Attachment as an Organizational Construct

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SROUFE, L. ALAN, and WATERS, EVERETT. *Attachment as an Organizational Construct.* CHILD DEVELOPMENT, 1977, **48,** 1184–1199. Developmentalists have often conceptualized infant-adult ties in terms of an implicit trait construct evolved from the study of dependency. The major dimension of individual differences has been conceptualized in terms of quantitative differences in the "strength" of attachments, and a variety of discrete behaviors (touch, look, smile, approach, cling, cry) have been assumed to be valid "indices" of this dimension. These behaviors have been assumed to be significantly intercorrelated and stable across situations and over time. Critics have argued strongly that these assumptions cannot be defended empirically. It has further been argued that the study of individual differences in infant-adult ties is unlikely to be a productive research strategy and that attachment (as implying anything more than infant-adult interaction) has outlived its usefulness as a developmental construct. When, however, trait models are abandoned and greater attention is paid to the functions, outcomes, and context sensitivity of attachment behavior and to the underlying behavioral control systems that organize it, the apparent conflict between situational influences and stable individual differences can be resolved. The study of changes in the organization of behavior during development provides a framework for productive individual differences research. When greater emphasis is placed on the organization of behavior, both the stability and the flexibility of attachment behavior can be comprehended, and the attachment construct can continue to play an important integrative role in developmental theory.

Assumptions concerning the nature of constructs underlying developmental research are often only implicit, yet they guide data collection and interpretation of results. For example, a number of researchers have provided data concerning intercorrelations among behaviors presumed to be indices of attachment (e.g., Coates, Anderson, & Hartup 1972; Maccoby & Feldman 1972). Noting that such "index" behaviors do not intercorrelate highly, do not show temporal stability, and are strongly influenced by context, critics have concluded that the attachment *construct* itself is wanting, that concepts such as attachment relationship and affective bond are superfluous, and that varying patterns of attachment behavior among infants are of little consequence (Cairns 1972; Gewirtz 1972a, 1972b; Masters & Wellman 1974; Rosenthal 1973; Weinraub, Brooks, & Lewis 1977). It has been suggested that individual differences be disregarded (e.g., Masters & Wellman 1974) and that research on attachment be reduced to study of contingencies within the contemporary interaction of caregiver-infant dyads (e.g., Cairns 1972; Gewirtz 1972a, 1972b; Rosenthal 1973).

The intercorrelational research and the critiques based upon it reflect a particular view of the attachment construct. If attachment is viewed as a trait construct, as a thing residing in the infant in some amount, then index behaviors should be intercorrelated. Failure of substantial intercorrelation calls *this* construct into question. This view of attachment as a trait construct, however, is not essential to attachment theory. It was superimposed on the attachment concept from the social learning theory of dependency (e.g., Maccoby & Masters 1970; Sears, Whiting, Nowlis, & Sears 1953), when investigators from that tradition turned to the study of caregiver-infant behavior. From another point of view (Ainsworth 1972, 1973, 1974; Bowlby 1969; Sroufe & Mitchell, in

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press; Yarrow 1972; Waters, Note 1), attachment is not viewed as a static trait; rather, it has the status of an intervening variable or an organizational construct, to be evaluated in terms of its integrative power. It is not a set of behaviors that are constantly and uniformly operative (in the manner of a temperamental characteristic) or even operative with a fixed probability of occurrence. Neither is it reducible to the interaction between infant and caregiver, though it is a product of that interaction (as it is shaped by species general characteristics, cognitive development, and characteristics of the individual baby and caregiver). Rather, attachment refers to an affective tie between infant and caregiver and to a behavioral system, flexibly operating in terms of set goals, mediated by feeling, and in interaction with other behavioral systems. In this view, behavior is predictably influenced by context rather than constant across situations.

Ainsworth (1972) has made a clear distinction between this organizational view of attachment and the trait view derived from work in dependency. Attachment is a "mode of relating to a specific figure," and individual differences are viewed in terms of "qualitative differences in the way attachment behaviors are organized, rather than as differences in the strength of some generalized drive or trait" (p. 124). Therefore, the validity of the attachment construct does not rest upon a demonstration of positive intercorrelations in a random sample of cases. Rather, ". . . different patterns of correlations might well be grounds for distinguishing qualitative differences in the organization of attachment relationships" (Ainsworth 1972, p. 124). Previous critiques (e.g., Cairns 1972; Feldman & Ingham 1975; Masters & Wellman 1974; Weinraub et al. 1977) have not been relevant to this organizational construct.

The Organizational Conceptualization of Attachment

Bowlby's (1969) conceptualization is the starting point for an organizational view of attachment and remains the definitive work on the topic. By casting attachment in systems theory terms of set goals, goal correction, and function, he removed the construct from encumbrance by drive reduction and causal trait concepts.[1] Attachment refers to species general (and even cross-species–mammalian) behavior systems, selected for their effect on the reproductive success of individuals in the environment in which they evolved. Viewing protection from predation as the biological function and proximity as the set goal of the attachment system, Bowlby argued that diverse behaviors such as smiling, clinging, and signaling could be seen as functionally related; all lead to the same predictable outcome, caregiver-infant proximity. Moreover, the set goal/goal correction concept suggested that proximity-promoting behaviors such as locomotion and crying would be automatically activated when information reached the infant that a (context-influenced) proximity-distance threshold had been exceeded. In the manner of a feedback loop, such behaviors would remain operative until (and only until) proximity was reestablished. In this way Bowlby sought to remove any drive considerations or any need for an attachment motive. Attachment behaviors could be activated without requiring an attachment drive and could be terminated without invoking concepts of expended or rechanneled energy.

Significant as Bowlby's classic work has been, his control systems model (as distinguished from his broader theoretical perspective) requires elaboration to yield a truly viable developmental construct which can serve a vital integrative function in the study of infancy. Bowlby discarded drive reduction in his working model of attachment at the expense of motivational and affective components, which are central to the organizational view presented here and which are not tied to drive reduction theories, except by tradition (see also Engel 1971). (This is despite the fact that his observations led him to describe attachment as an "affective bond" and despite the fact that the position outlined below is clearly anticipated in his book.) His cybernetic working model does not do justice to some of his more important observations. With attachment tied to the set goal of proximity, and information as the major determinant of behavior, the infant's tendency to be more readily upset following one separation-reunion experience cannot be explained, the effectiveness of developmentally advanced alternatives to contact (showing, looking, internal representation) cannot be encompassed, and inappropriate analogies to imprinting, with its implications for inflexibility in behavior, are brought to mind.

[1] See Wiggins (Note 2) for a critique of the use of trait attributions as causal or explanatory constructs and for a discussion of their use as categorical summaries of a person's behavior, as characterizations of behavioral acts, and as predictors of future behavior.

When, on the other hand, the set goal of the attachment behavioral system is viewed as "felt security," and affect is permitted to serve as a mediator of adaptive behavior, these problems can be resolved. Proximity seeking is not automatically elicited but depends on the infant's evaluation of a variety of internal and external parameters, in terms of a subjective experience of security-insecurity (Bishof 1975). Setting, familiarization, preceding events, and other aspects of context, as well as the infant's mood and developmental level, influence the initiation of bids for contact or proximity. And the behaviors which serve to recover an internally represented set goal are selected in terms of their efficacy in the present environment. With development there are increasingly varied means of maintaining contact, and there is decreasing proximity to the caregiver in the absence of stress (e.g., Feldman & Ingham 1975; Maccoby & Feldman 1972; Weinraub et al., 1977).

Bowlby's account of the function of attachment behavior also requires broadening. While protection may be sufficient for the evolution of attachment behavior in many species, a role in support of exploration is of similar importance in human adaptation today, since flexibility and problem-solving skill are major advantages of our species. Consequently, the concept of the attachment figure as a secure base for exploration (e.g., Ainsworth 1972) is of parallel importance to protection and again makes the concept more viable as a developmental construct.

Basic Definitional Features: The Affective Bond

The affective bond is, of course, a metaphor. It captures the expressions of positive affect embodied in the bouncing, smiling greeting reactions to caregivers and the apparent security and comfort derived from the mere presence and later the internal representation of the caregiver. It is the psychological tether which binds infant and caregiver together. While based in cognitive constructs such as object permanence, discrimination learning, and representation (Ainsworth 1973), the affective bond concept implies something beyond the mere discrimination of caregivers from others.

The secure-base concept and the notion of preferential treatment under stress are central in an organizational definition of attachment (Ainsworth 1972, 1974). With the formation of the attachment bond the infant should derive security from (as well as feel affection for) the caregiver. Given the infant's complex motivation concerning novel aspects of the surround (Sroufe & Waters 1976), such security may be inferred *not* from generalized proximity seeking but rather from the ability of the infant to use the caregiver as a base from which to explore the environment. Infants obviously have strong exploratory and affiliative tendencies, as well as tendencies to be wary of novelty (Ainsworth 1972; Bretherton & Ainsworth 1974; Sroufe 1977). In the absence of threat, the infant may spend little time in physical proximity, especially with increasing age (e.g., Rheingold & Eckerman 1973), though in a novel environment it may "check back" occasionally (Mahler 1975), visually or vocally or through locomotion. Given their curiosity and affiliative tendencies, infants may even spend more time looking at or interacting with (exploring) an unfamiliar person than they do their caregiver (e.g., Bretherton & Ainsworth 1974; Rheingold & Eckerman 1973). When distressed, however, especially by separation, 12–18-month-old infants require some form of contact with the caregiver to again become comforted. While crying may diminish when comfort is offered by another, ready settling and a return to relaxed exploration and play are expected only upon reestablishing contact with an attachment figure (Tracy, Lamb, & Ainsworth 1976).

This conceptualization is consistent with the observation (e.g., Ainsworth 1973) that most 1-year-old infants (those who *can* find comfort in the caregiver) characteristically seek proximity and physical contact when distressed and at least seek distance interaction and contact upon reunion, even if minimally distressed by separation. Most important, when distressed these infants find contact an effective terminating condition for the attachment behaviors activated during separation. Indeed the inability to find comfort in contact with an attachment figure is an important sign that the attachment behavioral system is not serving the integrative/adaptive function that it does for most infants. Insecurely or maladaptively attached infants may need contact even when environmental stress is minimal, may be unable to regain security or resume exploration upon reunion, or may actively avoid contact or interaction upon reunion. This concept of secure (adaptive) attachment is in stark contrast to the notion of strength or intensity of attachment. The latter leads to confusion over whether "strongly" attached infants should always (or never) seek proximity and so forth.

The affective bond concept frequently has been challenged by critics (Cairns 1972; Gewirtz 1972a, 1972b; Rosenthal 1973; Weinraub et al. 1977), primarily because of difficulties operationalizing and measuring such a concept (Bernal 1974). Yet to discard the notion of the affective bond is to lose the integrative power of the attachment construct. The affective bond is the concept that welds together the secure base phenomenon and preferential treatment of attachment figures. It is the security in the caregiver's presence that promotes exploration in a novel environment, and it is the distress at separation (or positive affect upon reunion) that promotes proximity seeking (or interaction) during reunion. The feelings of relaxation and security then promote the return to play. Moreover, only the affective bond concept affords the explanation for the observed behavioral sequences of infants upon prolonged separation from caregivers (Bowlby 1969; Robertson & Robertson 1971). The phases of protest, anger, despair, and detachment typical of such separations cannot be reduced to or reproduced from the study of caregiver-infant interactions (though separation-reunion behavior is influenced by the nature of the prior interaction experience [Ainsworth, Blehar, Waters, & Wall 1977; Hinde & Spencer-Booth 1970]). The behavioral sequence unfolds in the absence of input from the caregiver. Similarly, the sequence of indifference, ambivalence, and rapprochement following significant separations (Heinicke & Westheimer 1966) cannot be readily captured without the construct of the affective bond. The difficulty of measuring or demonstrating the affective bond in laboratory studies cannot be cause for assuming it to be superfluous (see Weinraub et al. 1977).

As we will discuss further below, procedures adequate for inferring such a bond and assessing individual differences in the quality of infant-adult relationships are available. Bowlby (1969), Ainsworth (1972, 1974), Harlow (1961; Harlow & Zimmermann 1959), Hinde (1976a, 1976b), and others have argued that the affective bond derives from experience and is reflected in observable behavior. One needs merely to assume that there is security in the familiar to deduce that caregivers, through countless interactions, continued exposure, and coordination of reciprocal behavior patterns, would become a source of security for the infant—a source of familiarity that is highly portable and which ultimately could be internalized.[2] Variations in the reliability, responsivity, and sensitivity of the caregiving may then be hypothesized to lead to individual differences in the security the infant derives from the relationship (Ainsworth 1972, 1974; Lewis & Goldberg 1969).

The role of learning.—Rather than being antithetical to a learning position, an organizational perspective points to the complexity of the learning that occurs in the caregiver-infant interaction. The operation of an attachment behavioral system as the mediator of an affective bond assumes that the infant has learned to coordinate a wide variety of behavioral reponses into an adaptive and flexible goal-corrected response repertoire. It also assumes that the infant has acquired the ability to discriminate attachment figures from others, to anticipate the behavior and goals of the attachment figure, to appraise a wide variety of environmental contingencies, and to coordinate affective and behavioral responses. In addition, it assumes that the infant has acquired a mapping of familiar environments and the ability to estimate the attachment figure's accessibility in terms of his own behavioral capabilities. The knowledge that a caregiver is reliable and responsive and the elaboration of generalized expectancies and competence motivation eventually crystalize from this as the first truly social learning experiences. Behavior is dependent on environmental support, and the caregiver is a rich and reliable source of this support. But an organizational perspective suggests also that these early learning experiences have consequences for the individual infant's functioning even outside of the interaction with the caregiver. What is challenged here is not the view that attachments are learned but the narrow view that it is merely discrete behaviors that are learned and that behaviors are maintained in the repertoire only as a result of environmental contingencies (e.g., Gewirtz 1972a, 1972b).

The Organization of Behavior and the Assessment of Attachment

Viewing attachment in terms of the organization of behavior leads to quite different approaches to description and assessment than does a conventional trait approach or the revised social learning position, within which attachment must be defined in terms of stimulus

[2] Or one could further assume that the caregiver becomes a conditional stimulus for frequently performed behavior (Cairns 1966).

control within the dyadic interaction (e.g., Cairns 1972; Gewirtz 1972a, 1972b). From the trait perspective various "indices" of attachment (e.g., amount of crying, proximity seeking, etc.) are assessed over time or intercorrelated within and across situations (behavioral/temporal isomorphism being required) or differentiality of the "indices" with respect to caregivers and others is assessed (e.g., Feldman & Ingham 1975). Masters and Wellman's (1974) critique, based on the data of Coates et al. (1972a, 1972b), Maccoby and Feldman (1972), and Stayton, Ainsworth, and Main (1973), casts doubt on the assumptions underlying this research. Correlational approaches, based on frequency or duration of discrete behaviors, independent of meaning, are clearly inadequate, and the assumption that discrete behaviors may index attachment is also called into question (Waters, in press).

Partly in response to the failure of the trait approach, current social learning models stress that attachment *is* the (sequential contingencies in the) interaction and that the construct, if it is useful at all, can only be assessed by examining the contemporary dyadic interaction (Cairns 1972; Gewirtz 1972a, 1972b; Rosenthal 1973). From this viewpoint, stable individual differences in attachment, existing independent of dyadic interaction, are not predicted. The process of attachment itself can only be examined by determining the stimulus control parameters for a given child-caregiver pair within that situation. Stability data to be presented in a later section illustrate the limitations of this view.

From an organizational perspective, the quality of an attachment relationship is best assessed by reference to the organization of attachment behaviors with respect to the caregiver and in consideration of context (Ainsworth 1972). Based on observations of humans and other species, assumptions are made about the functions which the attachment relationship serves. For example, most attachment relationships are adaptive in that they are effective in supporting the infant's mastery of the inanimate and social world, which may mean proximity and contact in some circumstances, lack of proximity in other circumstances. Given the emphasis on behavioral organization, emphasis is not placed on the *frequency* of attachment behaviors as indices of important individual differences.

Unlike a trait view, or even the revised social-learning position, an organizational perspective is not unable to comprehend continuity within the context of developmental changes. An adaptive attachment relationship (one that is serving the infant well as it faces the tasks of a particular developmental period) can be reflected in a changing, though predictable, organization of adaptive behavior. Even as the functions of attachment become elaborated, the effectiveness (quality) of the relationship can be assessed. Discrete behaviors may or may not be stable. Proximity seeking and clinging may be transformed to distance interaction, crying to signaling. But an adaptive, secure attachment relationship at time 1 will be the basis for a similar quality relationship at time 2. The role of the attachment relationship in promoting instrumental competence will be reflected in the patterning of behavior, even as the occurrence of discrete behaviors changes.

Behavioral Categories, Behavioral Classes, and the Meaning of Behavior

As an alternative to the simple frequency count/duration of response approach to assessment, behaviors may be viewed as exemplars of categories or classes, and the manner in which behaviors are *organized* across situations and across individuals may be assessed. From an organizational perspective, assessment involves attending to the "meaning" of the behavior (see below), not simply its occurrence (Sroufe, in press). It also involves constraining or qualifying definitions of behavioral categories. Since multiple behaviors can have similar meanings (serve the same function or have the same or equivalent outcome), the prediction becomes not that behavior A will be correlated with behavior A across situations or time, but rather that behavior A, as a member of class X, will predict the occurrence of behaviors in class X in that same context. Babies who vocalize and show a toy in one reunion episode may smile in another; both are positive greetings. Similarly, babies who seek proximity on reunion at one age may smile and vocalize when they are older; both are ways of reestablishing contact.

Also, since the same behavior can have multiple meanings (see Santostefano & Baker 1972), determining whether behavior A is properly a member of class X (in a given instance) requires a consideration of the behavioral and situational context and the interrelationships among behavioral systems. The same behavior may act as a member of class X in one context, class Y in another. For example, most babies turn away when their nose is

wiped. Such a response is of limited interest and would not predict turning away when picked up in the course of seeking contact. The latter has a radically different meaning, and tallying the two responses together is certain to obscure results. Contact seeking mixed with squirming to get down, pushing away, or general petulance has a different meaning than relaxed molding to the caregiver (though both would contribute to total scores for time in contact). Looking at the mother, when combined with bouncing and smiling upon the caregiver's entrance, has different significance (positive greeting) than merely looking sometime later. The scoring of any behavior can easily be tied to behavioral and situational context, and when this has been attempted both high reliability and a wide range of external correlates have been reported (see Hinde [1976a, 1976b] for further discussion of related issues).

What is at issue here is the functional equivalence and organization of behaviors. Functional equivalence obviously does not mean that behaviors concerning the door through which mother has departed should be related to behaviors directed to the mother (cf. Masters & Wellman 1974). Rather, it means that different behaviors can serve the same function (Bowlby 1969; Ainsworth 1972). Contact with mother can be reestablished through proximity or by smiling and showing a toy; it cannot be reestablished by turning away, even in the context of proximity seeking. Security can be maintained by physical contact, or by seeing the caregiver, or even by the opportunity to see her (Carr, Dabbs, & Carr 1975).

There are various routes to achieving and maintaining security as the infant explores the environment, and there are various reactions to feelings of insecurity. A generally secure or insecure attachment cannot be inferred from any particular behavior (even crying, anger, or resistance, which are at times exhibited by all infants) but must be inferred from the pattern of behavior, in consideration of context, across time. Attributing meaning adds complexity, but the complexity resides in the infant's behavior. Complexity does not mean that predictions cannot be made or that they cannot be verified from behavioral observation (nor could this be the case with an ethological concept). It does mean, however, that predictions will require theoretical guidance: Behavior occurring in one context may be less predictive of itself than it is of a phenotypically different behavior in another context. For example, proximity seeking when distressed may be more predictive of positive greetings upon reunion when not distressed than it is of proximity seeking in that context (Waters, Note 1). That this is in fact the case is easily assimilable from an organizational perspective (Ainsworth 1972, 1974) but cannot be readily formulated from current social learning positions.

Attachment as Behavior and Behaviors Reflecting the Quality of Attachment

Bowlby (1969) has specified smiling, looking, vocalizing, following, and clinging as attachment behaviors. These are behaviors directed to caregivers by all normal members of the species. They are designated attachment behaviors because they are used by the infant in the service of proximity or physical or psychological contact. They are attachment behaviors because of their role in the development of and service of attachment and because of their organization in relation to one another. But attachment is not any of these behaviors, even in combination, just as intelligence is not performance on an intelligence test or the solving of a problem; it must be inferred from such behavior.

Most behaviors can serve more than one behavioral system (e.g., the exploratory, affiliation, or wariness systems [Bretherton & Ainsworth 1974; Sroufe 1977, in press]). For example, infants may smile in sharing a positive experience with the caregiver, as a positive greeting, as part of exploratory visual inspection, as an affiliative gesture, or to communicate affiliative intent. More generally, smiling reflects fluctuating arousal (tension), which can be produced in a variety of ways, including interaction with a stranger or successful problem solving (Sroufe & Waters 1976). No behavior is exclusively an attachment behavior, nor are behaviors designated attachment behaviors by virtue of their being directed exclusively or even more frequently toward the principal caregiver in all contexts.

Even separation protest and proximity seeking, "hallmarks" of attachment, are indicative of the quality of attachment *only* as they are organized with respect to context and to other behaviors. Amount or degree of proximity seeking or separation protest cannot index amount of attachment, despite the fact that such measures have fared rather well in discrete behavioral analyses (e.g., Feldman & Ingham 1975; Coates et al. 1972a, 1972b) and can be

important in assessing the onset of attachment (e.g., Schaffer & Emerson 1964). If such behaviors did index amount of attachment, then infants would be viewed as less attached as they develop between 12 and 24 months. As a carryover from the concept of dependency, infants who cling to the caregiver at all times would be seen as "more attached" than infants who seek the caregiver under stress or for affective sharing but also separate from the caregiver to explore the environment (Ainsworth 1972). Similarly, most 1-year-olds cry when left alone in unfamiliar settings, and many cry when left with a stranger. But absence of crying may reflect that the infant is comfortable in the situation as well as that being with the caregiver is not preferred to being with the stranger.

To determine whether absence of separation protest signifies a nonnormative attachment relationship, other behavior must be examined, for example, the use of the mother as a secure base for exploration, presence or absence of greetings, active avoidance or resistance to contact on reunion, and lack of affective sharing during exploration. Duration of crying in response to separation has often been used to assess "strength" of attachment, despite the fact that very few external correlates have been established. Also, crying is known to be influenced by a host of factors, including developmental level, fatigue (or state in general), and recent separation experiences. Still, like proximity seeking, the *organization* of separation distress with other behaviors is an important feature of stable individual differences in attachment behavior, with significant implications for the prediction of external criteria.[3]

Avoidance and resistance.—Avoidance of proximity or interaction and resistance to physical contact upon reunion are not attachment behaviors at all. Nor are they "indirect" indices of the "strength" of attachment. Whereas operational approaches have attempted to assess the infant's attachment through observation of the caregiver's control or contextual control over discrete attachment behaviors, the goal here is to assess the extent to which an attachment relationship is an asset to the infant in pursuit of constructive social and exploratory goals. Unlike the typical discrete behavioral measures often used in attachment research, avoidance and resistance are *signs* of maladaptation and do not require extensive *sampling* within and across situations to yield stability. As we will show below, their very occurrence in reunion episodes (i.e., in 6 min of behavior) will predict occurrence of related behavior 6 months later. The importance of such variables (except as reduced to a single index such as looking away) has often been overlooked (e.g., Feldman & Ingham 1975; Gewirtz 1972a, 1972b), because they are difficult to conceptualize in terms of discrete behavior; yet they are crucial for defining individual patterns of attachment behavior in the strange situation and have been shown to have a wide variety of competence-related external correlates (Ainsworth et al. 1977; Blehar, Lieberman, & Ainsworth 1977; Main, Note 3).

The Description of Individual Differences and the Assessment of Stability

A central assertion of Bowlby's theory of infant-adult ties is that they arise from experience with characteristic patterns of early interaction. The testable hypothesis then is that differences in (the quality of) early experience will result in different outcomes in the development of the attachment behavioral system. Thus, it is seen that the study of individual differences is not entirely a matter of preference. Indeed, it is *required* for the evaluation of Bowlby's hypothesis. From the organizational perspective, establishing and describing individual differences in the way attachment behaviors are organized is crucial, both for a complete understanding of normative patterns and in order to examine the origins and consequences of individual differences. In addition, the strong claim is made that given a well-understood behavioral system such as underlies attachment, early adaptations can be shown to be qualitatively similar to later adaptations. The crucial test of the organizational perspective is in the demonstration of such continuity (given a stable caretaking environment).

Patterns of Attachment

Ainsworth has developed a classification scheme for three general patterns and eight

[3] The analysis of crying or any other behavior as it is organized with other behaviors can be viewed as an application of the configural scoring methods developed in psychometric research by Meehl and others (see Wiggins 1973). It has been shown that even when two variables are uncorrelated with a criterion (which implies no multiple correlation when the variables are combined in multiple regression), they can, in configuration, afford perfect prediction of the criterion variable.

quite specific patterns of organization in the attachment behavior of 1-year-olds. Infants are observed in a standardized laboratory situation, consisting of the following series of episodes: (1) mother and infant enter an unfamiliar room, (2) infant at play with mother present, (3) stranger and mother present, (4) infant left with stranger, (5) mother returns (stranger leaves), (6) infant left alone, (7) stranger returns, (8) mother returns (Ainsworth, Bell, & Stayton 1971; Ainsworth et al. 1977). The patterns of crying and reunion behavior which characterize each of the classes are summarized in table 1. While crying upon separation is not critical for distinguishing the normative, securely attached (B) group, the scores on avoidance and resistance and, in some instances, proximity seeking and contact maintaining are central. Group B infants are characterized by active proximity seeking and contact maintaining or by positive greetings and active distance interaction upon reunion, by the ease with which they recover from separation distress (without avoidance of proximity or interaction or resistance to contact), and by the absence of negative affect (especially anger) upon reunion.

Examples from the category rating scales, which illustrate the behavioral basis for the classification scheme, are provided in the Appendix. Classification is not a matter of subjective impression but rather a process of template matching from detailed examination of behavior in context. In addition to separation and reunion behavior, behavior toward the caregiver during preseparation and behavior toward the stranger also enter into the classification scheme. Full details concerning the category behavior scales and the classification process are provided in Ainsworth et al. (1977).

From her understanding of the operation of the attachment behavioral system, Ainsworth has made quite specific predictions regarding the consistency with which these patterns of behavioral organization will occur, despite the fact that a much greater range of patterns is in principle possible. For example, when distressed at being left alone, 1-year-olds who seek proximity on reunion, maintain contact, and are comforted by contact (calming and returning to play) will *not* be likely to seek contact during preseparation, will actively explore the environment, will be affiliative toward a stranger during preseparation, and will positively greet the caregiver on reunion if not distressed. They may or may not be distressed on separation when not left alone. In brief, they will be able to use the caregiver as a secure base for exploration. Babies who are not comforted on reunion (or who resist as well as seek physical contact) will tend to cry even during preseparation, *will* be quite distressed at separation, will be wary of a stranger, will be generally apprehensive, and will show impoverished exploration. Babies who avoid and/or ignore the caregiver on reunion will not seek proximity in preseparation, will *not* be distressed by separation unless left alone, will interact as readily and be comforted as readily by a stranger as by the mother, and may show an affectless, superficial quality in play. While these predictions are complex, they are *falsifiable*. In contrast, there are very few patterns of behavior that could not be assimilated by social learning models. The ability to generate strong tests of construct validity is one of the clear strengths of an organizational point of view.

Our studies provide independent support for the workability and power of this system (Waters, in press). First, of 70 12-month-olds classified according to Ainsworth's strange-situation procedure, only 10% could not be readily fitted to one of Ainsworth's eight categories though, as mentioned, many more patterns could be imagined. There were no infants, for example, who avoided mother on reunion who were wary of the stranger or cried when left with the stranger. There were no infants who exhibited contact resistance who *did not* cry when left with the stranger. In the absence of a theory these patterns would be as conceivable as those described by Ainsworth. It is important to point out that those who claim that Ainsworth's classification system does not work (e.g., Smith & Martinsen 1977), or are cited by others as failures to replicate Ainsworth (e.g., Felman & Ingham 1975) have not in fact employed Ainsworth's system. Such investigators do not emphasize the avoidance and resistance behavior categories on reunion and, rather, attempt to operationalize individual differences in terms of frequencies or durations of discrete behaviors.

Percentage agreement of two independent raters was .92 for the three major categories (secure, avoidant, ambivalent), .84 for the eight subcategories. Since the system was developed on 12-month-olds, coders had somewhat more difficulty classifying 18-month-olds, but interrater agreement was still quite satisfactory (.88 for the three major categories and .81 for the eight subcategories). Disagreements in classification were readily resolved by con-

TABLE 1

PATTERNS OF INTERACTIVE BEHAVIOR AND CRYING IN THE STRANGE SITUATION

	BEHAVIOR TO MOTHER ON REUNION[a]				CRYING	
	Proximity Seeking	Contact Maintaining	Proximity Avoiding	Contact Resisting	Preseparation/Separation/Reunion	ADDITIONAL CHARACTERISTICS
Avoidant:						
A1.....	Low	Low	High	Low	Low/low or high/low	Avoidance is the same or greater on second reunion.
A2.....	Moderate to high	Low	High	Low to moderate	Low/low or high/low	Avoidance is the same or greater on second reunion.
Secure:						
B1.....	Low to moderate	Low	Low	Low	Low/low/low	Positive greeting to mother on reunion and active distance interaction.
B2.....	Low to moderate	Low to moderate	Low to moderate	Low	Low/low to moderate/low	Avoidance decreases on second reunion. May show proximity seeking in preseparation episodes.
B3.....	High	High	Low	Low	Low/moderate to high/low	Proximity seeking and contact maintaining vary directly with separation distress. Recovery from distress before 2 min and return to play is typical.
B4.....	High	High	Low	Low	Low/high/low to moderate	Proximity and attention to mother throughout.
Ambivalent:						
C1.....	High	High	Low	High	Low to moderate/high/moderate to high	Difficult to comfort on reunion. Strong resistance of contact with stranger during separation. Often angry toward mother on reunion.
C2.....	Low to moderate	Low to moderate	Low	High	Low to moderate/high/moderate to high	Exploratory behavior is weak throughout. Difficult to comfort on reunion.

[a] Scored on seven-point scales, odd points anchored to behavior descriptions selected from typed transcripts of the behavior of 1-year-olds in the strange situation (see Appendix).

ference and rereview of the videotape. These differentiations were supported by concurrent heart-rate recordings; for example, avoidant infants showed sustained heart-rate acceleration on reunion (in the absence of vigorous motor activity), suggesting clear affective response rather than indifference (Sroufe & Waters 1977). Most 1-year-old infants showed rapid heart-rate recovery in the caregiver's arms.[4]

Moreover, the data were clear with respect to the issue of stability (Waters, in press). When 50 infants were classified at 12 months and then again at 18 months, *48 of the 50*, $p < .001$, *received the same major classification* (avoidant, securely attached, ambivalent, classes A, B, and C in table 1). There were 30 exact subcategory predictions, $p < .001$. A series of procedures insured against coder bias influencing these data. There were four coders; two coders independently coded *each* baby at each age from raw videotape records, and the two coders classifying the infants at 18 months had no knowledge of the 12-month codings; three of the four coders had never even seen the babies before coding the strange situation videotapes. In addition, results of a discriminant function analysis of the 12-month category rating scale data were used to classify the 18-month-olds empirically, again yielding highly significant stability (Waters, in press).

These data suggest the limitations of defining attachment solely in terms of conditional probabilities within the caregiver-infant interaction (Cairns 1972; Gewirtz 1972a, 1972b; Rosenthal 1973) or the view that individual differences be treated as error variance (Masters & Wellman 1974). First, these stability data are based on codings of infant behavior only. Though maternal behavior and caregiver-infant interaction were the subject of study both earlier and later in this research project, the classifications at 12 and 18 months disregarded maternal behavior even in response to the infant; for example, an infant avoidant at 12 months would be predicted to avoid at 18 months, regardless of his mother's reaction to the avoidance during the first assessment. Infant behavior is a product of the interaction and is, no doubt, subject to change if the quality of the interaction changes over time (see also Hinde 1976a, 1976b), but the quality of the attachment relationship is reflected in infant behavior, not just in the caregiver-infant interaction.

Second, the entire observational procedure lasts only 20 min, and classifications are heavily determined by the two 3-min reunion episodes. Six or 20 min of observation is clearly insufficient for assessing conditional probabilities of behaviors or consistency of contingent reinforcement of low frequencey behaviors. From one point of view, it is too little time for any reliable observation, and, indeed, it will not yield stability in terms of the discrete behaviors commonly assessed in attachment research. Of the 28 possible 12–18 month correlations of vocalizing, looking/glancing, smiling, gesturing, approaching, touching, and holding on (to mother or stranger in preseparation and postseparation episodes) only four were significant, and the range was from −.16 to +.46 (Waters, in press).

It was not the particular *behaviors* that were stable across this period. Even for the behavioral category rating scales that showed strong stability (avoidance: $r = .62$, $p < .01$; resistance: $r = .51$, $p < .01$), it was the category that showed stability, not the underlying discrete behaviors. Infants who did not initiate contact and turned away when being held by mother on reunion, for example, may or may not have exhibited this *behavior* on reunion at 18 months. But they were likely to show some kind of avoidance (turning away, ignoring, gaze aversion, etc.). It is the organization of behavior, the adaptational patterns, the quality of the affective bond that has been shown to be stable, not particular discrete behaviors maintained by contingent maternal responses.

It would have been difficult to predict these results from current statements of the social learning point of view. At the very least, it must be accepted that the organization of the interaction of individual infant-caregiver dyads is much more consistent than might be expected from the data on individual behaviors. Perhaps this can be explained in terms of mutually supportive reinforcement systems which become stable sometime in the first year. How this kind of stability can be found in scoring of infant behavior alone in such a brief situation remains to be explained. No such stability in the conditional probabilities within the interaction has been demonstrated. Meanwhile, theoretically derived and empirically observed patterns of behavioral organization, closely tied by theory

[4] That avoidance is not due to indifference or to a precocious interest in exploration is also suggested by the fact that it was most conspicuous when the mother actively sought contact, or interaction.

to the concepts of a behavioral system and the affective bond, yield clear stability.

In challenging the employment of "emotional" concepts, presumably including insecure attachment and affective bond, Gewirtz (1972a) has written, "Even if such conceptions were operationalized in approaches to predicting the patterns of social control over behavior that are at issue, their use would be justified tactically only if they could provide substantially more predictive leverage than would a straight-forward molar emphasis simply on stimuli, responses, and the functional relations into which they enter" (p. 170). By this criterion, and in light of the present data, the affective bond and security-of-attachment concepts are clearly justified, perhaps necessary.

Research and Implications

Attachment-Exploration Balance

There is a great deal of evidence that affective concepts like secure base and attachment-exploration balance (Ainsworth), home base and checking back (Mahler 1975), provide descriptive insights into the way attachment works. Infants (e.g., Ainsworth 1967; Rheingold & Eckerman 1973) and toddlers (e.g., Anderson 1972) often range some distance from their mothers, even beyond visual contact, in the course of exploration (toddlers up to 200 feet). That this distancing is in the service of exploration is suggested by the fact that if the caregiver increases the distance the infant becomes distressed. A need for control over the proximity is also implied by the fact that the infant becomes distressed if shut in a room separated from the caregiver (Rheingold & Eckerman 1970).

A number of investigators have found that infants move and explore more freely and exhibit less negative affect in a novel environment in the presence of the caregiver or attachment figure (Cox & Compbell 1968; Gershaw & Schwartz 1971; Harlow & Zimmermann 1959; Lester, Kotelchuck, Spelke, Sellers, & Klein 1974; Maccoby & Feldman 1972; Schaffer & Emerson 1964). In the caregiver's presence they show less wariness of strangers in standard stranger-approach studies, especially if on the caregiver's lap (Bronson 1972; Campos, Emde, & Gaensbauer 1975; Morgan & Ricciuti 1969). Even when an unfamiliar person enters the room, 12-month-olds may move closer to their caregivers and visually explore the stranger from that point (Bretherton & Ainsworth 1974; Feldman & Ingham 1975). The occasional infant who goes so far as to actually approach and *touch* the stranger is highly likely to *immediately* retreat to the caregiver (Bretherton & Ainsworth 1974).

A study by Carr et al. (1975) illustrates the changing manner in which the attachment behavioral system mediates the use of the caregiver as a secure base. The basic finding from this study was that 18–30-month-olds spent more time in play if they could readily make visual contact with the mother (i.e., she was seated on the other side of the toys rather than behind the child or behind a screen). They did not in fact look at her more; rather it seemed that the mere *opportunity* to do so enabled them to play. It was also found that when mother was behind the screen vocalization increased markedly, apparently in compensation for the reduced visual contact.

Thus, as reflected in play, exploration of novel objects and persons, activity, and affect expression, human infants apparently derive security from the presence of the caregivers and the opportunity to be in contact with them. This is consistent with an organizational perspective. It should be pointed out that while such findings could also be reconciled with a social-learning viewpoint (caregiver as a generalized reinforcer, conditional reinforcer, discriminative stimulus), they have not been predicted by investigators within that framework. Moreover, even when empirical studies demonstrate the phenomenon very clearly, those working from a social learning position have failed to point to the usefulness of such a conceptualization.

The Issue of Differentiality

Some have suggested that differentiality is the key both for defining attachment behaviors and for determining the specialness of the caregiver-infant relationship (Cohen 1974; Feldman & Ingham 1975). Discrete behaviors exhibited more frequently to caregivers (and only these behaviors) are said to be attachment behaviors, and only by showing differential rates of behavior between individuals can differences in relationships be examined. Since strangers may inhibit certain behaviors, comparisons with acquaintances, habituated others, and those well known to the baby are called for. If the difference in frequencies between fathers-strangers and mothers-strangers is similar, then the attachment relationship with father is implied to be comparable to that with mother.

A problem with this operational definition approach to attachment, however, is that it disregards context and the meaning of behavior. A strength of an organizational perspective is that it can encompass the complexity of behavioral organization, while still addressing the issue of differentiality (preferential treatment). Differentiality would not be assessed by simple frequency differences, which could probably show any outcome depending on choice of context (see Organization of Behavior and the Assessement of Attachment, above); rather, differential organization of behavior would be assessed. Tracy, Lamb, and Ainsworth (1976), for example, found frequency of approach to mother in the home to be only slightly (though significantly) more frequent to mother than habituated unfamiliar persons *when context was disregarded.* "In 2 behavioral contexts, however, spontaneous infant approaches were sharply differential to the mother; approaches accompanied by crying and approaches terminating in a pick-up appeal were directed almost exclusively to the mother ($p < .0001$ for both)" (p. 571). Similarly, laboratory studies have shown that an infant may accept the stranger's overtures and engage the stranger in the caregiver's presence, and even go on playing with the stranger when the caregiver leaves. However, when the baby is later left alone and is distressed, the unfamiliar person cannot substitute for the caregiver. When the stranger enters, the baby may show disappointment and continue crying. It may allow itself to be picked up, and it may even cooperate in that effort (though it more likely will resist contact). If picked up it may momentarily cling, and it may be somewhat comforted. But typically the infant will still immediately leave the stranger upon mother's reappearance, seek proximity with her, and if distressed will cling, mold, and otherwise maintain contact in a manner qualitatively different from that exhibited to the stranger (Ainsworth et al. 1977).

For some the issue of preferential treatment is still open to discussion. Important questions, however, do not concern whether behaviors serving the attachment system may be directed to a variety of people. Neither is there disagreement that infants may be attached to fathers or others, as well as to mothers (multiple attachment being the rule [Ainsworth 1972]) or that people other than attachment figures are important in the study of early development. The challenging questions in this area concern the way in which infant behavior is organized with respect to the people in an infant's world.

Developmental Consequences of Individual Differences in Attachment

Establishing stable individual differences in the organization of attachment behavior, in the quality of the affective bond, is of more than methodological importance. Such individual differences would seem likely to have developmental implications as well. Establishing a secure, adaptive attachment relationship may be viewed as a major developmental task for the first year, having consequences for subsequent tasks such as exploration and mastery of the inanimate environment, achieving a concept of autonomous self, and competence in the peer group. From an organizational perspective, numerous specific predictions can be made concerning relationships between quality of attachment and social, emotional and cognitive development. And now there are some preliminary data.

As the discussion of attachment as secure base implied, an obvious prediction has been that securely attached infants would show greater exploration of a novel setting (in the caregiver's presence) and a richer quality of play. Quality of exploratory behavior was indeed one criterion for defining secure attachment initially (Ainsworth et al. 1971; Waters, Note 1). It was not surprising, therefore, that Bell (1970) demonstrated an interaction between quality of attachment and cognitive development; namely "mother permanence" developmentally anticipating "object permanence" in securely attached infants, but not in insecurely attached infants. Now both Main and Londerville (Note 4) and Matas (Note 5) have shown that qualitative characterizations of attachment relationships predict exploration and play behavior up to a year later.

Ainsworth (e.g., 1974) has previously reported that the quality of attachment is related both to DQ and to how well the infant conforms to maternal demands in the first year of life. Matas (Note 5) has reported that quality of attachment is related to compliance with maternal requests, negativism, help seeking, and problem-solving behavior at age 2. In her study 50 infants given an attachment classification at 12 or 18 months were seen in a tool-use problem-solving situation at age 2. At that age problem-solving attitude and style, ability to seek help, frustration behaviors, compliance with maternal requests, petulance, and negativism were assessed. Infants classified as

securely attached at 12 or 18 months exhibited more enthusiasm and positive affect in approaching these tool-using problems, some of which were quite difficult for 2-year-olds. They were less easily frustrated (hitting, foot stomping), less petulant, and better able to use the caregiver for help. Insecurely attached infants showed strikingly poorer adaptation in this situation. They were less able to use the caregiver for assistance, were more negativistic, more quickly gave up and became more easily upset in the problem-solving situation. Those who could not be settled 6 or 12 months earlier exhibited more tantrum behavior and more dependent behavior at age 2. Those who had avoided the caregiver on reunion at 12 or 18 months on occasion exhibited unprovoked aggression against the mother or sought help from the experimenter in preference to the mother. Thus, the patterns of anxious attachment and angry avoidance were revealed in a transformed way to age 2. Main and Londerville (Note 4) have obtained very similar data (see Ainsworth et al. [1977] for a review.)

It would also be expected that security of attachment would predict later competence in the peer group. The course of adaptation is complex and subject to many influences. Still, hypothesized relationships between quality of infant-caregiver attachment and peer competence have sufficient specificity for testing. Avoidant babies might be expected to be self-isolates, while ambivalent babies, because of their lack of object skills, low self-esteem, and social hesitancy may have low acceptance by other preschoolers. In general, securely attached infants would be competent and confident in their dealings with objects and people, would be looked to by other children, and would be well liked by both peers and teachers. Establishing stable individual differences in the quality of attachment makes possible the empirical pursuit of such theoretical links.

Conclusion

An organizational view of the infant-adult attachment relationship is not inconsistent with the study of normative patterns of attachment behavior, nor is it incompatible with either social learning or cognitive approaches. Even when an organizational view is adopted, there remains a great need for careful analyses of interactive behavior and the process of bonding. Similarly, it becomes important to understand the cognitive structures which support the development of the affective bond and which organize attachment behavior in relation to both internal and external inputs. We would do well, in pursuing process research and in analyzing the cognitive bases of attachment, to capitalize on the established patterns of individual differences. An organizational view of the attachment construct can provide an important integrative perspective from which to conceptualize and design the research that lies ahead.

Appendix

Examples from Ainsworth's Interactive Behavior Category Rating Scales

Contact maintaining (scale point 5)

a) The baby, in the course of contact lasting for *less than 1 min,* shows *one* marked instance of resistance to release (clinging on attempted release, clambering up after having been put down, turning to the adult to make closer contact), which, as it turns out, does result in maintaining contact or at least in delaying release.

b) Or, he shows *two* instances of active behavior of this sort, neither of which results in more than brief contact.

c) Or, having actively initiated contact (by clambering up or other similarly active behavior), he actively resists release once.

d) Or, if the baby is held by the mother *for more than 1 min,* the baby perhaps crying and/or clinging, he makes no active effort to resist release or to clamber up having been put down. (Desire for contact is shown by clinging or diminished crying, but the adult's response [continued holding] does not require active resistance to release or release is delayed until the baby is comforted.)

e) Or, the baby is held for less than 1 min, *clinging markedly,* and protests strongly when put down, even though he may not actively clamber up or clutch at the adult in resistance to release.

Resistance to physical contact (scale point 5)

a) Repeated rejection of toys offered by the adult, for example, dropping or throwing down, but with no strong pushing away or batting away. At least *three* such behaviors.

b) Persistent resistance to the adult when she seeks interaction, but without the intensity of struggling, pushing away, hitting, etc. of the higher scores. For example, a fuss or increased crying whenever the adult approaches, offers a toy, etc.

c) Resistance to being held by the mother shown by immediately squirming to be put down, but without the intense struggling implied in the higher scores.

d) Persistent low-intensity pouting or cranky fussing, with at least *one* other manifestation of rejection such as protesting interference, rejection of toys, etc. (note: see "inability to be comforted by contact" in text).

Proximity and/or interaction avoidance (scale point 5)

a) On reunion, the baby may look but gives the mother no greeting, then looks away, turns away, or ignores the mother for 30 sec or more, during which time she makes no special effort to gain his attention.

b) The baby gives the mother no greeting; the mother strives to gain his attention; after about 15 sec he gives her his attention but is fairly unresponsive even then.

c) The baby greets his mother on reunion or starts to approach her, but then he either markedly turns away (or looks away) or tries to go out the door past her, and ignores her attempts to gain his attention.

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