and sexual satisfaction among people with multiple sclerosis and their partners. *Sexuality and Disability, 25*, 179-188. doi:10.1007/s11195-007-9053-9
- McCabe, M. P., McKern, S., McDonald, E., & Vowels, L. M. (2003). Changes over time in sexual and relationship functioning of people with multiple sclerosis. *Journal of Sex & Marital Therapy, 29*, 305-321.
- McLean, L. M., Walton, T., Matthew, A., & Jones, J. M. (2011). Examination of couples' attachment security in relation to depression and hopelessness in maritally distressed patients facing end-stage cancer and their spouse caregivers: A buffer or facilitator of psychosocial distress? *Supportive Care in Cancer, 19*, 1539–1548. doi:10.1007/s00520-010-0981-z



- McPheters, J. K., & Sandberg, J. G. (2010). The relationship among couple relationship quality, physical functioning, and depression in multiple sclerosis patients and partners. *Families, Systems & Health*, 28, 48-68. doi:10.1037/a0018818
- Meesters, C., & Muris, P. (2002). Attachment style and self-reported aggression. *Psychological Reports*, 90, 231-235. doi:10.2466/PRO.90.1.231-235
- Meng, Y.-J., Li, N.-X., Liu, C.-J., Chen, J.-H., Song, Y.-C., & Qian, Z.-S. (2008). Quality of life and hostile mentality trend of patients with HIV/AIDS in China. *Public Health*, 122, 404-411. doi:10.1016/j.puhe.2007.06.007
- Mikulincer, M. (1998). Adult attachment style and individual differences in functional versus dysfunctional experiences of anger. *Journal of Personality and Social Psychology*, 74, 513–524. doi:10.1037/0022-3514.74.2.513
- Mikulincer, M., Florian, V., Cowan, P. A., & Cowan, C. P. (2002). Attachment security in couple relationships: A systemic model and its implications for family dynamics. *Family Process*, 41, 405-434.
- Mikulincer, M., Horesh, N., Levy-Shiff, R., Manovich, R., & Shalev, J. (1998). The contribution of adult attachment style to the adjustment to infertility. *The British Journal of Medical Psychology*, 71, 265-280.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York, NY, US: Guilford Press.
- Millings, A., & Walsh, J. (2009). A dyadic exploration of attachment and caregiving in long-term couples. *Personal Relationships*, 16, 437–453. doi:10.1111/j.1475-6811.2009.01232.x
- Mondor, J., McDuff, P., Lussier, Y., & Wright, J. (2011). Couples in therapy: Actor-partner

- analyses of the relationships between adult romantic attachment and marital satisfaction. *The American Journal of Family Therapy*, 39, 112–123.  
doi:10.1080/01926187.2010.530163
- Multiple Sclerosis Society of Canada (2012). *About MS*. Retrieved from <http://mssociety.ca/en/information/default.htm>.
- Muris, P., Meesters, C., Morren, M., & Moorman, L. (2004). Anger and hostility in adolescents: Relationships with self-reported attachment style and perceived parental rearing styles. *Journal of Psychosomatic Research*, 57, 257–264. doi:10.1016/S0022-3999(03)00616-0
- O'Connor, E. J., McCabe, M. P., & Firth, L. (2008). The impact of neurological illness on marital relationships. *Journal of Sex & Marital Therapy*, 34, 115–132.  
doi:10.1080/00926230701636189
- Paika, V., Almyroudi, A., Tomenson, B., Creed, F., Kampletsas, E. O., Siafaka, V., ... Hyphantis, T. (2010). Personality variables are associated with colorectal cancer patients' quality of life independent of psychological distress and disease severity. *Psycho-Oncology*, 19, 273–282. doi:10.1002/pon.1563
- Pakenham, K. I. (2001). Application of a stress and coping model to caregiving in multiple sclerosis. *Psychology, Health & Medicine*, 6, 13–27. doi:10.1080/13548500020021883
- Paley, B. J., Cox, M. J., Harter, K. S., & Margand, N. A. (2002). Adult attachment stance and spouses' marital perceptions during the transition to parenthood. *Attachment & Human Development*, 4, 340–360. doi:10.1080/14616730210167276
- Papp, L. M., & Witt, N. L. (2010). Romantic partners' individual coping strategies and dyadic coping: Implications for relationship functioning. *Journal of Family Psychology*, 24, 551–559. doi:10.1037/a0020836

- Perrone, K. M., Gordon, P. A., & Tschopp, M. K. (2006). Caregiver Marital Satisfaction when a Spouse has Multiple Sclerosis. *Journal of Applied Rehabilitation Counseling*, 37, 26-32.
- Pfleger, C. C. H., Flachs, E. M., & Koch-Henriksen, N. (2010). Social consequences of multiple sclerosis. Part 2. Divorce and separation: A historical prospective cohort study. *Multiple Sclerosis*, 16, 878-882. doi:10.1177/1352458510370978
- Porter, L. S., Keefe, F. J., Davis, D., Rumble, M., Scipio, C., & Garst, J. (2012). Attachment styles in patients with lung cancer and their spouses: Associations with patient and spouse adjustment. *Supportive Care in Cancer*. doi:10.1007/s00520-011-1367-6
- Ravitz, P., Maunder, R., Hunter, J., Sthankiya, B., & Lancee, W. (2010). Adult attachment measures: A 25-year review. *Journal of Psychosomatic Research*, 69, 419-432. doi:10.1016/j.jpsychores.2009.08.006
- Renshaw, K. D., Blais, R. K., & Smith, T. W. (2010). Components of negative affectivity and marital satisfaction: The importance of actor and partner anger. *Journal of Research in Personality*, 44, 328-334. doi:10.1016/j.jrp.2010.03.005
- Riggs, S. A., Cusimano, A. M., & Benson, K. M. (2011). Childhood emotional abuse and attachment processes in the dyadic adjustment of dating couples. *Journal of Counseling Psychology*, 58, 126-138. doi:10.1037/a0021319.
- Rodrigues, A., & Rogge, R. (2012). How many ways can conflict be hostile? Exploring the underlying structure of aversive behavior in relationships. Manuscript submitted for publication.
- Rohrbaugh, M. J., Cranford, J. A., Shoham, V., Nicklas, J. M., Sonnega, J. S., & Coyne, J. C. (2002). Couples coping with congestive heart failure: Role and gender differences in

- psychological distress. *Journal of Family Psychology*, 16, 3-13. doi:10.1037//0893-3200.16.1.3
- Saavedra, M. C., Chapman, K. E., & Rogge, R. (2010). Clarifying links between attachment and relationship quality: Hostile conflict and mindfulness as moderators. *Journal of Family Psychology*, 24, 380-390. doi:10.1037/a0019872
- Schmaling, K. B., Afari, N., Hops, H., Barnhart, S., & Buchwald, D. (2009). Change in airflow among patients with asthma discussing relationship problems with their partners. *Journal of Health Psychology*, 14, 715-720. doi:10.1177/1359105309338975
- Schwartz, C., & Frohner, R. (2005). Contribution of demographic, medical, and social support variables in predicting the mental health dimension of quality of life among people with multiple sclerosis. *Health & Social Work*, 30, 203–212. doi:10.1093/hsw/30.3.203
- Senchak, M., & Leonard, K. E. (1992). Attachment styles and marital adjustment among newlywed couples. *Journal of Social and Personal Relationships*, 9, 51-64. doi:10.1177/0265407592091003
- Shaver, P. R., Schachner, D. A., & Mikulincer, M. (2005). Attachment style, excessive reassurance seeking, relationship processes, and depression. *Personality and Social Psychology Bulletin*, 31, 343–359. doi:10.1177/0146167204271709
- Sibley, C. G., Fischer, R., & Liu, J. H. (2005). Reliability and validity of the revised experiences in close relationships (ECR-R) self-report measure of adult romantic attachment. *Personality and Social Psychology Bulletin*, 31, 1524-1536. doi:10.1177/0146167205276865
- Sibley, C. G., & Liu, J. H. (2004). Short-term temporal stability and factor structure of the revised experiences in close relationships (ECR-R) measure of adult attachment.

*Personality and Individual Differences*, 36, 969-975. doi:10.1016/S0191-8869(03)00165-

X

Simpson, J. A., & Rholes, W. S. (2010). Attachment and relationships: Milestones and future directions. *Journal of Social and Personal Relationships*, 27, 173–180.

doi:10.1177/0265407509360909

Skodova, Z., Nagyova, I., van Dijk, J. P., Sudzinova, A., Vargova, H., Studencan, M., & Reijneveld, S. A. (2008). Socioeconomic differences in psychosocial factors contributing to coronary heart disease: A review. *Journal of Clinical Psychology in Medical Settings*, 15, 204-213. doi:10.1007/s10880-008-9117-8

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage & the Family*, 38, 15-28.

doi:10.2307/350547

Treharne, G. J., Lyons, A. C., Booth, D. A., Mason, S. R., & Kitas, G. D. (2004). Reactions to disability in patients with early versus established rheumatoid arthritis. *Scandinavian Journal of Rheumatology*, 33, 30-38.

Troisi, A., & D'Argenio, A. (2004). The relationship between anger and depression in a clinical sample of young men: The role of insecure attachment. *Journal of Affective Disorders*,

79, 269-272. doi:10.1016/S0165-0327(02)00406-8

Tsivgoulis, G., Triantafyllou, N., Papageorgiou, C., Evangelopoulos, M. E., Kararizou, E., Sfagos, C., & Vassilopoulos, D. (2007). Associations of the Expanded Disability Status Scale with anxiety and depression in multiple sclerosis outpatients. *Acta Neurologica Scandinavica*, 115, 67–72. doi:10.1111/j.1600-0404.2006.00736.x

- Turan, B., Osar, Z., Turan, J. M., Ilkova, H., & Damci, T. (2003). Dismissing attachment and outcome in diabetes: The mediating role of coping. *Journal of Social and Clinical Psychology, 22*, 607-626. doi:10.1521/jscp.22.6.607.22933
- Verhofstadt, L. L., Buysse, A., Devoldre, I., & De Corte, K. (2007). The influence of personal characteristics and relationship properties on marital support. *Psychologica Belgica, 47*, 195-217.
- Vilchinsky, N., Findler, L., & Werner, S. (2010). Attitudes toward people with disabilities: The perspective of attachment theory. *Rehabilitation Psychology, 55*, 298–306.  
doi:10.1037/a0020491
- Volling, B. L., Notaro, P. C., & Larsen, J. J. (1998). Adult attachment styles: Relations with emotional well-being, marriage, and parenting. *Family Relations, 47*, 355-67.
- Wampler, K. S., Shi, L., Nelson, B. S., & Kimball, T. G. (2003). The adult attachment interview and observed couple interaction: Implications for an intergenerational perspective on couple therapy. *Family Process, 42*, 497-515. doi:10.1111/j.1545-5300.2003.00497.x
- Woodin, E. M. (2011). A two-dimensional approach to relationship conflict: Meta-analytic findings. *Journal of Family Psychology, 25*, 325–335. doi:10.1037/a0023791
- Woollett, S. L., & Edelman, R. J. (1988). Marital satisfaction in individuals with multiple sclerosis and their partners: Its interactive effect with life satisfaction, social networks and disability. *Sexual & Marital Therapy, 3*, 191-196.
- Yancey, A. K., Ortega, A. N., & Kumanyika, S. K. (2006). Effective recruitment and retention of minority research participants. *Annual Review of Public Health, 27*, 1–28.  
doi:10.1146/annurev.publhealth.27.021405.102113
- Zorzon, M., Zivadinov, R., Monti Bragadin, L., Moretti, R., De Masi, R., Nasuelli, D., &

Cazzato, G. (2001). Sexual dysfunction in multiple sclerosis: A 2-year follow-up study.  
*Journal of the Neurological Sciences*, 187, 1–5. doi:10.1016/S0022-510X(01)00493-2

## Appendix A: Sample Syntax for APIM Interaction and Two-Intercept Models

Interaction Model:

**MIXED** DASOveralltot.A **WITH** DEM1.A DEM2.A Role\_effects.A CECRAvoid.A  
CECRAvoid.P

**/FIXED**=DEM1.A DEM2.A Role\_effects.a CECRAvoid.A CECRAvoid.P

DEM2.A\*Role\_effects.a DEM2.A\*CECRAvoid.A DEM2.A\*CECRAvoid.P

Role\_effects.a\*CECRAvoid.A Role\_effects.a\*CECRAvoid.P

DEM2.A\*Role\_effects.a\*CECRAvoid.A DEM2.A\*Role\_effects.a\*CECRAvoid.P |

SSTYPE(3)

**/METHOD**=REML

**/PRINT**=SOLUTION TESTCOV

**/REPEATED**=DEM2.a | SUBJECT(DyadID) COVTYPE(CSH).

Two-Intercept Model:

**MIXED** DASOveralltot.A **BY** DEM2.A **WITH** DEM1.A Role\_effects.a CECRAvoid.A  
CECRAvoid.P

**/FIXED**=DEM1.A DEM2.A Role\_effects.a DEM2.A\*CECRAvoid.A DEM2.A\*CECRAvoid.P

| NOINT SSTYPE(3)

**/METHOD**=REML

**/PRINT**=SOLUTION TESTCOV

**/REPEATED**=DEM2.a | SUBJECT(DyadID) COVTYPE(CSH).

Dependent variable

Fixed variables:  
Covariates  
(including  
distinguishing  
variable(s) as a  
covariate),  
actor, and  
partner  
variables

Restricted maximum likelihood

Identifying variable used to  
treat individual scores as  
repeated measures in the dyad

Identifies the level at which there is  
independence

Distinguishing  
variable as a factor

Compound Symmetry  
Heterogeneous

Dependent variable

Restricted maximum  
likelihood

Covariate and interactions  
between distinguishing variable  
and actor and partner effects (no  
main actor and partner effects)

No  
Intercept

Identifying variable used to treat  
individual scores as repeated  
measures in the dyad

Identifies the level at which there is  
independence

Compound Symmetry  
Heterogeneous