Attachment Classification from the Perspective of Infant-Caregiver Relationships and Infant Temperament

L. Alan Sroufe

Institute of Child Development, University of Minnesota

SROUFE, L. ALAN. *Attachment Classification from the Perspective of Infant-Caregiver Relationships and Infant Temperament.* CHILD DEVELOPMENT, 1985, **56**, 1–14. Recently a number of investigators have suggested that classification differences in the Ainsworth Strange Situation (anxious and secure patterns of attachment) may be due largely or in part to endogenous temperamental variation. In doing so, these investigators have suggested a dimensional-trait approach in place of a qualitatively different taxonomic approach. Moreover, much evidence is directly contrary to a strong temperament interpretation of attachment patterns (changing attachments, differing attachments with different caregivers, prospective data on the early characteristics of infants later classified as securely or anxiously attached). Other interactionist temperament models currently have not been tested sufficiently. At the same time, a host of research findings support the interpretation that Ainsworth assessments capture aspects of the relationship between infant and caregiver, as derived from the history of their interaction. This includes direct evidence from observations of infants and mothers over time, the influence of varying patterns of care within and between cultures, the impact of factors presumed to influence quality of care (e.g., social support, life stress, caregiver family history), and predictions of later parent behavior from strange situation assessments of infant behavior. The importance of understanding attachment as a relational concept is twofold: (1) it represents a theoretical and paradigmatic shift of importance for many aspects of developmental psychology, and (2) it opens the way for more productive research on temperament, the interaction between temperament and experience, and important process studies of the unfolding of the infant-caregiver relationship.

The Strange Situation procedure introduced by Ainsworth and Wittig (1969) has spurred extensive predictive research over the last decade. The research has been diverse, suggesting on the one hand that patterns of behavioral organization with respect to the caregiver (relationships) may be stable even when specific behaviors change and, on the other hand, that numerous aspects of later functioning may be predicted.

Attachment relationships in infancy are stable in usual circumstances, and even changes in attachment are predictable. When trained coders assess randomly selected, middle-class infant-caregiver pairs, following the methods of Ainsworth, the quality of attachment is highly concordant between two assessments across a 6-month period (Connell, 1976; Main & Weston, 1981; Waters, 1978). Even when the infant shows a different pattern of attachment with two caregivers, the assessment of each dyad is stable over time (Main & Weston, 1981). In poverty samples, there is still significant stability, though here there is also substantial change (Vaughn, Egeland, Sroufe, & Waters, 1979). Such change, however, is related meaningfully to changes in life stress, that is, changes from anxious to secure attachment are associated with reductions in life stress.

Beyond this evidence for stability, Strange Situation classifications have been shown to have a number of external correlates. In dozens of reports based on numerous samples, secure attachment (in contrast to anxious attachment) has been related to peer competence, self-esteem, curiosity, coping with novelty, coping with failure, enthusiasm and persistence in problem solving, independence and infrequency of behavior problems, among other things (e.g., Arend, Gove, & Sroufe, 1979; Bates, Maslin, & Frankel, in press; Erickson, Sroufe, & Egeland, in press; Grossman & Grossman, in press; Lewis, Feiring, McGuffog, & Jaskir, 1984; Londerville & Main, 1981; Matas, Arend, & Sroufe, 1978; Sroufe, 1983; Sroufe, Fox, & Pancake, 1983; Waters, Wippman, & Sroufe, 1979). These

Direct reprint requests to L. Alan Sroufe, Center for Advanced Study in the Behavioral Sciences, 202 Junipero Serra Blvd., Stanford, CA 94305. After June 15, 1985: Institute of Child Development, University of Minnesota, 51 East River Road, Minneapolis, MN 55455-0345.

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studies all have used coders blind to attachment history and to other data on the children. In some cases persons totally unfamiliar with attachment theory collected outcome data prior to attachment classifications, which were then done by blind coders from previously recorded videotapes (Waters et al., 1979). Sometimes the data were derived from persons who could not be biased with respect to attachment theory (e.g., sociometric choices of children). And sometimes outcome data have been highly objective, for example, frequency of sitting on the preschool teacher's lap (Sroufe et al., 1983).

All in all, this body of research makes it clear that something reliable and meaningful is being assessed with the Ainsworth procedure. Differences often are substantial and always in the predicted direction, commonly with controls for moderator variables such as IQ. But how are these differences to be interpreted?

In the Bowlby/Ainsworth tradition, attachment (in contrast to attachment behavior) is viewed as a relational construct (Sroufe & Fleeson, in press). While researchers within this framework may not always have been clear on this point, the Strange Situation, as used by Ainsworth, was devised to capture the quality of functioning of the infant-caregiver *dyad*. As stated in our first empirical paper (Matas et al., 1978), attachment classifications, while based solely on infant behavior, are presumed to reflect the history of caregiver sensitivity. "The effectiveness of the pair is being captured even in assessing infant behavior" (p. 555). In fact, the Strange Situation was introduced and widely adopted only because it was related to contemporaneous patterns of infant-caregiver behavioral organization (the attachment/exploration balance in the home) and because it was shown in Ainsworth's original work to be related to earlier patterns of interaction (caregiver responsivity to infant behavior). Distinct patterns of attachment with each caregiver, predictions to later caregiver behavior (including behavior with siblings), predictions from caregiver developmental history, or predictions of change in attachment in the face of changing caregiver circumstances would have made little sense outside of the relational perspective (all discussed below).

In sharp contrast to this relational position, a number of writers recently have suggested that Ainsworth classifications may to some extent be a reflection of individual differences in infant temperament (Campos, Barrett, Lamb, Goldsmith, & Sternberg, 1983; Chess & Thomas, 1982; Kagan, 1982). In particular, Kagan has argued that attachment group status (A, B, or C) may be due to endogenous individual differences in the disposition to become distressed at separation.

While bodies of data generally are open to multiple interpretations, the differences between these two positions are pronounced and the consequences of accepting one position or the other are substantial. The whole Ainsworth scheme is trivialized if differences in attachment classification may be reduced to endogenous infant variation. In fact, if these assessed differences are due largely to temperament, then they cannot be measures of attachment at all in the Bowlby/Ainsworth sense, because within their framework, attachment (the affective/organizational bond between infant and caregiver) is inherently a relationship concept.

Establishing that the Ainsworth approach yields assessments of qualitative aspects of the relationship between infant and caregiver, rather than inborn dispositions for separation distress or some other endogenous characteristic, is important for several reasons: First, the full implications and potential of the Ainsworth approach are only beginning to be realized. As developmental psychology moves beyond the study of individuals to the study of relationships, it is important to have demonstrations that *relationships* can be assessed. Second, the assessment of qualitative aspects of behavior and behavioral organization, as represented by the Ainsworth procedure, currently provides a model for research on other periods of development and other domains of functioning. Third, if in the Ainsworth procedure the infant-caregiver relationship is assessed (and not simply the infant), and yet these assessments predict later individual functioning outside of the caregiving context (peer competence, curiosity, etc.), this has important theoretical consequences. The most obvious implication is that qualities that arise in relationships ultimately lead to qualities of individuals—an old idea, but one that has proved difficult to demonstrate empirically. Very important process questions automatically follow. With attachment assessments trivialized as temperamental variation, all of this is lost.

Relationship and Temperament Models

Both the relationship and temperament interpretations of Strange Situation classifications can take many forms. Moreover, viewing attachment classifications as reflections of the

infant-caregiver relationship would not exclude viewing temperament as an important concept in explaining many aspects of infant or caregiver behavior. Similarly, those ascribing a key role for temperament may still allow a substantial role for experience. Most researchers adopt some kind of interactional model.

For example, within a relationship perspective one can assume that: (1) attachment classifications (secure/insecure) and temperamental dimensions may be orthogonal, that is, (*a*) temperamental variation influences various aspects of behavior but not behavior *organization* (attachment classification), or (*b*) temperament influences subcategory classification (B1, B4, etc.) but not major category placement, or (*c*) quality of care determines security of attachment (B, non-B), while the *particular* pattern of anxious attachment (A, C) may result from an interaction of infant robustness with insensitive care; (2) relationship history so totally transforms constitutional temperamental variation that its contribution to Strange Situation assessments or attachment behavior more generally is negligible or unknown. Each of these positions acknowledges the reality of temperamental variation.

Those suggesting a more prominent role for temperament can believe that such influences are partial or interact with experience in variously complex ways. For example, Goldsmith and Campos (1982) summarize three possible relations: (1) temperament might influence the caregiver's (degree of) social responsiveness, which then influences attachment and strange situation classification; (2) caregivers' social responsiveness might influence both attachment and temperament *expression*; (3) temperament differences may directly influence Strange Situation assessments, which then are not measures of attachment. The first two of these may be compatible with a relationship perspective; the third is not.

We will examine this range of potential models in light of cumulated research evidence. But first it will be useful to examine certain sources of confusion concerning the meaning and validity of Strange Situation assessments.

Attachment and Strange Situation Behavior

In part, the confusion of attachment and temperament concepts (as also was the case with attachment and dependency; Sroufe et al., 1983) arises because attachment researchers and temperament researchers attend to many of the same behaviors, for example, clinging, crying, and soothability. Thus, infants classified by Ainsworth as having "avoidant" relationships generally cry little and seek little contact, while "resistant" cases show much crying and contact seeking. Such consistent individual differences in attachment could be readily assimilated to a temperament position. Thus, Kagan (1982) has written: ". . . a child who becomes distressed following maternal departure is more likely to rush to and to greet the mother than one who fails to cry or one who is minimally distressed by the departure. As a result the former child is more likely to be classified as securely attached. Infants who ignore or do not greet the mother on return, *because they were not upset*, are more likely to be classified as less securely attached" (p. 24, italics added).

Such an interpretation, in addition to being factually incorrect (see below), overlooks central aspects of the classification approach. Behaviors such as crying or clinging may or may not be influenced by temperamental variation. But individual differences in such behavioral manifestations are at a different level of analysis than attachment classification. The point has been made previously (e.g., Sroufe & Waters, 1977) that the *organization* among behaviors and across contexts lies at the root of the Ainsworth procedure, not presence or frequency of particular behaviors. No single behavior can index quality of attachment independent of context and organization with other behaviors. Crying at separation and contact upon reunion are not exceptions. "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 . . ." (Sroufe & Waters, 1977, p. 1189, italics added).

Whether an infant cries none, a little, some, or a lot is of little relevance to the determination of the *security* of attachment (i.e., B or non-B). Rather, it is how the infant responds to the caregiver when distressed (contact seeking, absence of anger, returning to play when settled) or not distressed (greeting, seeking interaction upon reunion) that allows the classification of secure attachment.

The main point is that children in secure attachment relationships are behaviorally quite heterogeneous. There is as much variation in separation distress (and contact seeking) *within* the secure group as between the

secure and anxious groups. Infants in subgroup B_1 (judged to be secure because of active greeting and interaction upon reunion) cry as little as infants in the A group, as do many B_2's. Infants in subgroup B_4 (judged to be secure because contact is effective in terminating distress) cry as much during separation as children in the C group, as do many B_3's (see Table 1A). The split on crying clearly falls within the secure (B) group, not between the secure and anxious groups. Thus, one baby shows a great deal of separation distress, followed by much contact seeking and clinging, while another cries little or not at all and at no point seeks physical contact. Despite such differences in manifest behavior (temperament?), both may well be classed as securely attached on the basis of behavioral patterns. Other infants cry a lot and seek much contact, and the relationship still is classified as anxious. Separation distress alone does not discriminate secure from anxious patterns. Since the beginning, Ainsworth (1967) has been clear that distress at separation is not an adequate index of quality of attachment. Kagan, a proponent of the temperament position, reached this same conclusion some years later (e.g., Kagan, Kearsley, & Zelazo, 1978).

The Relation Between Separation Distress and Avoidance or Contact Maintenance Within the Strange Situation

Some researchers have suggested (1) that there is a strong relation between separation distress and behavior during reunion in the Strange Situation, and (2) that such a relationship shows that classifications are therefore second order and of limited validity (Campos et al., 1983; Connell & Goldsmith, 1982; Gaensbauer, Shultz, & Connell, 1983). Several points need to be made here.

First, certainly there are relations between behaviors across episodes of the Strange Situation. This is the whole point behind the organizational conception (Sroufe & Waters, 1977). It is the same dyad across contexts. In fact, in 1979 we showed that we could predict classifications from positive affective exchanges during *preseparation* (Waters et al., 1979). We, of course, did not argue that the affective sharing caused the later separation or reunion behavior, but rather that the organization of behavior is coherent across context, that secure attachment is manifest in positive affective exchanges as well as comforting when distressed.

Second, in fact, the negative correlation between separation protest and avoidance is quite modest ($-.10$ to $-.35$, the highest correlations being between crying in Episode 4 and Avoidance in Episode 5) when this variable is assessed by trained coders (Sroufe & Waters, 1977; Waters, 1978, and personal communication). While many avoidant infants do not cry during separation, some children who do cry show marked avoidance, and some who do not cry at all show no avoidance. Thus, crying and later avoidance are inversely correlated, but they are not redundant. There is a somewhat stronger correlation between separation distress and contact maintenance, of course. Children who are engaged in play and not upset are unlikely to seek prolonged physical contact. But contact maintenance does not distinguish secure (B's) from anxious (C's) dyads (see Table 1B). The correlation between separation distress and contact resistance is modest ($-.02$ to $+.34$), and it is *contact resistance* (anger, struggling, difficulty settling) that distinguishes B and C dyads. Some children cry a lot and show no or little contact resistance (B_3's or B_4's). Some cry a lot *and* show much resistance (C's).

TABLE 1

CRYING AND CONTACT MAINTAINING DURING SEPARATION IN THE STRANGE SITUATION

	A. CRYING						B. CONTACT MAINTAINING			
	Episode 4		Episode 6		Episode 7		Episode 5		Episode 8	
	M	SD	*M*	SD	*M*	SD	*M*	SD	*M*	SD
Group A	.17	1.16	3.41	4.20	.61	1.44	1.04	.15	2.11	1.09
Group B_1....	.37	.90	2.67	3.57	1.35	2.33	1.20	.63	2.20	1.14
Group B_2....	1.25	3.60	3.85	4.10	2.98	2.64	1.36	.81	4.50	1.53
Group B_3....	4.17	4.11	8.62	4.69	7.24	4.98	3.23	2.32	5.73	1.44
Group B_4....	6.63	3.04	12.00	0	9.80	4.40	2.75	2.06	4.50	.58
Group C	7.33	4.26	9.77	4.37	9.18	3.09	4.07	1.88	4.43	1.80

SOURCE.—Ainsworth et al., 1978, p. 372.

The Issue of External Validity

Even if these correlations between reunion behavior and separation protest were substantial, they would be irrelevant to the validity of the classifications or of avoidance scores or amount of separation protest as measures of meaningful individual differences in attachment. Strange Situation classifications are established as valid measures of individual differences because of their range of external correlates. They may be claimed to be valid assessments of individual differences in attachment because of the particular nature of many of these correlates, including relations with crying and exploration in the home (as well as independent laboratory assessments) and earlier measures of infant-caregiver interaction (discussed below). Separation distress, or other temperamental variables assessed in the Strange Situation, have not been shown to have any external correlates. The fact that they may show some correlation with reunion behavior is not relevant. Two variables may be correlated and not share criterial correlates.

As a concrete example, crying in the laboratory was not found to relate to any attachment-related behavior in the home, not even crying (Ainsworth, Blehar, Waters, & Wall, 1978). Crying in the home *was* predicted by Strange Situation classification, and specifically by contact resistance, which had a range of other home correlates. Avoidance also had a range of home correlates, including responding negatively to being put down, tentative contact, and anger. Thus, avoidance and resistance, while correlated with laboratory separation distress, have home correlates that laboratory crying does not share.

The fact that crying in the laboratory does not predict even crying at home, while resistance and avoidance do predict home behavior, is not paradoxical. Discrete behaviors such as crying are influenced by a host of situational factors and generally require extensive sampling for adequate stability. Thus, crying in the novel lab situation not only does not predict to the very different home situation, brief assessments of crying may not even predict to other unfamiliar situations. Avoidance and resistance during reunions with the caregiver in the Strange Situation are not conceived of as reflections of general dispositions. Rather, they are viewed as signs of anomalous organization of the attachment behavioral system (revealed in the context of a modest threat to the attachment bond). Therefore, as reflections of attachment relationship difficulty, they are expected to predict attachment problems in the home context, though not in an isomorphic way. As "signs" of atypical attachment and as behavioral categories, avoidance and resistance are not so dependent on extensive sampling as discrete behavioral referents of general dispositions.

Empirically, crying during separation shows a stability over 6 months of .41, while avoidance shows a stability correlation of .62. Classifications in the same sample showed 96% stability (Waters, 1978). It would seem obvious that classifications based on the overall organization of behavior would yield stronger predictions of future behavior than separation distress (Kagan, 1982) or other specific affective variables (Gaensbauer et al., 1983). To argue that such specific measures should be adopted as measures of attachment, or meaningful individual differences at all, investigators must provide data on stability and external correlates.

Recent Data Suggested to Implicate Temperament

Neonatal Neurological Status and Attachment

The finding from the Egeland and Sroufe longitudinal project of a relationship between nonoptimal status on the Brazelton exam at age 7 days and C-group classification at 12 months (Waters, Vaughn, & Egeland, 1980) has been cited as evidence that Strange Situation classifications may be due to temperament (Campos et al., 1983). Such a suggestion, of course, links Brazelton status with temperament; yet, "the NBAS is not exclusively, or even primarily a temperament scale" (Goldsmith & Campos, 1982, p. 171). Moreover, in this study, the 7-day Brazelton was not even stable over the 3 days to our second Brazelton assessment, one obvious criterion of temperament (Plomin, 1982). Our interpretation was, and remains, that given a poorly organized newborn and an overly taxed, economically disadvantaged mother, a difficult interaction (and ultimately anxious attachment) would be expected. It was predicted from the relationship perspective that this set of circumstances would predict resistant (Group C) but not avoidant attachment. We did this study to test these predictions, and both were borne out.

Fortunately, other data are available that allow further clarification concerning a direct causal link between neonatal status and Strange Situation classification. Crockenberg (1981) also examined the relation between newborn Brazelton and 12-month Ainsworth

assessments, but with a middle-class sample. As was predictable from a relationship perspective, there was no overall relation between Brazelton and attachment classification. Her further analyses confirmed that when caregivers have the resources they can cope with the challenges of a difficult infant; irritability in infants predicted anxious attachments only for mothers without adequate social support. Strange Situation assessments capture the history of the interaction over the first year, however complexly determined, not endogenous infant factors.

As an additional note here, there have been several efforts to examine directly links between attachment and temperament (as usually conceived), using the Carey Temperament Questionnaire or a similar instrument (e.g., Bates et al., in press; Meyer, 1984; Vaughn, Taraldson, Crichton, & Egeland, 1981). None of these prospective studies found a relation, although one may, of course, question the validity of these temperament assessments. We will return to this issue later.

Cultural Group Differences in Strange Situation Classifications

Recent reports of elevated avoidance in a West German sample (Grossman, Grossman, Huber, & Wartner, 1981) and elevated Group C proportions in a Japanese sample also have been interpreted as supporting the temperament position (Campos et al., 1983; Kagan, 1982). What is striking about this interpretation is that (1) the data obviously are open to multiple interpretations, including cultural caregiving differences or the inappropriateness of the assessment for the particular sample, and (2) the various interpretations easily are sorted out with further data collection. The relevant data are now available.

First, in the case of Germany, a subsequent study done with a non-working-class sample in south Germany, and with mothers born some time after the War (in contrast to the original Bielefeld sample), revealed proportions of attachment classifications comparable to U.S. samples, with no increase in the proportion of avoidance. Child-rearing attitudes and caregiving practices are implicated, not the German character. As will be discussed below, the high avoidance in the Bielefeld sample itself was, in fact, associated with earlier patterns of care.

The Japanese case is more striking. In the first sample to be reported there were 37% C's (compared to 10%–20% in U.S. samples) and no A's, a notable finding (Miyake, Chen, & Campos, in press). This was interpreted by Kagan and others as evidence that Strange Situation classifications reflect temperament. But Freedman (1974), among others, has described the Oriental newborn as "less changeable, less perturbable, tend[ing] to habituate themselves more readily, and tending to *calm themselves or to be consoled more readily when upset*" (p. 154, italics added). Given this description, the temperament interpretation of the Strange Situation classifications seems on the surface to be paradoxical. These Japanese infants were called C's because they cried without settling. How is this the result of their placid temperament? Moreover, the temperament interpretation glosses over an obvious cultural explanation of these reactions. The "traditional" Japanese mother never leaves her infant alone —even briefly—over the entire course of the first year. It is understandable then that they would be thoroughly distressed when left alone in a strange setting. The Strange Situation was designed to be a mild "everyday" stressor. Clearly, in the context of traditional Japanese culture, it is a stress situation of great magnitude, qualitatively different from all but the most unusual American cases. Moreover, in their effort to duplicate Ainsworth's procedure, the investigators allowed the separations to go on for 3 min regardless of amount of distress, rather than cutting the separations short, as is done here. Many infants will cry without readily settling if stressed enough. Given these distortions in the intent of the Ainsworth procedure, these assessments cannot be valid predictors of home attachment behavior (valid assessments of attachment), and for this reason Takahashi (who carried out the assessments) referred to the so-called anxiously attached infants as "pseudo-C's." In contrast to Group C infants in U.S. studies, these infants showed good quality play in preseparation, casting further doubt on their classification as anxious.

Miyake et al. (in press) report that neonatal frustration to nipple withdrawal was related to crying without settling in this Japanese sample. Such a finding tentatively suggests that degree of upset when severely stressed may be related to endogenous variation. However, this finding is not relevant to the relation between temperament and attachment. Crying and exploratory behavior of these subjects in the home would have to be assessed to assert such a tie.

Furthermore, the validity of a strong temperament interpretation of the cultural group differences is easily checked: one needs only to examine Japanese subjects not

reared according to traditional patterns. The cultural/experiential interpretation is confirmed by a recent study involving "modern" Japanese families (i.e., mothers oriented toward careers who at times leave their infants in the care of others and otherwise behave like Western mothers). In this study, the proportion of A's (13%), B's, and C's (18%) was comparable to U.S. samples (Durrett, Otaki, & Richards, in press). A related study with Chinese Americans is also revealing (Li-Repac, 1982). An overall increase in C's was found. However, C status was linked to degree of acculturation; more fully acculturated Chinese families had the same proportion of C's as Caucasian samples.

Findings Suggested to Support a Relationship Perspective

The neonatal predictors of C status in a poverty sample but not a middle-class sample, and the cultural differences just discussed, are quite congruent with the view that Strange Situation classifications reflect differences in the dyadic relationship between infant and caregiver. A host of other empirical studies converge to support this interpretation. Some of these involve direct observations of caregiver responsiveness to infants earlier in the first year; others involve factors that would be expected to influence the quality of care and thereby the infant-caregiver relationship, such as social support or changing life stress.

Attachment and Quality of Earlier Care

Bowlby's (1969) major hypothesis was that quality of attachment was dependent upon the quality of care. Therefore, central in Ainsworth's original research (summarized in Ainsworth et al., 1978) was the finding that sensitive responding to the infant's communications in the first year was related to secure attachment in the Strange Situation at 12 months (while early infant behavior per se was not; see also Blehar, Lieberman, & Ainsworth, 1977). Without this finding, further research with the Strange Situation would not have been inspired.

Given the centrality of this finding, it is important that it has been replicated widely with diverse samples and in several laboratories (Bates, Maslin, & Frankel, in press; Bell, in press; Egeland & Farber, 1984; Grossman & Grossman, in press; Smith & Pederson, 1983). These five studies are exact replications. In each, Ainsworth's sensitivity scales at 6 months (and sometimes other ages as well) were related to attachment classifications at 12 months, always done by coders blind to earlier sensitivity scores. In each study, responsive care was associated significantly with secure attachment.

Since two of these studies (Egeland and Grossman) sometimes have been interpreted as failing to support Ainsworth (e.g., Campos et al., 1983; Lamb, Thompson, Gardner, Charnov, & Estes, 1984), a further word is required. In the Egeland and Sroufe project, we assessed discrete infant and mother behaviors in feeding and play situations, in addition to obtaining sensitivity ratings. Few relationships came out of the discrete behavioral analyses. This reflects negatively on the power of discrete behaviors for prediction, but it is not a reflection on Ainsworth's hypothesis. Our only a priori prediction was that sensitivity as assessed by Ainsworth's scales would be related to security of attachment. Her findings were replicated (beyond the .001 level of confidence).

Grossman reported that sensitivity ratings at 2 and 6 months predicted attachment classification at 12 months, but ratings at 10 months did not (Grossman & Grossman, in press). This was because in the Bielefeld sample caregivers in general begin to push for independence and "proper" deportment late in the first year. The variance in sensitivity disappears and mean sensitivity moves down. Rather than disconfirming Ainsworth, these findings support the predictive power of quality of care. Despite changes in sensitivity late in the first year, earlier assessment still predicted attachment classification, that is, individual differences in attachment still were predicted despite the general cultural press.

The relation between responsive care and later quality of attachment has proven to be extremely robust. It should be noted that sensitivity, as assessed by Ainsworth, entails responsivity to the particular moods, needs, and signals of the individual baby (i.e., temperamental differences already are encompassed) and therefore cannot likely be reduced to endogenous infant factors (see below).

Factors Influencing Quality of Care

An array of studies have been carried out on factors that reasonably would be expected to relate to quality of care and therefore the attachment relationship. In many cases predictions have been quite specific (e.g., avoidant attachment and maternal "unavailability") and few would follow from a strict temperament perspective.

Caregiver social support and life stress. —These factors, which would be expected to

affect the quality of caregiver infant interaction, have been found to be related predictably to attachment (Crockenberg, 1981; Durrett et al., in press; Vaughn et al., 1979). They are likely to be independent of endogenous infant characteristics.

Personal resources of caregivers.—For a number of years we have been following a sample of poverty families in Minneapolis. The stress, living situation instability, and often disorganized patterns of care led us to expect an elevation in the Group C (resistant) attachment pattern (see also Ainsworth, in press; Bretherton, in press). We found 22% Group C at 12 months, a significant elevation from middle-class samples.

Abuse and neglect.—Extreme forms of maltreatment are predictably associated with marked elevations in anxious attachment. In the case of physical neglect (with the infant's basic needs for food, hygiene, and safety not attended) there is an elevation in Group C attachments; in the case of physical abuse and "emotional unavailability" there is a marked increase in avoidant attachment (Crittenden, 1983; Egeland & Sroufe, 1981; George & Main, 1979; Schneider-Rosen & Cicchetti, 1984). While one could argue that mothers neglect irritable infants and physically abuse (or fail to respond to) unresponsive infants, such interpretations would be post hoc, and are contradicted by evidence to be presented below. The findings here were predicted from the relationship perspective.

Maternal history.—From a relationship perspective, the caregiver's responsiveness to her infant should be predictable from her own early care. The ideal prospective study has not yet been completed. However, three interview studies have obtained a relation between maternal reports of childhood experiences and an anxious attachment between her and her infant (Main & Goldwyn, 1983; Morris, 1980; Ricks, in press). In the Morris study, for example, mothers who reported that their own mothers were available to them and were viewed as competent in the caregiving role, and whose early lives were characterized by stability, regularity, and parental warmth, were dramatically more likely to have securely attached infants. The history data and attachment classifications were as usual obtained independently. Blind judges were able to classify correctly (as secure or anxious) an average of 79% of these cases. More objective criteria from the interviews also yielded significant relations between quality of early care experienced by mother and attachment relationships between this new mother and her infant.

Ill infants.—From a relational view there is, of course, a role for the infant. Some infants are more challenging and more likely to be a source of caregiver anxiety. Such is the case with infants having a severe respiratory disorder. In a recent study, Meisels, Plunkett, Stiefel, Pasick, and Roloff (1984) found that 42% of these infants formed anxious/resistant attachment relationships. This is in direct accord with predictions from the relationship theory, as one would expect chronic illness to create anxiety in caregivers but not necessarily make them unavailable (the avoidance precursor). Note also that these are serious illnesses, not minor temperamental variations. Premature infants are no more likely to be anxiously attached than full terms, given normal health (Rode, Chang, Fisch, & Sroufe, 1981).

Some Clearly Differentiating Data

All of the findings reported above are in accord with, and were predicted from, a relationship perspective. Many of the findings are, of course, open to post hoc temperament interpretations (e.g., unresponsive mothers are genetically atypical or exert prenatal influences on infant temperament; mother's own early care was due to her temperament, etc.). Some of the findings, such as differences among the Japanese samples, stretch a temperament interpretation rather severely. Still other data are strongly differentiating between temperament and relationship interpretations.

First, infants may have secure attachments with one caregiver and anxious attachments with another (Grossman et al., 1981; Main & Weston, 1981). This is not paradoxical from the point of view that attachment classification is the product of interaction; it is paradoxical from a strict temperament interpretation. Temperamental characteristics (e.g., disposition to fearful reactions to novelty) should show some stability across partners (Plomin, 1982).

Second, the quality of attachment, even with the same caregiver, is subject to change if the life stress experienced by the caregiver changes (Vaughn et al., 1979). Again, if the quality of interaction changes, attachment pattern, as a reflection of this relationship, changes. Temperamental differences, as usually conceived, should not be so readily modifiable (Plomin, 1982).

Third, Strange Situation assessments, though focused on infant behavior, predict maternal behavior at later ages and in other contexts (Matas et al., 1978). They even predict maternal behavior with a sibling (Meyer,

1984; Ward, 1983). In the Ward study, attachment classification of the firstborn predicted both the mothers' emotional support and quality of assistance with second-borns in an assessment at age 2 years (i.e., up to 3 years later). This follows directly from the notion that the infant-caregiver relationship is being assessed (and therefore both members of the dyad), rather than endogenous infant variation (Matas et al., 1978; Sroufe & Fleeson, in press). If attachment assessments are products of dyadic interaction (orchestrated by caregiver responsiveness), then it is not surprising that security of attachment with a mother-firstborn pair predicts mother's responsiveness to a second-born years later.

Finally, prospective data show that nonoptimal patterns of care precede infant maladaptation and anxious patterns of attachment (Egeland & Sroufe, 1981). Results are most clear in the case of what we have defined as "emotionally unavailable" caregivers (N = 19). These mothers were observed as early as age 3 months to be uninvolved, detached, and affectless in interacting with the infant. Even in the hospital they were rated by nurses as showing less interest in their infants than the sample as a whole. By contrast, these infants showed normal Apgars, normal Brazelton exams at 7 and 10 days (not significantly different from any other subgroups in our sample), and were still quite robust at age 3 months (being, in fact, significantly higher than their control group on a summary factor score). Their means on all individual infant variables assessed in our 3-month feeding and play observations were comparable to those of infants who later were securely attached. The infants showed a notable decline between 3 and 6 months, however, and maladaptation became more notable at each assessment thereafter. By 12 months, 42% of these infants showed the avoidant pattern of attachment, and by 18 months 86% were avoidant (despite the fact that the sample as a whole showed less anxious attachment at this age). By age 2 they were virtually without exception unenthusiastic in engaging challenges, easily frustrated, and excessively angry and negativistic in interacting with their mothers in a problem-solving task (Egeland & Sroufe, 1981). Such prospective data are the final arbiter of explanations of attachment differences.

Evaluation of Models

Temperament Positions

From this review of available evidence concerning Strange Situation classifications, it is clear that the strong temperament interpretation is without basis. It is supported only by post hoc assertions, which cannot be given the same status as a network of specifically predicted relations. Moreover, it is countered by overwhelming evidence. Differences in attachment classification cannot be accounted for by endogenous disposition to distress or other inherent temperament characteristics. As discussed below, other interactionist temperament positions remain intuitively more appealing, but at present are without support by evidence.

1. It may be argued that, while temperament clearly is not the sole determinant of attachment classification, perhaps it is a partial determinant (Campos et al., 1983); that is, experience and temperament add together to determine attachment status. This seems difficult to square with the absence of a relation between attachment assessments with two caregivers, and it is not supported by evidence (except in extreme cases; see model 3 below). In fact, behavior of infants in early infancy is not stable, nor does it predict later attachment (though caregiver behavior in the same assessments does; Blehar et al., 1977). It sometimes is argued that important temperamental variations emerge later in the first year (Goldsmith & Campos, 1982), when stable differences can be detected, and that these late-emerging variations exert influence on attachment assessments. This certainly is possible, but such a position is untested and, at the present time, perhaps untestable, since such late-appearing endogenous variation cannot easily be separated out from experience. Given the predictability of attachment status from caregiver behavior, such an assumption seems gratuitous at present.

2. Related to position 1, caregiver responsiveness may influence both the development of attachment and the expression of temperament (Goldsmith & Campos, 1982). Strange Situation assessments then would represent some unknown combination of attachment variation and temperamental expression (e.g., learned thresholds of expressed fearfulness; high for avoidant infants, moderate for secure infants, and low for resistant infants). There is no evidence that specifically supports this position, and there is evidence that is challenging for it. The home observation of negative responses of avoidant infants to being put down already has been mentioned. It also is the case that outcome assessments in preschool (Sroufe et al., 1983) show that children with histories of avoidant attachment are high on emotional dependency with preschool teachers (equal to resistant infants and significantly higher than secure infants).

They also are high on negative affect (Sroufe, 1983). This directly followed from the view that avoidance reflects anxious attachment, but would not seem to be a likely prediction from the view that avoidance reflects a low fearfulness threshold.

3. Another alternative is that certain infant temperament characteristics may lead to caregiver nonresponsiveness (the caregiver-infant mismatch hypothesis). This position has been popular and, in fact, was a major hypothesis in early stages of the Egeland and Sroufe project. However, we have found little evidence to support such a view (i.e., neither caregiver behavior nor attachment were predicted by infant behavior early in the first year), nor is there evidence in the literature that, within the broad normal range, variation in infant behavior causes nonresponsiveness in caregivers. In extreme circumstances (such as poverty) or with extreme infant conditions (severe respiratory disorder, Down's syndrome), caregiver responsiveness is at times negatively influenced. In more usual circumstances, however, caregivers seem to respond to the particular nature of the particular infant. In fact, there is evidence that in usual circumstances caregivers are *more* responsive to premature infants than to full-term infants (Cohen & Beckwith, 1979). Thus, the usual caregiver response to mild anomalies or minor variations in infant reactivity is to adjust behavior appropriately. This fails to occur only in unusual circumstances. That is, based on current data, it is plausible to argue that nonresponsiveness occurs when infant temperament is *not* having an effect. The reason Ainsworth sensitivity scores are so powerful in predicting attachment is that they take into account responsivity to particular infants. It seems to be that *the caregiving context determines responsiveness; infant temperament perhaps determines what responsiveness entails.* While a role for temperament may be seen in this revised model, it is not viewed as causal, even partially, of attachment quality.

Some infants would challenge many parents. Therefore, 44% C's were found in infants with respiratory distress syndrome; but note that the majority still were securely attached. *Some infants would tax some parents* (nonoptimal Brazelton status and type C attachment with a poverty, but not a middle-class, sample). But for most infants, most parents provide good enough care, and the general quality of that care seems unrelated to normal range variations in temperament.

Relationship Positions

The evidence clearly supports the general interpretation that attachment classifications reflect the relationship history of the infant-caregiver dyad. But how might temperament concepts be considered in such a developmental account?

1. Attachment and temperament may be orthogonal. Temperamental variation may underlie differences in activity level, cuddliness, reactivity thresholds, and so forth, but such dimensions may play little role in determining attachment behavioral organization (e.g., attachment/exploration balance or whether comfort is sought when the distress threshold is exceeded, etc.). That is, attachment assessments and temperament assessments may be directed at different levels of analysis. An alternative here is that subgroups *within* the major classification categories (B_1, B_4, etc.) are influenced by temperamental variation, but major category placement is not. There is nothing in the literature counter to the proposition that subgroupings reflect temperament; neither is there any evidence for it. From this position it would be expected that there would be some congruence in attachment with two caregivers, if subcategories were considered (e.g., if A_1 with mother, then A *or* B_1 with father, etc.).

2. Alternatively, security of attachment (B–non-B) may be determined by caregiver responsiveness, whereas temperamental variation (broadly conceived) may be implicated in distinguishing between the avoidant (A) and resistant (C) patterns of anxious attachment. As one possibility here, Gordon Bronson (personal communication) has suggested that avoidant attachment results when a robust infant encounters insensitive care, and resistant attachment when a nonoptimally functioning infant encounters insensitive care. In contrast to the infant-caregiver mismatch position discussed above, this interactional position is congruent with the data from our poverty sample. However, more data would be required to confirm this hypothesis. Almost all of the infants in our "psychologically unavailable" group were avoidant, and not all of these were robust as infants. Any such interactional viewpoint still suggests that attachment classifications are capturing the quality of the relationship and not simply endogenous infant characteristics.

3. Finally, it may be that endogenous temperamental differences, however extensive, are thoroughly transformed within the caregiving relationship system; that is, they become part of a totality. Such endogenous variation may continue to unfold after the early months, but it unfolds within the rela-

tionship and cannot be factored out. By 12 months all one has is the relationship history, not relationship and temperament in two separate suitcases (Sroufe & Fleeson, in press).

Thus, in usual circumstances if a caregiver has an infant that is easily overaroused, the caregiver will be prompted to provide modulated stimulation, smooth transitions, and so forth. In time the infant develops sufficient arousal tolerance and self-modulating capacity. A placid, hard to arouse infant elicits more vigorous stimulation and articulated expressiveness. In time the infant becomes more actively engaged. Within this perspective, which truly respects infant plasticity, such change is viewed in terms of real transformation. The original temperament no longer is "there." What has been challenged here is not the concept of temperament but views of temperament as a causal concept (as in the child's temperament causes attachment pattern or causes behavior in the Strange Situation or causes poor parenting). The "child effects" idea is turned around to imply prompting of required parental care, rather than as causing poor parenting.

Admittedly, this is a radical position. Something short of the total transformation of endogenous behavioral dispositions seems intuitively likely. And infants would seem to vary in terms of the demands they make on the skill and responsiveness of the caregivers. But the position deserves more attention than it has yet been given. It is no more presumptive than any of the temperament positions outlined above. Moreover, it is congruent with all of the data yet published on attachment.

Implications for Research

Further research on temperament influences on attachment or a new emphasis on process research both would be possible. Some issues for temperament researchers will first be indicated, followed by a discussion of outcome and process studies.

Temperament Research

Those who advocate that differences in individual physiology play a large role in attachment classifications must (1) provide evidence for reliable and stable behavioral differences in the early weeks of life that are related to later attachment classifications, or (2) show that twins reared apart are largely concordant for attachment class. Observing differences in attachment and simply asserting that they are due to temperament is not enough.

Those who, in the face of instability in early behavior, argue that stable temperamental differences emerge later in the first year (a plausible idea) must find some way of assessing such variation independent of caregiver influence, if any causal role is to be implied. If one believes that temperament is inextricably interwoven with caregiving experience (the relationship position), then the assumption of a causal role for temperament is gratuitous.

Those who argue that the role of temperament in attachment is not directly causal but rather is indirect, via influences on the caregiver, again must find some way of assessing infant behavior independent of caregiving and also must assess caregiver reactions. The mere existence of behavioral variation in infants and caregivers is not enough. Commonalities in negative caregiving of twins reared apart from birth would again be one approach. The match-mismatch hypothesis and other models of negative influence on caregiver behavior certainly merit further study. While not supported by evidence at the present time, such positions nonetheless remain logically plausible and probably testable.

Many of the same points apply when considering positions based on the idea that temperamental variation may be orthogonal to security of attachment and yet influence attachment behaviors (amount of crying, clinging, etc.). Researchers would need to show that such behavior may be predicted from earlier assessments of infant behavior, shown to be at least partially independent of caregiving experience. The existence of differences in crying, clinging, fear of novelty, etc., assessed at the end of the first year, even if then stable, cannot be used by themselves as evidence for physiologically based variation. These too may be the result of caregiving experience. To date there is no discriminating evidence.

There is some support for Bronson's idea that B–non-B (security of attachment) is the result of experience, while pattern of anxious attachment (A or C) results from an interaction of infant robustness with insensitive care. It would be quite worthwhile to do further work on this position.

Outcome and Process Research

Each of the relationship models of attachment has implications for research. The view that attachment and temperament are strictly orthogonal has clear implications for predictive studies. If cognitive ability, temperamen-

tal variation, and social/personality organization were to be defined independently, our ability to understand and predict behavior (based on all three sources of variation) should be enhanced greatly. Moreover, as Plomin (1982) has suggested, research on temperament itself is hampered when researchers ascribe any and all individual differences to temperament. Were we more discriminating in our interpretations, it might become possible to establish firmly certain temperamental characteristics. We then could study the interaction of temperament and experience, opening up new frontiers of knowledge.

When researchers embrace the view that much of temperamental variation is encompassed within the relationship system, important process questions arise. How are these transformations accomplished? How do they vary across various temperamental patterns and caregiving circumstances? Which aspects of temperament are more readily modified, which less so? These are questions that have been raised before, but generally within a view of temperamental dimensions as trait concepts (modifiable but nonetheless remaining intact). Here the idea would be that the same set of temperamental characteristics could be transformed into totally (qualitatively) different end products in given caregiving systems. Thus, twins reared apart no doubt show similarity in terms of certain characteristics of behavioral expression (Freedman, 1974), but in terms of many socioemotional aspects of behavior (especially quality of relationships with parents, peers, intimate partners, and offspring) they may be no more similar than any other separately reared individuals.

It is time once again to put aside the nature-nurture debate. Given the general agreement that experience transforms endogenous characteristics and that even newborn behavioral variation (including Brazelton status) may be predicted by prenatal assessments of maternal anxiety and other factors (Davids, Holden, & Gray, 1963; Molitor, Joffe, Barglow, Benveniste, & Vaughn, 1984), it generally will not be possible to prove that child factors cause developmental outcomes independent of caregiver influences. A more productive use of research energy would be study of the unfolding of infant-caregiver relationships themselves.

Conclusion

It should not be suprising that temperament concepts seem to have little power in explaining security of attachment. Attachment and temperament concepts operate at different levels of analysis. Temperament and attachment, as defined by Bowlby and his followers, are fundamentally different constructs, and research guided by the attachment perspective cannot meaningfully be assimilated to the temperament construct (Cronbach & Meehl, 1955). Qualitative aspects of relationships (dyadic behavioral organization) simply cannot be reduced to individual behavioral dimensions. Expectations of comforting, security in the presence of the other, and shared affect are not well conceived as temperamental variations. In a fundamental way, relationships are the result of experience, that is, the history of the interaction of the dyad.

In accepting a relationship interpretation of Strange Situation classifications, one does not have to abandon an interest in physiological factors. Attachment and temperament constructs refer to different domains, and there is no inherent incompatibility between relationship and temperamental concepts in moving toward a wholistic understanding of the child. The most urgent need is for process studies of how caregivers typically adjust their behavior to accommodate to the particular needs and nature of a given child.

Moreover, the relationship view, with its stress on parental history, social support, and life stress, carries no implication of blame for parents (Sroufe & Waters, 1982). However, there are implications of the position that parent-child relationships profoundly influence personality development. As a member of society one shares a responsibility with respect to the quality of care available to all children. If responsibility for the child's well-being does not reside in his or her inborn variation, then it is ours.

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