Attachment as Regulation: A Commentary

Sandra Pipp
Lehigh University

Robert J. Harmon
University of Colorado Medical Center

PIPP, SANDRA, and HARMON, ROBERT J. Attachment as Regulation: A Commentary. CHILD DEVELOPMENT, 1987, 58, 648–652. In our commentary, we show how Hofer's work alters the traditional perspective on human attachment in important ways. Hofer describes 2 components of attachment: one that does not develop and one that does. Drawing on work with rodents and primates, Hofer suggests that one component of attachment that does not develop is the sensorimotor or homeostatic regulation between members of a dyad, a stable aspect of all intimate relations throughout the life span. We suggest that this component of attachment in humans may be especially important in the first 6 months of life, a period for which no current theory of attachment provides adequate explanation. Second, Hofer has shown that some components of homeostatic regulation change with development through physiological maturation of organs, internalization of function, and distribution of regulation. We suggest that, in humans, the development of an internal working model can lead to increasing internalization of these functions as well as distribution of regulation among a number of close relationships.

One major puzzle in attachment theory is how to account for the development of the infant's attachments to others in the first half-year of life (Bretherton, in press). Hofer's conceptualization holds the promise of solving this puzzle by suggesting an alternative framework in which to view early attachment (Hofer, 1987, in this issue). In our commentary, we will describe how we believe Hofer's approach offers a resolution of the puzzle of early attachment by specifying components of attachment that develop and those that do not.

The puzzle of how to account for attachment in the first 6 months of life was created by Bowlby's (1969) initial description of the four phases of attachment. Bowlby's primary definition of attachment is the infant's ability to seek proximity to a specific caregiver. He described the first two phases of attachment, encompassing the first 6 months of life, as devoted to the infant's increasing ability to discriminate the caregiver from others. These two phases are seen as preparatory to the third phase, proximity seeking, which defines attachment proper and to which most research on attachment in humans is devoted. Components necessary to attain the third phase, proximity seeking to a specific caregiver, are thus embedded in the first two phases, discrimination of that specific caregiver.

This description of the development of attachment, however, fails on at least two grounds. First, it creates a puzzle of determining how an "attatched" state develops from a "preattached" state, almost by definition. By specifying attachment as proximity seeking, Bowlby unnecessarily consigns the earlier phases to a preattachment category. Second, by describing the first two phases as being devoted to discrimination between people in the infant's world, Bowlby restricts the description of what does go on between mother and infant.

Hofer's approach widens the description of attachment to include ways in which members of a dyad influence each other at the biological level. There are two parts to Hofer's contribution. Drawing on research with rodents and primates, he offers an exciting account of how infants attach or connect to

Preparation of this paper was supported by a grant from the MacArthur Foundation Network on the Transition from Infancy to Early Childhood to the second author. Thanks to Linda Crnic and Bruce Pennington for their helpful editorial comments. Requests for reprints should be sent to the first author at the Department of Psychology, Chandler-Ullman Hall 17, Lehigh University, Bethlehem, PA 18015.

1 The fourth phase is labeled "goal-corrected partnership" and concerns the mother and infant's abilities to work together toward some goal.

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others throughout the life span by presenting evidence emphasizing the importance of biological regulation as a component of all close relationships. One component of attachment, then, does not “grow up” but maintains itself at all ages. He hypothesizes that the biological component of attachment serves a similar function for all mammals. A second component of attachment does “grow up” and is transformed with development. It is in this context that the notion of “internal working models,” defined as a dynamic representation of the relationship (Bretherton, 1985; Main, Kaplan, & Cassidy, 1985), becomes important. We will hypothesize that attachment relations which change with development do so by virtue of changes in structure of the internal working model. We will treat each point in turn.

**Attachment Functions That Do Not Grow Up**

Bowlby (1969, 1973) suggested that attachment systems serve to maintain proximity seeking. Yet, attachment is something much more profound than simple proximity seeking. As Bretherton (1985) pointed out, an observer external to the behaviors will perceive the infant’s attempts to stay close to the caregiver. From the perspective of the organism involved in the behaviors, proximity seeking represents a feeling of security when close to the caregiver. In the very young, “preattached” organism, felt security may result from biological regulation, or homeostasis, and Hofer’s central finding is that mother-infant interactions in lower animals serve physiological regulatory functions for the infant.

Bowlby (1973) distinguished between an “inner ring” that maintains physiological homeostasis and the “outer ring” of life-maintaining systems between the organism and the environment. Hofer’s work with infant rats suggests that the “inner ring” that maintains physiological homeostasis is the “outer ring.” As Hofer points out, the prolongation of immaturity in altricial species allows the infant to maintain an open homeostatic system, with the regulation of the “inner core” or “internal milieu” being delegated to the interactions between self and caregiver. One question this approach raises is whether the relation between delegated homeostasis and internal homeostasis changes with development.

Hofer (1984; 1987, in this issue) suggests that biological homeostasis appears to be a function of all close relationships, not just between mother and infant. That is, attachment serves the function of homeostatic regulation throughout the life span. For example, behavioral and physiological responses to bereavement in adult humans bear striking similarity to those obtained during infants’ separation from their caregiver. In making this point, Hofer underscores the “connectedness” of our species. At the most basic level, the biological one, we are connected and embedded in each others’ biological rhythms, not only in utero, at birth, or in early infancy, but throughout the life span.

There may be different forms of biological connectedness, however. Hofer presents intriguing evidence suggesting that the acute, or protest, and chronic, or despair, responses to separation from this biological connectedness are characterized by different structures. The structure revealed by the immediate response to separation is additive, in that each additional cue that represents characteristics of the mother decreases protest behavior in a linear fashion. Thus, littermates, with the greatest number of cues, reduce vocalization the most. This finding finds an analogue in humans. Siblings have been reported to attenuate separation distress and to use each other as secure bases (Heinicke & Westheimer, 1966).

“Despair,” the response to long-term separation, is a result of severing of biological homeostasis of the infant’s internal functioning. Specifically, Hofer suggests that the “slow developing changes in the rat are clearly the result of . . . withdrawal of the regulators previously supplied by the mother-infant interaction” (p. 645). The mechanisms underlying behaviors emerging as a function of longer-term separations appear to be relatively independent of each other, with the mother providing both “up and down” regulation of independent neurochemical and behavioral systems.

One question not addressed by Hofer is how each species recovers homeostatic regulation after separation. In primates, for example, some physiological functions, most notably heart rate and body temperature, approached baseline during longer phases of separation (Reite, Short, Seiler, & Pauley, 1981). When homeostatic regulation is severed by separation, how does each species recover physiological regulation in time, and what are the mechanisms of recovery? Findings of recovery—or lack of recovery—of homeostasis might enable us to determine whether there are physiological concomitants
that differentiate between the phases of despair and detachment.

**Attachment Functions That Do Grow Up**

Not only does attachment serve homeostatic regulatory functions throughout the life span, but the mechanisms of regulation may change with development. We believe that his speculations about the transformation in regulation are quite exciting, especially in the light of the concept of “internal working models.”

Internal working models are defined as dynamic representations of the relationship (Bowlby, 1969, 1973, 1980; Bretherton, 1985; Main et al., 1985). A major focus of this concept is the infant’s affective and cognitive representational schemas of the attachment relationship. Main et al. (1985) hypothesized that the internal working model changes as cognitive and affective development increases. While they focused on representational thought, sensorimotor components of the internal working model are possible, and, indeed, Main et al. speculated that an internal working model first appears at 3 to 4 months of life in the human.

The most basic level of an internal working model may be the sensorimotor one that concerns homeostatic regulation. Sander (1975), for example, specifies regulation as the first issue to be resolved between infant and mother. Those aspects of the internal working model that are most resistant to change may be those that relate to sensorimotor codings of the reliability of homeostatic regulation. At the most basic, “security of attachment” relates to a physiological coding that the universe is benign and need-satisfying, that is, homeostatic disruptions will be set right.

Maternal upset over inability to restore homeostatic regulation may have a biological basis. Hofer points out that the intricate “dance” or “attunement” (Stern, 1984) between mother and infant may be recast as biological symbiosis in which both partners are dependent on the other to carry out their role. Hofer’s major contribution to this notion of symbiosis is to underscore the importance of the infant’s behavior for the mother’s symbiotic dependence on her infant for maintenance of her mothering role. At the biological level, then, we return to the notion of the importance of the child on the parenting functions of the caregiver (Bell, 1968).

Within this framework, sensorimotor components of the internal working model may account for many of the puzzles of “unconscious” or “primary process” influences on later behavior. Those aspects of the internal working model that are most resistant to change may be those sensorimotor codings about the reliability of the attachment figure for meeting the self’s needs. These codings are relatively resistant to change because they are sensorimotor and not under conscious control. Some tentative support for this position is obtained from studies showing that the original Ainsworth classification derived for 1-year-old infants’ security of attachment is also relevant for classification at older ages, such as preschool (Main et al., 1985), adolescence (Kobak & Scerey, in press) and adulthood (Hazan & Shaver, in press). Stronger evidence for this claim will require longitudinal research examining the stability of attachment classification throughout the life span.

One of the most fascinating aspects of Hofer’s article is his speculation on the process by which biological regulation may become internalized. Internalization of biological regulation in all probability requires little cognitive ability in the rat. In humans, however, internalization of biological regulation should be a function of (1) maturational changes in organ systems, (2) internalization of affective and cognitive components of the relationship (internal working models), and (3) the lifelong influence of social relationships. While point number 1 is beyond the scope of this paper, points 2 and 3 will be considered in turn.

Hofer’s appeal to increased higher-order associative and symbolic functions to control homeostatic functioning may be one component of the internal working model. One way in which this may occur is through the process broadly described by neo-Piagetians of a social cognitive orientation (Case, Hayward, Lewis, & Hurst, in press; Fischer & Pipp, 1984). A child’s affective and cognitive understandings of relationships will change in structure with development, and this development will influence a person’s biological responses to separation. To make an obvious point, an explanation to a 12-month-old that Mommy will be right back will have less influence on physiological responses than it will have on a 4-year-old, presumably because the older child has a representational structure that allows for a more stable understanding of the reliability of the mother.

Equally interesting is Hofer’s hypothesis that the shift from external to internal regulation may also involve differences in response to social interactions, specifically, a move-
ment "from a dependence on interaction with the mother to a more flexible dependence on a variety of different social interactions" (p. 20). That is, increased internalization may come about not only by increased affective and cognitive structures but by distributing biological homeostasis and "attachments" to more than one close relationship. Or, greater predictability in a greater number of situations and/or people will be obtained when infants or children can generate larger numbers of appropriately specific internal working models.

This does not mean that the internal working model of each relationship must follow the same classification. One of the puzzles of data deriving from attachment theory is that an infant's attachment to one caregiver, for example, the mother, is not necessarily predictive of other attachment relationships, for example, the father (Lamb, 1977, 1978; Main et al., 1985). While an infant may generalize attachment behavior from a good mother who is no longer available to another individual, it is also true that security of attachment changes as a function of the quality of interactions and so may vary as a function of the life stress of the family or with different relationships. And, it should not be presumed that multiple problematic attachment relationships predispose a child to be unable to develop more secure relationships in appropriate parenting situations (Harmon, Wagonfeld, & Emde, 1982).

In summary, we have suggested that Hof- er's contribution alters the traditional perspective on attachment in profound ways. By suggesting a language to understand attachment in the first 6 months of life, we no longer must puzzle how the "preattached" infant becomes "attached." Instead, Hofer's emphasis on biological connectedness suggests an important component of attachment in the first 6 months of life: Infant and mother are connected at the level of biological symbiosis. The symbiosis serves an attachment function that manifests itself as proximity seeking after approximately 6 months.

Our treatment of Hofer suggests that attachment can be conceptualized in terms of those components that develop and those that do not. In this, we follow the tradition of Freud (1911/1958) and Piaget (1970), who suggest that some structures of thought maintain themselves throughout development (e.g., primary process and sensorimotor thought), while others develop from the transformation of the earliest structures (e.g., secondary process and operational thought). In attachment theory, it may be that throughout the life span we are biologically connected to those with whom we have close relationships. Sensorimotor or homeostatic regulation between members of a dyad is a stable aspect of all intimate relationships throughout the life span. This component does not develop, but instead may serve as a sensorimotor version of the internal working model and may account for the unconscious components of attachment relationships (Bretherton, in press; Fischer & Pipp, 1984; Main et al., 1985). In addition, some components of homeostatic regulation change with development through physiological maturation of organs and development of the internal working model. The development of the internal working model leads to increasing internalization of these functions as well as distribution of regulation among a number of close relationships.

**References**


