

# Explaining Disorganized Attachment:

## Clues From Research On Mild-to-Moderately Undernourished Children in Chile

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### Abstract

A wide range of data have demonstrated the Disorganized attachment pattern can be scored reliably, has good discriminant validity vis a vis important alternative interpretations, and is related to significant developmental outcomes. The challenge now is to understand Disorganized attachment in terms of developmental mechanisms and activating conditions. Ideally, this would involve understanding Disorganized attachment in terms of the operating characteristics of an underlying attachment control system. Unfortunately, this is beyond the reach of current theory and methods. Nonetheless, we can develop useful hypotheses about mechanisms relevant to Disorganized attachment and collect data that can help decide among alternative hypotheses. This paper reports data on the stability of an Atypical attachment pattern observed in thirty-four nutritionally healthy and 37 chronically undernourished and children from an impoverished neighborhood in Santiago, Chile. The hallmarks of this pattern were (1) clear avoidance (or resistance) in the first reunion and then a change to clear resistance (or avoidance) in the second reunion or (2) a mixture of A and C behaviors across preseparation, separation, and reunion episodes. Thus most met Main & Solomon's (1990) sequential contradictory behavior criterion for Disorganized attachment. The key findings were (1) very high rates of Atypical attachment in mild-to-moderately undernourished 18-month olds, (2) marked decline in the frequency of Atypical attachment (without improvement in nutritional status) at a 28-months, and (3) the fact that Atypical infants most often became good examples of standard insecure attachment patterns. Neither the high rate of Atypical attachment patterns nor their tendency to become typical insecure attachment patterns with age were predicted from attachment theory or previous research. The results are discussed in terms of mechanisms underlying the disorganized attachment pattern. In light of the possibility that there is important diversity within the disorganized attachment category, investigations of new populations, collaborative research, and meta-analysis deserve high priority in research on key issues.

One of Bowlby's primary goals in developing modern attachment theory was to preserve Freud's genuine insights about close relationships. In order to accomplish this, Bowlby replaced Freud's view of attachment as a bond based on mental energy with the concept of attachment as a secure base relationship orga-

nized by a behavioral control system. The hallmarks of infant secure base behavior are (1) exploration away from the caregiver, (2) monitoring the caregiver's accessibility during exploration, (3) increased alertness to or proximity to the caregiver under circumstances that would impede monitoring or access, (4) preferential

proximity and contact seeking in the face of uncertainty or threat, and (5) finding comfort in proximity and contact. In contrast to psychoanalytic and social learning views of the infant as clingy and demanding, Bowlby envisioned an active inquisitive infant, intent on exploration and mastery and all the more able to pursue these goals for its confidence in an attachment figure's availability, responsiveness, and competence. When these behaviors are employed in an organized way and with respect to just one or a few caregivers across time and across situations, they are referred to as the secure base phenomenon.

Control systems theory enabled Bowlby to explain the complexity, environmental and situational sensitivity, developmental adaptiveness, and apparently purposefulness of secure base behavior without invoking unverifiable psychological constructs or endowing the infant with unlikely cognitive sophistication. Control system models are also a useful way of formalizing ideas about the organization of the secure base phenomenon (Bischoff, 1975; Bretherton, 1985; Waters, 1981). They also anchor Bowlby's and Ainsworth's concept of attachment security. Secure attachment is closely linked to the notion of a well configured, well functioning control system. Although researchers have shown little interest in parametric analysis of secure base functioning, this framework has served as a useful conceptual tool and guide to assessment for over 30 years.

It is somewhat surprising therefore that the control system perspective does not anticipate or suggest a second powerful device that has served attachment theory and research for just as long. This is the notion of patterns of attachment. The control system model emphasizes the skilled nature of secure base behavior. Within this perspective, attachment security is just a matter of some infants being more skillful at secure base behavior than others. A continuum, nothing more.

In fact, the situation appears more complex. As Mary Ainsworth pointed out, there is a wide range of individual differences in secure base

behavior. Not only are some infants more skilled than others, there is quite a bit of diversity in the secure base behavior of the more skilled infants and even more among those whose secure base behavior seems less skilled. This is particularly evident under the stress of separation and reunion in the standard Strange Situation and particularly during reunion episodes. Secure infants are characterized by comfortable exploration in mother's presence, reduced exploration when she leaves, positive greeting or proximity seeking when she returns, effective comforting by contact if needed, and return to pre-separation levels of exploration. Within this framework, some secure infants favor independent exploration, some prefer interactive play. Some cry during separation, others do not. And reunion behavior ranges from active distance interaction to close contact. These patterns tend to be stable across time and are entirely consistent with the organization and adaptive function of the secure base concept.

The most surprising aspect of infant attachment behavior is that ineffective secure base behavior in the Strange Situation finds two very different expressions. Avoidant infants show little greeting or proximity seeking in reunion episodes. They may in fact abort active approaches, actively avert gaze, or ignore the mother's call. They may also show flashes of anger in their expression or cries. Mary Main (1981) has suggested that at low levels this behavior heightens maternal attachment behavior. And indeed, mothers often chide avoidant infants saying "Oh, you're angry" or "Don't be angry" and seeking to engage them or pick them up.

Resistant (ambivalent) infants are extremely distressed by separation and yet approach behavior is weak or entirely absent when mother returns. In addition, they find little comfort in contact and are often angered if mother tries to comfort them with a toy. They are sometimes termed "ambivalent" in reference to the fact that they mix weak contact maintaining with strong protest if mother puts them on the floor. Exploratory behavior rarely recovers to pre-separa-

tion levels during the reunion episodes.

Both the avoidant and the resistant patterns are not merely attenuated secure base behavior, they are entirely paradoxical. Both reflect distress at separation and, from the point of view of the secure base phenomenon, self-defeating behavior upon reunion. Separation is the source of the infant's distress. And when mother returns and greets them from the door, the solution to their problem is at hand. They need only take it. But they don't. The question is why?

Each of these patterns has a certain coherence or logic to it. This has led some to suggest that they are strategic (Main, 1990) even adaptive in human evolution (Belsky, 1999). In addition, they are clearly discrete. That is, they are not arbitrary divisions on a spectrum. They are also very consistent and have a wide range of competence related correlates (Colin, 1996). And perhaps most surprisingly, the secure, avoidant, and resistant patterns have proven to be useful prototypes for describing patterns of attachment in adults (Main & Solomon, 1986)

Not surprisingly, the primary attachment classifications (secure, avoidant, and resistant) and their subgroups were discovered early and relatively few new groups have been added. The first was the B4 subgroup of secure infants. These infants are extremely distressed by separation but, unlike resistant infants, they show active proximity seeking and contact maintaining. Most importantly, they are comforted by contact and return to effective play as long as they are permitted to stay close to mother or on her lap. This pattern was first noticed in Sylvia Bell's (1970) dissertation research and has become quite familiar in subsequent research. The Disorganized pattern described by Main & Solomon (1986) has been the only widely accepted addition to this catalogue.

Although secure, avoidant, and resistant attachment patterns are familiar, it would be too much to say that we fully understand them. Understanding an attachment pattern involves three steps: identification, validation, and explanation. Identification is a matter of establishing that the pattern exists. That is, it can be coded

reliably and is frequent enough to be considered a significant distinction, and shows patterns of stability and change consistent with attachment theory. Validation is the process of demonstrating that the pattern reflects individual differences in secure base behavior, not temperament, DQ, or some other behavioral or psychological construct. Validation research typically involves examining predicted correlates such as maternal sensitivity or maternal state of mind with respect to attachment, secure base behavior at home, and affective, behavioral, and cognitive correlates in naturalistic and standardized settings. It also involves examining alternative interpretations by independently assessing temperament, IQ, etc. Finally, explanation is the process of developing and testing hypotheses about the mechanisms underlying an attachment pattern. Ideally, these would involve detailed understanding of links between an underlying attachment control system and attachment classification.

This could be accomplished in any of several ways. For secure patterns, this could involve mapping classification criteria into a specific control system model and argue persuasively that the conditions leading to secure attachment also play a role in the development of this particular control system. This would also be relevant to explaining an insecure pattern. Alternatively, or in addition, one could develop a persuasive argument that specific failures in a control system would account for (i.e., predict) the behavior associated with the insecure pattern. And finally, we would have taken a step toward explaining an insecure pattern if we could make the case that experiences specifically associated with its development or with activation of characteristic behaviors would in fact interfere with an underlying control system in specific ways. Each of these involves close argument and empirical support. These in turn depend on developing specific hypotheses about the components and organization of the attachment control system and on establishing behavioral facts that can be used to distinguish between alternative control system models and between various hypotheses about the development and activation of the

behaviors associated with an attachment pattern.

Each of the primary attachment classifications is now well justified and validated. With the publication of this volume, much the same can be said of the Disorganized pattern. The task now is to move from validation to explanation. Unfortunately, attachment theorists rarely achieve or even attempt the kind of analytic explanation of attachment patterns discussed above. Instead, we most often settle for hypotheses that make only informal reference to mechanisms or that invoke mechanisms without the expectation that they will or can be rigorously tested against empirical data.

Despite the limitations of current theory and methods, it is worth defining analytical explanation in terms of control system models as a standard against which to measure other approaches to explaining attachment patterns. This is the kind of explanation Bowlby had in mind when he proposed the control systems model and defining it as a goal is an important step toward keeping the control system concept and the secure base phenomenon at the heart of attachment theory. Focussing on analytic explanation also insures that we do not settle for identification and validation alone. These are important but they do not take us to the level of mechanisms that ultimately is necessary to truly explain attachment patterns and realize Bowlby's goal of an effective prevention and therapy.

This paper reports data that can stimulate hypotheses about the development and activation of the Disorganized attachment pattern and help sort out alternative interpretations. This takes us beyond identification and validation and brings us step closer to the kind of explanation outlined above. Our data are from samples of well-nourished and mild-to-moderately under-nourished children living on the outskirts of Santiago, Chile. The primary goal of the study was to examine links between maternal sensitivity and the children's nutritional status. In the course of the research, the children were seen in the Strange Situation at 18- and 28-months of age. Especially at the younger age, a surpris-

ingly large number of the subjects could not be assigned to any of the traditional attachment classifications. Instead, they were extremely inconsistent, showing behavior characteristic of one classification in the first reunion and then a very different pattern in the next. Because these data were collected prior to the widespread use of the Disorganized classification and prior to the emergence of systems for scoring the Strange Situation beyond infancy, these infants were classified "Atypical". As described below, this corresponds to at least a subset of the infants who would today be classified Disorganized. This paper reports that "Atypical" attachment is strongly associated with nutritional status and that rates of "Atypical" attachment diminished markedly with age. These surprising findings suggest interesting and testable hypotheses about the nature of Disorganized attachment and provide information that can be used to evaluate existing hypotheses. They also have implications for our perspective on the development of secure attachment.

#### **Attachment Stability and Change**

Stability of infant-mother attachment between 18 and 20 months, has been examined in a wide range of samples. Overall, studies on stability of attachment have found secure/anxious classification in the Strange Situations to be stable in middle-class samples when no major changes were experienced by the families between the two assessments. Several researchers have demonstrated the long-term stability of attachment. Connell (1976) using a discriminant analysis classification procedure found 80% stability between attachment classification at the 12 months and later classification at 18 months. Similarly Waters (1978) using classifications assigned by trained coders reported 96% stability at 12 and 18 months. Main & Weston (1981) reported 80% of stability of attachment toward the mother at 12 and 20 months in all major classifications, including an "unclassifiable" group. In a follow-up study, designed to assess continuity of organization of attachment behaviours beyond infancy, Main, Kaplan & Cassidy (1985) also reported significant stability of

attachment ( $r = .76$ ) in children assessed in the Strange Situation at 12 months and later assessed at 6 years in a modified procedure to assess attachment at this age.

These data have been important in establishing the reliability of the Strange Situation assessments and have played a part in its adoption for a wide range of research on the early social and emotional development of children. Data on changes in attachment classification over a 6-month period in relation to changes in family circumstances and stressful life events have also contributed to our confidence in the Strange Situation and to our understanding of the individual differences it measures. In particular, Thompson, Lamb & Bates (1982) have shown that Strange Situation classifications can change markedly when mothers of one-year-olds are returning to work after spending the child's first year at home. Reported stability by these authors is 53% for overall classification of children seen at 13 and 20 months old. Vaughn, Egeland, Sroufe & Waters (1979) have also reported substantial change in Strange Situation classification from 12-18 months in a low socioeconomic sample. Most importantly, they were able to relate patterns of change to stressful life events mothers experienced between the two assessments. Mothers of infants who were anxiously attached at both assessments reported the highest number of stressful events. Those whose infants had been secure and changed to anxious reported fewer stressful events. Fewer still were reported by mothers whose infants improved from anxious to secure. Fewest occurrence of stressful life events of all were reported by mothers of stable secure children.

These data have been important for several reasons. First, Bowlby's attachment theory is a theory of the infant's responsiveness to salient environmental cues and to patterns of maternal care. It stipulates that infant-mother attachment develops from interaction and requires that relationships be responsive to changes in infants experience. In addition, infant attachment relationship has come to be viewed as being modified by changes in the caregiver or the infant for

mutual accommodation in a predictable manner. This responsiveness to life events, along with data indicating that attachment relationships with mother and father are not highly correlated, have contributed to provide decisive evidence against a temperament interpretation of Strange Situation classifications (Sroufe, 1985).

A noteworthy feature in the stability studies to date has been a tendency for change to involve attachment classification moves from anxious to secure, rather than at random, in studies that have not involved specific stressors between test and re-test assessments. This phenomenon may be understood in terms of the organism's self-righting tendencies in development (Sameroff & Chandler, 1975), the infant's active role in eliciting care (Main, 1981) and in terms of increasing influence of infant behaviour on the caregiver with age (Bell & Harper, 1977).

The present analysis of attachment stability was undertaken within the context of a study designed to document the pervasiveness of a pattern of disturbances in infant-mother attachment found in a previous sample of low income, mild to moderate chronically undernourished children at 18 months (Valenzuela, 1990). Although relationships between social, family and nutritional variables were established in initial cross-sectional assessments, longitudinal data were collected for several reasons. First, Strange Situation stability data in our low income control group was obtained for comparison with data from low income samples in North America (e.g., Vaughn, Egeland, Sroufe & Waters, 1979).

Similar stability results in Chile would be one of several types of evidence supporting our use of the Strange Situation in this culture. Second, these data were also collected in order to evaluate the stability of the relationships between the nutritional and the attachment variables described by Valenzuela (1990) at 18 months. Finally, stability data were collected because our initial assessment at 18 months indicated that there was a very high rate of Atypical attachments (51% which also included 32% of an anxious avoidant-resistant pattern) in our chroni-

cally undernourished sample. These are rare in middle class non-clinical samples and they have not been closely studied. Retest data are a potentially valuable source information about Atypical Strange Situation classifications and about their relationships to other attachment patterns.

### **Subjects**

The subjects for this project were 34 nutritionally healthy children (> 90% of expected weight-for-age) and 37 mild-to-moderate undernourished children (70-85% of expected weight-for-age) and their mothers. Both samples were recruited through neighborhood community health clinics in an impoverished neighborhood of Santiago, Chile. There were no statistically significant differences between the two different nutritional groups in family income, mother's age or education, father's age, education or type of occupation, family size or number of children. All children were last born, full-term and normal birth weight.

The families lived in a treeless, impoverished community of approximately 15,000 on the outskirts of Santiago, a city of approximately five million. In general the unpaved streets were clean and violent crimes (as opposed to property crimes) were rare. However, crowding, health problems, under-employment, family conflict, and male alcohol abuse were significant problems in this community. The families lived in 1-2 room concrete block structures with earthen floors. All of the homes had clean indoor water and basic electricity. The number of children ranged from 1-4 per family. All of the fathers earned subsistence incomes as laborers, peddlers, or in subsidized employment (e.g., cleaning parks or construction sites) in Santiago. All but one of the mothers was at home full time; one mother employed as a peddler took her child with her each day. Mothers' earnings for work performed at home were intermittent and minimal.

The community was served by a system of community health centers that provided basic health care (including birth control) consultation, services, and referrals. Each center was staffed by physicians, nurses, nutritionists, and social

workers. The present study was conducted in three centers that specialized in child health care and nutrition. Each provided well baby care and distributed free supplies of powdered milk for children under six-years-old. All of the subjects lived within walking distance of one of these centers.

With the exception to two of the dyads, all subjects came from intact families. Between the first and the second assessment, no major changes in family composition occurred, no mothers started working outside the home, no new childcare arrangements were made and no child had started daycare or experienced illness requiring hospitalization. Only 7% of the families seen in the second assessment changed residence between assessments. Fourteen (16.5%) mother-infant dyads were not seen in the second assessment. These families changed residence outside the city or moved within the city limits but did not notify the Community Health Clinic of a change of address.

### **Assessment Procedures**

All mother-infant dyads were initially seen in the Strange Situation procedure at a mean age of 18 months (range =17-21). The second assessment was conducted at mean age 28 months (range = 24-32 mo.). The Strange Situation is a standardized, well validated procedure to assess quality of infant-mother attachment. It consists of eight 3-minute episodes including two separations and two reunions with mother. The Ainsworth et al. procedures were used without modification at both ages and were recorded on videotape.

Behavior in the Strange Situation is only scoreable if the child has both the locomotor and cognitive competence necessary to recognize the novelty of the situation, note and recall mothers absence and return, and (in principle) activate secure base behavior during reunions. In home-reared middle-class infants, these are well consolidated in virtually all healthy one-year olds. Because we could not assume that 12-month-olds reared in extreme poverty would display fully developed secure base behavior, our initial assessments were conducted at 18- months.

Children were classified into Ainsworth's major (A, B, or C) attachment categories according to the scoring system outlined by Ainsworth, Blehar, Waters, & Wall (1978). Although this system is best validated for infants 12-18 months of age, this system seemed more appropriate for the present sample than adaptations designed for older children (e.g., Cassidy & Marvin, 1992). First of all, the Ainsworth procedure is not irrelevant to children as old as 28-months. Bosso, Corter & Abramovitch (in press) report a strong association between Ainsworth Strange Situation classifications and Q-sort observations of secure base behavior at home in a sample of 18-32 month-olds (mean age = 26.3 mo.). Moreover, the Ainsworth scoring criteria seemed entirely adequate to the task in this sample. We saw few indications that the content or organization of the subjects' secure base behavior involved the kinds of developmental and strategic shifts cited in the Cassidy & Marvin (1992) system. For example there was little indication that avoidance was more subtle than in infant samples (Cassidy & Marvin, p. 15). There was also little indication of that resistant behavior was accompanied by or had been replaced by controlling behavior (Cassidy & Marvin, p. 56). Nor did verbal behavior play a prominent role in their secure base behavior (Cassidy & Marvin, 1992, p. 35, 42). The relevance of the Ainsworth scoring system at both 18- and 28-months is also supported by the fact that agreement between independent coders was high and approximately equal at both ages.

Even within the Ainsworth scoring system, a substantial number of subjects could not be assigned standard classifications. These were infants, especially in the mild-to-moderately under-nourished sample whose behavior was easily scored within episodes but was inconsistent across episodes. Their behavior was (1) typical of one insecure group (A or C) in the first reunion and then a distinctively different (C or A) pattern in the second, (2) typical of one insecure group (A or C) in the first moments of a reunion episode and changed to a distinctively different (C or A) insecure pattern

during the remainder of the episode, or (3) alternated between A and C-type responses throughout the final reunion episode. To avoid the risk of over-interpreting unexpected behavior in these cross-cultural and very deprived samples, we designated these subjects "insecure-Atypical" rather than Disorganized. We also used this designation because we noted few of the "odd" behaviors that are today associated with the Disorganized attachment pattern. Nonetheless, most of these "Atypical" children would meet Main & Solomon (1990) criteria for the "D" classification by virtue of "Sequential display of contradictory behavior patterns"<sup>1, 2</sup>.

Both authors independently scored the 18- and 28-month Strange Situations. The follow-up Strange Situations were scored approximately one year after the 18-month sessions. In addition, the two sets of videotapes were not identified by name or identical subject numbers. Agreement was 88.2% for the 18-month data and 83.7% for the 28-month data. Disagreements lead to review of the videotapes and final classification was decided by the more experienced rater. Nutritional status was not readily apparent from the video records at either age.

### Results

All of the subjects retained the same nutritional status for the duration of the study.

#### Nutritionally Healthy Sample

The 18- and 28-month classifications for the low income, normally developing children are presented in Table 1. Fifty percent (17/34) of the adequately nourished infants were classified secure at the 18-months and 67.6% (23/34) were classified secure at 28-months (*ns*)

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Overall, 21/34 (61.8%) of the children received the same secure vs. insecure classification at both ages ( $\kappa = .24, p < .17$ ). Using four categories (A, B, C, Atypical), 21/34 (61.8%) of the children received the same received the same classification at both ages ( $\kappa = .37, p < .01$ ). As in previous research (e.g., Ainsworth, Blehar, Waters & Wall, 1978; Waters, 1978;

Egeland & Farber, 1984), secure classifications were more stable than insecure classifications.

Among secure infants, 14/17 (82.4 %) received the same classification at both ages. Only 8/17 (47.1 %) insecure infants received the same classification at both ages. These rates of secure vs. insecure attachment and stability vs. change are comparable to data from a large North American Sample of low socioeconomic status families (Vaughn, Egeland, Sroufe, & Waters, 1979).

#### **Mild-to-moderately under-nourished sample**

The 18- and 28-month classifications for the mild-to-moderately under-nourished sample are presented in Table 2. Only 8.1% (3/37) of the children in this sample were classified secure at 18-months and 27% (10/37) were classified secure at 28-months ( $p < .04$ ). These rates are significantly lower than in the socioeconomically matched adequately nourished sample at both 18-months ( $p < .01$ ) and 28-months ( $p < .01$ ).

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Overall, 24/37 (64.9%) of the mild-to-moderately under-nourished children received the same secure vs. insecure classification at both ages ( $\kappa = -.14$ ,  $p < .56$ ). This is comparable to stability of secure vs. insecure classifications in the nutritionally healthy sample ( $p < .99$ ). Using four categories (A, B, C, Atypical), only 12/37 (32.4%) of the moderately under-nourished subjects received the same classification (A, B, C, Atypical) at both ages ( $\kappa = .13$ ,  $p < .15$ ). This is significantly less than the stability of four-group classifications in the adequately nourished sample ( $\kappa_1$  vs.  $\kappa_2$ ,  $p < .01$ ).

None (0/3) of the children classified secure at 18-months received the same classification at 28-months. This is significantly less than the 82.4% stability of insecure attachment in the adequately nourished sample ( $p < .01$ )<sup>3</sup>. In contrast, 24/34 (70.6%) children classified insecure at 18-months were also classified insecure at 28-months. This is significantly greater than the

47.1% stability of insecure attachment in the adequately nourished sample ( $p < .05$ ).

In brief, adequately nourished children were more likely than mild-to-moderately undernourished children to be securely attached. They were more likely to receive the same four-group attachment classification across age. As discussed below, this was largely due to the high rate and instability of Atypical attachment in the mild-to-moderately under-nourished sample.

#### **Atypical attachment**

Atypical attachment was more common among mild-to-moderately under-nourished children at both ages (56.8% (21/37) vs. 14.7% (5/34),  $p < .01$  at 18-months and 18.9% (7/37) vs. 2.9% (1/34),  $p < .04$  at 28-months. In addition, the proportion of insecure infants classified Atypical declined across age in both samples. This effect was especially marked in the mild-to-moderately under-nourished sample (91.9% (21/34) of the insecure classifications at 18 months vs. 25.9% (7/27) of the 28-month insecure classifications,  $p < .01$ ). This explains the fact that the stability of secure vs. insecure classifications was similar across samples while four-group classifications were less stable in the mild-to-moderately under-nourished sample.

Finally it is worth noting that the fate of atypical attachment was different in the two samples. In the adequately nourished sample, 4/5 (80%) of the Atypical 18-month olds were secure at 28-months. In the mild-to-moderately under-nourished sample, only 8/21 (38.1%) became secure. The remainder (9/21) were classified avoidant or resistant and 4/21 remained Atypical.

#### **Discussion**

A substantial number of children in this study showed an atypical attachment pattern in the Strange Situation. This involved inconsistent patterns of avoidant and resistant behavior across reunion episodes, changing from avoidance to resistance (or *vice versa*) within reunion episodes, and occasionally alternating between avoidance and resistance throughout the final reunion episode. Under the traditional Strange Situation classification system, these infants

would most often be informally classified A/C and simply scored as insecure for most data analyses. If it were necessary to force an A or C classification, most coders would give greater weight to behavior in the second reunion.

Main & Solomon's (1986, 1990) recognition of disorganized responses to separation and reunion has focussed attention on the possibility that there may be a logic to such behavior. A wide range of studies reviewed and included in this volume have shown that the Disorganized attachment pattern can be scored reliably, has good discriminant validity vis a vis temperament constructs, and had a wide range of important correlates in maternal behavior and competence related outcomes. The task now is to move from identification and validation to explanation.

Although the children in our samples did not show the full range of behaviors associated with the Disorganized attachment pattern, they uniformly displayed sequences of contradictory behaviors. The hallmark of their Strange Situation behavior was inconsistent patterns of avoidant and resistant behavior within and across reunion episodes. We described these infants as "Atypical" rather than Disorganized because our data were initially scored before the Main & Solomon (1986) scoring system was not fully validated. In addition, we wanted to avoid overinterpreting the behavior of children from a cultural and socio-economic context quite unlike those in which the traditional Ainsworth classifications and the Main & Solomon scoring system were developed. Nonetheless, most of the Atypical children in our sample would today be classified Disorganized.

Interestingly, there was little evidence of misdirected or incomplete behaviors, stereotypes, freezing, confusion or disorganized behavior, or apprehension regarding the parent. This suggests that there may be distinct sub-groups of Disorganized attachment, perhaps associated with different etiologies (Sprangler, Fremmer-Bombik, and Grossmann's, 1996). This said, it is useful to examine alternative explanations for the behavior we observed and the relevance of these explanations to the broader concept of

disorganized attachment. As mentioned above, attachment theory and research have not yet reached the point of explaining attachment patterns in terms of specific control system models and their operating characteristics. It is not too early, however, to move beyond identification and validation to consider the types of mechanisms that might explain Disorganized attachment. Indeed, this is a good time to start asking what the answer may be like.

### **Infant characteristics and Atypical attachment**

Because both of our samples were drawn from the same neighborhoods, the high rate of Atypical attachment in the mild-to-moderately undernourished children cannot be explained in terms of greater socioeconomic disadvantage. It is possible, however, that poor nutrition itself contributed to this effect. For example, poor nutritional status might contribute directly to high and stable rates of insecure attachment by interfering with a child's tolerance of stress and thus with the ability to organize coherent separation and reunion responses. This would be consistent with Sprangler et al.'s (1996) interpretation of Disorganized attachment. This emphasis on the ability to produce organized behavior under stress articulates well with Main & Solomon's emphasis on conflict and approach-avoidance as motivational factors in Disorganized attachment. For, as Sroufe & Waters (1976) have noted, increasing ability to maintain organized behavior under stress (i.e., greater stress tolerance) is a hallmark of early socio-emotional development.

What is missing from such explanations is specific reference to the effects of stress on a secure base control system. That is, if stress and conflict are truly explanatory, we should be able to detail how stress impacts on a specific control system model to produce exactly the behavior associated with Disorganized attachment. In principle, stress could interfere with the input, integrative, or output functions of an attachment control system. That is, it could interfere with (1) a child's perception of separation and reunion situations, (2) access to representations of

past experience, (3) appraisal processes, and or (4) selection, activation, and coordination of secure base responses.

Developing testable hypotheses at this level of analysis is important to achieving the goals Bowlby had in mind for the control systems model. Indeed, without this kind of analysis, explanations in terms of stress and conflict are largely post-hoc. It is not enough to explain Atypical or Disorganized attachment in terms of stress. We have to ask why we see disorganization in some aspects of behavior and not in others and why these patterns of attachment are associated with some stressful contexts and rearing environments and not others. As in other areas of psychology, stress and coping can easily explain too much and reduce explanation to the empty notion that all good (and bad) things go together. The best protection against this is to ask stress and coping theorists to outline the mechanisms through which stress and coping could produce all of the behaviors that need to be explained, without producing behaviors that in fact are not observed.

Hypotheses about the mechanisms underlying the effects of stress and coping can be addressed indirectly through correlational data and close examination of secure base behavior at home and in the Strange Situation. They can also be addressed via experimental analyses of secure and Disorganized children's perceptions, appraisals, and secure base responses to well defined circumstances and patterns of maternal behavior. Although stress is most often treated as a unitary construct, it is in fact a very complex phenomenon with wide individual differences in its eliciting conditions and modes of expression (vis. Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, K., 1996). For these reasons, measures of psychobiological variables such as stress related hormones may provide useful for manipulation checks and as dependent variables in some of this research.

#### **Caregiver behavior and Atypical attachment**

The association between poor nutrition and Atypical attachment is also consistent with the hypothesis that a third variable contributes inde-

pendently to poor nutrition and insecure attachment. The obvious candidate is inadequate maternal behavior. As mentioned above, the mothers in this sample were poorly educated, underemployed, impoverished, and had little hope that their circumstances would improve. Under these circumstances, chronically detached and depressed mothers might well have provided both inadequate nutrition and inadequate secure base behavior.

As with stress and coping constructs, reference to maternal behavior easily explains too much and too easily leads us toward the hypothesis that all good (and bad) things go together. Again, the best defense is specificity. Insofar as possible, parental behavior explanations of Disorganized attachment should specify exactly what aspect of parental behavior is involved and how its interaction with an attachment control system would produce observed behaviors without also producing behaviors that are not observed. Unfortunately, this is easier to achieve conceptually than empirically. All of the factors that influence parental behavior can create correlations across a wide range of caregiving responses. Thus it is difficult to isolate specific components of parental care in empirical research, especially because much that is important in parental care cannot ethically be manipulated. Faced with these same constraints, Bowlby's strategy was to seek conceptual clarity in control systems theory and hope that this would reveal the best possibilities for empirical analysis.

The best known explanation of Disorganized attachment is Main & Hesse's (1991) "frightened and/or frightening maternal behavior" hypothesis. They note that the hallmarks of Disorganized attachment are competition among or inhibition of attachment behaviors, especially just as they are being initiated (p.173). They also note that freezing and apprehensive behavior are also part of the Disorganized attachment pattern. Thus Main & Hesse (1991) suggest that initiation and then inhibition of an attachment behavior sequence by fear is central to the Disorganized attachment pattern.<sup>4</sup>

Following Bowlby, Main & Hesse suggest that the infant's fear reflects something in its actual experience. Obvious examples include physical abuse and extreme behaviors associated with parental psychosis. They also suggest that a parent suffering from unresolved mourning may still be frightened by the loss and as a result may display anxiety, unusual vocal patterns and speech content, unusual movements, and lapses of cognitive monitoring that an infant or young child might find frightening. The clarity and testability of this explanation is enhanced by the fact that Main & Hesse explicitly cast it in terms of Bowlby's attachment control system construct. This proves a useful framework within which to contrast the cognitive and motivational state of Avoidant and Resistant infants with that of Disorganized infants at various points in separation and reunion episodes. Their analysis emphasizes that, for the Disorganized infant, the mother herself, not the situation, is the source of distress. The control systems framework clarifies how this limits the child's response options and sets the stage for sustained high levels of stress. This, they suggest, leads to behavioral inhibition and disorganization.

This analysis has much to recommend it. It is relatively detailed and closely mapped into Bowlby's control system model. As a result, it suggests a wide range of testable hypotheses. Nonetheless, we have several reservations that could be addressed empirically. First, it is not clear that lapses of monitoring, behavioral disfluencies, and related behavior would stand out among the imperfections, interruptions, and intrusions that come with even the most sensitive care in a real environment. Nor is it clear that they would be perceived as frightening if they were. These issues can certainly be addressed in naturalistic observations and in experimental studies of infants reactions to simulated lapses, disfluencies, etc.

A second concern is that Main & Hesse's analysis does not anticipate heterogeneity among Disorganized infants. That is, it does not anticipate that in a study such as ours children would show sequential incongruities but not misdi-

rected or interrupted behavior, stereotypes, freezing, or apprehension. It is possible that the "frightening and/or frightened maternal behavior" hypothesis can be elaborated to accommodate this concern. This might be facilitated by a taxonomic search to identify subgroups of Disorganized infants and children. It would be useful if this included data on ordinary secure base behavior from naturalistic settings as well as emergency behavior from contexts such as the Strange Situation.

Finally, the "frightening and/or frightened maternal behavior" hypothesis does not anticipate the significant decline in Atypical attachment observed in the present study. Although one could speculate that with maturation infants are increasingly able to maintain organized behavior in the face of frightening and/or frightened maternal behavior. However, this implies that Disorganized behavior would be rare after early childhood, which it is not (van Ijzendoorn, Schuengel, & Bakermans-Kranenberg, 1998).

#### **Caregiver behavior and attachment organization**

Bowlby suggested that the attachment behavior control system is part of our primate evolutionary endowment. This, and his references to imprinting, has led many to think of the attachment control system as a fully organized blueprint genetically mapped in the human brain, ready to emerge fully organized when activated by appropriate maternal behavior. Although there is some support for this view in Bowlby's writings, he consistently emphasized the role of experience over time and contexts in attachment development. As Waters, Kondo-Ikemura, Posada, & Richters (1991) point out, our primate endowment is less likely to be a fully organized blueprint than a set of biases in our learning abilities that make it easy to integrate control system components through experience with an organized pattern of caregiver behavior. This is what Bowlby was referring to when he stated that attachment development depends on experience of species typical parental care. Indeed, an organized and organizing environment is critical to the development of every physiolog-

ical, perceptual, and complex behavior control system. Building upon organization in the environment reduces the amount of information that has to be encoded genetically and also allows developing systems to adapt to prevailing conditions.

This perspective suggests an alternative view of parental behavior and Disorganized attachment patterns. If the attachment control system depends on organized and organizing patterns of secure base support, it follows that it will not be properly organized if such support is absent, disorganized, or markedly discrepant from the caregiving environment that our primate heritage takes for granted. This would lead to disfluent and perhaps even disorganized attachment behavior in both ordinary and emergency situations.

Many of the mothers in our Chilean samples were chronically disengaged and many would have met the criteria for clinical depression. Disengagement and depression were particularly evident in the mothers of the mild-to-moderately under-nourished children. It seems likely that they also provided poorly organized secure base support.

Although poorly organized secure base support could affect almost any aspect of a developing attachment control system, the inconsistency across episodes observed in our sample and the simultaneous display of incompatible behaviors, incomplete and interrupted behaviors, and “odd” movements that define the D classification suggest that the problem is primarily one of response selection. One of the functions of the attachment control system is to integrate information about the physical situation, the mother, and the child’s expectations, the attachment control system and to pass the result to components that select an appropriate response. We suggest that some of the hallmarks of Disorganized attachment result when the control system components responsible for this integration fail to pass along a signal that is strong enough and or selective enough to activate and maintain a single predominant response. Under various circumstances, this could produce a wide range of

outputs, ranging from no response to interrupted responses, activation of more than one response, and alternating responses. Moreover, the inability to produce or maintain an adaptive response could prove very stressful.

This analysis has two important implications. The first is that the primary factor in Disorganized attachment may prove to be response selection rather than approach / avoidance. The second is that fear and “apprehension” may be result rather than the cause of behavioral disorganization.

This response selection hypothesis is consistent with many of the observations cited in support of the “frightened and or frightening maternal behavior” hypothesis. For example, both abusive and psychologically disturbed caregivers are likely to provide poor secure base support. The same can be said of caregivers whose unresolved mourning distracts them or undermines motivation necessary to provide organized and organizing secure base support. In addition it anticipates that as a child gets older it may be more able to detect weak or inconsistent organization in the caregiver’s behavior. It may also be more able to actively elicit organized care. Depending on why the caregiver’s behavior was deficient in the first place, this might lead to secure attachment in some cases and to well-configured insecure attachment patterns in others. If the caregiver is seriously disturbed or the caregiving environment is inconsistent with organized and organizing secure base support, the Disorganized attachment pattern would persist. In contrast, the “frightened and or frightening maternal behavior” hypothesis suggests that both the caregiver’s problems and the child’s experience of aversive secure base support are relatively enduring. Consequently it predicts that Disorganized attachment will typically endure. Our results indicate that this is not always the case. The mothers in our sample were, after all, far more disadvantaged than disturbed. And as a result, they may have been able to provide more organized and organizing secure base support when, after infancy, their children could present stronger or clearer demands for secure base

support.

**Disorganized attachment: One pattern or several?**

Diversity among children with Disorganized attachment is a difficult problem for any theory. Most can be adapted, post hoc, to account for specific examples of diversity. But few can predict patterns of diversity in advance. In all likelihood, some of the diversity among Disorganized attachment patterns will be due to the fact that more than one variable is in play. That is, children will inevitably have different experiences and develop different expectations from even similar experiences. In addition, there will always be wide individual differences in cognitive, behavioral, and physiological coping mechanisms and in thresholds for distress. There are also many different ways that the structure or function of a secure base control system might lead to disorganized behavior. Some of these might be examined via computer simulation.

The present study illustrates the diversity of Disorganized attachment patterns. It also provides interesting findings that can be used to test the power of hypotheses about the mechanisms underlying Disorganized attachment. If we cannot yet predict the ways in which Disorganized attachment will be diverse, we can at least discover and carefully describe them. Thus, taxonomic research on the ordinary and emergency secure base behavior of Disorganized infants and children deserves high priority in attachment research. Hopefully the results will suggest useful hypotheses about the origins of this diversity and about the nature of Disorganized attachment. In turn, this may contribute to our understanding of avoidant, resistant, and secure attachment patterns.

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### Footnotes

1. The wording of the Main & Solomon criterion emphasizes inconsistency within episodes. In practice, the criterion is also applied to inconsistencies across episodes (Judith Solomon, personal communication, October, 1998). Another criterion for the "D" classification,

"Simultaneous display of contradictory behavior patterns" is indeed applied exclusively to behavior within an episode.

2. As mentioned above, we noticed few behaviors in the 28-month Strange Situations that seemed inconsistent with standard Ainsworth et al (1978) classification criteria. Indeed, Bosso, Abramovitch, & Corter (in press) have demonstrated the validity of these criteria in a sample of two- to three-year-olds by comparing them to direct observations of secure base at home with the Attachment Q-set (Waters & Deane, 1985). Virtually all of the subjects classified secure, avoidant, and resistant at the 28-month follow-up would have received corresponding classifications in the Cassidy & Marvin's (1992) revised classification system for 30- 54-month-olds. The majority of the "Atypical" infants would have been classified insecure-other.

Because most of the inconsistency in their behavior was across rather than within episodes, few would have met the criteria for insecure-controlling-disorganized. In addition, inconsistency across episodes would also have precluded our reporting underlying ("forced") classifications for most of the Atypical subjects.

3. Although the difference between the stability of secure (0/3) and insecure classifications (24/34) in this sample is significantly greater than 0 ( $p < .01$ ), we cannot accurately estimate the stability of secure attachment from only three cases.

4. They allow however that disorganized attachment behavior might arise as well from neurological impairment or confusion due to inconsistent signals from the caregiver.

**Table 1: Attachment Classification at 18 and 28 months in the Well-nourished Group**

18-Month Attachment Classifications	28 Month Attachment Classifications				TOTAL
	Avoidant	Secure	Resistant	Atypical	
Avoidant	4	2	0	0	6
Secure	1	14	1	1	17
Resistant	0	3	3	0	6
Atypical	1	4	0	0	5
TOTAL	6	23	4	1	34

**Table 2: Attachment Classifications at 18 and 28 months in the Mild-to-Moderate Undernourished Group**

18 Month Attachment Classifications	28 Month Attachment Classifications				TOTAL
	Avoidant	Secure	Resistant	Atypical	
Avoidant	4	1	0	1	6
Secure	2	0	1	0	3
Resistant	0	1	4	2	7
Atypical	5	8	4	4	21
TOTAL	11	10	9	7	37