

Matters of the Heart: Patients' Intra- and Interpersonal Adjustment to  
Life Following a Cardiac Crisis

by

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## Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Sharon So

## Abstract

Cardiac crises (e.g. heart attack or bypass surgery) have been shown to be related to poorer patient psychological and relational functioning. While these studies assume that the event significantly impacts patients, they do not measure the specific ways by which the cardiac event impacts their lives. In the current study, new measures were developed and validated to assess specifically how the event emotionally impacts the patient's life. I proposed that how these emotions are engaged in part accounts for the impact of the event on negative outcomes. Results showed that the greater the current impact of the cardiac event on patients, the greater their current levels of depression, anxiety and trauma. Further, greater emotional blocking (failure to willingly process emotions internally) was associated with less optimal psychological and relational functioning. Unexpectedly, greater disclosure of emotions to one's partner was also related to diminished psychological health, but unrelated to relationship functioning. Thus, it appears disclosure in the current study reflects distressed "venting", and blocking represents an unhealthy form of engaging negative emotions from the cardiac event. Implications for further research using the scales assessing the distinct components of the emotional impact of the event and the engagement of these emotions are discussed.

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## Dedication

With my deepest respect, I dedicate this thesis to the two individuals who taught me the meaning of persistence - my parents - my role models, and the strongest and most hardworking people I know. I have never ceased to be inspired by their ability to overcome hardships and persevere against all odds, while providing unconditional love and support along the way.

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## Introduction

According to the Heart and Stroke Foundation of Canada (2003), by the age of 70, 20% of women and 25% of men will have been diagnosed with heart problems. Though mortality rates from the disease have decreased since the middle of the twentieth-century (Manuel, Leung, Nguyen, Tanuseputro, & Johansen, 2003), coronary heart disease remains a significant and enduring concern. Indeed, coronary heart disease is the primary cause of death in Canada and the United States, as well as the leading economic burden on the national health care system in both countries (Health Canada, 2006; U.S. Centers for Disease Control and Prevention & National Center for Health Statistics, 2003), amounting to direct costs (hospital care, medicines, physician and other institutional care) of \$6.8 billion and indirect costs (mortality and disability) of \$11.6 billion (Canadian Public Health Association, 1998).

Some of these costs are a result of psychosocial difficulties secondary to the cardiac event. Indeed, cardiac events, such as having a heart attack or cardiac bypass surgery, have been shown to be related to increased symptoms of depression, anxiety, and post-traumatic stress disorder in patients (Havik & Maeland, 1990; Moore, 1994; Shemesh, Koren-Michowitz, Yehuda, Milo-Cotter, Murdock, Vered et al., 2006), as well as decreased relationship quality and intimacy in some couples affected by such health crises (Brecht, Dracup, Moser, & Riegel, 1994; Waltz, 1986). While cardiac crises are extraordinarily emotionally evocative events for all patients, some patients are more resilient than others following these crises. Thus, understanding factors that may contribute to or diminish risk for developing problems in psychosocial functioning following a cardiac crisis becomes a critical endeavor.



In the current study, I posit that the extent to which the patient engages his or her emotions *around the cardiac* events (both internally and with his or her partner) will significantly impact the extent to which healthier psychological and relational outcomes are evidenced for the patient. Specifically, in this thesis I argue that the more patients willingly process their emotions about their cardiac events internally, and the more that they share their feelings with their partner in order to connect with and work through their emotions about their cardiac event, the more positive their personal and relational functioning will be. Moreover, I predict that the more patients avoid or block the experience of their emotions and fail to process them openly with their partner, the more their personal and relational well-being will suffer. Importantly, these emotional processing effects are predicted to emerge independent of the effects of the impact of and time since the event, thereby showing that healthy emotional processing is essential in the aftermath of an emotionally evocative health crisis. To provide a backdrop for the current study, I first review the existing evidence showing the impact of cardiac events on personal well-being and relational functioning.

### *Impact of Cardiac Events on Patient's Psychological Well-Being*

Having a cardiac event poses initial challenges for patients in the immediate recovery period, including limits to physical functioning (Manuel et al., 2003) and lifestyle changes, such as modified diet and the need to begin or increase exercise (Daly, Elliott, Cameron-Traub, Salamonson, Davidson, & Jackson et al., 2000). However, even when patients' physical health has recovered, emotional difficulties often persist. Specifically, research has shown that some people experience significant emotional adjustment

difficulties beyond the immediate recovery period following a heart attack or cardiac bypass surgery (Gardner & Worwood, 1997; Havik & Maeland, 1990; Kaptein, De Jonge, Van Den Brink, & Korf, 2006; Lane, Carroll, Ring, Beevers, & Lip, 2002; Moore, 1994; Shemesh et al., 2006).

For many, depressive symptoms commonly develop in the aftermath of a heart attack or cardiac bypass surgery, and for some, clinically significant depression emerges within a year of their cardiac event. For example, Lane and colleagues (2002) found significant rates of depression in post-heart attack patients, with 31% of patients having elevated levels of depressive symptoms during hospitalization, 38% depressed at four months post-heart attack (a 6.8% increase), and 37% depressed at one-year follow-up. Similarly, Kaptein and colleagues (2006) found that nearly 25% of patients' symptoms of depression increased from immediately post-heart attack to follow-up one year later. Further, relative to patients without depressive symptoms, those with depressive symptoms at follow-up were at higher risk for new cardiovascular events. Specifically, those who experienced severe depressive symptoms initially and had increasing symptoms over the year (4.0%) were at a significantly greater risk for new cardiovascular events.

In addition to depressive symptomatology, patients often develop significant anxiety following a cardiac event. Lane and colleagues (2002) found that 26% of post-heart attack patients had elevated symptoms of anxiety immediately after being hospitalized, 42% experienced elevated anxiety four months post-heart attack, and 40% continued to report feelings of anxiety after one year. Indeed, anxiety and depression appear to be highly co-morbid in half of post-heart attack patients (Lane et al., 2002), with those who show severe anxiety for longer periods of time also showing higher levels of

depression (Gardner & Worwood, 1997). Notably, a comparison of the effects of depression and anxiety on cardiac health following a first time heart attack showed that anxiety independently predicted greater likelihood of recurrent cardiac events as well as greater consumption of the health care system (Strik, Denollet, Lousberg, and Honig, 2003). In addition, anxiety subsumed the effects on health outcomes that were initially attributed to depression. Thus, it appears that anxiety is an important predictor of health outcomes following a heart attack, above and beyond the effects of depression.

Finally, the experience of a cardiac crisis is emotionally traumatic, and for some may lead to symptoms of post-traumatic stress disorder (Alonzo, 1999; Shemesh et al., 2006; van Driel & Op den Velde, 1995). For example, Shemesh and colleagues (2006) observed that 22% of patients show significant symptoms of post-traumatic stress disorder within six to nine months after a heart attack. Notably, patients with higher rates of post-traumatic symptoms were also more likely to be non-compliant to prescribed medication and showed poor control of cardiovascular risk-factors (e.g., blood pressure, smoking, cholesterol) after their heart attack, thus leaving them at higher risk for future cardiac episodes.

In sum, whether experiencing an abrupt and unexpected heart attack or facing a major cardiac surgery and its aftermath, cardiac crises have been shown to result in greater incidence of depression, anxiety, and post-traumatic stress disorder (Gardner & Worwood, 1997; Havik & Maeland, 1990; Kaptein et al., 2006; Lane et al., 2002; Moore, 1994; Shemesh et al., 2006). Notably, beyond this risk to personal psychological health, cardiac crises have also been shown to be intimately related to marital functioning, a point to which I now turn.

### *Impact of Cardiac Event on Patient's Marital Relationship*

Marital functioning at the time of a cardiac event has important implications for post-event functioning in patients. Research has consistently shown that low marital quality immediately post-cardiac event is predictive of subsequent unhealthy personal and relational adjustment. For example, in a sample of male patients who experienced a heart attack or cardiac bypass surgery, poor quality of marriage was associated with poor psychosocial adjustment, greater distance, and decreased relational satisfaction post-heart attack (Brecht et al., 1994). In contrast, couples who were in more intimate relationships at the time of the cardiac event became closer as a result of the illness three months post-cardiac event and patients in these couples showed greater personal adjustment. Similarly, Waltz (1986) found that couples in high-intimacy marriages showed the highest well-being (i.e. positive affect) in the hospital, as well as at six and 12-month follow-ups. In contrast, those reporting marital distress at the time of hospitalization showed lower well being in hospital, as well as diminished psychological well-being at six and 12 month follow-ups.

While low marital quality may negatively impact patient adjustment after a cardiac event, it has also been shown that the challenges posed by a cardiac event place notable strain on the patient's romantic relationship. For example, Waltz (1986) found that at time of hospitalization, a small proportion of the sample reported moderate to high marital dissatisfaction (15%), which increased to include approximately one-third of patients at six months follow-up and 50% at 12 months follow-up. At six months, one- to two-thirds of patients dissatisfied with their marriage reported communicative barriers in their relationship, such as feeling that they could not disclose their illness-related worries. At 12

months follow-up, greater emotional distance and less self-disclosure was correlated with greater marital conflict. Finally, at 12 months post-cardiac event, individuals in marriages with the highest rate of conflict reported significantly greater adversity in their family situation due to their cardiac event and substantial interpersonal dissension with their partners in particular. The increasing prevalence of marital dissatisfaction from hospitalization to 12 months following the event underscores the potentially negative consequences of a heart attack, even for initially healthy partnerships.

Thus, it seems there is a bi-directional relationship between marital quality and stress from a cardiac event. On one hand, the literature has shown marital quality to be an important predictor of patient adjustment to a cardiac event, such that those in stronger marriages appear to fare better both psychologically and relationally following a heart attack or bypass surgery. On the other hand, distress from having a cardiac event may pose several challenges for couples, including patients feeling unable to disclose their worries to their spouses, which in turn may undermine the quality of the relationship.

In sum, there are clear personal and relational costs associated with acute cardiac events, such as having a heart attack or cardiac bypass surgery. Patients show increased tendencies toward experiencing depression, anxiety, and trauma following such events, and show decrements in their relational functioning. As romantic partners are important support figures for successfully navigating emotionally intense cardiac events, how patients engage their emotions in the context of their relationships likely contributes significantly to their own personal and relational functioning. I turn now to a discussion of what functions comprise healthy emotional engagement in relationships, and specifically how these functions may be challenged in the context of a cardiac crisis and its aftermath.

### *Healthy Emotional Engagement*

La Guardia and Ryff (2003) suggest that healthy emotional engagement occurs when people are aware of their emotions, openly process them internally, and disclose them to close and supportive others, regardless of whether the emotions are positive or negative. Emotional awareness requires taking an interest in and noticing one's emotional experiences. Open internal processing of emotions requires examination of the emotions that emerge and an attempt to understand the meaning of them. When emotions are instead blocked or avoided, people are limited in acting on these emotional experiences. Finally, open disclosure requires active sharing and expression of feelings to a close and supportive other, with the intent of connecting with the other around the emotions and attempts to work through or understand the emotional experience through this exchange.

Recently, La Guardia (2008) demonstrated that *all* of these components of healthy emotional engagement are implicated in positive personal and relational outcomes. Specifically, in cross-sectional and diary assessments of emotional engagement in dating couples, results showed that those who were more aware of their emotions, openly processed (rather than blocked) their emotions when with their partner, and disclosed their emotions to their partner reported greater overall personal well-being, as evidenced by greater levels of vitality and positive affect and lower levels of negative affect. Further, healthy emotional engagement conferred benefits to relationship functioning, as evidenced by higher levels of relational intimacy, satisfaction, vitality, and attachment security with romantic partners.

These ideas are echoed in a large literature on emotion regulation, which has

identified both optimal and less optimal strategies people use to manage their emotional experiences. In terms of *intrapersonal* strategies, much research has focused on expressive suppression, or inhibiting the expression of emotion. Emotional suppression has been shown to exact significant negative consequences for interpersonal functioning, such that inhibiting emotional expression strains relationship functioning and the ability to engage in support behaviors necessary in intimate relationships (Butler, Egloff, Wilhelm, Smith, Erickson, & Gross, 2003; Gross & John, 2002). Specifically, Butler and colleagues (2003) showed that emotional suppression decreases rapport-building, social bonding, and physiologically arouses not only those suppressing their emotions but the individuals they interact with as well. Gross and John (2002) also found that emotional suppression served to inhibit social connectedness, such that those who tend to suppress provide poorer social support, utilize less social support when coping with negative emotions, and are less likely to be liked by others. Further, the more individuals suppress emotions, the more negative emotions they experience.

In terms of *interpersonal* strategies, emotional disclosure has been shown to be important for positive relational functioning (Greenberg, Ford, Alden, & Johnson, 1993; Laurenceau, Feldman Barrett, & Pietromonaco, 1998). Disclosing negative emotions to a supportive partner may serve to benefit the relationship by deepening intimacy between partners (Laurenceau, et al., 1998), and when relationships are distressed, intimate disclosures promote positive change by increasing affiliative behavior (Greenberg et al. (1993). Further, greater openness to emotional disclosure has been linked to greater personal well-being as well (Ryan, La Guardia, Butzel, Chirkov, & Kim, 2005).

While willingness to internally process and disclose emotions to others represent healthy methods of engaging negative emotions, it is clear that people may sometimes fail to utilize these strategies. Indeed, even for those who regularly engage in healthy emotional regulation strategies, during increasingly emotionally challenging circumstances, their ability to employ healthy modes of managing distress may be particularly strained. Suffering a cardiac crisis is an evocative and acutely distressing event that may inhibit people's use of healthy ways of managing emotions, and lead them to instead implement less than optimal forms of engagement. I will now turn to a discussion of how patients are emotionally challenged specifically by cardiac crises.

#### *Emotional Impact of a Cardiac Event*

Studies have documented a variety of stressors that emerge for patients following their cardiac events. From qualitative studies, major themes focus on patients' fears about their health, fear of death (i.e. mortality salience), fear of recurrent cardiac events, and worries about their general future health (Al-Hassan & Sagr, 2002; Clark, 2003; Condon & McCarthy, 2006; Daly et al., 2000; Jensen & Petersson, 2003; Kristofferzon, Lofmark, & Carlsson, 2007). Further, patients report that lifestyle changes (e.g., altering diet, increasing exercise, quitting smoking) are difficult challenges, and although they recognize the importance of making such lifestyle changes, they often feel overwhelmed, stressed, and anxious in their attempts to make them (Condon & McCarthy, 2006; Daly et al., 2000; Kristofferzon et al., 2007; Stewart, Davidson, Meade, Hirth, & Makrides, 2000). Patients have also reported feeling frustrated with physical limitations resulting from their cardiac event, feeling overwhelmed by the everyday consequences of having had a heart



attack and/or bypass surgery, and yearning for a return to pre-event functioning (Al-Hassan & Sagr, 2002; Condon & McCarthy, 2006; Stewart et al., 2000; Thompson, Ersser, & Webster, 1995). Finally, patients report feeling stressed by their desire to care for loved ones coupled with the recognition that they may not be able to provide care for them in the future (Al-Hassan & Sagr, 2002).

Clearly, patients are faced with numerous stressors after their cardiac events that take a significant emotional toll (Stewart et al., 2000). Further, many individuals hesitate to rely on others after their cardiac events (Al-Hassan & Sagr, 2002), and as such, the impact of the event may be exacerbated without these much needed supports. Indeed, in a review of over 20 years of research, studies have shown that higher levels of distress and poorer health outcomes are evidenced when patients do not disclose their emotions to their romantic partner in the course of a significant physical illness (Panagopoulou, Kersbergen, & Maes, 2002). Specifically male patients who experienced heart attacks and showed a greater tendency to hide or deny worries about their heart attack also had higher distress and lower marital satisfaction at one to six months after discharge from the hospital (Suls, Green, Rose, Lounsbury, and Gordon, 1996). Notably, distress increased over time, thus showing cumulative effects of earlier disavowal of emotional experiences. Further, Helgeson (1991) assessed patients' perceptions of the extent to which they *felt* they could have an open discussion with their partner (i.e. disclose to their partner) during recovery from a heart attack. Patients who reported being less able to disclose to their spouse experienced more severe chest pain, were more likely to be re-hospitalized, and reported decreased health one year later. Clearly, the perception of not being able to communicate openly with one's partner has negative implications for recovery from a cardiac event.

While the literature suggests that failing to disclose emotions may be a key obstacle to healthy adjustment following a cardiac event, I suggest that being open to internally processing emotions when with a partner is a pre-requisite to healthy disclosure, and thus is also required for optimal relational and personal functioning post-cardiac event. Further, I suggest that utilizing these strategies to engage the emotions *specifically* around the cardiac events is particularly important, above and beyond global engagement of emotional experiences. The extant literature shows that patients face unique emotional challenges as a result of cardiac crises. While these stressors become a central concern in patients' lives, the emotions associated with these stressors often may not be directly engaged in recovery, and poorer personal and relational outcomes may result. Thus, openly processing these cardiac event-specific emotions and disclosing them to one's partner are predicted to be critical to positive adjustment after a heart attack or bypass surgery.

### *The Current Study*

In normative populations, healthy emotional engagement requires open intrapersonal processing and disclosure of emotions to supportive others for optimal personal and relational functioning to occur. The cardiac literature shows that patients are emotionally challenged by numerous stressors resulting from cardiac events, and for a significant portion of patients, depression, anxiety, trauma, and diminished relational functioning are evidenced. I suggest that one reason why patients may develop greater problems in psychosocial functioning following a cardiac event is that they are attempting to internally block their negative emotional experiences about their cardiac event and its

consequences and/or are not disclosing their emotions about their cardiac event and its consequences to their partner.

To test these propositions, two important endeavors regarding measurement were necessary. First, previous studies measuring emotional distress in cardiac patients have typically examined patients' emotional experience and expression, without anchoring the questions to the cardiac event (Havik & Maeland, 1990; Moore, 1994; Lane et al., 2002). Thus, a new measure to assess the impact and pervasiveness of specific stressors associated with the cardiac event was derived from the qualitative literature. Specifically, the measure developed for the current study taps the extent to which patients are fearful of their own death, fearful of having a future cardiac event, worried about their overall future health, and concerned about the consequences of their death for loved ones, as well as taps the extent to which they are frustrated with their physical limitations, frustrated with lifestyle changes, and are overwhelmed by the consequences of their cardiac event. Second, as I have suggested that the main challenge for patients is not in their general processing of emotions, but is instead in their processing of emotional experiences *unique to the heart attack and/or bypass surgery*, a new measure assessing patients' engagement of their emotions about the cardiac event and its consequences was also developed for the current study. I focus on two components of emotional engagement---1) the extent to which patients block or avoid experiencing and internally processing emotions about their cardiac event and its impact when with their partner and 2) the extent to which patients disclose emotions about their cardiac event and its impact to their partner---as these are most readily measurable by self-report.

I hypothesize that the more pervasive the emotional impact of the cardiac event, the more the patient will show diminished psychological functioning (evidenced by greater anxiety, depression and trauma) and relational functioning (evidenced by lower satisfaction and closeness). Further, I predict that the more patients engage their emotions from the event in a healthy way (i.e. less blocking and greater disclosure), the less patients will experience anxiety, depression and trauma, and the more satisfied with and close to their partner patients will feel. I also predict that the more severe and pervasive the emotional impact of the cardiac event is for patients currently, the less able they will be to engage in healthy strategies for managing emotions, as evidenced by less open processing and disclosure. Finally, I predict that emotional engagement will uniquely account for variance in personal and relational outcomes, even when controlling for the impact and pervasiveness of the event and time since the event's occurrence. Exploratory analyses will examine whether type of cardiac event (heart attack only, bypass only, heart attack and bypass) will moderate these effects.

## Method

### *Participants & Procedure*

Sixty-six participants (60 men, 6 women) who experienced a cardiac bypass surgery, heart attack, or both within the past year were recruited from cardiac care hospital units and cardiac rehabilitation programs across western Ontario. The sample was limited to those within one year of the cardiac event(s) in order to understand the more acute adjustment period following their crises. Participants ranged in age from 42 to 85 years old ( $M = 62.0$  years;  $SD = 10.3$  years), and the majority of participants identified as White ( $N = 55$ ; 83.3%), with the remaining participants identifying as Asian ( $N = 5$ ; 7.6%), East Indian ( $N = 3$ ; 4.6%), or of another ethnic background ( $N = 3$ ; 4.5%).

The mean length of time since the patients' cardiac event(s) was 6.2 months ( $SD = 2.6$  months; range = 1 month to 12 months). Thirty-one participants (47%) experienced a heart attack only, 8 (12%) had a heart attack followed by an immediate bypass surgery, and twenty-seven (41%) underwent a cardiac bypass surgery or valve replacement surgery only.

Participants completed paper and pencil measures assessing the impact of their cardiac event(s) within the past two weeks. Additionally, for those married or in an exclusive dating relationship, measures assessing the quality of their relationship and the impact of the cardiac event(s) on the relationship within the past two weeks were assessed. Fifty-five participants (83%) were in a relationship, and had been together for an average of 33.4 years ( $SD = 15.1$  years; range = 3.75 to 66.0 years). All participants received a free movie voucher for completing the first questionnaire package, and participants in a committed relationship received another free movie voucher for completing the additional

measures. Further, all participants were entered into a draw for five cash prizes of \$50 each.

### *Measures*

*Impact and Pervasiveness of Cardiac Event.* Twenty-four items were generated for this study to assess the emotional impact and pervasiveness of having a cardiac event (Appendix A). Drawing from prior literature (Al-Hassan & Sagar, 2002; Clark, 2003; Condon & McCarthy, 2006; Daly et al., 2000; Jensen & Petersson, 2003; Kristofferzon et al., 2007; Stewart et al., 2000), impact and pervasiveness were conceptualized as the extent to which patients have fears about mortality, their own future physical health, and the consequences of their own death for their loved ones, the extent to which they are aware of physical limitations and are reactive to lifestyle changes due to their cardiac event, and the extent to which they feel overwhelmed or helpless because of their cardiac events and consequences from them. Items were rated on response scales to assess either the severity their emotional distress from the cardiac event(s) (i.e. impact) or how frequently the distress was coming up in the patients' lives (i.e. pervasiveness). Impact of the cardiac events was assessed by asking participants to rate the extent to which the statements presented reflect their experiences within the past two weeks. Sample items, including "I felt angry about all of the changes I have had to make in my lifestyle because of my illness" (lifestyle changes) and "I felt overwhelmed by all of the changes I've been going through because of the heart attack and/or bypass surgery" (helplessness), were rated on a 9-point Likert-type scale ranging from "not at all true" (1) to "very true" (9). Pervasiveness items assessed the frequency of patients' experiences in the past two weeks and were rated

on a 9-point Likert-type scale ranging from “not at all” (1) to “almost always / all the time” (9). Sample items include “My pulse quickened and I got afraid that I was about to die” (mortality salience), “I had fears about my future health” (future health), “I worried about how my close others would go on without me if I died” (fears for loved ones), “I felt frustrated by the physical limitations this heart attack and/or bypass surgery has placed on me” (physical limitations). Seven subscales--addressing 1) fears about mortality, 2) fears of a future heart attack, 3) fears of their own future physical health, and 4) fears about the consequences of their own death for their loved ones, as well as the extent to which they are 5) aware of physical limitations and are 6) reactive to lifestyle changes due to their cardiac event, and the extent to which they feel 7) overwhelmed or helpless because of their cardiac events and consequences from them---were derived by taking the means of items within each subscale. Pearson correlations show that these subscales were moderately to highly correlated (Table 1; all  $r$ 's > .35) and thus a total scale score was calculated by taking the mean of standardized subscale scores<sup>1</sup>. Higher scores on this composite measure indicate greater impact and pervasiveness of emotional distress from the cardiac event(s). An analysis of the full 24-item scale showed very good reliability ( $\alpha = .95$ ).

*Emotional engagement.* Based on recent work by La Guardia (2008), a measure was developed to assess the extent to which participants engaged their negative emotions about their cardiac event and the consequences it has had for them in the past two weeks (Appendix B). Five items, referred to herein as “emotional blocking”, reflect attempts to avoid processing the meaning of experienced negative emotions or avoid negative emotional experiences altogether. In other words, “emotional blocking” assesses the extent to which participants avoided engaging their emotions intrapersonally. Six items were also

derived to measure the extent to which participants disclosed their negative feelings about their cardiac event to their romantic partner. Two different response scales were used to assess the frequency of emotional blocking and disclosure. First, items such as “I distracted myself from the feelings about the heart attack and/or bypass surgery when I was with my spouse/romantic partner” (blocking) and “I showed or shared my feelings about my heart attack and/or bypass surgery with my spouse/romantic partner” (disclosure) were rated on a 9-point Likert-type scale ranging from “never” (1) to “each time I was with him/her” (9). Then, sample items such as “I wanted to just forget about or shut off the feelings about the heart attack and/or bypass surgery when I was with my spouse/romantic partner” (blocking) and “I worked with my spouse/romantic partner to build a deeper understanding of our feelings around the heart attack and/or bypass surgery and a greater connection with him/her” (disclosure) were rated on a 9-point Likert-type scale ranging from “not at all true” (1) to “very true” (9). The mean of the five blocking items comprises the scale score for emotional blocking, with higher scores indicating a tendency to avoid attending to or internally processing emotions about the cardiac event when with one’s partner, and the mean of the six disclosure items serves as the disclosure subscale score, with higher scores reflecting a greater tendency toward expressing emotions about the event to their partner. Reliabilities for both emotional blocking and disclosure were good (Cronbach  $\alpha$ 's = .87, .92, respectively), and the blocking and disclosure subscales were not significantly correlated ( $r = .09$ , n.s.).

*Depression.* The 21-item Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) is a widely used measure of psychological and physical symptoms of depression. Symptoms assessed include sadness, irritability, guilt,



fatigue, and loss of libido. Participants provide a score for each item ranging from 0 to 3, with 0 indicating an absence of the symptom and higher ratings indicating greater severity of the symptom. The scale score is derived by summing the total of all the items. Higher scores indicate greater symptoms of depression, with a score of greater than 17 indicating clinically significant symptoms of depression. The BDI showed good reliability in the current sample ( $\alpha = .91$ ).

*Anxiety.* The 16-item Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) assesses fears of physical and affective anxiety sensations, as well as fears of becoming psychologically ill or others noticing one's outward signs of anxiety. As those who have suffered a relatively recent cardiac event may be particularly apt to associate anxiety sensations with heart dysfunction (e.g. heart palpitations), this measure was selected to serve as a more sensitive risk indicator for the development of anxiety disorders. Sample items include "It scared me when I felt faint", "It scared me when I was unable to keep my mind on a task", "Other people noticed when I felt shaky", and "It scared me when I was nervous". Participants rated how true each item was of their experience in the past two weeks on a 5-point Likert-type scale ranging from "not at all true" (1) to "very true" (5). The scale score was derived by taking the mean of the item scores, with higher scores indicating greater anxiety sensitivity. In the current sample, the ASI showed good reliability ( $\alpha = .92$ ), and was strongly correlated with the BDI ( $r = .56, p < .001$ ).

*Post-Traumatic Stress Disorder.* The 15-item Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) assesses symptoms of post-traumatic stress disorder following an event of a traumatic nature, in this case, the cardiac event(s). The IES is

separated into two components, with seven items assessing intrusive thoughts about the traumatic event and eight items assessing a tendency to avoid any associated stimuli reminding the person of the event and attempts to escape from residual distress from the event. Sample items from the intrusion subscale include “Any reminder brought back feelings about it” and “Pictures of it popped into my mind”, and sample items from the avoidant subscale include “I stayed away from reminders about it” and “I tried to remove it from my memory”. The mean of the 15 items comprises the scale score, with higher scores reflecting greater post-traumatic stress symptoms from having experienced the cardiac event. In the current sample, the IES showed good reliability ( $\alpha = .91$ ), and was highly correlated with the BDI ( $r = .66, p < .001$ ) and the ASI ( $r = .60, p < .001$ ).

*Relationship Satisfaction.* The six-item Quality of Marriage Index (QMI; Norton, 1983) assesses overall relationship quality. Five items are rated on a 7-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (7). Sample items include “I really feel like part of a team with my partner” and “We have a good relationship”. The final item assessing happiness with the relationship is rated on a 9-point scale ranging from “very unhappy” (1) to “perfectly happy” (9). The scale score is computed by taking the mean of the six items, with higher scores indicating higher relationship quality and satisfaction. The QMI showed good reliability in the current sample ( $\alpha = .95$ ).

*Relational closeness.* Seven items were derived to assess relational closeness within the past two weeks. Sample items include “I felt we had a deeper understanding of each other and a greater connection” and “We were both mutually supportive (we both gave and received support)”, and were rated on a 9-point Likert-type scale, ranging from “not at all true” (1) to “very true” (9). The mean of the seven items serves as the total score, with

higher scores reflecting higher closeness to one's romantic partner. The scale showed adequate reliability in the current sample ( $\alpha = .80$ ), and was strongly correlated with the other relational health measure, the QMI ( $r = .60, p < .001$ ).

## Results

### *Preliminary Analyses*

Means and standard deviations of the study variables are shown in Table 2. Patients reported that currently they feel mildly to moderately impacted by their cardiac event. Examining the subcomponents of impact and pervasiveness of the cardiac event, patients most strongly endorsed frustration with physical limitations from the event, followed by frustrations with life changes, feeling overwhelmed by the aftermath of their cardiac event, and feeling concerned about the consequences of their death for loved ones. Mortality salience and fears about a future heart attack appeared to be less of a current concern to patients in the sample. Patients also reported generally mild levels of anxiety ( $M = 1.71$  out of 5,  $SD = .71$ ), trauma ( $M = 1.63$  out of 5,  $SD = .58$ ) and depression ( $M = 8.23$  out of 63,  $SD = 7.75$ ), and with respect to their romantic relationships, patients generally reported quite high levels of satisfaction and closeness to their partner.

Pearson correlations were first calculated to examine the association of time since the cardiac event with impact and pervasiveness of event (Table 3). Results show that the more time had passed since the cardiac event, the trend was for the overall emotional impact and pervasiveness of the event to lessen ( $r = -.23$ ,  $p = .07$ ). Specifically, the more time since the cardiac event, the less patients felt overwhelmed by the consequences of the event for their lives ( $r = -.26$ ,  $p < .05$ ) and the less they tended to have fears about future physical health ( $r = -.23$ ,  $p = .07$ ). Time since the event was not significantly related to fears of a future heart attack ( $r = -.13$ , n.s.), concerns about consequences of the patient's own death for loved ones ( $r = -.16$ , n.s.), frustration with life changes due to the event ( $r = -$

.14, n.s.), mortality salience ( $r = -.20$ , n.s.), or frustration with physical limitations due to the event ( $r = -.20$ , n.s.).

Next, Pearson correlations were calculated to examine the association of time since the cardiac event to emotional engagement, as well as to psychological and relational functioning (Table 3). Time since the event was not significantly related to internal emotional processing ( $r = -.06$ , n.s.) nor was it significantly related to disclosure to one's partner ( $r = -.24$ , n.s.). Similarly, time since the cardiac event was not significantly related to depression ( $r = -.06$ , n.s.), anxiety ( $r = -.15$ , n.s.), trauma ( $r = -.11$ , n.s.), relationship satisfaction ( $r = .06$ , n.s.), or relational closeness ( $r = .06$ , n.s.). Thus, how patients process their cardiac events, and the psychological and relational impact of these events, is not a function of time since their cardiac crisis.

Using one-way ANOVAs, exploratory analyses were conducted to determine if type of cardiac event (heart attack only, heart attack and bypass surgery, or bypass surgery only) was related to scores on impact and pervasiveness of the cardiac event, emotional engagement about the event, psychological health, and relational functioning (Table 4). Significant differences by event type were found for impact and pervasiveness of the cardiac event(s), depression, and trauma. Specifically, for impact and pervasiveness of the event, [ $F(2, 62) = 5.83, p < .01$ ], Tukey HSD post-hoc tests revealed that patients who had a heart attack only were significantly more impacted by their event than those who had bypass surgery only ( $MD = 1.05, p < .05$ ), and those who had both a heart attack and bypass surgery were also more impacted by their event than patients who had bypass surgery only ( $MD = 1.67, p < .05$ ). There was no significant difference in the impact and pervasiveness of the event for those who had a heart attack compared to those who had a

heart attack and bypass surgery ( $MD = .63$ , n.s.). For depression, [ $F(2, 61) = 5.86$ ,  $p < .01$ ], Tukey HSD post-hoc tests showed that patients who only had a heart attack showed significantly greater incidence of depressive symptoms than those who only had bypass surgery ( $MD = 6.66$ ,  $p < .01$ ). Patients who had both a heart attack *and* bypass surgery did not differ in their depressive symptoms from either those with only heart attack ( $MD = -3.43$ , n.s.) or those with bypass surgery only ( $MD = 3.23$ , n.s.). Finally, for trauma [ $F(2, 60) = 3.70$ ,  $p < .05$ ], Tukey HSD post-hoc tests revealed that patients who had a heart attack only experienced significantly greater post-traumatic stress disorder symptoms than those who had bypass surgery ( $MD = .38$ ,  $p < .05$ ). Trauma scores in patients who had both a heart attack and bypass surgery did not differ from those who had a heart attack only ( $MD = .04$ , n.s.) or bypass surgery only ( $MD = .42$ , n.s.). The ANOVAs for disclosure, blocking, anxiety and both markers of relational health were not significant.

### *Main Analyses*

First, Pearson correlations were calculated to examine the relationships between the impact and pervasiveness of the cardiac events and both psychological and relational well-being (Table 5). Results show that the greater the impact and pervasiveness of the cardiac event on the patient's life currently, the greater their symptoms of depression ( $r = .64$ ,  $p < .001$ ), anxiety ( $r = .70$ ,  $p < .001$ ), and post traumatic stress ( $r = .80$ ,  $p < .001$ ). Specifically, examining the subscales of the impact and pervasiveness measure, greater fears about mortality, future physical health, and consequences for loved ones, as well as awareness of physical limitations, reactivity to lifestyle changes, and feelings of helplessness were all significantly related to greater psychological distress. While the overall impact and

pervasiveness of the cardiac event was strongly associated with psychological distress, it was not significantly associated with current relational closeness ( $r = -.14$ , n.s) or relational satisfaction ( $r = -.17$ , n.s.). However, a more specific examination of the subcomponents of the impact and pervasiveness measure revealed that greater frustration with life changes from the cardiac event was significantly associated with feeling less close to one's partner ( $r = -.36$ ,  $p < .01$ ).

Next, Pearson correlations were calculated to examine the relationship between emotional engagement and both psychological and relational outcomes (Table 6). Results showed that the more patients blocked their emotions about their cardiac event, the greater their depression ( $r = .62$ ,  $p < .001$ ), anxiety ( $r = .56$ ,  $p < .001$ ), and trauma symptoms ( $r = .68$ ,  $p < .001$ ). Further, the more patients blocked their emotions about their cardiac event(s), the less close they felt with their partner ( $r = -.39$ ,  $p < .01$ ) and the less satisfied they felt in their relationship ( $r = -.35$ ,  $p < .05$ ). Contrary to predictions, results also showed that the more patients disclosed their emotions about their cardiac event and its consequences to their romantic partner, the more they experienced symptoms of anxiety ( $r = .39$ ,  $p < .01$ ), and trauma ( $r = .31$ ,  $p < .05$ ), and the more also they tended to experienced symptoms of depression ( $r = .26$ ,  $p = .07$ ). Further, disclosure was not significantly related to feeling close to ( $r = .07$ , n.s.) or satisfied with their partner ( $r = -.02$ , n.s.).

Pearson correlations were also calculated to assess the association of impact and pervasiveness of the cardiac event with measures of internal emotional processing and emotional disclosure (Table 7). The greater the impact and pervasiveness of the cardiac event for patients currently, the more they attempt to avoid the experience and meaning of their negative emotions about the event by blocking their feelings ( $r = .54$ ,  $p < .001$ ).

Further, the more that the cardiac events continue to impact the patients' lives, the more likely they also were to disclose their emotions to their partner ( $r = .36, p < .01$ ).

Finally, I predicted that emotional engagement would uniquely contribute to both personal and relational well-being, above and beyond the impact and pervasiveness of the cardiac event(s). Correlational analyses in the current sample show that impact of the event was not significantly related to either relationship closeness or relationship satisfaction. Thus, regressions were not conducted with these outcomes, as they would not test the incremental value of emotional engagement over impact and pervasiveness of the event for relational closeness and satisfaction. However, examining the outcomes of psychological health, I found that emotional blocking continued to show a unique effect, above and beyond that accounted for by impact and pervasiveness of the cardiac event. Specifically, when simultaneously entering impact and pervasiveness and emotional blocking in the prediction of psychological health outcomes, results showed that emotional blocking exerted a unique effect on depression [ $F(2, 47) = 9.40, \beta = .35, p < .01$ ] and trauma [ $F(2, 46) = 18.13, \beta = .39, p < .001$ ], and a marginally unique effect on anxiety [ $F(2, 46) = 2.97, \beta = .17, p = .09$ ]. Thus, regardless of how impactful and pervasive their cardiac event remains for them, the more patients blocked their emotions, the worse their psychological health.

Given that some important study variables differed according to the type of cardiac event experienced, exploratory regression analyses were conducted to test emotional engagement and type of cardiac event as predictors of personal and relational well-being (Table 8). First, I tested the unique contributions of emotional blocking and cardiac event type as predictors of psychological health. In step 1, main effects of emotional blocking



and type of event (dummy coded such that patients who had a heart attack only or both a heart attack and bypass surgery were compared against the reference group of patients who had a bypass surgery only) were entered. In step 2, the two-way interaction between emotional blocking and cardiac event type was entered. As shown already in the zero-order correlations, the main effects of emotional blocking on depression [ $F(3, 45) = 25.1, \beta = .55, p < .001$ ], trauma [ $F(3, 44) = 33.9, \beta = .63, p < .001$ ], and anxiety [ $F(3, 44) = 12.97, \beta = .54, p < .001$ ] were significant. However, results further showed that when controlling for the effects of blocking, the main effect of event type emerged as a unique predictor of depression and trauma scores<sup>3</sup>. Specifically, mean depression scores in patients who had a heart attack were 5.46 units (out of 63) higher than the depression scores in those who had bypass surgery [ $F(3, 45) = 7.76, \beta = .32, p < .01$ ], while depression scores did not differ between those who had both a heart attack and bypass surgery and those who had bypass surgery only [ $F(3, 45) = .89, \beta = .11, n.s.$ ]. For trauma scores, mean trauma scores for those who had a heart attack was 0.26 (out of 5) units higher than patients who had a bypass surgery only [ $F(3, 44) = 5.25, \beta = .26, p < .05$ ], and similar to depression, there were no significant differences in trauma scores between patients who had both a heart attack and bypass surgery compared to patients who had bypass surgery only [ $F(3, 44) = .47, \beta = .07, n.s.$ ]. The two-way interaction of blocking and event type was not significant for either depression [ $F\text{-change}(2, 43) = 2.01, n.s.$ ] or trauma [ $F\text{-change}(2, 42) = .29, n.s.$ ]. Neither the main effect for type of cardiac event [for heart attack,  $F(3, 45) = .27, \beta = .07, n.s.$ ; for heart attack and bypass surgery,  $F(3, 45) = 1.00, \beta = .13, n.s.$ ] nor the two-way interaction between blocking and event type was significant when predicting anxiety [ $F\text{-change}(2, 42) = .15, n.s.$ ].

Next, I used the same regression models to predict relational health. As found in the zero-order correlations, the main effect of blocking was significantly related to closeness [ $F(3, 46) = 7.67, \beta = -.37, p < .01$ ] and satisfaction [ $F(3, 46) = 4.63, \beta = -.30, p < .05$ ]. The main effect of type of cardiac event was not significant in the prediction of relationship closeness [for heart attack,  $F(3, 46) = 1.08, \beta = -.15, n.s.$ ; for heart attack and bypass surgery,  $F(3, 46) = .52, \beta = .10, n.s.$ ] or satisfaction [for heart attack,  $F(3, 46) = 2.58, \beta = -.23, n.s.$ ; for heart attack and bypass surgery,  $F(3, 46) = .12, \beta = -.05, n.s.$ ], and neither were the two-way interactions between blocking and event type on closeness [ $F$ -change (2, 44) = 1.22, n.s.] or satisfaction [ $F$ -change (2, 44) = .39, n.s.]. In sum, blocking emotions about one's cardiac event(s) accounts for greater deficits in psychological and relational functioning, irrespective of the type of cardiac event experienced.

Of note, emotional disclosure was positively related to markers of psychological distress and negatively related to relational functioning in the current sample. These findings are inconsistent not only with my theoretical predictions that disclosure to one's partner would reduce psychological distress and improve relational health, but also with an extensive body of existing literature predicting such outcomes. Thus, given these unexpected and seemingly antithetical findings, the relation of emotional disclosure and cardiac event type to personal well-being and relationship functioning was not tested further.

## Discussion

The aim of the current study was to investigate the current emotional impact of cardiac events for patients and their engagement of their current emotions about these events, as well as the consequences of both emotional impact and emotional engagement on psychological (depression, anxiety, and post-traumatic stress disorder) and relational (closeness and satisfaction) functioning. Specifically, I hypothesized that the more emotionally impactful the cardiac events are for patients currently, the worse off they would be both psychologically and relationally. However, I also predicted that patients' engagement of their current emotions around their cardiac event would have its own unique influence on psychological and relational health. Specifically, I expected that the more patients internally processed their emotions and disclosed them to their romantic partner, the less depression, anxiety, and trauma they would experience and the closer and more satisfied they would feel with their relationship. Results partially supported these predictions.

As expected, the more emotionally impactful and pervasive the cardiac event is for the patient currently, the worse their psychological health, as indicated by greater symptoms of depression, anxiety, and trauma. In other words, the more patients remain negatively affected by the cardiac event within the first year since the event, the more psychologically distressed they remain. This is consistent with the current literature documenting that greater distress from the event itself is linked with decreased psychological well-being, including depression, anxiety and post-traumatic stress disorder (Condon & McCarthy, 2006; Gardner & Worwood, 1997; Havik & Maeland, 1990; Kaptein et al., 2006; Lane, et al., 2002; Moore, 1994; Shemesh et al., 2006; Stewart et al.,

2000). Notably, the new measure of “impact and pervasiveness” created for this study served as a “psychological thermometer” of the cardiac event, as it seemed to show convergent validity with traditional markers of psychological health. Thus, impact and pervasiveness of the cardiac event for patients seems to be a predominant indicator of psychological health within the year following their cardiac crisis.

Surprisingly, while evidence from prior research suggests that the cardiac event may place some strain on the patient’s relationship (Brecht et al., 1994; Waltz, 1986), impact and pervasiveness of the cardiac event did not predict how connected and satisfied patients were with their romantic partners in this sample. In the current study, most patients reported being quite close and highly satisfied with their partner; thus there may have been limited variance to predict in the relational health measures. Alternatively, it may be that satisfaction and closeness are not directly impacted by the emotional impact of a cardiac crisis. Perhaps other relational constructs, such as depth of communication or intimacy, may show greater impact from the cardiac events. Though the closeness measure may approximate these constructs, it was not designed to directly tap either aspect of relational functioning.

Importantly, in line with predictions, when patients’ experience of their cardiac event is most intense and impactful, and they are thus seemingly in the most in need of openly processing their emotions, they are less able to process their emotions in a healthy way. Specifically, greater impact and pervasiveness of the event was associated with greater blocking of emotions from the event. Further, emotional blocking was associated with greater deficits in psychological and relational functioning, as evidenced by greater depression, anxiety, trauma, and decreased satisfaction and closeness to their partner.

These findings are consistent with the literature showing that suppression of negative emotions leads to less adaptive interpersonal and affective functioning (Butler et al., 2003; Gross & John, 2002). Further, these findings are also consistent with literature showing that failure to internally process emotions when with a partner negatively impacts one's own psychological health and romantic relationship functioning (La Guardia, 2008). This study importantly extends the current literature by clarifying the role of emotional blocking in dealing with distress from a cardiac event. While the extant literature has shown that not expressing emotions after a significant physical illness is detrimental for personal and relational health (Helgeson, 1991; Panagopoulou et al., 2002; Suls et al., 1996), the current study further shows that being less open to internally processing emotions is also detrimental for both psychological and relational well-being.

While greater impact and pervasiveness of the cardiac event was associated with greater emotional disclosure to a romantic partner as predicted, the more patients reported disclosing, the higher their depression, anxiety and trauma. Moreover, disclosure was not significantly related to their closeness or satisfaction with their partner. These correlations with personal and psychological health were contrary to my predictions as well as to prior literature that suggests that disclosure of emotions is a healthy strategy of engaging negative emotions. Given that the impact of the event was highly correlated with depression, anxiety and trauma, the findings seem to suggest that patients' emotions from the event may have been relatively unprocessed and "unloaded" or "vented" in distress rather than thoughtfully disclosed in order to connect with their partner and gain a greater understanding of their emotional experience. Indeed, this may also explain why disclosure, a form of emotional engagement typically related to greater relational connectedness and

satisfaction in relatively non-distressed couples (Greenberg et al., 1993; Laurenceau et al., 1998; Ryan et al., 2005), was not related to healthy relational functioning in the current sample. Future work will need to more clearly differentiate these potentially discrepant modes of disclosure in such a distressed population in order to more clearly understand their consequences for patients' psychological and relational health.

The final aim of the study was to test the hypothesis that emotional engagement is a unique contributor to psychological and relational health, above and beyond the current impact and pervasiveness of the cardiac event. For relational outcomes, this hypothesis could not be viably tested because associations between event impact and indices of relational functioning were not significant. For psychological outcomes, the results supported the hypothesis that emotional blocking uniquely contributes to psychological health, such that blocking predicted greater depression and trauma, and tended to predict anxiety as well, even when accounting for the impact and pervasiveness of the cardiac event. These findings suggest that regardless of the extent to which patients are impacted by their event, willingness to process their emotions about the event internally, rather than blocking these emotions, is critical for optimal post-event psychological functioning.

Notably, interesting patterns emerged when examining time since the cardiac event and type of cardiac event. First, with regard to time since the cardiac event, patients in the current sample had a relatively recent cardiac event, on average six months prior to participation. Time since the event was marginally related to the overall impact of the event, such that the longer it has been since the patient's event, the less they tended to fear the future of their physical health and the less they tended to be overwhelmed by the aftermath of their cardiac event. These findings may be expected given that the effects of

the cardiac events may have lessened as the patients have had greater time to physically recover from their event, adjust to the initial shock of the event, and reduce persistent fears about their future physical health. Indeed, the impact reported in the sample was mild to moderate, suggesting that the most acute period of adjustment to the event was over, and patients currently experienced only some residual consequences of the event, such as physical limitations due to the event, being frustrated with the life changes they must make in response to their event, and being somewhat fearful about their own death and the possibility of having another heart attack. Interestingly, time since the event was not significantly related to mortality salience, fears of a future heart attack, concerns about consequences of their own death for loved ones, frustration with life changes, or physical limitations due to the event. Thus, after having a cardiac crisis, the fear of having a recurrent heart attack or of not being able to be there for their loved ones if they die, thoughts about their own death, frustrations of continued physical limitations, and frustrations of managing a number of permanent lifestyle changes (e.g., modifying diet, engaging in regular exercise, quitting smoking) may not diminish over time nor increase over time. Finally, although the impact of the heart event measure seems to tap the constructs of depression, anxiety and trauma, and impact of the heart event decreased with time, time since the event was not significantly related to the measures of psychological health. These later two findings potentially could be accounted for by the role of emotional engagement, such that regardless of how long it has been since the event occurred, the event may continue to impact the patient unless he or she is open to internally processing the distressing emotions from the event and actively working through those feelings with his or her partner.

With regard to type of event, it appears that individuals who have only had a bypass surgery fare better than all others in terms of the impact and pervasiveness of their cardiac event, as compared to those who had a heart attack only or those who underwent both a heart attack and bypass surgery. Those who had only undergone a bypass surgery also had significantly lower levels of depression and trauma compared to patients who had a heart attack only. Overall, it seems as though having a heart attack is the most emotionally jarring event, perhaps because it is sudden, unexpected, and requires immediate attention. Further, I suspect that those who have experienced a heart attack may not have had as significant a recovery time from the event, compared to those who have undergone major surgery and have allotted time to readjust their lives. That is, for many who have had a heart attack, they may not only be expected to return to a “regular” routine more quickly, but because they often do not manifest outward signs of their recent attack, they potentially may garner less support or accommodation from others in their social world before being expected to “return to normal functioning”. Thus, although the outward physical crisis may have seemed to abate, patients may remain significantly impacted by the event and thus may be at risk for developing symptoms of depression and post-traumatic stress disorder. Thus, the present findings may suggest that it will be of great import to regularly monitor patients’ psychological health and coping post-heart attack, and particularly attend to the potentially hidden psychological costs for those who have had a heart attack.

#### *Limitations & Future Directions*

One limitation of the current study is that the sample size was relatively small, which limited the sophistication of statistical modeling that could be done. Further, given



that some expected effects did not emerge, I was unable to test a path model which simultaneously models the impact and pervasiveness of the event and emotional engagement to predict the patient's personal and relational well-being.

Consistent with the cardiac literature, the current sample was composed of significantly more men than women (91% vs. 9%). In reality, however, heart disease is the leading killer of both men and women (Women's Heart Foundation, 2007). Without a representative balance of gender in the sample, it is difficult to generalize the findings to women who are cardiac patients. A plethora of cardiac studies have reported the limitation of low participation from women in research as well. It will be important for future studies assessing patients after a heart attack or bypass surgery to focus recruitment more directly towards more participation of women in order to better understand their experiences in the context of cardiac illness, as they too are largely impacted by heart disease.

With respect to examining the association between impact of the cardiac event and relational health, the measures used in the current study may not necessarily tap the aspects of a romantic partnership most challenged by a cardiac crisis. The measures themselves seemed to yield a ceiling effect (high reported levels of relationship satisfaction and closeness) that may not have allowed enough variance to understand the nature of the relationship between relational health and event impact. Future directions should include other relational constructs that may be impacted by emotional distress, such as measures of communication or intimacy in partnerships.

Further, it appeared that the measure I created to assess the patient's emotional disclosure to the partner did not seem to clearly differentiate disclosure aimed at deepening the connection with one's partner from disclosure that is likened moreso to "distressed

venting”. Refining the current disclosure measure in order to better tap the kinds of disclosure occurring would clarify if indeed the patients are venting in distress rather than trying to connect with their partner. In future work, we may also learn more about the nature of disclosure and its impact by assessing both patients’ and partner’s reports of their emotional exchanges regarding the cardiac event.

As the current study was a one-time cross-sectional design, it was not possible to determine the causal direction of relationships between study variables. In future work, it will be important to examine the trajectory of patients’ emotional experiences, engagement and personal and relational well-being immediately post-event and across the period of recovery. A longitudinal examination of the study variables would allow us to elucidate the causal direction of relationships between these variables, such as whether stressors from the event lead to poor psychological or relational outcomes, or whether poor marital quality predicts poor adjustment to an event.

Finally, it will be important for future work to assess functioning not only in the cardiac patient, but in the spouse as well. An abundance of literature has documented that spouses show increased levels of general psychological distress, depression, and stress specifically associated with “caregiver burden” (Bennett & Connell, 1998; Karmilovich, 1994; O’Farrell, Murray, & Hotz, 2000; Thompson & Cordle, 1988). Moreover, there is a wide body of research showing the importance of the spouse to patient recovery and well-being, such as providing social support to the patient (King, Reis, Porter, & Norsen, 1993; Kulik & Mahler, 1989; Kulik & Mahler, 1993). By examining the impact of the cardiac event on the spouse’s well-being, it will be possible to understand not only how the spouse is affected by the event but also how this influences the partner’s ability to provide support

to the patient. Further, by assessing each partner's perception of the other's emotional experience and engagement as well as their own, we will be able to better understand the dynamics occurring within the dyad in the recovery period following a cardiac event. Finally, it will be valuable to carry out such dyadic study designs using diary methods over the recovery time. Assessments immediately post-event up to twelve months after, attending to each partner's experience and engagement of emotions as well as markers of physical, psychological and relational health using diary measures, will allow us to understand the trajectory of personal and relational functioning over time as well as the reciprocity of emotional engagement between members of the couple and its impact on personal and relational functioning.

### *Conclusions*

Cardiac events pose unique emotional challenges for patients, even for those who may regularly employ healthy global strategies for emotional engagement. The current work emphasizes the importance of patients willingly processing their negative emotions about their cardiac event internally in order to optimize their psychological and relational functioning. In other words, when faced with the emotional stressors from having experienced an emotionally evocative cardiac event, when patients willingly process their negative emotions rather than blocking them, they experience lower levels of depression, anxiety and trauma and more optimal relational functioning in the form of greater closeness and satisfaction with their romantic partner.

Tables

Table 1. Correlation Coefficients between subscales of Impact and Pervasiveness of Cardiac Event Measure

Subscales <i>n</i> = 66	Mortality Salience	Fear of future HA	Fear of future health	Frustration with body limits	Frustration with life changes	Overwhelm -ed by aftermath
Fear of future Heart attack (HA)	.66***					
Fear about future physical health	.73***	.66***				
Frustration with body limits	.73***	.40***	.70***			
Frustration with life changes	.54***	.35***	.53***	.56***		
Overwhelmed by aftermath of event	.74***	.47***	.62***	.70***	.73***	
Consequences of death for loved ones	.82***	.67***	.76***	.68***	.51***	.62***

Note: \*\*\*  $p < .001$

Table 2. Means (Standard Deviations) for Impact and Pervasiveness of Cardiac Event, Emotional Engagement, and Personal and Relational Health

<i>Variable</i>	<b>Mean (SD)</b>	<b>Maximum Score</b>
<b><i>Overall Impact &amp; Pervasiveness of Event</i></b> (n = 66)	2.50 (1.53)	9
Mortality Salience	1.95 (1.15)	9
Fear of future heart attack	1.53 (.83)	9
Fears about future physical health	2.61 (2.11)	9
Frustration with physical limitations	3.28 (2.33)	9
Frustration with life changes	2.63 (2.17)	9
Feeling overwhelmed by aftermath of cardiac event	2.77 (2.03)	9
Consequences of own death for loved ones	2.70 (2.21)	9
<b><i>Emotional Engagement</i></b> (n = 51)		
Blocking	2.69 (1.77)	9
Disclosure	4.56 (1.91)	9
<b><i>Psychological Health</i></b>		
Depression (n = 65)	8.32 (7.75)	63
Anxiety (n = 64)	1.71 (.71)	5
Trauma (n = 64)	1.63 (.58)	5
<b><i>Relational Health</i></b> (n = 52)		
Relational Closeness	7.02 (1.12)	9
Relational Satisfaction	6.24 (1.12)	7

*Note:* Higher numbers indicate more of a given construct.

Table 3. Correlation Coefficients of Time since event with subscales of Impact and Pervasiveness of Event Measure

<i>Variable</i>	<b>Correlation with Time since Event</b>
<b><i>Overall Impact &amp; Pervasiveness of Event</i></b> (n = 66)	-.23 <sup>†</sup>
Mortality Salience	-.20
Fear of future heart attack	-.13
Fears about future physical health	-.23 <sup>†</sup>
Frustration with physical limitations	-.20
Frustration with life changes	-.14
Feeling overwhelmed by aftermath of cardiac event	-.26 <sup>*</sup>
Consequences of own death for loved ones	-.16
<b><i>Emotional Engagement</i></b> (n = 51)	
Blocking	-.06
Disclosure	-.24
<b><i>Psychological Health</i></b>	
Depression (n = 65)	-.06
Anxiety (n = 64)	-.15
Trauma (n = 64)	-.11
<b><i>Relational Health</i></b> (n = 52)	
Relational Closeness	.06
Relational Satisfaction	.06

Note: <sup>†</sup>p < .07  
<sup>\*</sup>p < .05

Table 4. One-way ANOVA F-values and Means (Standard Deviations) of Study Variable Scores by Cardiac Event Type

		<i>HA only</i>	<i>Bypass only</i>	<i>HA &amp; Bypass</i>
		<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
	<i>F</i>			
<b><i>Overall Impact and Pervasiveness</i></b>	<i>F</i> (2, 62) = 5.83**	2.85 (1.58)	1.80 (.76)	3.48 (2.34)
<b><i>Emotional Engagement</i></b>				
Blocking	<i>F</i> (2, 47) = 1.19	3.01 (1.89)	2.19 (1.38)	2.92 (2.03)
Disclosure	<i>F</i> (2, 47) = 1.11	4.56 (1.65)	4.54 (2.10)	5.70 (1.86)
<b><i>Psychological Health</i></b>				
Depression	<i>F</i> (2, 61) = 5.86**	11.35 (8.51)	4.30 (4.12)	8.11 (7.70)
Anxiety	<i>F</i> (2, 60) = 1.07	1.85 (.72)	1.54 (.65)	1.72 (.80)
PTSD	<i>F</i> (2, 60) = 3.70*	1.79 (.60)	1.39 (.31)	1.73 (.91)
<b><i>Relational Health</i></b>				
Relational Closeness	<i>F</i> (2, 48) = 1.51	6.65 (1.68)	7.35 (1.23)	6.83 (1.79)
Relational Satisfaction	<i>F</i> (2, 48) = 2.13	5.90 (1.39)	6.57 (.70)	6.07 (.83)

Note: \*  $p < .05$   
 \*\*  $p < .01$

Table 5. Correlation Coefficients of overall Impact and Pervasiveness of Cardiac Event and its subscales with Patient Scores on the BDI (Depression), ASI (Anxiety), and IES (Post-Traumatic Stress Disorder) and Relational Satisfaction and Closeness

	<i>Psychological Health</i>			<i>Relational Health</i>	
	<i>Depression</i> ( <i>N</i> = 65)	<i>Anxiety</i> ( <i>N</i> = 64)	<i>PTSD</i> ( <i>N</i> = 64)	<i>Closeness</i> ( <i>N</i> = 52)	<i>Satisfaction</i> ( <i>N</i> = 52)
Overall Impact and Pervasiveness	.64 <sup>***</sup>	.70 <sup>***</sup>	.80 <sup>***</sup>	-.20	-.17
<i>Subscale</i>					
Mortality Salience	.51 <sup>***</sup>	.66 <sup>***</sup>	.70 <sup>***</sup>	-.10	-.06
Fear of future heart attack	.32 <sup>**</sup>	.56 <sup>***</sup>	.48 <sup>***</sup>	-.15	-.02
Fears about future physical health	.57 <sup>***</sup>	.63 <sup>***</sup>	.67 <sup>***</sup>	-.24	-.23
Consequences of death for loved ones	.46 <sup>***</sup>	.64 <sup>***</sup>	.74 <sup>***</sup>	-.09	-.06
Frustration with physical limits	.53 <sup>***</sup>	.59 <sup>***</sup>	.67 <sup>***</sup>	-.07	-.10
Frustration with life changes	.62 <sup>***</sup>	.40 <sup>***</sup>	.62 <sup>***</sup>	-.36 <sup>**</sup>	-.22
Overwhelmed by aftermath of event	.70 <sup>***</sup>	.59 <sup>***</sup>	.72 <sup>***</sup>	-.14	-.19

Note: <sup>\*\*</sup>  $p < .01$   
<sup>\*\*\*</sup>  $p < .001$



Table 6. Correlation Coefficients of Impact and Pervasiveness of Cardiac Event and its components with Psychological and Relational Health

	<i>Emotional Engagement</i>	
	<i>Blocking</i>	<i>Disclosure</i>
<b><i>Psychological Health</i></b>		
Depression (n = 50)	.62 <sup>***</sup>	.26 <sup>†</sup>
Anxiety (n = 49)	.56 <sup>***</sup>	.39 <sup>**</sup>
Post-traumatic Stress Disorder (n = 49)	.68 <sup>***</sup>	.31 <sup>*</sup>
<b><i>Relational Health</i></b>		
Closeness (n = 51)	-.39 <sup>**</sup>	.07
Satisfaction (n = 51)	-.35 <sup>*</sup>	-.02

Note: †  $p < .07$   
<sup>\*</sup>  $p < .05$   
<sup>\*\*</sup>  $p < .01$   
<sup>\*\*\*</sup>  $p < .001$

Table 7. Correlation Coefficients of Impact and Pervasiveness of Cardiac Event and its components with Engagement of Emotions Regarding the Cardiac Event

	<i>Emotional Engagement (n = 51)</i>	
	<i>Blocking</i>	<i>Disclosure</i>
<b><i>Overall Impact and Pervasiveness of Event</i></b>	.54 <sup>***</sup>	.36 <sup>**</sup>
Mortality Salience	.48 <sup>***</sup>	.35 <sup>*</sup>
Fear of future heart attack	.21	.37 <sup>**</sup>
Fears about future physical health	.52 <sup>***</sup>	.24 <sup>†</sup>
Consequences of own death for loved ones	.42 <sup>***</sup>	.33 <sup>**</sup>
Frustration with physical limitations	.49 <sup>***</sup>	.29 <sup>*</sup>
Frustration with life changes	.44 <sup>***</sup>	.15
Feeling overwhelmed by aftermath of cardiac event	.56 <sup>***</sup>	.35 <sup>*</sup>

*Note:* †  $p < .08$   
<sup>\*</sup>  $p < .05$   
<sup>\*\*</sup>  $p < .01$   
<sup>\*\*\*</sup>  $p < .001$

Table 8. Regression Analysis Results Assessing Main Effects of Cardiac Event Type and Blocking and 2-way Interaction of Cardiac Event Type x Blocking on Psychological and Relational Health

	Heart Attack vs. Bypass Surgery		Heart Attack & Bypass vs. Bypass Surgery		Blocking		Interaction Between Cardiac Event Type and Blocking	
	<i>F</i>	<i>β</i>	<i>F</i>	<i>β</i>	<i>F</i>	<i>β</i>	<i>F-change</i>	<i>R-sq change</i>
<b><i>Psychological Health</i></b>								
Depression	7.76	.32**	.89	.11	25.1	.55***	2.01	.045
Anxiety	.27	.07	1.00	.13	12.97	.54***	.15	.005
PTSD	5.25	.26*	.47	.07	33.9	.63***	.29	.006
<b><i>Relational Health</i></b>								
Closeness	1.08	-.15	.52	.10	7.67	.37**	1.22	.042
Satisfaction	2.58	-.23	.12	-.05	4.63	-.30*	.39	.015

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

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## Footnotes

1. Given the current sample size ( $N = 66$ ), a factor analysis of the whole of items may be somewhat problematic. Yet, given these limitations, a preliminary Principal Components Analysis with Varimax rotation of the impact and pervasiveness subscales shows that all subscales loaded strongly onto one general factor (eigenvalue = 4.79 and all factor loadings  $> .72$ ) accounting for 68% of the variance, thereby suggesting that the construction of this total scale score is not unreasonable.
2. Again, given the current sample size ( $N = 66$ ), a factor analysis of the whole of items may be problematic. However, prior research (La Guardia, 2008) has shown evidence for these two factors. Indeed, in this sample, a Principal Components Analysis with a Varimax rotation yielded the hypothesized blocking and disclosure factors (eigenvalues = 4.3 and 3.4, respectively; all factor loadings  $> .68$ ), accounting for 70% of the variance. Therefore, the construction of these two scales seems to reasonably represent data in the present sample.
3. I conducted a one-way ANOVA on time since event by type of cardiac event to determine if the effect of event type on depression, trauma and event impact could be accounted for by time since the event. The analysis showed that time since event did not differ by event type [ $F(2, 62) = .11$ , n.s.]. Therefore, the unique effect of event type on depression, trauma and event impact cannot be accounted for by the length of time since the event.

## Appendices

### Appendix A: Impact and Pervasiveness of Cardiac Event

The experience of your heart attack and/or bypass surgery has likely had many effects on how you think, feel, and behave. Think about your experiences over *the past two weeks*. Then, please read the following statements and indicate *how often* you have had each experience.

1	2	3	4	5	6	7	8	9
<i>Not at all</i>		<i>Several times per week</i>		<i>Once per day</i>		<i>Several times per day</i>		<i>Almost Always/All the time</i>

1. I was afraid that I would have a heart attack.
2. My pulse quickened and I got afraid that I was about to die.
3. I felt tightness in my chest or arm and I worried that I was about to have a heart attack.
4. I was scared about going to sleep because I worried that I wouldn't wake up again.
5. I didn't want to be alone or out of touch with others for fear that I might have a heart attack and no one would be there to help me.
6. I had uncertainty of my physical future and it frightened me.
7. I had fears about my future health.
8. My pulse quickened and I got afraid that I was about to have a heart attack.
9. I felt sad thinking about dying and never seeing the close others in my life again.
10. I worried about how my close others would go on without me if I died.
11. I tried to deny that I had a heart attack and/or bypass surgery but my physical body reminded me that I did.
12. I was afraid to do certain activities because I was physically limited (or felt limited) in what I could actually do.
13. Thoughts about my heart attack and/or bypass surgery were so present that I had a hard time concentrating on anything else.

- 14. I tried in my mind to forget about my heart attack and/or bypass surgery, but my body kept telling me I just can't do things like I used to.
- 15. I was aware of my physical vulnerability (e.g. I could die).
- 16. I had daydreams and/or nightmares, reliving the trauma of the heart attack and/or bypass surgery.

Please read the following statements and rate *how true* each statement is about your experiences *in the past two weeks*.

1	2	3	4	5	6	7	8	9
<i>Not at all true</i>		<i>Slightly true</i>		<i>Some- what true</i>		<i>Quite true</i>		<i>Very true</i>

- 17. I felt overwhelmed by all of the changes I've been going through because of the heart attack and/or bypass surgery.
- 18. I was tremendously aware of and focused on death (e.g., other people being sick and dying).
- 19. I felt angry about all of the changes I have had to make in my lifestyle because of my illness.
- 20. I was overwhelmed by all of the changes I have had to make in my lifestyle because of my heart attack and/or bypass surgery.
- 21. I felt resentful because I had to change my eating habits because of my heart attack and/or bypass surgery.
- 22. I felt angry about all of the problems that this heart attack and/or bypass surgery has caused me.
- 23. I felt resentful because I had to start exercising or change my exercise habits because of my heart attack and/or bypass surgery.
- 24. I felt unfocused and unmotivated to do much of anything in my life.

## Appendix B: Engagement of Emotions from Cardiac Event

The experience of your heart attack and/or bypass surgery has likely had many effects on how you think, feel, and behave. Think about your experiences over *the past two weeks*. Then, please read the following statements and indicate *how often* you have had each experience.

- | 1                     | 2 | 3                                     | 4 | 5                       | 6 | 7                                    | 8 | 9   |
|-----------------------|---|---------------------------------------|---|-------------------------|---|--------------------------------------|---|---|
| <i>Not<br/>at all</i> |   | <i>Several<br/>times per<br/>week</i> |   | <i>Once<br/>per day</i> |   | <i>Several<br/>times per<br/>day</i> |   | <i>Almost<br/>Always/All<br/>the time</i> |
1. I tried to ignore feelings that came up for me around my health and my heart attack and/or surgery when I was with my spouse/romantic partner.
  2. I showed or shared my feelings about my heart attack and/or bypass surgery with my spouse/romantic partner.
  3. I blocked feelings that came up for me around my health, my heart attack and/or bypass surgery when I was with my spouse/romantic partner.
  4. I wanted to talk with my spouse/romantic partner about my feelings that came up for me around the heart attack and/or bypass surgery.
  5. I tried to connect with my spouse/romantic partner about my feelings evoked by the heart attack and/or bypass surgery.
  6. I disconnected from my spouse/romantic partner because otherwise I would re-live terrible feelings I have about the heart attack and/or bypass surgery.
  7. I tried to connect with my spouse/romantic partner about his/her feelings about the heart attack and/or bypass surgery.
  8. I distracted myself from the feelings about the heart attack and/or bypass surgery when I was with my spouse/romantic partner.
  9. We talked openly about our feelings around the heart attack and/or bypass surgery and the consequences of these events with each other.
-

Think about your experiences over *the past two weeks*. Then, please read the following statements and rate *how true* each statement is about your experience.

1	2	3	4	5	6	7	8	9
<i>Not at all true</i>		<i>Slightly true</i>		<i>Some- what true</i>		<i>Quite true</i>		<i>Very true</i>

10. I worked with my spouse/ romantic partner to build a deeper understanding of our feelings around the heart attack and/or bypass surgery and a greater connection with him/her.

11. I wanted to just forget about or shut off the feelings about the heart attack and/or bypass surgery.