

Attachment Security in Infancy and Early Adulthood: A 20-Year Longitudinal Study

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Sixty white middle-class infants were seen in the Ainsworth Strange Situation at 12 months of age; 50 of these participants (21 males, 29 females) were recontacted 20 years later and interviewed using the Berkeley Adult Attachment Interview (AAI). The interviewers were blind to the participants' Strange Situation classifications. Overall, 72% (36/50) of the infants received the same secure versus insecure attachment classification in early adulthood ($kappa = .44$, $p < .001$). As predicted by attachment theory, negative life events, defined as (1) loss of a parent, (2) parental divorce, (3) life threatening illness of parent or child (e.g. diabetes, cancer, heart attack), (4) parental psychiatric disorder, and (5) physical or sexual abuse by a family member were an important factor in change. Fifty-six percent (10/18) of the infants whose mothers reported negative life events changed attachment classifications from infancy to early adulthood. Only 28% (9/32) participants who reported no such events changed classification ($p < .05$). These results support Bowlby's hypothesis that individual differences in attachment security can be stable across significant portions of the lifespan and yet remain open to revision in light of experience. The task now is to use a variety of research designs, measurement strategies, and study intervals to clarify the mechanisms underlying stability and change.

One of Bowlby's primary goals in developing modern attachment theory was to preserve what he considered Freud's genuine insights about close relationships and development. These included insights about (1) the complexity of social, cognitive, and emotional life in infancy, (2) underlying similarities in the nature of close relationships in infancy and adulthood, and (3) the importance of early experience.

In order to preserve these insights, Bowlby recast Freud's insights in terms of control systems and

ethological theories. He also placed his own imprint on them, replacing cathectic bonding with evolved secure base patterns as the common thread in infant and adult relationships. He also placed greater emphasis on the openness of early relationships to change, especially in light of real-life experiences.

Ainsworth's observational studies of secure base behavior at home and in the laboratory (Ainsworth, Blehar, Waters, & Wall, 1978, Ch. 4, 5, 13) initially focused on normative trends in infants' responses to novelty, separation, and reunion. Her goal was to

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test the appropriateness of Bowlby's control systems model of infant behavior toward a caregiver. Subsequently, individual differences designs proved useful for examining the determinants and developmental significance of secure base behavior (Ainsworth et al., 1978, Ch. 7, 8, 14; Colin, 1996).

Working within Mischel's (1968) critique of the individual differences paradigm, Masters and Wellman (1974) examined intercorrelations and stability in several studies of infant behavior in brief laboratory separations. They concluded that, consistent with Mischel's (1974) situationist critique of the individual differences paradigm, there was little evidence of consistency in correlations across discrete "attachment behaviors" or of stability over intervals of weeks, days, or minutes. These conclusions carried considerable weight.

The present study began (Waters, 1978) as an effort to clarify issues raised by the Masters and Wellman (1974) review. Strange Situation data were collected on a middle-class sample at 12 and 18 months of age. In each episode, we counted the frequency of discrete "attachment behaviors" and rated key interactive behaviors (proximity seeking, contact maintaining, proximity and interaction avoiding, and contact resisting). In addition, we classified each infant as secure, insecure-avoidant, and insecure-resistant at each age. Reliability analysis indicated that most of the discrete behaviors examined in the Masters and Wellman (1974) review were far too rare to obtain a reliable estimate of an infant's typical behavior from brief episodes. That is, measurement failure could explain much of the negative evidence compiled by Masters and Wellman (1974). This interpretation was strengthened by evidence that stability across episodes and across time was much higher with the broader (and thus more reliable) rating scales and classifications. These results addressed the Masters and Wellman critique in detail and, in doing so, buttressed an emerging methodological defense of individual differences research (e.g., Block, 1977 and Epstein, 1978). As a result, they too carried considerable weight.

Lacking attachment security measures that could be applied beyond infancy, few if any researchers in the mid-1970's planned long-term follow-up assessments. This obstacle was overcome with the development and validation of the Berkeley Adult Attachment Interview (Main, Kaplan, & Cassidy, 1985;

see Crowell & Treboux, 1995, for a review). As Vaughn, Egeland, Sroufe, and Waters (1979) note, Bowlby's theory predicts that secure base use and attachment representations are significantly stable across time and yet open to change in light of significant attachment-related experience. The goal of this follow-up study was to examine the extent of stability and change in attachment patterns from infancy to early adulthood and to stimulate research into the mechanisms underlying these developmental trajectories.

METHOD

Participants and Procedure

Sixty 12-month-olds recruited from newspaper birth announcements in Minneapolis and St. Paul were seen in the Ainsworth and Wittig Strange Situation in 1975 and 1976. Most also participated in a six month follow-up at 18-months of age (see Waters, 1978). Fifty of these participants (21 males; 29 females) were relocated 20 years later and agreed to participate in the Berkeley Adult Attachment Interview (George, Kaplan, & Main, 1985). Their ages at the time of the AAI were from 20-22 years. As had their families in the original study, their socioeconomic status spanned the lower- to upper-middle classes. Living arrangements were diverse: 45% lived at college, 24% at home, 24% lived independently, 6% other arrangements (e.g., military). Seventy-two percent described their primary occupation as "student"; 18% had completed high-school and were now employed; 4% had completed college and were now employed; 6% did not mention employment. In most instances (78%) the participants' parents had remained married. Two participants lost a parent before age 6. Two participants had a child of their own.

Infant attachment assessment. Each participant was seen in the Ainsworth Strange Situation at one year of age. They were classified as secure, insecure-avoidant, or insecure-resistant, as described in Ainsworth et al. (1978). The insecure disorganized classification (Main & Solomon, 1986) was not yet developed when we scored these tapes. Independent coders assigned infant attachment classifications at 12- and 18-months¹. Raters agreed on major classifications in 45/50 (90%) of the cases (see Waters, 1978). Disagreements were resolved by conference. The distribution of attachment classifications at 12-months was 29 (58%) secure, 12 (24%) insecure-avoidant, and 9 (18%) insecure-resistant.

Adult attachment assessment. Adult attachment status was assessed using the Berkeley Adult Attachment Interview (George, Kaplan, & Main, 1985) when each participant was 20-21 years of age. Administration and scoring procedures are summarized in the General Introduction and detailed in Main and Goldwyn (1994). The interviews were conducted by three of the authors. Thirty-seven interviews were conducted in a private room provided by a community library; three participants were interviewed in their parent's homes. We interviewed 10 participants by telephone, nine who had moved away from the Minneapolis area and had no plans to visit and one who was at sea with the Navy. The interviewers were blind to participants' infant attachment classifications.

Before scoring, each interview was typed, compared with the audiotape, and if necessary corrected. Two of the authors who had completed AAI training seminars conducted by Dr. Mary Main served as coders. Inter-rater agreement was assessed using 25 of 50 transcripts. Agreement for this sample on the three major attachment classification was 84%, $kappa = .72$, $p < .001$. The distribution of AAI classifications was 25 (50%) secure, 16 (32%) insecure dismissing, and 9 (18%) insecure preoccupied. One participant in each group was classified unresolved.

Negative Life Events. One of the cornerstones of Bowlby's theory is that attachment related expectations and working models remain open to revision in light of changes in the availability and responsiveness of secure base figures. That is, attachment theory predicts both stability under ordinary circumstances and change when negative life events alter caregiver behavior. In order to test the hypothesis that changes in attachment classification would be related to negative life events, we obtained a score on negative life events from each participant's AAI transcript. Negative life events were defined as: (1) loss of a parent, (2) parental divorce, (3) life threatening illness of parent or child (e.g. diabetes, cancer, heart attack), (4) parental psychiatric disorder, and (5) physical or sexual abuse by a family member. The coders who counted negative life events did so without knowledge of the participants' Strange Situation or AAI classification and without training in the AAI scoring system. In order to allow time for the impact of such events to be reflected in the AAI, we limited the counts to events that had occurred before age 18.²

RESULTS

As hypothesized, early attachment security with mother was significantly related to AAI attachment security 20 years later (see Table 1). Using three classifications at each age, 32/50 (64%) of participants were assigned to corresponding classifications in infancy and early adulthood ($kappa = .40$, $p < .005$; $tau = .17$, $p \cong .002$ [AAI dependent])³. Thirty-six out of 50 participants (72%) received the same classification using the secure-insecure dichotomy ($kappa = .44$, $p < .001$; $tau = .20$, $p \cong .002$).

Thirty-six percent of the participants changed classification from infancy to early adulthood. Reliability and validity problems with the attachment measures certainly account for some portion of the observed change. Nonetheless, the results also suggest that experiences beyond infancy also play a role in adult security. We examined this by counting the number of attachment-relevant negative life events mentioned in each participant's AAI transcript and relating this to whether the participant retained or changed attachment classification across age. These results are presented in Table 2. When mothers reported no stressful life events, attachment stability (3 groups each age) was 72 % ($kappa = .465$, $p < .009$; tau (AAI dependent) = .23, $p \cong .006$). For the secure versus insecure dichotomy, stability was 78% ($kappa = .525$, $p < .009$; tau (AAI dependent) = .28, $p \cong .003$).

Hierarchical multiple regression analyses were used to determine whether (1) secure and insecure infants were equally likely to change attachment classification, (2) mothers of secure and insecure infants were equally likely to report stressful life events, (3) infants whose mothers reported experiencing stressful life events were more likely to change attachment classification from the initial to the follow-up assessment, and (4) secure versus insecure infants whose mothers report stressful life events are equally likely to change classification. The analyses used stressful life events (presence versus absence), infant attachment classification (secure versus insecure) and their interaction to predict whether infant's attachment classifications (secure versus insecure) changed or remained the same over the course of the study.⁴

After first entering stressful life events, R^2 change for infant classification = .01, $F(2,47) = .50$, $p < .49$). Thus, there was no difference in the likelihood that secure (31%, 9 of 29) and insecure

Table 1
Stability Of Attachment Classifications From Infancy To Adulthood

Adult Attachment Classification (AAI)	Infant Attachment Classification (Strange Situation at 12 months)		
	Secure (B)	Avoidant (A)	Resistant (C)
Secure (F)	20	2	3
Dismissing (D)	6	8	2
Preoccupied (E)	3	2	4

Stability:64 % (3 groups each age) $\kappa = .40, p < .005$ (S/S dependent) = .17, $p \cong .002$ τ (AAI dependent) = .17, $p \cong .002$ 72% (secure versus insecure) $\kappa = .44, p < .001$ (S/S dependent) = .20, $p \cong .002$ τ (AAI dependent) = .20, $p \cong .002$

infants (28.6%, 6 of 21) would change classification from infancy to early adulthood. After first entering infant attachment classification, R^2 change for presence or absence of stressful life events = .09, $F(2,47) = 4.64, p < .037$). Thus, infants whose mothers reported one or more stressful life events were more likely to change attachment classification (44.4%, 8 of 18) than infants whose mothers reported none (21.9%, 7/32). Finally, after both attachment classification and stressful life events were included in the analysis, the interaction term in the analysis was also significant (R^2 change = .14, $F(3,46) = 8.48, p < .006$). Stressful life events were significantly related to the likelihood of a secure infant becoming insecure in early adulthood (66.6% if mother reported one or more events versus 15% if she reported none, $p < .01$) in secure infants. Stressful life events were not significantly

related to classification changes in insecure infants. Among insecure infants whose mothers reported one or more such events, 22% became secure as young adults versus 33.3% if mother reported none ($p < .59$).

Although attachment related stressful life events were most often associated with changes from secure to insecure attachment, this was not always the case. One participant, whose parents responded with consistent sensitive care to the childhood onset of a lifelong illness, changed from insecure to secure. The relationship between life events and attachment patterns across time was not perfect. Eight participants reported significant attachment-related stressful life events and yet retained their infant attachment status in early adulthood. Similarly, nine participants reported no such events and yet changed attachment classification.

Table 2
Relations of Stressful Life Events To Attachment Classifications

<u>Number of Stressful Life Events Reported</u>	<u>Stability and change from 12 months to 21 years</u>	
	<u>Retained AAI security classification</u>	<u>Changed AAI security classification</u>
<u>None</u>		
Total S/S sample (n=32)	25 (78%)	7 (22%)
Secure in S/S (n =20)	17 (85%)	3 (15%)
Insecure in S/S (n =12)	8 (75%)	4 (25%)
<u>One or more</u>		
Total S/S sample (n=18)	11 (61%)	7 (39%)
Secure in S/S (n =9)	3 (33%)	6 (66%)
Insecure in S/S (n=9)	8 (89%)	1 (11%)

DISCUSSION

The present data provide strong evidence for the value of the secure base concept as a conceptualization of attachment relationships in infancy and adulthood. They also support Bowlby's expectation that individual differences can be stable across significant portions of the life span. Finally, they confirm the notion that, throughout childhood, attachment representations remain open to revision in light of real experience.

The success of the secure base concept as a conceptual foundation for both the Strange Situation and the AAI is important support for the notion that early and late relationships have something in common. Moreover, the present stability data support the notion that they are not merely similar in kind but somehow developmentally related. Processes that may be contributing to stability include (1) consistency in caregiver behavior across time, (2) a tendency toward persistence in early cognitive structures, (3) the relatively moderate intensity and low frequency of attachment-related stressful events in this middle-class sample, (4) the effects of individu-

als on their environment, and (5) stabilizing effects of personality trait variables (Waters, Kondo-Ikemura, Posada, & Richters, 1991). This study was designed to stimulate interest and help in the design of research into the roles that such mechanisms play in the consistency of attachment stability over time.

A portion of the change noted in this study is attributable to measurement error. Imperfect scoring agreement introduces approximately 10% error at each age. In addition, a similar amount of error is attributable to the fact that neither the Strange Situation nor the AAI is perfectly reliable; behavior observed in a given assessment may not be entirely representative of the persons typical behavior (see Ainsworth et al. (1978) and Crowell & Treboux (1995) for test-retest data). Correctly estimating these psychometric factors in change is important to understanding our results. It is important to accurately assess both stability and change; it would be a mistake to minimize either. As Vaughn, Egeland, Sroufe, and Waters (1979) emphasized, Bowlby's attachment theory predicts both stability *and* change.

The portion of change in attachment classifications that proved correlated with attachment-related stressful life events provides important support for Bowlby's ideas about (1) the openness to change of attachment representations and (2) the importance of real-world experiences in such change. Research on the mechanisms through which experience leads to change in attachment representations deserves high priority in current attachment research. An important conclusion from this study is that the AAI sensitive enough to experience to serve usefully in such work. The types of events associated with change in attachment security and the underlying mechanisms of change deserve careful analysis in shorter-term longitudinal designs.

Middle class samples offer both advantages and disadvantages. They represent a large segment of the population and are ordinarily accessible, cooperative, and interested in research. This was evident in the fact that each of the participants we recontacted agreed to participate in the AAI. The educational level of middle class participants is also an asset because the AAI makes heavy demands on a wide range of conceptual and verbal abilities. At the same time, stability in middle class samples may reflect more than simply the inherent stability of attachment security. Both a relatively low rate of negative attachment-relevant experiences and social support structures that buffer secure base expectations against such experiences may also contribute to the stability of secure attachment in middle class samples, just as consistent high levels of stressful events contributes to the stability of insecure attachment in disadvantaged samples.

Strong social support structures might reduce the number or impact of negative experiences and thus increase stability; they could also attenuate links between negative experiences that occurred and attachment stability. The best way to address these concerns is to examine both the stability of attachment in other populations and the mechanisms of change in close detail, in order to understand why any participant would stay the same or change. The accompanying studies provide important information about stability and change in populations with very different patterns of caregiving and life events.

REFERENCES

- Ainsworth, M., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.
- Block, J. (1977). Advancing the psychology of personality: Paradigm shift of improving the quality of research? In D. Magnusson & N. Endler (Eds.), *Personality at the crossroads: Current issues in interactional psychology*. Hillsdale, NJ: Erlbaum.
- Colin, V. (1996). *Human Attachment*. Philadelphia: Temple University Press.
- Crowell, J., & Treboux, D. (1995). A review of adult attachment measures: Implications for theory and research. *Social Development*, 4, 294-327.
- Epstein, S. (1978). The stability of behavior: I. On predicting most of the people much of the time. *Journal of Personality and Social Psychology*, 37, 1097-1126.
- George, C., Kaplan, N., & Main, M. (1985). The adult attachment interview. Unpublished manuscript, University of California at Berkeley.
- Main, M., & Goldwyn, R. (1994). Adult attachment rating and classification systems. version 6.0. Unpublished manuscript, University of California at Berkeley.
- Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), *Monographs of the Society for Research in Child Development*, 50, (1-2, Serial No. 209), 66-106.
- Main, M., & Solomon, J. (1986). Discovery of a new, insecure-disorganized/disoriented attachment pattern. In M. Yogman & B. Brazelton (Eds.), *Affective development in infancy*. Norwood, NJ: Ablex.
- Masters, J., & Wellman, H. (1974). Human infant attachment: A procedural critique. *Psychological Bulletin*, 81, 218-237.
- Mischel, W. (1968). *Personality and assessment*. New York: Wiley.

Vaughn, B., Egeland, B., Sroufe, L., & Waters, E. (1979). Individual differences in infant-mother attachment: Stability and change in families under stress. *Child Development*, *50*, 971-975.

Waters, E. (1978). The reliability and stability of individual differences in infant-mother attachment. *Child Development*, *49*, 483-494.

Waters, E., Kondo-Ikemura, K., Posada, G., & Richters, J. (1991). Learning to love: Mechanisms and milestones. In M. Gunnar & L.A. Sroufe (Eds.) *Minnesota Symposium on Child Psychology* (Vol. 23: Self Processes and Development), 217-255.

FOOTNOTES

1. Each participant was classified by two independent coders (Everett Waters, Alan Sroufe, Brian Vaughn, and/or Dante Cicchetti). Eighteen-month data were scored without knowledge of 12-month classifications.

2. To determine whether results were specific to this method of ascertaining stressful life events, we examined events reported by checklist one year later. Forty-seven completed a checklist of life events that included all of the events identified in the AAIs. This method depends less on free-recall, the manner in which interview questions are posed, the participant's state of mind, and the amount of material produced in the AAI. These data are relevant to the present study and to the accompanying studies that obtained life events from the AAI. Participants were divided into those reporting none and those reporting one or more of the target experiences. The one or greater criterion was set *a priori* on the basis that all of the target experiences would be considered major life events in current research on stress and coping; each has the potential, on its own, to change expectations about caregiver availability and responsiveness.

Agreement on life events classification (none versus one or more) by AAI and checklist was 78.7%, $kappa=.57$, $p<.002$). Twenty-two participants were classified "none" and 15 were classified "one or more" by both methods. Eight were classified "one or more" by the checklist but "none" by the AAI. Two were classified "one or more" by the AAI but none by the checklist.

3. Cohen's $kappa$ is computed from (a) the maximum level of agreement possible (100%), (b) the proportion of concordant cases (in the diagonal cells) expected by chance (from cross-multiplying marginals), and (c) the observed proportion of agreements. $Kappa$ is equal to the proportion of possible agreement over and above chance that is actually obtained. In addition to the significance test associated with $kappa$, the statistic itself can be construed as an indication of effect size. In order to determine whether any of the present results are specific to the statistic used, we also report, where appropriate, an alternative concordance index (Goodman & Kruskal's tau , via SPSS) based on a different model of chance agreement levels. When computed with AAI dependent, tau reflects the proportional reduction in error when Strange Situation classification is used to predict AAI classification. Complete data from which other indices can be computed are included in tables.

4. The results in Table 2 also suggest hypotheses about changes from insecure to secure attachment in the absence of stressful life events. These deserve to be pursued with appropriate statistical power in a larger sample or meta-analysis of data from several studies. Independent assessment of stressful life events and caregiver-child interaction at several points between the initial and follow-up attachment assessments would also be useful.