Research Review

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Attachment, Loss, and Complicated Grief

ABSTRACT: *Bereavement is a highly disruptive experience that is usually follow-ed by a painful but time-limited period of acute grief. An unfortunate minority of individuals experience prolonged and impairing complicated grief, an identifiable syndrome that differs from usual grief, major depression, and other DSM IV diagnostic entities. Underlying processes guiding symptoms are not well understood for either usual or complicated grief. We propose a provisional model of bereave-ment, guided by Myron Hofer's question "What exactly is lost when a loved one dies?" We integrate insights about biobehavioral regulation from Hofer's animal studies of infant separation, research on adult human attachment, and new ideas from bereavement research. In this model, death of an attachment figure produces a state of traumatic loss and symptoms of acute grief. These symptoms usually resolve following revision of the internalized representation of the deceased to incorporate the reality of the death. Failure to accomplish this integration results in the syndrome of complicated grief.* © 2005 Wiley Periodicals, Inc. Dev Psychobiol 47: 253–267, 2005.

INTRODUCTION

The death of a loved one is a unique and highly stressful event. Nevertheless, the majority of people cope effec-tively with this experience (Bonanno, 2004). Bereaved people sometimes find new meaning in the wake of a loss and/or an increased sense of closeness to others (Neimeyer, Prigerson, & Davies, 2002). Most people are deeply saddened by the death of an attachment figure during a period of weeks or months of acute grief. Many experience intense yearning, intrusive thoughts and images, and/or a range of dysphoric emotions, but these symptoms do not persist (Bonanno, Moskowitz, Papa, & Folkman, 2005). Instead, the initial reaction subsides; interest and engagement in daily activities is renewed; and the loss is integrated into the bereaved person's ongoing life. As this integration occurs, painful feelings lessen and

thoughts of the loved one cease to dominate the mind of the bereaved. The remaining sense of connection to the deceased varies in intensity.

By contrast, for an unfortunate minority of people bereaved of a close attachment, such an auspicious outcome does not occur. For these people, currently estimated at 10%–20%, coping is fraught with difficul-ties. Integration of the loss does not occur and acute grief is prolonged in the form of complicated grief (Horowitz et al., 1997; Prigerson et al., 1995, 1999). People who suffer from complicated grief experience a persistent disturbing sense of disbelief regarding the death. There are feelings of anger, bitterness, and resistance to accep-tance of the painful reality. Intense yearning and longing for the deceased continue, along with frequent pangs of intense, painful emotions. Thoughts of the loved one remain preoccupying, often including distressing intru-sive thoughts related to the death. There is avoidance of a range of situations and activities that serve as reminders of the painful loss. Interest and engagement in ongoing life is limited or absent. Pathological grief of this sort has been discussed in the clinical literature for decades, yet formally sanctioned diagnostic criteria for a grief-related syndrome have not been established.

The regrettable absence of official status for compli-cated grief has hindered clinical research. The pathway to

complicated grief is not well described, nor have its neurobiological correlates been elucidated. Researchers use different criteria for grief outcomes, which makes assimilation of findings across studies cumbersome. Without clarity regarding the boundary between normal and complicated grief, interventions are sometimes encouraged for bereaved people who are coping well on their own. Furthermore, many well-meaning grief therapists provide interventions that rest upon untested theories and intuitive beliefs, and have little or no documented effectiveness. Perhaps it is not surprising that outcome studies of grief counseling suggest that intervention is often unnecessary, and sometimes causes interference rather than facilitation of the grief process (Jordan & Neimeyer, 2003).

The idea that bereavement is a deeply private experience that should not be intruded upon by strangers has also deterred research. Thus, studies needed to disentangle questions related to bereavement, as well as work to establish diagnostic criteria for complicated grief, have been slow to appear. In spite of the barriers, researchers have begun to examine this important human experience and have made significant progress in recent years (Center for the Advancement of Health, 2004). Studies are beginning to elucidate risk factors and map pathways to chronic (complicated) grief (Bonanno, Wortman, & Nesse, 2004; Bonanno, Papa, Lalande, Zhang, & Noll, 2005; Boerner, Wortman, & Bonanno, 2005). It is now possible to define and reliably identify the syndrome of complicated grief (Prigerson & Maciejewski, 2005). A treatment targeting complicated grief was shown to be more effective than a proven efficacious treatment for depression (Shear, Frank, Houck, & Reynolds, 2005). Nevertheless, some clinicians remain unaware of the distinction between normal and complicated grief, as well as when to diagnose complicated grief rather than major depression or posttraumatic stress disorder (Lichtenthal, Cruess, & Prigerson, 2004; Prigerson et al., 2005). Prevalence of complicated grief has not yet been established, and the underlying neurobiology of both usual and complicated grief is virtually unknown (Glass, 2005).

Research on attachment can also contribute to understanding bereavement. In particular, Myron Hofer's research team has conducted a programmatic series of studies investigating maternal–infant attachment in rodents. Hofer has also written about loss and grief, setting forth ideas based on discoveries from his animal studies (Hofer, 1984). In a classic example of translational research, Myron details the similarities between an infant rodent's response to maternal separation and an adult human's response to loss of an attachment relationship. He suggests that the neurobiological origin of grief symptoms can be understood based on these similari-

ties. Contemporaneously, adult attachment researchers, guided by John Bowlby's ethological theory of attachment, have developed reliable methods to identify attachment figures, and to assess and categorize attachment quality as both a personality trait and a relationship characteristic. Studies have been conducted to examine the influence of attachment style on stress response including bereavement reactions.

In this article, we present a provisional model of bereavement that incorporates findings from these different areas of research. Our approach is to first explicate Hofer's ideas about grief, based on (Hofer, 1996) his studies of maternal–infant separation. We then summarize selected findings from studies of adult attachment and some key observations from bereavement research. We integrate these various strands in conceptualizing consequences of attachment loss. We provide a testable model that can be used as a guide for clinical researchers studying different facets of bereavement and complicated grief.

BIOLOGICAL MODELS OF ATTACHMENT RELATIONSHIPS

The fact that maternal separation has a profound impact upon behavioral and physiological functioning in mammalian infants has been well documented (Harlow & Zimmerman, 1959; Igel & Calvin, 1960). In the 1960s, John Bowlby began work to explain this phenomenon using an ethological model in which attachment seeking is viewed as an intrinsic biological motivational system. According to Bowlby (1982, 1980), attachment to others is a core human goal "from cradle to grave" associated with resistance to separation and great disruption when loss occurs (Bowlby, 1969). The underlying biological mechanism is presumed to be a set of instinctive behavioral routines that both guide the establishment of attachment relationships and direct a predictable, sequenced response to separation. The attachment system, so defined, is regarded as one of a group of motivational systems important in understanding behavior.

Bowlby reasoned that the presence of a caregiver is necessary for survival of an immature infant. Thus, infants instinctively seek proximity to such a person and resist separation. In fact, they are thought to be preprogrammed to emit a sequence of behaviors upon separation. The initial protest response is intended to attract the attention of the caregiver. If reunion does not occur, a state of despair and withdrawal ensues in order to conserve resources. Continued failure of reunion leads to a process of detachment, opening the way for new attachment. While intuitively appealing and consistent with observations of separated infants, this teleological explanation

lacks explication of specific mechanisms entailed in these processes. Myron Hofer's research attends to such specifics and the results lead to a very different way of describing the biological underpinnings attachment and separation.

In beginning of his work, Hofer had no intention of studying maternal–infant separation. Instead he was interested in the development of cardiac rate responses to different stimuli. Infant rats were a convenient vehicle for examining this process. However, a dam escaped from her cage one night, and examination of tie abandoned litter revealed that the pups had a 50% reduction in resting heart rate, and were hypothermic and relatively unresponsive. Hofer was interested and decided to study the separation response. Warming the pups to normal body temperature, expected to raise the heart rate by correcting hypothermia, had no apparent cardiac effect, but led to an unexpected increase in activity levels compared to normal pups. At this point Hofer reports, ''I began to ask the right question— exactly what is lost in separation?'' (Hofer, 1994). Experiments designed to answer this question brought surprising results.

Hofer's team began to systematically investigate pups' responses to individual sensory stimuli normally associated with a healthy functioning dam, for example, warmth, milk, tactile stimulation, odor, etc. In doing so, they found that each discrete maternal stimulus was associated with a specific and often unique behavioral and/or physiological response in the pup. Furthermore, absence of different stimuli was associated with different times to onset of pup's response. Short term responses occurred following loss of some maternal stimuli (e.g., body warmth). Longer term responses were observed when other signals were absent (e.g., regular provision of milk and tactile stimulation). Quite surprisingly, longer term responses occurred at the expected time, even when the short term responses had been blocked. In other words, the acute response elements that are generally attributed to protest (e.g., agitation, vocalization, searching) could be blocked by the presence of a familiar littermate, yet another series of later emerging responses to maternal deprivation, generally ascribed to despair, still occurred (summarized in Polan & Hofer, 1999).

The startling results emerging from this research indicated that the observed unfolding of response to separation is not a purposeful, well-orchestrated response to caregiver absence as Bowlby supposed, but rather a composite of discrete physiological and behavioral changes, each brought about by lack of a specific maternal cue. Based on these findings, Hofer suggested a new way to understand the biology of maternal–infant separation. Instead of a separation-triggered inborn instinctive response, he proposed that the global, observable infant response to the absence of its mother actually results from

loss of a group of ''hidden regulators'' provided by a collection of maternal stimuli. The seemingly purposeful infant response is better understood as a composite of component biological processes, each released from specific maternal regulatory restraint, and each on its own timetable (Hofer, 1978, 1987, 1994; Hofer & Reiser, 1969).

The implication of Hofer's insight is profound. The hidden regulator model replaces Bowlby's teleological assumptions with a testable, empirically supported explanation for the separation response. The discovery that attachment relationships provide vital regulatory input makes it clear that loss of such a relationship would produce great disruption. Hofer has speculated that attachment relationships in adults are also constructed as interpersonal regulatory systems. If so, an important system of physiological and behavioral regulation is part of what we lose when a loved one dies.

HOFER'S PERSPECTIVE ON GRIEF

In his 1984 article ''Relationships as Regulators: A Psychobiological Perspective on Bereavement'' (Hofer, 1984), Hofer begins with a review of the discovery that maternal infant separation is explained by disrupted regulation, and then speculates that this mechanism is also applicable in adults. If so, this can change the way we understand bereavement. Hofer outlines this change, drawing a parallel that links manifestations of human bereavement, such as agitation, crying, aimless activity/ inactivity, sighing respirations, and muscular weakness to the responses of agitation, vocalization, and the searching-inactivity cycle observed among infant rats following maternal separation. Of course, Hofer appreciates that human adult attachment relationships are different and more complex than those of infant rats. Thus, he includes a discussion of the effects on biological regulatory systems of maturation and advanced cognitive functioning.

Changes occur in biobehavioral regulatory systems during development. Response systems undergo maturational changes and attachment relationships operate differently in an adult. Instead of an amalgam of independent, stimulus-response units seen in infants, adult biobehavioral responses are manifest as integrated states that comprise organized affective, attentional, and motivational processes. In a mature individual, internalized representations play an important role in relationship functioning. Correspondingly, much of the relationship-based, biobehavioral regulation is also internalized. Moreover, as the infant's world expands beyond the maternal enclave, an array of new social and environmental stimuli develops salience and begins to contribute regulatory input.

Hofer imagines that the process of maturation is such that early experiences remain influential in the adult. Here, his view is similar to Bowlby's. The idea is that memory traces of repeated experiences with attachment figures, especially those that have provided gratification and/or relief from tension, are incorporated into the developing, internalized regulatory systems. Hofer envisions that "the key developmental process that joins the early infantile biological regulatory actions to the world of intrapsychic processes are those of associative learning" (p. 576). Actual experiences with a caregiver become learned expectancies that eventually are elaborated into a "complex set of predispositions, acquired responses, and internal states referred to as attachment or object representation." (p. 576).

The concept of mental representations of attachment relationships was proposed by Bowlby in order to explain why older children and adults do not require physical proximity in order to feel securely attached. Internal representations provide a connection with attachment figures from whom one is separated. Bowlby believed that such "working models" are developed in childhood and that their quality is determined by early experiences, especially with regard to sense of security. Attachment security is attained through consistent, accessible, and responsive experiences with early caregivers. Inconsistent, inaccessible, and/or unresponsive caregiving leads to insecure attachment. Importantly, the fact that mental representations devolve from repeated experiences means they are built upon a kind of summation of such experiences and, once established, a single new experience does not change their configuration. Thus, the quality of attachment security developed in infancy and early childhood becomes a traitlike personal characteristic that forms a foundation for day-to-day psychological functioning throughout the lifespan. At the same time, working models are regularly checked against reality and if there is an important shift in the quality of a current relationship, this is eventually incorporated into the mental representation.

Furthermore, people generally have more than one attachment figure, so that there are both specific and generalized working models of attachment. The generalized model derives from childhood and exists as a permanent template for expectations of close relationships. Additionally, specific mental representations are built for each subsequent attachment figure. The processes underlying the construction of working models of different attachment figures are similar, in that they are created from consistent patterns of behavior which, once stabilized, are modified only slowly by repetitive patterns in key experiences within the ongoing relationship.

In Hofer's model too, attachment representations carrying the imprint of actual experience are important in adults. Hofer asserts that these cognitive-affective structures provide regulatory functions in adults, in a manner similar to caregivers during infancy. He speculates that the physical presence of an attachment figure may also continue to play some role in biobehavioral regulation in an adult. Thus, Myron postulates that grief entails loss of inputs that usually provide regulatory control,

> "The central characteristic of the disturbance is a failure of the normal smooth modulation and coordination of affect, behavior, and physiological function into a stable daily pattern. This is felt by the individual as a sense of internal disorganization. Habitual tasks, attention, concentration, sleep, food intake, and mood become fragmented.... Another highly specific phenomenon in grief is the remarkable increase in access to memories of the deceased and the degree to which these memories capture the attention of the grieving person.... This escape of memories may be analogous to the escape from inhibitory control of corticosterone secretion in the separated rat pup and the sustained increase in sucking, vocalization, and rocking in maternally deprived young primates resulting from loss of regulatory maternal interactions. Increase access to these affect-laden memories may also play a temporary reparative role..." (p. 582).

Acknowledging that the mechanism of response to bereavement is not yet understood, Hofer offers his pertinent guiding insight, "if there is one thing this animal model of loss has to tell clinicians who work with the stress of loss in individual patients, it is, look carefully for exactly what was lost." (Hofer, 1996, p. 581).

ADULT ATTACHMENT RESEARCH

In order to know what exactly is lost in bereavement, it is important to understand as much as possible about exactly what is entailed in an adult attachment relationship. There has been a great deal of research in recent years pertaining to the quality and influence of adult attachment relationships. Although it is not possible to review this work comprehensively, we highlight some relevant findings. An attachment figure can be identified as (1) a target of proximity seeking; (2) a person from whom separation is resisted; (3) someone to whom a partner turns to for "safe haven" when under stress; and (4) a secure base from which the partner freely interacts in the world, seeking novelty, taking risks, and exploring the unknown (Feeney, 2004; Hazan & Zeifinan, 1999). Numerous studies have

shown that certain people in an adult's life can be characterized in this way, different from other close relations. Furthermore, internalized cognitive representations of attachment relationships are activated upon exposure to stress as a component of coping (Collins & Feeney, 2004; Mikulincer, Gillath, & Shaver, 2002; Mikulincer, Shaver, & Pereg, 2003; Pereg & Mikulincer, 2004).

Some researchers studying adult attachment (Hazan & Shaver, 1987) utilized the infant classification system developed by Ainsworth and Wittig (1969) to characterize attachment style in adults. However, categories have been refined over time. A popular current procedure (Griffin & Bartholomew, 1994) computes attachment quality by rating anxiety and avoidance. High attachment anxiety reflects feelings of uncertainty about the availability of an attachment figure, while low anxiety is associated with confidence in the accessibility of such a person. High attachment avoidance reflects a tendency to refrain from becoming attached to others, while low avoidance indicates a tendency to engage in such relationships. Attachment style is determined using these ratings. Secure attachment is defined by low anxiety and low avoidance. The presence of significant levels of anxiety and/or avoidance defines insecure attachment, of different types. Anxious preoccupied attachment entails high anxiety and low avoidance, while dismissive avoidant attachment is characterized by low anxiety and high avoidance. Fearful avoidant individuals are high on both anxiety and avoidance (Mikulincer et al., 2003). A large and growing body of work confirms that these categories of attachment style can be reliably identified in a variety of adult populations (e.g., Crowell, Fraley, & Shaver, 1999) and have implications for interpersonal functioning in a range of different situations.

Studies generally support the idea of attachment style as having traitlike properties and the prediction that early experiences with caregivers engender varying degrees of attachment anxiety and avoidance. Attachment security has effects on a range of psychological and physiological variables (Fraley & Davis, 1997; Mikulincer & Shaver, 2001) including cognition, emotion, and behavior, especially with respect to interpersonal functioning (Campbell, Simpson, Boldry, & Kashy, 2005; Fraley & Shaver, 1997; Fraley, Garner, & Shaver, 2000; Maier et al., 2005; Marchand, 2004; Mikulincer, Orbach, & lavnieli, 1998; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001; Scott & Cordova, 2002; Wearden, Cook, & Vaughan-Jones, 2003). Individuals with stable secure attachments have been repeatedly shown to be psychologically healthy and resilient. Those with high attachment anxiety often have difficulty with affect regulation (Mikulincer et al., 2003) and so experience heightened levels of negative emotions, including sadness, anger,

shame, and anxiety as well as lower positive emotions. These people tend to report low self esteem and low confidence in the esteem of others, often enter into dependent relationships, and are especially vulnerable to stress. Individuals with dismissive-avoidant attachment style have been shown to have an excessively positive view of themselves and an excessively negative opinion of others (Mikulincer et al., 2001). Under stress, these individuals value autonomy and are less likely to turn to an attachment figure than are securely attached individuals.

Attachment models can be changed as a result of continuous matching with ongoing input from the attachment figure they represent. There is some built-in resistance to change, based on biased expectations and perceptions, generally consistent input from the attachment figure, and automatic/unconscious functioning that is not easily available to self reflective modifications (Bretherton & Munholland, 1999). However, in the context of this relative stability, working models are revised as needed, so that they remain a fairly good representation of reality, as described by Bretherton and Mulholland,

> "In other words, representations at the most basic level are deemed to be in certain respects analogues of what they represent, retaining the dynamic relational properties of what they model, so that they can be activated (operated) to make predictions by running the model in 'mental time'." p. 95.

Given this view of working models, it is clear that these mental representations need to undergo profound change when an attachment figure dies, and also that this change will not occur quickly.

Attachment researchers assert that the set goal for the attachment system is a physically accessible and emotionally responsive caregiver who provides a sense of security that facilitates exploration and learning and minimizes fear (Kobak, 1999). Thus, biobehavioral systems for attachment, fear, and exploration are linked. Elliot and Reis (2003) note the exploratory system has received much less attention than the attachment system. They suggest that this system is essentially the same as the adult motivational system called "competence motivation." Competence motivation includes the basic affectively important dimensions of approach and avoidance, which are associated with mastery goals and performance goals. In other words, adults are generally oriented toward achieving mastery and/or performance success and avoiding failure in each of these areas. Motivation is based on both orienting toward positive emotions related to success (e.g., pride, satisfaction, joy) and orienting away from the pain (e.g., anxiety, shame, embarrassment)

of failure. However, people vary in the degree to which they are motivated by the seeking success and/or avoiding failure.

Attachment style contributes significantly to this variance, such that secure attachment is associated with mastery (though not performance) approach as a goal, and insecure attachment is associated with fear of failure and performance avoidance as goals. Thus, the attachment system plays an important role in modulating the activity of the exploratory system. The latter, in turn motivates active interest and engagement in the environment, needed for learning and overall effective functioning in the world (Bell & Ainsworth, 1972; Cassidy, 1999; Grossmann, Grossmann, & Zimmermann, 1999). We do not know of any studies examining effects of bereavement on the exploratory system. We believe, however, that such effects are likely and we include them in our provisional model. Similarly, the fear system is kept in check by an attachment figure that appears to offer a safe haven for retreat when danger threatens. Death of a loved one can both activate the fear system and alter the dynamics of fear, lowering the threshold for perception of danger, and/or increasing the intensity of fear upon confrontation with threat.

Additional behavioral motivation systems related to sexuality and caregiving come on-line in adults and add the potential for interpersonal regulatory interactions beyond those related to attachment, exploration, and fear. The prototype of adult attachment is the pair bond, a mutual relationship in which caregiving is as important as receiving care. Bowlby postulated a behavioral system for caregiving, different from that for attachment' although little research has been conducted to understand the caregiving system (Feeney & Collins, 2001). Adult pair bonds also frequently serve as sexual partners. There is an extensive literature focused on molecular mechanisms of sexual attraction and evolutionary significance of sexual behavior that we will not review here. Only recently has this work been linked to the formation of pair bonds (Bartels & Zeki, 2004; Fisher, Aron, Mashek, Li, & Brown, 2002; Pietromonaco & Barrett, 2000). As yet, researchers have not attempted to integrate findings from the attachment behavior and sexual behavior literatures. Still, if we are interested in what is lost when an attachment figure dies, we must include consideration of caregiving and sexuality. Among those who lose a child, effects on the caregiving system are likely to be dominant. For those who lose a spouse, loss of a sexual partner is likely to play a role.

Attachment figures in adults comprise a range of different kinds of relationships. Studies have shown that spouses are the most commonly identified adult attachment figures, but that parents, siblings, close friends, and adult children also frequently serve in this role (Antonucci, Akiyama, & Takahashi, 2004). Moreover, an individual frequently has several attachment figures and the pattern of attachment security may vary across these relationships. Frequency of contact varies as well. Some intimates are in close proximity while others live at a distance. Thus, in order to know what is lost with bereavement, it is important to know something about the characteristics of the attachment relationship with the deceased.

Investigators have begun to consider attachment representations related to specific adult relationships, different from traitlike attachment style. While mental representations of early attachment relationships appear to be woven into the developing brain as permanent scaffolding for future relationships, attachment to an adult romantic partner does not necessarily match childhood attachment with respect to attachment security (Crowell, Treboux, & Waters, 2002; Waters, Wemfield, & Hamilton, 2000; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). Studies by Waters et al. indicate that matching of generalized attachment security between partners occurs only about 50% of the time. Mismatch of generalized and specific attachment within an individual also occurs in a significant minority (Treboux, Crowell, & Waters, 2004).

Two studies of young marital pairs followed over 6 years reveals consequences of the possible pairings of secure and insecure generalized and specific adult attachment representations (Treboux et al., 2004). In the first study, 291 participants from 157 marital pairs were interviewed to assess adult attachment (AAI) and current relationship (CRI) functioning. Secure base behavior was rated during a videotaped interaction and measures of positive feelings about the marital relationship and relationship conflict were obtained. Attachment (generalized–current) was characterized as secure–secure (27%), secure–insecure (16%), insecure–secure (15%), and insecure–insecure (42%). Assessments were repeated 6 years later and the baseline attachment configurations were used to predict outcomes. The secure–secure configuration was associated with high secure base behavior, low marital conflict, and high positive feelings for the relationship 6 years later. All other categories had low secure base behavior. The insecure–secure configuration resembled the secure-secure group with regard to high positive feelings about the relationship and low relationship conflict. The secure–insecure group had very low positive feelings about the relationship and some relationship conflict while the insecure–insecure group had high levels of relationship conflict and more neutral feelings about the relationship.

In study 2,114 females and 93 males who had been married at least 36 months (some derived from study 1) completed a similar battery of attachment and relationship measures with additional assessments of life events and

positive feelings about self. The Life Events Scale (Sarason, Johnson, & Siegel, 1978) was rated for the previous 18 months on a 0–8 scale of stressfulness; 43 negative events were utilized to determine an upper quartile of high stress individuals that were compared to the remainder of the group. Among these study participants there were 68 secure–secure, 34 secure–insecure, 29 insecure–secure, and 76 insecure–insecure. In all four groups, stress was associated with a reduction in positive feelings about self and an increase in relationship conflict. However, different patterns were seen in secure base behavior and positive feelings about the relationship, depending on attachment style. Those with secure–secure attachment maintained positive feelings about the relationship and secure base behavior in the face of stress. Those with insecure–insecure had the greatest increase in conflict of all the groups. The mismatched groups (secure–insecure and insecure–secure) showed the greatest change with stress. Both showed greatly increased conflict and greatly diminished positive feelings about the relationship. Most striking was the marked reversal in the insecure–secure group of the low stress pattern of low conflict and high positive feelings.

This research demonstrates that specific attachment representations can be reliably measured and differentiated from generalized attachment. Different pairings of attachment security across generalized and specific attachment have different consequences for relationship conflict and feelings about their relationship. Mismatch between the two forms of attachment representations has some consequences that are only seen under high stress. The mismatch data are thus of interest in considering the role for remaining attachments in a bereaved person's life. These data suggest that a seemingly well functioning marital relationship can produce unexpected problems when a couple is under stress, if one or both partners have an insecure generalized or specific attachment representation. Emergence of unfamiliar relationship conflict and loss of positive feelings between the partners could hinder adjustment to an important loss.

PERTINENT FINDINGS FROM BEREAVEMENT RESEARCH

Psychological, Physiological, and Behavioral Effects

Over the past few decades, a great deal of important bereavement research has been performed. Here, we highlight some of the thinking that is incorporated in our provisional model. First, most people experience an initial period of painful emotions, yearning for the deceased love one and intrusive thoughts after a loved one dies. This

period is self-limited, however, and existing data suggests that resilience is the most common response to loss, manifest within 6 months after the death (Bonanno et al., 2002). The process of adjustment to loss entails coping with stressors directly related to the loss of an attachment figure and coping with stressors related to ongoing life (Stroebe & Schut, 1999). Researchers who proposed the dual process model further suggest that the process of coping occurs in an oscillatory pattern, such that coping with both types of stressors proceed more or less in tandem. We believe that this is the process by which the mental representation is most effectively revised and re-integrated as a working model of an important person, now deceased.

A surprising finding is that bereaved people who experience least distress, even when suppressing emotions, have the most benign course (Bonanno & Keltner, 1997; Bonanno, Keltner, Holen, & Horowitz, 1995; Bonanno et al., 2005). Thus, the idea that it is important to confront and express painful emotions in order to cope well with a loss is not supported by data. Instead, the evidence suggests that the more intense the negative affect in the initial grief period the greater the likelihood of chronic grief. In a similar vein, positive emotions in the wake of bereavement foretell better outcomes, consistent with findings that genuine positive emotions are helpful in regulating physiological and cognitive functioning (Emmons & McCullough, 2003; Fredrickson & Levenson, 1998; Gerin, Pieper, Levy, & Pickering, 1992; Lawler et al., 2003; Richman et al., 2005; Rozanski & Kubzansky, 2005; Schwartz, Meisenhelder, Ma, & Reed, 2003).

Interestingly, a recent study found that all bereaved participants, regardless of their clinical state, reported increasingly positive thoughts about the deceased over time (Bonanno et al., 2005). This trend may work to optimize the experience of positive emotions that provide an important means of maintaining regulatory flexibility following the loss of an attachment figure. For most people, positive feelings occur naturally in the wake of a loss, though they can sometimes be inhibited by guilty recriminations. When this happens, unopposed negative emotions may escalate and interfere with coping and integration of the loss.

Most bereavement studies focus on assessment of psychological functioning. Hofer's point of view suggests mat disrupted hidden biobehavioral regulators may also cause problems for bereaved people. For example, both the frequencies of performing simple daily activities, and the regularity with which these activities are performed, are considered to be an important part of circadian rhythms. Dysregulation of this system can result in dysphoric emotions as well as disrupted physiological functioning (Monk et al., 1994). Disturbance in the pattern of daily activities could occur with bereavement because

of loss of cues and/or entraining behaviors provided by an attachment figure. Consistent with this idea, we recently completed a study of levels of social rhythm activity levels in patients with complicated grief and found significant reductions (Monk, Houck, & Shear, 2005).

Bereavement researchers have been interested in other physiological consequences of loss, in particular in changes in stress hormones, immune function, and sleep, Hofer contributed to this literature early in his career (Wolff, Hofer, & Mason, 1964; Wolff, Friedman, Hofer, & Mason, 1964). Studies of parents of terminally ill children from John Mason's group at NIMH revealed that bereaved parents had a range of urinary 17-OHCS levels. However, those whose cortisol levels were in the highest quartile differed in their interview-assessed coping from those whose levels were in the lowest quartile. High cortisol excreters showed persistent intense grief. Descriptions of these parents revealed symptoms consistent with complicated grief. Low cortisol excreters showed a very different pattern, with little distress and clear evidence of engagement in their ongoing lives. A series of other studies of cortisol levels and ACTH response to CRH stimulation generally support the idea that cortisol dysregulation occurs in bereaved individuals, especially in the early period following the death (e.g., Kosten, Jacobs, & Mason, 1984; Roy et al., 1988; Schuchter, Zisook, Kirkorowicz, & Risch, 1986). Other studies have suggested bereavement-related impairment in immune function also occurs (Biondi & Picardi, 1996).

Sleep disturbance is a well-recognized problem following loss of a loved one (Chen, 1999; Zisook, 1985). In a small study of bereaved widows, 77% of them reported insomnia in the first week after the loss (Parkes, 1970). In another study, elderly people without major depression were compared to non-bereaved controls on EEG sleep measures over a 2-year period. Results showed a persistent increase in REM density in the bereaved group (Reynolds et al., 1993). Hall et al. (1997) studied EEG sleep in 40 elderly bereaved individuals with major depression and found a high rate of intrusion and avoidance symptoms, as assessed by the well-validated Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979). They noted that scores on this measure were as high as usually reported among patients with PTSD (Davidson et al., 1990). This is consistent with our findings in patients with complicated grief (unpublished data.) Also, consistent with the idea that complicated grief is different from depression, Hall et al. found that IES scores accounted for a significant proportion of the variance in sleep latency (13%) and delta sleep ratio (15%), while depressive symptoms contributed significantly to REM latency (15%). A recent study examined insomnia in bereaved college students (Hardison, Neimeyer, & Lichstein, 2005) and found that reports of trouble falling asleep due to thinking about the deceased and dreaming of the deceased were correlated with scores on a measure of complicated grief. In a regression analysis, insomnia predicted symptoms of complicated grief. Consistent with these results, we found a high rate of insomnia in a group of patients presenting for treatment of complicated grief (Germain, Caroff, Buysse, & Shear, 2005). We conclude that acute grief is associated with neuroendocrine and sleep disturbance indicative of biobehavioral dysregulation, and this disruption persists in those with complicated grief.

Bereavement and Attachment

Researchers have begun to investigate aspects of attachment important in bereavement. For example, Wayment and Vierthaler (2002) studied 91 individuals who lost a family member or close friend in the previous year. They used the Attachment Style Questionnaire (Feeney, Noller, Hanrahan, & Berman 1994) to classify individuals as secure, anxious ambivalent or avoidant, and found grief intensity was greater with a greater degree of attachment to the deceased and among those with anxious ambivalent attachment style. Fraley and Bonanno (2004) completed a longitudinal study of 59 bereaved individuals in which they examined the relationship between self-reported attachment style and the intensity of grief and other symptoms at 4 and 18 months post-loss. These investigators obtained ratings for participants along dimensions of attachment anxiety and attachment avoidance, using the Relationship Styles Questionnaire (Griffin & Bartholomew, 1994). They found those who were high on attachment anxiety, regardless of the level of attachment avoidance, had higher levels of grief at both time points. Additionally, grief intensity increased between 4 and 18 months, in the high anxiety group while those with low anxiety did not experience more grief over time.

Another group of investigators have been interested in the relationship between attachment, grief, and continuing bonds with the deceased. There is a prevalent idea that grief is the process by which one detaches from a lost loved one in order to free up energy to reconnect with a new attachment figure (e.g., Worden, 1991). However, this notion has been challenged (e.g., Klass, 1993; Murphy, Johnson, Chung, & Beaton, 2003). In one such study, Russac, Steighner, and Canto (2001) questioned a group of bereaved college students about their sense of closeness to the deceased person. They found that although mean ratings of closeness decreased over the time after the loss, there was no difference at end point between the bereaved students and a non-bereaved control group matched for the same relationship. The investigators interpret these findings as suggesting that there is a process of gradually decreasing sense of closeness following a death, but this

does not lead to detachment. Instead, there is a continued sense of connection to the person who died, akin to closeness felt in similar relationships with living people.

A series of articles by Field and Friedrichs (2004) and Field, Gal-Oz, and Bonanno (2003) sought to measure and assess the role of continuing bonds to the deceased. In the first of these articles (Field, Nichols, Holen, & Horowitz, 1999), bereaved volunteers were recruited 3–6 months following the death of a spouse. Participants who underwent a videotaped empty chair dialogue with their imagined spouse were rated for grief and other symptoms. Four items assessing continued bonds with the deceased were included in as part of a structured interview. These included ratings of a sense of presence of the deceased, keeping possessions of the deceased, comfort from possessions, and comfort from memories. Ratings for the two items related to possessions correlated positively with more grief at 6, 14, and 25 months post-loss.

In an article that included 39 of the original 82 participants in the empty chair dialogue study (Field, Gao, & Paderna, 2005), a new assessment of continuing bonds was administered 5 years after the loss. This scale has 11 items, including seeking reminders, keeping possessions, enjoying reminiscence, having inner conversations, feeling the loving presence of the spouse, taking on attributes of the spouse, realizing the impact of the spouse on "who I am today," attempting to carry out spouse's wishes, many fond memories, including spouse in decision making, and experiencing the spouse "as continuing to live on through me." Results showed that endorsement of all items was frequent, with a mean overall score in the moderate range. The total score at 5 years was strongly correlated with total concurrent symptoms of grief ($r = .65$). All but three of the items (like to reminisce, having inner conversations, and awareness of impact of the spouse) showed significant correlations with concurrent grief when assessed separately. However, inner conversations was significantly correlated with concurrent depression ($r = .32$) and with lower positive emotions ($r = -.38$).

The investigators also found that higher grief scores at 6 months predicted higher scores on continuing bonds at 5 years. Scored ratings of the empty chair monologue at 6 months revealed that greater blaming the deceased and greater helplessness were also significant predictors of continuing bonds at 5 years. These results suggest that continuing bonds, as assessed by this brief questionnaire can be problematic for bereaved spouses. On the other hand, ideas that a deceased spouse made a difference in the life of the bereaved person is not a problem, nor is enjoying reminiscences about the deceased, if such remembrance is not named as a source of comfort or solace. These benign forms of remembrance may be indicators of an appropriately revised and reintegrated working model of the deceased.

Field and Friedrichs (2004) conducted a study of 30 widows ≥55 years of age whose spouse died 4 or 25 months earlier. Participants completed ratings of continuing bonds and mood at 3 hr intervals for 2 weeks. Results revealed a significant relationship between scores on continuing bonds and negative mood at both time points. Lagged analyzes to explore the direction of this relationship indicated that for the early, but not late bereaved group, continuing bonds predicted negative mood. In another set of lagged analyzes, negative mood predicted continuing bonds at both time points. There was no relationship between continuing bonds and positive mood at 4 months, but there was such a relationship at 25 months. The authors conclude that there is some evidence that continuing bonds are associated with better coping late, but not early in bereavement. Also of interest is that negative mood appears to trigger continuing bonds in bereaved individuals, at both early and later time periods after the death.

Summarizing this work, and that of others, Field, Gao, and Paderna (2005) underscore the importance of differences in timing, type, and meaning of continuing bonds to the deceased in relation to hypothesized phases of reaction to loss. This work documents that bereaved people often seek connection to the deceased, especially during the early period after the death. During the period of acute grief, typical behaviors include the urge to visit places the deceased frequented and the need to leave the deceased's possessions exactly as they were before the death. In addition there is a tendency to misperceive others for the deceased, to interpret various perceptual cues as related to the deceased, and even to have paranormal experiences. The authors highlight the important distinction between behavioral manifestations of continuing bonds, as compared an internal state of felt-connectedness. Imagined conversations and other deliberate efforts to connect with the deceased in imagination in order to feel comforted may be an intermediate manifestation between the behavioral and more abstract mental connections. Behavioral and deliberate imaginal forms of continued bonds do not seem to contribute to coping in the long-run. In fact, these experiences, triggered by negative affect, may act to impede the progress of integration.

By contrast continued bonds that are symbolic can be integrated into the bereaved person's sense of identity. For example, the deceased is remembered as a role model, and/or as a participant in the bereaved person's autobiography, having left a lasting legacy. This kind of continuing bond allows the deceased to play an historic role in the emotional life of the bereaved person that is not at all inconsistent with their death. Reconfigured in this way, the mental representation of the deceased can continue to evolve as a part of the ongoing life of the bereaved person (Neimeyer et al., 2002).
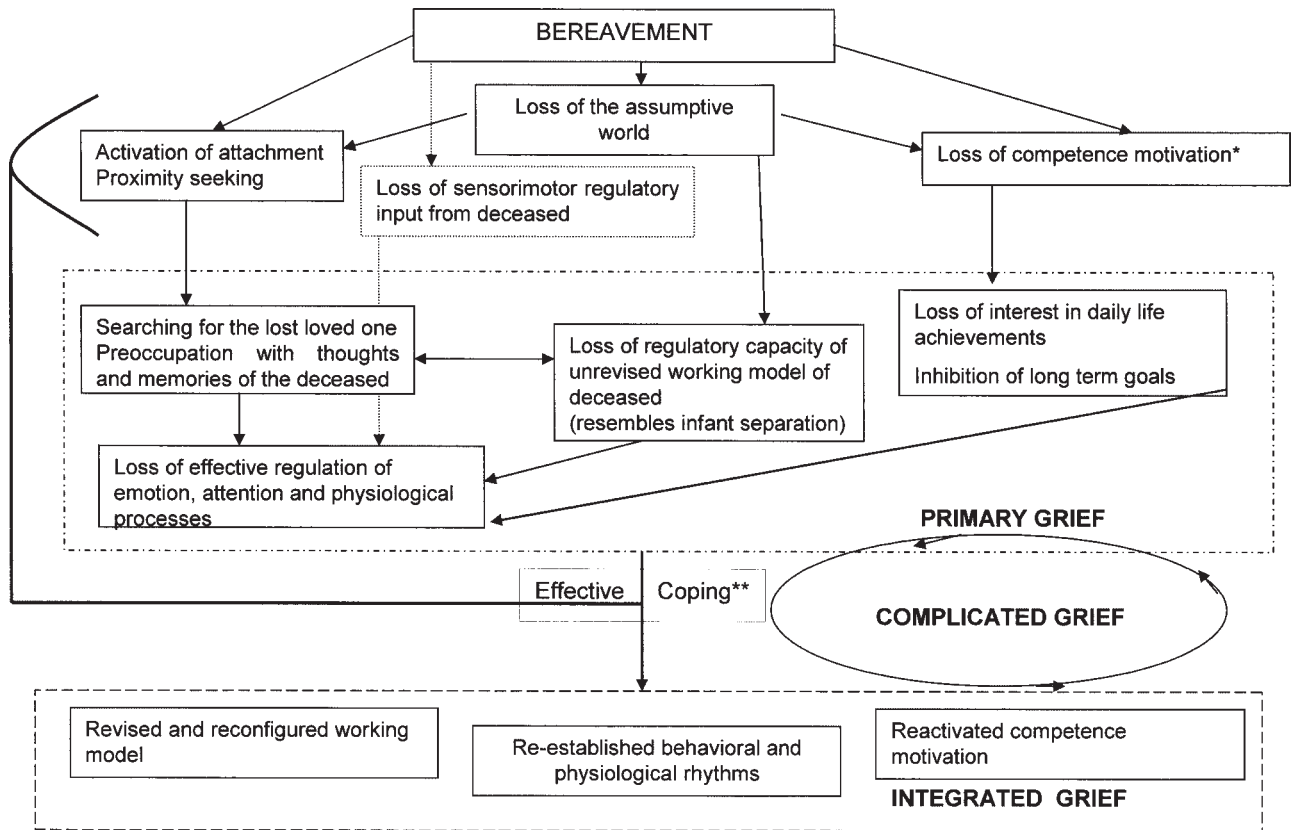
FIGURE 1 A provisional model of the bereavement process. The model incorporates ideas from Myron Hofer's animal studies of infant separation, as well as research on adult human attachment and bereavement. *Changes in caregiving and sexual systems are also expected, but are not included in this provisional model. **Moderated by attachment style, relationship variables, characteristics of the death, and social-environmental resources. The path to effective coping need not pass through primary grief. Dotted arrows indicate connections considered more tentative.

Field et al. (2005) interpret their research findings according to the premises of Bowlby's model. For example, they postulate

> . . . because the separation response is based on parts of the brain that evolved prior to the ability of mammals to comprehend the permanence of the separation following death, the absent loved one is registered as simply missing. . .[early continuing bonds] imply failure to acknowledge the irrevocability of the loss. . . . These CB expressions can be expected to diminish markedly after the first few months following the death as the finality of the loss becomes more fully registered at the attachment system level." (pp. 280–281).

These authors view the tendency of recently bereaved people to misperceive others for the deceased as a manifestation of the failure to understand the permanence of the loss. In the next phase of grief, the bereaved person is said to have understood the permanence of the loss

without having relinquished the goal of reestablishing proximity. However, misperceptions and other phenomenon seen in the early phase of grief are vastly different from the experience of a person who is separated from an attachment figure who has not died. Moreover, data repeatedly fail to indicate that bereaved persons regularly go through the hypothesized stages of the grief process. Thus, we have a somewhat different explanation for the very interesting findings from this line of work. Our model is based on Hofer's thinking.

A PROVISIONAL BIOBEHAVIORAL MODEL OF BEREAVEMENT

Hofer's fundamental insights pertain to maternal–infant attachment. Challenging Bowlby's notion that infant attachment is directed by pre-programmed response repertoires, Myron's research confirms that relationships act as regulators of biobehavioral functioning in rodent infants. However, neither he nor others have studied

mechanisms of attachment relationships as regulators in adults. It is obvious that adults are different and more complex organisms that live in a far more diverse environment than the maternal nest. Even the principles of learning they obey differ from those of infants (Polan & Hofer, 1999.) Thus, it is not clear whether the infant model holds for adults, and if so, how it works.

Hofer speculates that relationships do serve as biobehavioral regulators in human adults and that this has important implications for thinking about mechanisms of bereavement. Still, he suggests that there are also essential differences between infants and adults. The most important is that mental representations play a critical role in adults, to a large extent over-riding the need for physical proximity. In addition, regulatory responses are comprised of integrated affective and attentional responses in adults, rather than separable, specific physiological reactions seen in infants and a range of different social and environmental stimuli provide regulatory cues in adults. We accept these premises, and, in particular, functioning of the mental representation of the deceased plays a central role in our provisional model (Fig. 1).

Attachment researchers maintain that information contained in working models tends to be stable and biased toward the initial configuration. At the same time, because the internal representation needs to be an accurate reflection of reality, expectations, and predictions contained in such representations are repeatedly matched with actual experience. Still, internalized representations are revised slowly, and only when a mismatch with continuing experience is perceived as reliably present. This system does not easily accommodate the death of an attachment figure. Death entails a drastic permanent change in the ongoing real relationship that is easily perceived by the bereaved person, yet it cannot be immediately assimilated into the working model. This decisive inconsistency between perceived reality and its mental analogue is the hallmark of trauma (Janoff-Bulman 1992). It is likely that trauma, by definition, temporarily renders the relevant working model ineffective and that this occurs at a time when it is being actively recruited into service. Observed symptoms follow from this dilemma.

Bereavement is highly stressful, and stress activates attachment motivation and inhibits competence motivation. Activation of attachment deploys attention to thoughts and images of the deceased contained in the mental representation. There is a concomitant urge to seek proximity to the attachment figure and to enhance the sense of felt connectedness. However, achieving the goal of reunion is frustrated by conscious awareness of it impossibility. At the same time, activation of the unrevised working model of the deceased produces disconcerting feelings of the continued presence of the loved one and thus intensifies the desire for contact. In this situation, the bereft person searches for the lost loved one in her or his own mind as well as the environment in a dogged attempt to reconnect. Thoughts and images of the deceased are strongly activated, perhaps amplified in an effort to compensate for the profound loss of the real person. Access to images, thoughts, and memories may be further recruited as part of the process needed to renovate the working model. We think all these mechanisms contribute to the marked preoccupation with the lost loved one noted by Hofer and regularly observed in acutely bereaved people.

To the extent that preoccupying thoughts of the deceased are dysphoric, this distress further activates the attachment system, producing a feed-forward escalation in distress. Positive emotions, by contrast, are known to have beneficial psychological and physiological effects (Ashby, Isen, & Turken, 1999; Rozanski & Kubzansky, 2005) Thus, their presence reduces distress, deactivates the attachment system, and activates competence motivation. For some people, religious beliefs, forgiveness, or compassion, or finding meaning in the death help reduce distress and/or generate positive emotions. It is likely that generalized attachment style also plays a moderating role in bereavement. This early working model seems to function as a traitlike individual characteristic that influences stress response, including response to bereavement. A secure generalized attachment representation increases the likelihood of available current secure attachment relationships and facilitates adaptation. Anxious attachment is associated with higher levels of distress and more difficulty coping with stress.

The stress of bereavement also inhibits competence motivation, resulting in reduced interest in interactions in the world, and loss of long-term goal orientation. These consequences create new stresses that can further activate the attachment system and further inhibit engagement in the world. The presence of other people and good environmental resources can be helpful, and absence of these supports can increase the difficult of coping with loss. An important role of support is to compensate for the bereaved person's temporary withdrawal from mastery and performance tasks. A good support system can ensure that needed tasks are completed and gently encourage the bereaved person to think about future plans. Without this, fear of failure and performance avoidance can take hold, creating another pathway for feed-forward escalation of bereavement-related distress. Evidence suggests that respite from such distress facilitates revision of the working model, while intensification of emotional pain impedes the process of revision.

Caregiving is the complement to the attachment, functioning to provide others with a sense of security.

We believe caregiving contributes to biobehavioral regulation in adults and that it is also important in bereavement. However, there is little empirical evidence for this at present, so caregiving is not fully incorporated into our provisional model. Since adult attachment relationships are reciprocal, it is unclear whether mental representations of caregiving are separate from those of attachment, or exactly how the two systems inter-relate. Caregiving includes behaviors that are mirror images of attachment behaviors, supplying comfort and reassurance through provision bf a safe haven and encouraging autonomy through establishment of a secure base. Expectations for caregiving effectiveness are almost certainly contained in mental models in a manner comparable to attachment security (Feeney & Collins, 2001). Bereavement almost certainly leads to a mismatch in the caregiving as well as attachment representation. It is easy to imagine that executive, managerial caregiving functions contribute directly to daily life rhythmicity and also play an important role in adult well being and sense of identity and that their loss adds to the visceral reaction, dysphoric mood, painful feelings of incompetence, and unfamiliar identity confusion that accompanies bereavement. If so, resolution of mismatched internalized models of caregiving may be needed along with the revision of the attachment representation.

Several lines of existing data indicate that the transition from primary to integrated grief is usually accomplished, or at least well underway, by 6 months after the death. If not, this is suggestive of the persistence of irreconcilable discord between the reality of the death and the mental representation of the deceased. In its unrevised form, the working model continues to produce disconcerting feelings of continued presence of the loved one and strong urges to search for and unite with the deceased person. The bereaved person has a persistent experience of traumatic loss, as reality continues to fail to match the assumptive world. Competence motivation remains inhibited producing a sense of estrangement from the world. Continued mismatch of the reality of the death with internalized caregiving models can create persistent feelings of failure to protect the deceased and/or to take good enough care of this person. Together, these symptoms describe the syndrome of complicated grief.

In conclusion, our provisional model, organized around Hofer's question of exactly what is lost when a loved one dies, indicates that bereavement produces numerous losses. They usually include loss of the assumptive world, loss of proximity and sense of comfort from the attachment figure, loss of competence motivation, loss of effective biobehavioral regulation, loss of an important fear regulation mechanism, and loss of caregiving behaviors and satisfactions. Coping with bereavement requires addressing each relevant loss. Our identified losses map onto the recommended "dual process model" by refraining the two overarching coping goals as revision of the working model of the deceased and reactivation of competence motivation. These processes normally proceed in tandem, with the success of each supporting that of the other. What is remarkable is that in spite of the tremendous upheaval, coping usually progresses well. Most adults have the capacity to successfully adjust to important loss, making use of an array of available alternative regulatory inputs, and experiencing varying degrees of discomfort in the process.

On the other hand, as we noted in beginning of this article, for an important minority, this auspicious outcome does not occur. Perhaps related to insecure attachment style, intercurrent additional stressors, cooccurring psychiatric or medical problems, or other risk factors, there are problems in revising the working model of a deceased loved one and in reestablishing smooth functioning regulatory systems. Competence motivation remains inhibited, attachment and/or caregiving motivation is chronically activated and the experience of traumatic loss persists. The result is a protracted period of primary grief that comprises the syndrome of complicated grief. This debilitating syndrome is only now beginning to receive the attention it needs to ensure appropriate recognition and treatment of people caught in its web.

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