Mothers' Attachment Style, Their Mental Health, and Their Children's Emotional Vulnerabilities: A 7-Year Study of Children With Congenital Heart Disease

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ABSTRACT The long-term contribution of mothers' attachment insecurities to their own and their children's psychological functioning was examined in a 7-year prospective longitudinal study of children with Congenital Heart Disease (CHD). Sixty-three mothers of newborns with CHD participated in a three-wave study, beginning with the CHD diagnosis (T1), then 1 year later (T2), and again 7 years later (T3). At T1, the mothers reported on their attachment style and mental health. At T2, the mental health measure was administered again, along with a marital satisfaction scale. At T3, participants completed these two measures again, and their children reported on their self-concept and completed the Children's Apperception Test. Maternal avoidant attachment at T1 was the best predictor of deterioration in the mothers' mental health and marital satisfaction over the 7-year period, especially in a subgroup whose children had severe CHD. In addition, mothers' attachment insecurities (both anxiety and avoidance) at the beginning of the study were associated with their children's emotional problems and poor self-image 7 years later.

Adult attachment researchers have increasingly focused on the protective role of attachment security (expectations that key people in one's life will be available and supportive in times of need) in coping with and adjusting to life's adversities (for reviews, see Mikulincer & Shaver, 2003, 2005, 2007). This role is particularly important in the case of long-term, persistent stressors, such as chronic illness and has been shown to be highly significant when an adult copes with the

We owe thanks to Nili Shinar for her help in gathering the data.

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Journal of Personality 76:1, February 2008

DOI: 10.1111/j.1467-6494.2007.00479.x

painful experience of raising a child who has a severe, life-threatening disease (e.g., Berant, Mikulincer, & Florian, 2001a, 2001b, 2003). In such cases, mothers seem to bear the brunt of the coping burden (e.g., Cohn, 1996; Rae-Grant, 1985); hence, their sense of attachment security is likely to be associated with both their own well-being and mental health and the socioemotional development of their children. In the study reported here, we followed up mothers who experienced a major traumatic event—their infants' diagnosis with Congenital Heart Disease (CHD)—and examined whether their attachment style at the time of the child's diagnosis predicted their later mental health and marital satisfaction, as well as their child's eventual self-esteem, anxieties, and psychological defenses.

Attachment, Emotion Regulation, and Mental Health

One of the basic assumptions of attachment theory (Bowlby, 1982/1969, 1973, 1980) is that social interactions with significant others (called "attachment figures" in the theory) are internalized in the form of conscious and unconscious mental representations of self and relationship partners ("internal working models of self and others") that have an impact on close relationships and emotion regulation throughout life (Shaver & Mikulincer, 2002). To summarize the theory briefly, interactions with relationship partners who are available and supportive in times of need foster the development of both a sense of attachment security ("felt security"; Sroufe & Waters, 1977) and internal working models that are generally positive and optimistic, thereby providing a foundation for good mental health (Mikulincer & Shaver, 2003). When attachment figures are rejecting or unavailable in times of need, felt security is undermined, negative models of self and others are formed, and the likelihood of later emotional problems and maladjustment increases (Shaver & Mikulincer, 2002).

When testing this theory in studies of adults, most researchers have focused on a person's "attachment style"—the systematic pattern of relational expectations, emotions, and behaviors that results from a particular attachment history (Fraley & Shaver, 2000). Research, beginning with Ainsworth, Blehar, Waters, and Wall (1978) and continuing through recent studies by social and personality psychologists (reviewed by Mikulincer & Shaver, 2003, 2007), indicates

that attachment style can be measured in terms of two orthogonal dimensions, attachment-related *anxiety* and *avoidance* (Brennan, Clark, & Shaver, 1998). A person's position on the anxiety (or anxious attachment) dimension indicates the degree to which he or she worries that a partner will not be available in times of need and adopts "hyperactivating" attachment strategies—energetic, insistent attempts to obtain care, support, and love from relationship partners—as a means of regulating distress and coping with threats and stressors (Mikulincer & Shaver, 2003). A person's position on the avoidance (or avoidant attachment) dimension indicates the extent to which he or she distrusts relationship partners' goodwill, strives to maintain behavioral independence and emotional distance from partners, and relies on deactivating strategies, such as denial of attachment needs and suppression of attachment-related thoughts and emotions (Mikulincer & Shaver, 2003). People who score low on both dimensions are said to be secure or to have a secure attachment style.

There is now extensive evidence that a person's attachment style is predictably associated with coping strategies and adjustment in response to stressors. People who score high on attachment anxiety tend to appraise threats as extreme and their own coping resources as deficient, to exaggerate and ruminate on threatening thoughts, and to report high levels of distress during and after stressful events (e.g., Alexander, Feeney, Hohaus, & Noller, 2001; Birnbaum, Orr, Mikulincer, & Florian, 1997; Mikulincer & Florian, 1995, 1998, 2001). There is also evidence that people who score high on measures of avoidant attachment are reluctant to seek support during stressful events and tend to rely on cognitive and behavioral distancing as a coping strategy, to divert attention from distress-related cues, and to suppress distress-related thoughts (e.g., Birnbaum et al., 1997; Fraley & Shaver, 1997; Lussier, Sabourin, & Turgeon, 1997; Mikulincer & Florian, 1995, 1998, 2001; Mikulincer, Florian, & Weller, 1993; Simpson, Rholes, & Nelligan, 1992; Turan, Osar, Turan, Ilkova, & Damci, 2003).

With regard to mental health, avoidant attachment has generally been found to be unrelated to conscious psychological distress when dealing with daily hassles or minor stressors (see Mikulincer & Florian, 1998, 2001, for reviews). However, during and following encounters with traumatic and persisting stressors, avoidance predicts heightened distress and more severe emotional problems (e.g.,

Berant et al., 2001a; Mikulincer, Horesh, Eilati, & Kotler, 1999; Mikulincer, Shaver, & Horesh, 2006). A recent study has deepened our understanding of this vulnerability by showing that avoidant people fail to suppress threat-related thoughts about separation and negative self-representations when high cognitive demands are imposed on them, even in a laboratory situation (Mikulincer, Dolev, & Shaver, 2004). Thus, avoidant attachment seems to involve active suppression of threatening information and mental contents, which can be an effective defensive strategy when the external demands are relatively mild. But when the demands are great, suppression fails and an avoidant person is revealed to be insecure and anxious underneath.

Although the link between attachment style and mental health is well established (Mikulincer & Shaver, 2007), the direction of causality is still open to research. Most previous studies have been based on cross-sectional designs and the assumption that attachment style is a stable phenomenon that has persisting effects on other aspects of mental health (see Mikulincer & Florian, 1998, 2001, for reviews). However, recent studies have documented fluctuations in attachment style following major life changes (e.g., marriage) and stressful events (e.g., Cozzarelli, Karafa, Collins, & Tagler, 2003; Davila, Burge, & Hammen, 1997; Davila & Sargent, 2003). In fact, studies of adult attachment typically find that roughly 30% of adults change their self-reported attachment style when reassessed at a later time (e.g., Baldwin & Fehr, 1995; Davila et al., 1997), and in some cases at least, test-retest correlations between attachment assessments at different times have been only moderate in size (Mikulincer & Shaver, 2007, ch. 5). Hence, cross-sectional associations between attachment style and mental health do not necessarily support only a single causal interpretation of the link.

To overcome the limitations of cross-sectional studies, Berant et al. (2001b, 2003) adopted a longitudinal approach and examined the predictability from attachment style of changes in mothers' mental health over a 1-year period following the diagnosis of their infant's CHD, one of the most prevalent congenital diseases (affecting 8 of every 1000 newborns; Martin, Perry, & Ferencz, 1989). Although the severity of CHD ranges from minor cardiac defects that may spontaneously correct themselves to more life-threatening defects that require surgical intervention, they are often a major source of maternal stress (Austin, 1991; Cohn, 1996). Children with mild forms of

CHD are not restricted in their physical capacities and may be as active as their age mates. They need cardiac follow up, antibiotics for dental treatment, and parents should be aware of the children's possible problems. But children with severe forms of CHD suffer from significant physical incapacities, grow abnormally slowly, have feeding problems, and need regular medications and regular medical follow up. Hence, mothers of children with severe CHD have to devote more time and effort in daily care of their children and are under more stress in comparison with mothers of children with mild CHD.

We found that mothers who scored high on attachment anxiety or avoidance at the time of the initial diagnosis of their infant's CHD concurrently appraised the situation in more threatening terms, expressed more doubts about their ability to cope with motherhood, relied on less effective coping strategies, and reported poorer mental health. A follow-up study 1 year later revealed that mothers' avoidant attachment at the time of the CHD diagnosis prospectively predicted deterioration in their mental health over time. Although mothers scoring high on attachment anxiety showed elevated levels of psychological distress at the time of the CHD diagnosis, unlike the more avoidant mothers they did not show a deterioration of mental health over the following year. In the marital domain, we found that severity of the infant's CHD and mothers' attachment anxiety or avoidance predicted lower marital satisfaction a year later.

Although the follow-up study clearly indicated that mothers' attachment insecurities, particularly along the avoidance dimension, were associated with an increased risk of emotional and marital problems a year later, we did not know whether these insecurities would have longer-lasting effects on the mothers' mental health and marital relations beyond the 1-year study period. We also did not know whether these negative effects would contribute to the children's emotional development. These issues are addressed in the present 7-year follow up.

The Present Study

In this study, we recontacted the sample of mothers whose children were diagnosed with mild and severe forms of CHD 7 years earlier. We assessed their current mental health and marital satisfaction and their children's self-esteem, anxieties, and psychological defenses, as

evidenced in self-reports and in the stories they generated in response to the Children Apperception Test (CAT; Bellak & Abrams, 1996). We then determined whether the severity of the children's CHD (as indicated by physicians) and the mothers' attachment style at the time of the CHD diagnosis (assessed in terms of attachment anxiety and avoidance) could explain changes in their mental health and marital satisfaction over 7 years as well as differences in their children's self-esteem, anxieties, and psychological defenses.

Our first research issue is the contribution of a mother's attachment style to changes in her mental health over a 7-year period. Although few studies have dealt with prospective changes in the mental health of mothers of children suffering from chronic illnesses over periods longer than 1 year, accumulating evidence suggests that such mothers' mental health typically improves over time. For example, Kovacs et al. (1985, 1990) found that mothers' initial distress following the diagnosis of insulin-dependent diabetes mellitus in their children declined over the subsequent year, an improvement that persisted over the subsequent 5 years. Similar findings were reported by Dahlquist, Czyzewski, and Jones (1996), who found that mothers' anxiety following their children's cancer diagnosis had decreased 2 years later. We therefore wondered whether mothers' attachment orientations would be associated with this improvement in mental health over the years following their children's CHD diagnosis. Berant et al. (2001b) found that avoidant attachment, assessed at the time of the CHD diagnosis, predicted deterioration in mothers' mental health over a period of 1 year in cases of severe, life-threatening CHD. The question here is whether this deterioration remained stable over the subsequent 6 years.

Our second research issue is the possible long-lasting contributions of children's CHD and mothers' attachment insecurities to mothers' reports of marital satisfaction. The ongoing stress that mothers of a chronically ill infant face may have important implications for their marital relationship. Research has shown that although divorce rates are not necessarily elevated in these couples, there is a significant risk for marital distress (e.g., Hauenstein, 1990; Sheeran, Marvin, & Pianta, 1997; Zimand & Wood, 1986): Controlled studies have found that couples with chronically ill children report greater marital dissatisfaction than matched couples with healthy children (e.g., Lansky, Chairns, Hassaneim, Wher, & Lowmann, 1978; Reynold, Garralda, Jameson, & Postlehwaite, 1988; Tew,

Payne, & Laurence, 1974). The dissatisfaction seems to center on poor communication, role incongruity, and lack of intimacy and affection (e.g., Barbarin, Hughes, & Chesler, 1985; Heffreon, Bommelaere, & Master, 1973; Phillips, Bohannon, Gayton, & Friedman, 1985). Berant et al. (2003) also observed deterioration in marital satisfaction among mothers of children with severe CHD over the first year following the CHD diagnosis. But this deterioration was observed mainly among insecure mothers. In the present study, we examined whether this deterioration in marital satisfaction and the detrimental effects of attachment insecurities were still notable 7 years after the CHD diagnosis.

Our third research issue is the potential effect of CHD severity and mothers' attachment insecurities on children's emotional well-being. Like other chronic, life-threatening illnesses, severe forms of CHD are likely to have detrimental effects on children's emotional well-being. These negative consequences may be aggravated by the intergenerational transmission of a mother's emotional problems. In fact, anxiety and poor psychological adjustment in children with CHD seem to be more associated with maternal anxiety than with the severity of the child's physical disorder (Linde, Rasof, Dunn, & Rabb, 1966). Children with anxious or insecure mothers have to deal not only with their own disease but also with their mother's worries and dissatisfaction. Research has also shown that when mothers react with depression and anxiety to their child's chronic illness, mother-child interactions are less positive and the child is at greater risk for low self-esteem and emotional problems (e.g., Breslau, Staruch, & Mortimer, 1982; Stoneman, Brody, & Burke, 1989; Zuravin, 1989). In the present study, we examined (a) the extent to which CHD severity and mothers' attachment insecurities were associated with children's emotional well-being and (b) whether these associations were mediated by the mother's mental health and marital problems.

We hypothesized that a combination of the mother's avoidant attachment and the severity of the child's CHD would put both mothers and children at risk for emotional problems and maladjustment. It seemed likely that the severe and persistent stress of having to raise a child with severe, life-threatening CHD would impose harsh demands on avoidant mothers' psychological resources and then damage their mental health and marital relationships (Shaver & Mikulincer, 2005). As a result, mothers of children suffering from

severe CHD who scored high on avoidant attachment at the time of the CHD diagnosis would suffer from a further deterioration of mental health and marital satisfaction by the 7-year time point and their children would have correspondingly lower self-esteem, more intense anxieties, and more primitive defenses at age 7.

METHOD

Participants

The sample consisted of 63 mothers of children diagnosed with CHD during their first year of life, who participated in all three waves of assessment (immediately following the diagnosis, 1 year later, and 7 years later). At the time of the CHD diagnosis, the infants, who were referred to treatment and follow-up in different cardiology institutes in the central region of Israel, were 3 months old (on average), and 44% of them were boys. Mothers of CHD infants who suffered from other medical conditions at the time of the diagnosis (e.g., mental retardation, brain dysfunction) and mothers who were known to be substance abusers were excluded from the original sample.

The most frequent heart defects were Ventricular Septal Defect ($n = 33$), Arterial Septal Defect ($n = 10$), and Transposition of great arteries ($n = 7$). Immediately after the diagnosis, two senior pediatric cardiologists read the children's medical files and independently rated the CHD severity of each child on a 7-point scale, ranging from 1 (*not severe at all*) to 7 (*very severe, life-threatening defect*). These ratings, which were highly correlated ($r = .91$, $p < .01$), were normally distributed and averaged 3.54 ($SD = 1.16$). No significant association was found between these ratings and the mother's attachment style at the time of the diagnosis.[1]

The mothers' age at the beginning of the study (when their children were diagnosed with CHD) ranged from 24 to 40 ($M = 32.49$, $SD = 5.41$). All 63 mothers were Jewish, resided in the central urban area of the country, were married, and lived in intact families. At the beginning of the

1. With the exception of 12 infants whose health status was improved through surgical interventions, no change in CHD severity (as rated by cardiologists) was noted in the studied infants between Times 1 and 3. Again, no significant association was found between these ratings and mother's attachment style, mental health, or marital satisfaction. Statistical control of these ratings at Time 3 did not affect the associations reported in the Results section.

study, years of marriage ranged from 1 to 7 ($M = 3.05$, $SD = 1.78$) and number of children ranged from 1 to 5 ($M = 1.56$, $SD = 1.64$). Nineteen mothers gave birth to another child during the 7-year study period, and 11 mothers gave birth to more than one new child (between two and four children). None of these children was diagnosed as suffering from CHD or any other severe disease. Thirty-one percent of the mothers completed high school, whereas 62% of them studied in different professional programs. All participated in the study without monetary reward.

At Time 3 (7 years after the diagnosis), 60 of the 63 CHD children (34 girls and 26 boys) whose mothers participated in all three waves of data collection also participated in the study. We failed to collect data from three CHD children because their mothers did not wish to expose them to questions about their medical condition. Fifty-six children were 7 years old and four were 8 years old. Twelve children had undergone heart surgery, and two had been catheterized. Most of the children (52) were followed up at least once a year in a cardiology institute, and the remaining children were not followed up at all.

Materials and Procedure

The data were collected in three stages. At Time 1, we approached all of the mothers whose infants were diagnosed with CHD in five major medical centers in the central area of Israel over a 12-month period. Specifically, the pediatric cardiologist who diagnosed the CHD contacted the mothers immediately after the diagnosis, explained the illness and expected prognosis, and asked the mothers if they would be willing to participate in research aimed at understanding how mothers of CHD infants feel and the best ways to help them. Mothers were also told that, within 2 weeks, a psychologist would contact them and that their anonymity was assured. The mothers signed an informed consent agreement, and a female senior clinical psychologist visited them at their home after their infant was discharged from the hospital (Time 1). We originally approached 121 mothers who met the criteria for inclusion in the study, and 101 of them agreed to participate in the study (refusal rate of 18%). At this time, the mothers completed self-report assessments of attachment style and mental health.

One year later (Time 2), the mothers who participated at Time 1 and met the study's inclusion criteria (the child was alive and no brain dysfunction was diagnosed during the study period) were approached by the same psychologist who interviewed them at Time 1. Of the 101 mothers who participated at Time 1, 85 also participated at Time 2 (85%) and completed self-report measures of mental health and marital satisfaction.

Seven years later (Time 3), the mothers who participated at both Times 1 and 2 and met the study's inclusion criteria were approached by a

different female psychologist. Of the 85 mothers who participated at both Times 1 and 2, 63 participated at Time 3 and completed the same mental health and marital satisfaction scales. At this time, the psychologist also asked for a mother's consent to meet with her child privately. After receiving the mother's permission, the child completed measures of self-concept and generated stories in response to CAT cards.

The 38 mothers who did not participate in all three waves of measurement included 4 whose infant died during heart surgery, 1 who lost her husband, 7 whose infant had diagnosed brain damage, 1 who gave birth to a younger brother with pervasive developmental disorder (PDD), 10 who refused to participate for various reasons, and 16 who were impossible to locate following moves. There was no significant difference in Time 1 and Time 2 measures between the 63 mothers who participated at all three times points and the remaining 38 mothers.

At each wave of measurement, self-report scales were presented in random order and completed individually in the presence of the psychologist. All scales were Hebrew versions of English scales that were translated in previous studies using common back-translation techniques that have been shown to produce valid scales.

The mothers' attachment orientation at the time of the CHD diagnosis (Time 1) was assessed with Mikulincer, Florian, and Tolmacz's (1990) 10-item adult attachment-style scale. This scale includes five items tapping the avoidance dimension (e.g., "I'm somewhat uncomfortable being close to other persons") and five items tapping the anxiety dimension (e.g., "I often worry that my partner does not love me"). Items were constructed based on Hazan and Shaver's (1987) prototype measures of three major attachment styles. Participants were asked to think about their close relationships and rate the extent to which each item was self-descriptive. Ratings were made on 7-point scales, ranging from *not at all* (1) to *very much* (7). In our sample, Cronbach's alphas were adequate for the anxiety items (.71) and the avoidance items (.72). Scores were computed by averaging the relevant items. No significant association was found between the two scores, $r(61) = .18$.

The mothers' mental health at each of the three time points was assessed with the Mental Health Inventory (MHI; Florian & Drory, 1990; Veit & Ware, 1983). The MHI included 38 items, each answered on a 6-point scale, ranging from complete confirmation (6) to complete rejection (1) of applicability of the item to the participant over the preceding two weeks. The MHI consists of 14 positive state items that define psychological well-being (e.g., "I feel relaxed and calm," "I enjoy the things that I do"). It also includes 24 negative-state items ("I feel depressed," "I feel tense"). Cronbach's alphas indicated adequate internal consistency for the 38 items (.93 at Time 1, .95 at Time 2, .92 at Time 3). We computed a

total score at each time point by averaging the 38 items (as recommended by Veit & Ware, 1983). Higher scores indicated better mental health.

Significant and strong associations were found between mental health scores at different time points, with *r*s ranging from .46 to .63, all $ps < .01$. A within-subjects repeated measures analysis of variance (ANOVA) examining differences in mental health across the three waves of measurement revealed, in line with previous studies, better mental health at Times 2 and 3 ($Ms = 4.28$ and 4.39, respectively) than at Time 1 ($M = 3.75$), $F(2,59) = 6.41$, $p < .01$. The difference between scores at Times 2 and 3 was not significant.

Marital satisfaction at Times 2 and 3 was assessed with a shortened Hebrew version of the Evaluating and Nurturing Relationship Issues Communication and Happiness scales (ENRICH; Olson, Fournier, & Duickman, 1982). This instrument was designed to assess the level of satisfaction in five areas of marriage (a total of 50 items, 10 items per subscale): communication, conflict resolution, children and marriage, sexual relationship, and egalitarian relations. Participants rated their agreement with each item on a 5-point scale ranging from *not at all* (1) to *very much* (5). Cronbach's alphas were reasonably high for each of the five subscales (ranging from .75 to .89 at Time 2 and from .73 to .82 at Time 3), as well as the 50 items combined (.91 at Time 2, .92 at Time 3). Because Pearson correlations between scores on the five subscales were extremely high (*r*s ranging from .65 to .81 at Time 2 and from .63 to .84 at Time 3), we computed a single total score by averaging all 50 ENRICH items. (Analyses conducted on each of the five subscales replicated the results for the total marital satisfaction score.) Higher scores indicated higher marital satisfaction.

A significant and strong association was found between the total marital satisfaction scores at Times 2 and 3, $r(61) = .58$, $p < .01$, implying considerable stability across a 6-year period. A within-subjects repeated measures ANOVA examining differences in marital satisfaction between the two waves of measurement revealed a significant decrease in marital satisfaction from Time 2 ($M = 3.98$) to Time 3 ($M = 3.31$), $F(1,60) = 5.63$, $p < .01$. In addition, significant but moderate associations were found between reports of marital satisfaction and mental health at both Time 2, $r(61) = .38$, $p < .01$, and Time 3, $r(61) = .31$, $p < .05$, suggesting that these measures tap related but different facets of psychological functioning.

At Time 3, children completed a self-report measure of self-concept and were asked to generate stories in response to CAT cards. Children's explicit (i.e., conscious) self-concept was assessed with a brief version of the Tennessee Self-Concept scale (Fitts, 1965). It included 27 items that were applicable to 7-year-old children and tapped personal (six items), familial (six items), social (six items), and physical (nine items) self-image.

Children rated their agreement with each item on a 5-point scale, ranging from *not at all* (1) to *very much* (5). In our sample, the Cronbach's alpha was adequate for the 27 items (.85), so we averaged them to produce a single score; higher scores indicate a more positive explicit self-concept.

Children also told stories about CAT cards. The CAT is a self-expressive measure, used with children of both sexes between the ages of 3 and 10, to assess children's implicit motives, worries, and defenses in their relationship with important people in their lives. It consists of 10 pictures depicting animals in various situations, and children are asked to generate stories about what is happening in each of the pictures. The responses are recorded verbatim and later analyzed. In the current study, we administered nine CAT cards that had been shown to elicit themes of relationship with one's mother, the child's anxieties and ways of coping, the child's role within the family and attitudes toward parents, and fears of abandonment and separation. Most of the children ($n = 54$) responded to all nine cards, but six children responded to only four to six cards because they asked the examiner if they could stop.

Two clinical psychologists, who are experts in CAT scoring and were blind to the children's CHD severity and the mothers' self-reports, independently analyzed the children's stories and scored them according to the CAT manual (Bellak & Abrams, 1996; Haworth, 1966). For each story, each judge made several ratings. First, each judge independently rated (a) the child's implicit self-image as indicated in the narrative and (b) the dominant affect of the narrative. Each rating was made on a 5-point scale ranging from (1) *very negative* to (5) *very positive*.

Second, each judge independently marked whether or not (yes/no rating) each of the following four representations of a mother appeared in the narrative: (a) "mother is distant/avoidant," (b) "mother is bad/punishing," (d) "mother is good/caring," and (e) "mother is ambivalent toward the child." Then, for each story, each judge computed a total maternal representation score by counting the number of negative maternal representations (distant, punishing, ambivalent) and subtracting the number of representations of the mother as caring. Higher scores indicate more negative representations of the mother.

Third, each judge independently marked whether or not (yes/no rating) each of the following seven kinds of anxiety appeared in a story: (a) fear of punishment, (b) fear of disapproval, (c) fear of lack or loss of love, (d) fear of being rejected, (e) fear of separation, (f) fear of being overpowered by others, and (g) fear of being devoured by others. Then, for each story, each judge counted the number of interpersonal anxieties a child expressed in that story.

Fourth, each judge independently marked whether or not (yes/no rating) each of the following defense mechanisms appeared in a story in

response to conflicts and fears: (a) repression, (b) reaction formation, (c) regression, (d) projection, (f) undoing, and (g) rationalization. Then, for each story, each judge computed two defense scores according to Bellak and Abrams's (1996) typology: (a) reliance on low-level defenses (regression, projection, reaction formation, undoing) and (b) reliance on high-level defenses (repression, rationalization).

Pearson correlations between the ratings of the two judges for each of the categories (self-image, dominant affect, maternal representation, interpersonal anxiety, low-level defenses, and high-level defenses) and each of the stories revealed high interjudge reliability, with *r*s ranging from .77 to .84. We therefore averaged the two judges' scores for each category and story. Cronbach's alphas for each category across the nine stories were adequate, ranging from .78 to .89. For each child we computed total scores by averaging his or her scores for each category (self-image, dominant affect, maternal representation, interpersonal anxiety, low-level defenses, and high-level defenses) across all of the stories generated.

RESULTS

Mother's Mental Health

In this section, we examine the contribution of CHD severity and a mother's attachment style at the time of the diagnosis (Time 1) to changes in her mental health across 7 years.[2] We conducted a three-step hierarchical regression analysis predicting the total mental health score at Time 3. In Step 1, we introduced the mother's mental health at Times 1 and 2 as predictors. In Step 2, we included the mother's attachment anxiety and avoidance as well as the physicians' ratings of CHD severity at the time of the diagnosis (all of the variables were centered around their means). In other words, we examined the contribution of the mother's attachment style and the child's CHD severity to *changes* in the mother's mental health by Time 3 (compared with Times 1 and 2). That is, we examined whether attachment orientations and CHD severity significantly predicted changes in the mother's mental health beyond what was expected

2. We also included children's gender as an additional predictor in all of the regression analyses, but no significant unique or interactive effects were found for this variable. In addition, regressions conducted separately for boys and girls revealed similar significant effects for CHD severity and mother's attachment style. Therefore, we do not discuss gender further.

based on her mental health scores at Times 1 and 2 (Berant et al., 2001a, 2001b). In Step 3, we added the product of each attachment score and the physicians' rating of CHD severity in order to examine interactions between the mother's attachment insecurities at Time 1 and the severity of her child's illness. Table 1 displays the key results.

As can be seen in the table, the regression analysis revealed that the unique effects of the mother's attachment style and CHD severity accounted for 11.4% of the variance in the mother's mental health at Time 3, beyond what was expected from the mother's mental health at Times 1 and 2. An examination of the regression coefficients revealed a significant unique effect for Time 1 avoidant attachment: The higher the mother's avoidance score at the time of her child's diagnosis, the worse her mental health 7 years later beyond the level expected from her mental health at Times 1 and 2 (see Table 1). Neither Time 1 maternal attachment anxiety nor CHD severity contributed uniquely to changes in mental health by Time 3 (see Table 1).

The regression analysis also revealed that the interactions between maternal attachment dimensions and infant CHD severity added 21.8% to the explained variance. This overall effect was due mainly to the significant interaction between maternal avoidance and CHD

Table 1
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Attachment Scores and CHD Severity to Changes in Mother's Mental Health at Time 3

Effect	*b*	*SE*	Beta	*t*
Step 1—R^2 (%) = 23.9%, F (2, 60) = 10.27, $p < .01$				
Mother's mental health at Time 1	.35	.14	.37	2.80**
Mother's mental health at Time 2	.19	.15	.19	1.28
Step 2—R^2 change (%) = 11.4%, F (5, 57) = 7.44, $p < .01$				
Mother's avoidance at Time 1	−.65	.23	−.39	−2.86**
Mother's anxiety at Time 1	.05	.21	.03	0.27
Infant's CHD severity	−.24	.18	−.16	−1.33
Step 3—R^2 change (%) = 21.8%, F (7, 55) = 12.23, $p < .01$				
Mother's avoidance × CHD severity	−.65	.15	−.46	−4.41**
Mother's anxiety × CHD severity	−.13	.14	−.10	−0.97

Notes:
*$p < .05$; **$p < .01$.

severity (see Table 1). The interaction between maternal attachment anxiety and CHD severity was not significant.

Simple slope tests revealed that the mother's avoidant attachment at the time of the CHD diagnosis was significantly associated with a decrease in her mental health over 7 years if the infant's CHD was diagnosed as severe (1 *SD* above the mean), $\beta = -.85$, $p < .01$. However, when the infant's CHD was diagnosed as relatively mild (1 *SD* below the mean), the mother's avoidance at the time of the diagnosis did not contribute significantly to changes in her mental health over the 7 years, $\beta = .07$. Furthermore, the severity of the infant's CHD was significantly associated with the mother's poorer mental health 7 years later if her avoidance at the time of the diagnosis was relatively high (1 *SD* above the mean), $\beta = -.62$, $p < .01$, but not if her avoidance was relatively low (1 *SD* below the mean), $\beta = .28$. That is, highly avoidant mothers showed a significant decrease in mental health over the 7 years following the CHD diagnosis mainly when the child's illness was more severe.

Marital Satisfaction

To examine the contribution of CHD severity and the mother's attachment style at the time of the diagnosis to changes in her marital satisfaction over the years, we conducted the same kind of three-step hierarchical regression analysis described above on her marital satisfaction at Time 3. Mother's marital satisfaction at Time 2 was entered in Step 1 of the analysis so that we could assess changes in satisfaction over time, controlling for the earlier level of satisfaction. The analyses revealed that the higher the mother's avoidant attachment score at the time of her infant's diagnosis, the lower her reported marital satisfaction 7 years later (see Table 2). Neither Time 1 maternal attachment anxiety nor CHD severity made a significant unique contribution to changes in marital satisfaction by Time 3 (see Table 2). The analysis also revealed that the interactions between the mother's attachment dimensions and the infant's CHD severity added 10.7% to the explained variance. This effect was due mainly to the significant interaction between maternal avoidant attachment and infant CHD severity (see Table 2). The interaction between attachment anxiety and CHD severity was not significant.

Simple slope tests revealed that a mother's attachment avoidance at the time of the CHD diagnosis was significantly associated with a

Table 2
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Attachment Scores and CHD Severity to Changes in Mother's Marital Satisfaction at Time 3

Effect	*b*	*SE*	Beta	*t*
Step 1—R^2 (%) = 11.2%, F (1, 61) = 8.33, $p < .01$				
Mother's marital satisfaction at Time 2	.42	.14	.36	2.89**
Step 2—R^2 change (%) = 11.1%, F (4, 58) = 5.16, $p < .01$				
Mother's avoidance at Time 1	− .27	.09	− .40	− 2.92**
Mother's anxiety at Time 1	.07	.09	.11	0.79
Infant's CHD severity	− .09	.08	− .16	− 1.31
Step 3—R^2 change (%) = 10.7%, F (6, 56) = 5.84, $p < .01$				
Mother's avoidance × CHD severity	− .17	.07	− .30	− 2.37*
Mother's anxiety × CHD severity	− .07	.07	− .13	− 1.06

Notes:
*$p < .05$; **$p < .01$.

decrease in her marital satisfaction over the years if the infant's CHD was diagnosed as relatively severe (1 *SD* above the mean), $\beta = -.70$, $p < .01$. However, when the infant's CHD was diagnosed as relatively mild (1 *SD* below the mean), the mother's attachment avoidance at the time of the diagnosis did not contribute significantly to changes in marital satisfaction over the years, $\beta = -.10$. Furthermore, the severity of the infant's CHD diagnosis was significantly associated with a decrease in mother's marital satisfaction over the years when attachment avoidance at the time of the diagnosis was relatively high (1 *SD* above the mean), $\beta = -.46$, $p < .01$, but not when attachment avoidance was relatively low (1 *SD* below the mean), $\beta = .14$. That is, highly avoidant mothers showed a significant decrease in marital satisfaction by 7 years after the diagnosis of a severe CHD.

Children's Explicit Self-Concept

In this section, we examine the contribution of CHD severity and a mother's attachment style at the time of the diagnosis (Time 1) to children's score in the Tennessee Self-Concept scale at age 7–8. For this purpose, we conducted a two-step hierarchical regression analysis. In Step 1, we introduced the mother's attachment anxiety and avoidance and the physicians' ratings of CHD severity as predictors.

In the second step, we added the product of each attachment score and the physicians' ratings to examine interactions between the mother's attachment style and the severity of the child's illness. Table 3 presents the findings from these regression analyses.

As can be seen, the unique effects of the mother's attachment style at the time of the child's diagnosis and the child's CHD severity accounted for a very sizeable 29.3% of the variance in the child's Tennessee Self-Concept score 7 years later. Examination of the regression coefficients revealed significant unique effects for both Time 1 attachment-insecurity dimensions: The higher the mother's avoidance or anxiety score at the time of the diagnosis, the less positive her child's explicit self-concept 7 years later (see Table 3). CHD severity did not have a significant unique effect on the child's Tennessee Self-Concept score.

The regression analysis also revealed a significant interaction between a mother's attachment anxiety and her infant's CHD severity (see Table 3). The interaction between maternal avoidant attachment and CHD severity was not significant. Simple slope tests revealed that the mother's attachment anxiety at the time of the CHD diagnosis was significantly associated with the child's poor explicit self-concept at age 7–8 only when the child suffered from a relatively severe CHD (1 *SD* above the mean), $\beta = -.77$, $p < .01$, but not when the CHD was relatively mild (1 *SD* below the mean), $\beta = .01$. That is,

Table 3
Regression Coefficients, Standard Errors, and Significance Tests of the Contributions of Attachment Scores and CHD Severity to Child's Self-Esteem at Age 7

Effect	*b*	*SE*	Beta	*t*
Step 1—R^2 (%) = 29.3%, F (3, 56) = 8.75, $p < .01$				
Mother's avoidance at Time 1	−.21	.09	−.29	−2.28**
Mother's anxiety at Time 1	−.27	.09	−.38	−2.90**
Infant's CHD severity	.04	.08	.13	0.48
Step 2—R^2 change (%) = 9.8%, F (5, 54) = 8.18, $p < .01$				
Mother's avoidance × CHD severity	.09	.07	.16	1.25
Mother's anxiety × CHD severity	−.23	.07	−.39	−3.23**

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

the mother's attachment anxiety seemed to predispose children who suffered from severe CHD to develop a less positive explicit self-concept.

Children's CAT Responses

In this section, we examine the contribution of CHD severity and the mother's attachment style at the time of the diagnosis (Time 1) to children's CAT scores: self-image, dominant affect, maternal representation, interpersonal anxiety, low-level defenses, and high-level defenses. For this purpose, we conducted the same kind of two-step hierarchical regression analyses described in the previous section, but this time we examine the unique and interactive effects of the mother's attachment anxiety and avoidance and the physicians' ratings of CHD severity on the child's CAT responses. Table 4 summarizes the results.

For the CAT self-image score, the regression analysis revealed that the unique and interactive effects of the mother's attachment style and CHD severity accounted for 18.3% of the variance (see Table 4). Examination of the regression coefficients revealed a significant unique effect of the mother's avoidance: The higher her avoidant attachment score at the time of the diagnosis, the less positive her child's CAT self-image score 7 years later (see Table 4). A mother's attachment anxiety and CHD severity did not significantly contribute to her child's CAT self-image score. Beyond these main effects, there was a significant interaction between the mother's avoidance and CHD severity (see Table 4). Simple slope tests revealed that a mother's avoidant attachment at the time of the CHD diagnosis was significantly associated with a less positive child self-image (assessed with the CAT) when the child suffered from a relatively severe heart defect (1 *SD* above the mean), $\beta = -.74$, $p < .01$, but not when the CHD was relatively mild (1 *SD* below the mean), $\beta = -.14$. Viewed the other way around, more severe CHD was associated with a poorer child self-image (assessed with the CAT) when the mother's avoidance was relatively high (1 *SD* above the mean), $\beta = -.44$, $p < .01$, but not when the mother's avoidance was relatively low (1 *SD* below the mean), $\beta = .06$.

The regression analysis performed on the CAT dominant affect score revealed that a mother's attachment style and her child's CHD

Table 4

Standardized Regression Coefficients for the Contributions of Attachment Scores and CHD Severity to Child's CAT Responses

Effects	Self-Image	Dominant Affect	Mother Image	Interpers. Anxieties	Low-Level Defenses	High-Level Defenses
Step 1						
Mother Avoidance	−.45**	−.44**	.29*	−.05	.29*	−.17
Mother Anxiety	.16	.19	.28*	.39**	.01	−.16
CHD severity	−.15	−.18	−.06	.13	.22	−.12
R^2 (%)	14.2**	15.4**	18.4**	11.2*	11.9*	0.4
Step 2						
Avoidance × Severity	−.29*	−.17	.07	−.04	.30*	−.24
Anxiety × Severity	−.02	−.05	−.06	.30*	.16	.03
R^2 change (%)	4.1*	0.4	0.5	4.6*	14.4**	0.5

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

severity accounted for 15.8% of the variance (see Table 4). Only the unique effect of the mother's avoidance was significant: The higher the mother's avoidance score at the time of the child's diagnosis, the less positive was the child's dominant affect in the stories he or she devised years later.

The regression analysis for the CAT maternal representation score was also significant and accounted for 18.9% of the explained variance. As can be seen in Table 4, the unique effects of the mother's attachment anxiety and avoidance were significant. The higher the mother's attachment anxiety or avoidance at the time of the child's diagnosis, the less positive was the child's representation of his or her mother in the CAT 7 years later.

For the CAT interpersonal anxieties score, the regression analysis was significant and accounted for 15.8% of the variance (see Table 4). There was a significant unique effect of mother's attachment anxiety: The higher the mother's anxiety score at the time of the diagnosis, the more interpersonal anxieties her child expressed in the CAT stories years later (see Table 4). There was also a significant interaction between a mother's anxious attachment and her child's CHD severity. Simple slope tests indicated that the mother's attachment anxiety at time of the CHD diagnosis was significantly associated with the child's expression of more interpersonal anxieties in CAT stories if the child suffered from relatively severe CHD (1 *SD* above the mean), $\beta = .69$, $p < .01$, but not when the CHD was relatively mild (1 *SD* below the mean), $\beta = .09$. As well, more severe CHD was associated with the expression of more interpersonal anxieties in CAT stories when the mother's attachment anxiety was relatively high (1 *SD* above the mean), $\beta = .43$, $p < .01$, but not when the mother's anxiety was relatively low (1 *SD* below the mean), $\beta = -.17$. In other words, their mothers' attachment anxiety seemed to predispose children who suffered from severe CHD to experience more interpersonal anxieties later on.

The regression analysis performed on the CAT high-level defenses score yielded no significant unique or interactive effects, but the analysis for the low-level defenses score was significant and explained 26.3% of the variance (see Table 4). There was a significant unique effect of a mother's avoidant attachment: The higher the avoidance at the time of the diagnosis, the higher the child's later reliance on low-level defenses, as inferred from his or her CAT

stories. Also, the interaction between a mother's avoidance and CHD severity was significant (see Table 4). Simple slope tests revealed that a mother's avoidance at time of the CHD diagnosis was significantly associated with the child's greater reliance on low-level defenses years later when the child had relatively severe CHD (1 *SD* above the mean), $\beta = .59$, $p < .01$, but not when the CHD was relatively mild (1 *SD* below the mean), $\beta = -.01$, and more severe CHD was associated with greater reliance on low-level defenses when a mother's avoidance was relatively high (1 *SD* above the mean), $\beta = .52$, $p < .01$, but not when a mother's avoidance was relatively low (1 *SD* below the mean), $\beta = -.08$. That is, a mother's avoidant attachment seemed to predispose children with severe CHD to rely on more low-level defenses while dealing with tensions and conflicts.

Mothers' Psychological Functioning and Children's Emotional Responses

In this section, we consider possible associations between mothers' mental health and marital satisfaction at Time 3 with concurrent measures of children's explicit self-image and CAT scores. Specifically, we examined (a) the unique contribution of maternal mental health to children's responses beyond the already reported contributions of CHD severity and a mother's attachment orientations at the time of the child's diagnosis, and (b) the extent to which a mother's mental health and marital satisfaction mediated the effects of CHD severity and a mother's attachment orientation on children's responses (i.e., the extent to which statistical control of maternal mental health and marital satisfaction weakened the significant effects of CHD severity and earlier maternal attachment style reported in Table 4). For these purposes, we performed two-step hierarchical regression analyses examining the contributions of the mother's mental health and marital satisfaction at Time 3, the mother's attachment scores at Time 1, and CHD severity to children's explicit self-concept and CAT scores.

As can be seen in Table 5, self-reported maternal mental health had significant unique effects on child's CAT-stories scores of implicit self-image, dominant affect, mother representation, interpersonal anxieties, and low-level defenses: The better the mother's mental health at Time 3, the more positive her child's self-image, dominant affect, and mother representation and the lower the child's

Table 5

Standardized Regression Coefficients for the Contributions of Maternal Mental Health, Marital Satisfaction, Attachment Scores, and CHD Severity to Child's Responses

Effect	Explic. Self	CAT Self	CAT Affect	Mother Image	CAT Anxieties	Low-Level Defenses	High-Level Defenses
Mother Mental Health	.04	.33*	.38**	−.28*	−.31*	−.43*	.01
Marital Satisfaction	.01	.48**	.45**	.07	−.03	−.06	.05
Mother Avoidance	−.29*	−.36**	−.40**	.27*	−.12	.05	−.14
Mother Anxiety	−.39**	.08	.09	.32*	.38**	.01	−.13
CHD severity	.05	−.12	−.18	−.08	.03	.08	−.09
R^2 (%)	33.4**	29.8**	29.5**	25.1**	17.9*	31.1**	1.5
Avoidance × Severity	.14	−.34*	−.24	.04	−.08	.08	−.13
Anxiety × Severity	−.39**	−.01	−.05	−.08	.30*	.12	.05
R^2 change (%)	11.2**	7.6*	4.1	0.5	6.3*	4.3	1.2

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

interpersonal anxieties and reliance on low-level defenses. Maternal reports of marital satisfaction had significant unique effects on child's CAT-stories scores of implicit self-image and dominant affect: The greater the mother's marital satisfaction at Time 3, the more positive was her child's self-image and dominant affect, as expressed in CAT stories.

With regard to mediation effects, a comparison of Tables 4 and 5 indicates that the unique and interactive effects of CHD severity and the mothers' attachment insecurities to children's explicit self-concept and CAT scores remained essentially unchanged after introducing maternal mental health and marital satisfaction into the regression analyses. In fact, Sobel tests for mediation revealed almost no significant differences between the standardized regression coefficients in Table 4 and those in Table 5. Only the analysis of the CAT low-level defenses score indicated that the significant main effect of maternal avoidant attachment and the significant interaction between this variable and child's CHD severity (see Table 4) were small and no longer significant after controlling for maternal mental health and marital satisfaction (see Table 5). Sobel tests confirmed that this weakening of the effects of maternal avoidant attachment and the interaction between avoidance and child's CHD severity was statistically significant, Zs of 3.21 and 2.87, ps $< .01$.

Overall, the analyses indicate that maternal mental health and marital satisfaction made unique contributions to children's inner dynamics (implicit self-image, dominant affect, interpersonal anxieties, mother representation, and reliance on low-level defenses) and mediated the contributions of maternal avoidance and CHD severity to children's reliance on low-level defenses when responding to CAT picture cards. However, these maternal variables failed to mediate the effects of a mother's attachment insecurities and her child's CHD severity on the majority of the child psychological variables. That is, a mother's attachment orientation and her child's CHD severity seemed to have direct effects on children's dynamics that could not be completely explained by concurrently assessed maternal mental health and marital satisfaction. Importantly, similar findings were obtained when introducing into the analyses (a) measures of maternal mental health at Time 1 or 2 and marital satisfaction at Time 2 or (b) residuals of reported mental health and marital satisfaction at Time 3 that were not explained by the parallel variables at Time 2

(i.e., changes in mental health and marital satisfaction from Time 2 to Time 3).[3]

DISCUSSION

Our findings highlight the vulnerability of mothers who score high on avoidant attachment and of their children with CHD. In line with other evidence on the high psychological price paid by avoidant individuals for relying on deactivating defenses while attempting to regulate and cope with threats and stressors (e.g., Berant et al., 2001b, Mikulincer et al., 1999, 2004, 2006), avoidant mothers of CHD children experienced the greatest deterioration in mental health and marital satisfaction over the 7 years following their child's CHD diagnosis. Moreover, their 7-year-old children were more likely than same-aged physically hampered children of less avoidant mothers to suffer from low implicit self-image and other emotional problems. Interestingly, these detrimental effects of maternal avoidant attachment were observed mainly when children suffered from severe, life-threatening CHD. When the illness was not so severe and the child's life was not endangered by cardiac problems, highly avoidant mothers and their children did not have notable psychological problems. The many interactive effects generally rule out a simple genetic explanation of the effects of maternal avoidance (i.e., imagined "avoidance genes") on children's poorer outcomes. Maternal avoidance in itself was not necessarily damaging to a physically hampered child if the physical problem was not severe.

The findings add to our understanding of the psychological effects of prolonged coping with chronic illness in one's family. Bowlby (1988) claimed that "most human beings desire . . . that their children should grow up to be healthy, happy, and self reliant . . . but for those who fail to rear them to be healthy, happy, and self-reliant the penalties in anxiety, frustration, friction, and perhaps shame or guilt may be severe" (p. 1). These days, a growing number of mothers face the prospect of such penalties because of the number of children who

3. Regression analyses including additional dummy variables—(a) whether or not a child was subjected to heart surgery or (b) whether or not a mother gave birth to additional children during the 7-year study period—produced no significant unique or interactive effects for these variables.

survive despite serious illnesses and handicaps and because of the stresses and traumas of large-scale warfare and unpredictable terrorist acts. Our findings indicate that avoidant mothers of children with severe CHD were more vulnerable to poor mental health and greater marital dissatisfaction, and their children tend to be less happy.

Although we did not collect direct, process-oriented data on mechanisms (e.g., defenses, maternal behaviors) that might explain the detrimental effects of mothers' avoidant attachment on their marriages and their CHD children, we can offer some hypotheses to be tested in future research on parents of children who suffer from a chronic illness. For example, we know that more avoidant adults tend to deny vulnerability and neediness, suppress distress-eliciting thoughts, and repress memories that activate wishes and urges to admit a need for comfort and support (Mikulincer & Shaver, 2003). These defenses involve redirection of attention away from painful thoughts and feelings (Bowlby, 1980, called this "defensive exclusion") and the segregation or dissociation of distressing memories, which nevertheless continue to influence emotions and behaviors without an individual's awareness of their existence or effects. Our findings suggest that these defenses are associated with difficulties in mental health and marital relations, especially when severe forms of CHD require a mother to acknowledge her child's severe health problem and mobilize external sources of support. In such cases, avoidant mothers must engage in many daily activities related to their children's health problem, and these activities become unwanted reminders of unresolved worries and anxieties. This repeated activation of partially suppressed negative memories, thoughts, and emotions may explain the contribution of a mother's avoidant attachment orientation to the deterioration of her mental health and marital functioning (Fraley & Shaver, 1999).

Interestingly, the combination of maternal avoidance and severe child CHD predicted the most drastic deterioration in mental health and marital satisfaction during the 7-year study period. These results converge with Mikulincer et al.'s (2004) discovery that although avoidant defenses can be effective in suppressing unpleasant thoughts and feelings under conditions of low cognitive load, having to juggle an additional demanding cognitive task can disrupt these defenses and allow a measurable intrusion of suppressed worries and negative self-representations into the stream of consciousness. This

could be what happened to avoidant mothers of children with severe CHD, who were routinely placed under high cognitive and emotional loads. However, the finding that these mothers responded more strongly to severe CHD does not necessarily mean that their suppressed worries were suddenly breaking through. It is possible that even a normally high-functioning person will fare less well as the severity of a stressful situation increases because there is actually more to worry about and cope with. These problems may have been accentuated for avoidant mothers who were already handling things less well in mild CHD conditions, perhaps partly because they had less available social and emotional support and were less able to seek needed assistance. Future studies should directly monitor avoidant mothers' defenses and assess their contributions to mental health and marital satisfaction.

Another factor that might partially explain avoidant mothers' declining marital satisfaction during the 7-year study period is the adoption of a "withdrawal" (as opposed to "pursuit") position (Christensen & Heavey, 1990; Shaver, 2005) in marital relations. Avoidant people often seem not to be aware of suppressing or denying their own otherwise measurable needs for protection and support (Cassidy & Kobak, 1988). Moreover, they have little mental access to cognitive representations of supportive attachment figures when primed with attachment-related threats (Mikulincer, Gillath, & Shaver, 2002). This seems to be the case of highly avoidant mothers, especially when their distress regarding their children's serious condition further activates their deactivating defenses. As a result, they may distance themselves from intimacy, emotional involvement, physical affection, and support seeking, which, in turn, frustrates their spouses' attempts to provide help and comfort and causes the two spouses to become increasingly dissatisfied with marriage (Bartholomew & Allison, 2006). Future research should assess these dyadic processes and determine their contribution to avoidant mothers' declining mental health and marital satisfaction. Such research could inform the development of targeted clinical interventions to help families with sick children, beginning as soon as possible after the child's birth, and ideally focusing on those at highest risk (those with avoidant mothers).

Our results, like those of Mikulincer et al. (2004), suggest that avoidant defenses that result in what Bowlby (1980) and George and West (2001) called "segregated" mental systems are ineffective under prolonged stress and contribute to a deterioration in mental health

and marital functioning. Thus, it might be worthwhile to adopt Shaver and Mikulincer's (2005) suggestion when working clinically with avoidant mothers of CHD children: Help them deal with their distressing experiences less defensively; help them accept the natural need for communication and social support. In couples therapy or counseling, it might be worthwhile to help avoidant wives share and disclose their thoughts and feelings to their spouses. A relevant concern, however, is that "many troubled spouses cannot, on their own, find their way back to providing a safe haven and secure base for their well-defended partners" (Shaver, 2005). The spouses need to be helped and coached to reach out to their distressed but well-defended mates (e.g., Johnson, Makinen, & Millikin, 2001).

Another important clinical and educational issue raised by our study is the need to attend to the self-image and psychodynamic structure of children born with a life-threatening condition. This issue is especially important in light of Wray and Sensky's (1998) finding that children who had open-heart surgery had low self-esteem and perceived themselves as more fragile and anxious compared with healthy children. Our results suggest that these outcomes are not necessary and are exacerbated by a mother's insecure, especially avoidant, attachment style. It is especially important for the parents of children with CHD to be appropriately supportive. Most of these children are very young, and their cognitive abilities have not yet developed sufficiently to enable them to understand the medical procedures they are going through. Therefore, simple procedures might be experienced as frightening, and parents need to try to read children's signals of distress correctly and react accordingly. Scheeringa and Zeanah (2001) reported that mothers who are insensitive to their children's distress signals or behave inconsiderately toward them may contribute to emotional difficulties, especially if the children suffer from chronic illness. Edelstein et al. (2004) reported that avoidant parents were less supportive of their preschool children when the children were receiving painful inoculations at a medical clinic, and the more upset the child was, the more parental avoidance predicted unsupportive reactions.

In our study, CHD children whose mothers reported higher levels of attachment anxiety were more likely to hold an explicit negative self-concept if they suffered from severe CHD. Confronted with their child's serious condition and fearing their loss, anxiously attached mothers may be overwhelmed by attachment-related thoughts and

feelings. A mother's self-focused attention may prevent her from noticing and rewarding the child's s real achievements and positive behaviors, thus depriving the child of what Kohut (1977) called mirroring, admiration, and empathy needed for the development of inner stability, security, and self-esteem. In addition, children's natural magical thinking may convince them that they are responsible for their mother's distress.

We also found that maternal avoidance was associated with a child's poor explicit self-concept, regardless of CHD severity. This happened even if the child had a form of CHD that hardly interfered with his or her activities. Perhaps any degree of disorder taxed avoidant mothers' poorly developed capacities for emotional nurturance, sensitivity, and attentive responsiveness, all of which may be needed for a child to develop a strong positive self-image (Bowlby, 1969/1982). This would be in line with Bowlby's (1988, p. 15) contention that "a mother's feeling for and behavior towards her baby are deeply influenced by her previous personal experiences, . . . especially those with her own parents" and with research findings that avoidant mothers shut themselves down emotionally in response to their children's neediness and distress (e.g., Crowell & Feldman, 1989; Haft & Slade, 1989; Rholes, Simpson, & Blakely, 1995).

The psychodynamic structure of CHD children was assessed in the stories they generated in responses to CAT cards. These stories shed light on CHD children's implicit perceptions of themselves and their mothers, their interpersonal anxieties, and the nature of their psychological defenses (Haworth, 1966). In contrast to self-report findings, mothers' attachment anxiety was not associated with children's implicit self-image. Perhaps children of anxious mothers identified with their mothers' distress and voiced their own distress openly but did not suffer from hidden doubts about their self-image. Moreover, they might have learned from their mothers that complaining and expressing negative feelings was a way to elicit more attention. These findings are consistent with Shaver and Mikulincer's claim (2005) that during interactions with attachment figures, people tend to identify with them and internalize their features and traits, which changes their own self-representations. This claim is further supported by our findings that children of anxiously attached mothers expressed relatively high levels of interpersonal anxiety and revealed negative perceptions of mothers in their CAT stories. That is, mothers' attachment anxiety seemed to predispose

CHD children to experience more interpersonal anxieties and to internalize a negative image of mothers.

Children of avoidant mothers also showed implicit signs of distress and maladjustment in their CAT stories: negative self-image, negative affect, negative representations of mothers, and reliance on low-level defenses for managing distress. This negative psychodynamic structure was mainly found when children suffered from severe CHD. So again, the implicit measure provided further evidence for the vulnerability of children with severe CHD who had avoidant mothers. These CHD children may feel that they are not really loved by their avoidant and emotionally distant mothers, which, in turn, may contribute to their negative self-perception, negative affect, negative representations of mothers, and maladaptive ways of coping with frustration and pain.

Interestingly, we did not find that most of the effects of mothers' attachment insecurities on children's self-image and psychodynamic structure were significantly mediated by mothers' mental health and marital satisfaction. It is possible that this lack of mediation implies that other more attachment-specific processes are involved in the intergenerational transmission of emotional problems. According to attachment theory and research, quality of parental care is the most direct antecedent of children's socioemotional development, especially when children need special care because of a chronic illness or disability, as in the case of our CHD children (see Atkinson et al., 2000; Belsky, 1999; de Wolff & van IJzendoorn, 1997; and van IJzendoorn, 1995, for reviews and meta-analyses). The less secure the mother, the lower her availability, sensitivity, and responsiveness to her child's needs and the more pain, distress, and insecurity the child is likely to feel. Further research is needed to illuminate the role of parental care in mediating the association between a mother's attachment insecurity and CHD, on one hand, and a child's emotional problems, on the other.

As with other field studies, some caution is required in interpreting our findings. First, the mothers' data were collected via self-report measures and therefore may be affected by social desirability and other response biases. However, the fact that these measures were also significantly associated with children's explicit and implicit measures increased our confidence of their validity. Second, although we collected the mothers' reports at three time points, we did not have information about mothers' attachment style, mental health, and

marital satisfaction before the CHD diagnosis. Therefore, we do not know whether and how the actual receipt of the CHD diagnosis might have affected their attachment style or marital satisfaction.

Third, we assessed the mothers' global attachment style and did not collect data on the specific attachment style they might have possessed within their marital relationship. A more relationship-specific attachment measure might have been even more strongly related to marital satisfaction and children's emotional outcomes. Fourth, we did not collect data on fathers' attachment styles. However, there is evidence that a person's marital satisfaction and mental health can be affected by his or her partner's attachment style (see Mikulincer & Shaver, 2007, for a review). Therefore, fathers' attachment security might moderate the observed deterioration of avoidant mothers' mental health and marital satisfaction. Future research should examine this possibility.

Fifth, although the focus of our study was the long-term process of adjustment in mothers and their CHD children, the lack of a control group of mothers of healthy children prevented us from knowing whether our findings are specific to coping with chronic childhood illness or can be extended to motherhood in general. However, the fact that most of the effects of mothers' attachment insecurity depended on CHD severity implies that our findings really do reflect the difficulties of raising a child with special needs. Sixth, whereas the current study was conducted in Israel, most of the research on longitudinal effects of maternal attachment style has been conducted in the United States. Future research should check the replicability of our findings in American and other national samples and examine potential cross-cultural differences in the effects of maternal attachment style on children's functioning and development. Thus, although our study has limitations, as do all studies, especially ones dealing with real-world issues, it provides a useful and provocative foundation for future research on the role of parental attachment in shaping children's self-image and emotional well-being. It also provides several useful clues for parents and the clinicians who treat them.

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