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# Stability and Transmission of Attachment across Three Generations

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BENOIT, DIANE, and PARKER, KEVIN C. H. *Stability and Transmission of Attachment across Three Generations*. CHILD DEVELOPMENT, 1994, 65, 1444–1456. Stability of adult attachment and transmission of attachment across 3 generations were examined in a longitudinal study of 96 infants, mothers, and maternal grandmothers. The Adult Attachment Interview (AAI) was used to assess attachment in mothers (during pregnancy and when infants were 11 months old) and grandmothers (any time during the study). The Strange Situation (SS) was used to assess attachment in infants at 12 months. Both the 3- and 4-category classification systems of the AAI and SS were used. Mothers' AAI classifications were stable over 12 months in 90% (3-category) and 77% (4-category) of mothers. Mothers' AAI classifications during pregnancy predicted infants' SS classifications in 81% (3-category) and 68% (4-category) of cases, and grandmothers' AAI classifications in 75% (3-category) and 49% (4-category) of cases. Using log-linear analysis, we show that a simple parent-to-child model accounts for transmission of attachment.

Bowlby (1969/1982) suggested that *internal working models* are dynamic mental processes that influence an individual's affect, behavior, and perceptions of the self, others, and relationships. He also contended that working models have a propensity for stability within individuals and across generations. One of the major methodological breakthroughs in attachment research was the development of empirical means for "measuring" working models of attachment in infants, using the Strange Situation (SS; Ainsworth, Blehar, Waters, & Wall, 1978), and *states of mind* with respect to attachment in adults, using the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985).

The scoring system of the AAI is similar to that of the SS in that *patterns* of responses are considered to categorize an adult's *state of mind* with respect to attachment. In other

words, the scoring of the AAI relies primarily on qualitative aspects of the adult's descriptions rather than on factual information provided by the adult. Based on patterns of responses to the AAI, the adult's state of mind is then classified as *autonomous*, *dismissing*, *preoccupied*, or *unresolved*.

Adults classified as autonomous are generally thoughtful, value attachment experiences and relationships, and freely examine the effects past experiences have had on personal development. They either provide balanced, noncontradictory descriptions of one or both parents as loving during childhood, or if they had unfortunate experiences such as rejection, role reversal, or abuse, they have convincingly forgiven their parent(s) for the maltreatment.

Individuals classified as dismissing tend to dismiss attachment experiences as unimportant in influencing their personal devel-

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[*Child Development*, 1994, 65, 1444–1456. © 1994 by the Society for Research in Child Development, Inc. All rights reserved. 0009-3920/94/6505-0003\$01.00]

opment and their approach to their own children. They may insist that they cannot remember early events. The memories they do recall often contradict or fail to support their generally idealized descriptions of early experiences.

Individuals classified as preoccupied are often entangled with their early experiences and relationships with their family. They rarely have difficulty remembering early events but have difficulty presenting a coherent and succinct report of childhood experiences. They may be still dependent upon their parents and want to please them inordinately. Some preoccupied individuals may still be intensely angry with their parents.

The discourse of individuals classified as unresolved may show characteristics of any of the three other classifications but a primary unresolved classification is assigned when there is evidence of significant lapses in *metacognitive monitoring* of discourse or reasoning processes when discussing loss or trauma (Main & Hesse, 1990). These lapses may take the form of confusion or disorientation when loss of a loved one through death or experiences of sexual and/or physical abuse are discussed. Reports of behavioral disorganization in response to loss or trauma are also considered for unresolved classification (Main & Hesse, 1990).

Studies that have used both the AAI and the SS have documented an impressive 66%–82% correspondence between patterns of mothers' responses to the AAI and patterns of infants' behavior toward the mothers in the SS, whether the data are examined prospectively, retrospectively, or concurrently (Fonagy, Steele, & Steele, 1991; Grossmann, Fremmer-Bombik, Rudolph, & Grossmann, 1988; Main & Goldwyn, 1984, in press; Main, Kaplan, & Cassidy, 1985; Zeanah et al., 1993). The specific adult-infant pairings are: autonomous-secure, dismissing-avoidant, preoccupied-resistant, and unresolved-disorganized/disoriented.

Findings from these studies provide indirect evidence of the validity and cross-generational stability of adults' states of mind with respect to attachment. Nonetheless, the psychometric properties of the AAI (unlike those of the SS) are still unclear. Specifically, there are no published reports on the stability of AAI classifications within individuals. However, Ward, Carlson, and Altman (1992) recently presented preliminary data on 18 adolescent mothers indicating a

78% correspondence between AAI classifications during pregnancy and about 18 months later (using the four-category classification system). In addition, a correspondence between mothers' and their own mothers' AAI classifications has never been documented. Finally, studies that have examined the transmission of attachment across generations have been limited to two generations (parent and infant).

The present study contributes to our understanding of the AAI in three ways. First, it examines the stability of AAI classifications within individuals, from pregnancy to 11 months after delivery, in a stable, middle-to upper-middle-class sample. Second, it examines the correspondence between mothers' and their own mothers' attachment classifications. Finally, it explores the transmission of patterns of attachment across *three* generations.

Four a priori predictions were made. First, we predicted that AAI classifications in adult women would be stable over a 12-month period that included pregnancy, delivery, and early child rearing. Second, we predicted that patterns of attachment relationships would be transmitted not only from mother to infant, but also from maternal grandmother to mother. Third, we predicted that patterns of attachment relationships would be transmitted across three generations (i.e., cross-generational stability). Specifically, we predicted the following correspondence among the attachment classifications of grandmothers, mothers, and infants: autonomous-autonomous-secure; dismissing-dismissing-avoidant; or preoccupied-preoccupied-resistant. No a priori prediction was made with respect to the association between grandmothers' unresolved classification and maternal and infant classifications. Lastly, we predicted that maternal attachment classifications, assessed during pregnancy using the AAI, would predict infant SS attachment classifications at 12 months.

## Method

### *Subjects and Procedures*

One hundred and ten expectant mothers were recruited from several sources: (a) local childbirth education classes (a brief description of the project was presented and flyers describing the project and inviting participation were distributed); (b) local children's and maternity clothing stores (flyers were left); (c) physicians' offices (fly-

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ers were left); and (d) newspaper articles and advertisements inviting participation. Criteria for inclusion were that the expectant mother be at least 18 years old and have an uncomplicated pregnancy and that her mother agree to participate in the study.

Of these 110 mothers, 14 (13%) either miscarried or decided not to participate after more information about the project was provided. Of the 96 remaining mothers, 12 (13%) completed only parts of the study. The reasons given for dropping out of the study ranged from one mother giving her baby up for adoption to time constraints and moving away. Parking, transportation, and babysitting expenses incurred as a result of the study were reimbursed when requested. For many cases, one or two data points are missing, as the *ns* reported in the tables reflect. All analyses were performed with all subjects for whom data were available on the measures being used in the analyses.

During an initial meeting, informed consent and general demographic information were obtained from the 96 mothers of the final sample.<sup>1</sup> The mothers were interviewed twice with the AAI: once during the last month of pregnancy and once 2 to 4 weeks before they were seen with their 12-month-old infants in the SS.

The maternal grandmothers were interviewed at any time during the course of the study (i.e., whenever they were available) after informed consent was obtained. Interviews with the mothers and grandmothers were conducted in the lab or in the subjects' homes. However, eight grandmothers who lived out of town and were not expected to visit during the course of the study were interviewed over the telephone. Using MANOVA, there were no statistically significant differences between grandmothers interviewed on the telephone and those interviewed in person on measures of education, age, and income. Attachment was not significantly different between these two groups of grandmothers ( $\chi^2 = 1.9$ ,  $df = 3$ , N.S.). Thus, data from the grandmothers interviewed on the telephone were included in analyses. Of the 96 grandmothers who agreed to participate in the study at the time

of recruitment, 15 (16%) later decided against participation and were not interviewed.

All subjects were Caucasian. As seen in Table 1, most mothers were married and from stable, middle- to upper-middle-class backgrounds. The infants were healthy newborns and about half were firstborn and about half were boys. There were no significant differences in socioeconomic status, maternal age, and education between mothers who completed the study and those who did not.

### Measures

*Adult Attachment Interview (AAI; George et al., 1985).*—This 1-hour structured interview inquires about an adult's recollection and evaluation of early attachment experiences. The interview is audiorecorded, and verbatim transcripts are then rated using 14 9-point scales to measure the adult's *probable experience* with each attachment figure during childhood (three scales) and his or her current *state of mind* with regard to attachment (11 scales).

Interrater reliability was examined in two ways. First, one coder scored all transcripts and a second coder scored 32 randomly selected transcripts from this study (20 AAIs from grandmothers and 12 from mothers). Both coders were blind to (a) the AAI classification of the other member of the grandmother-mother dyad they were coding and (b) infants' SS classifications. The coders scored an additional 10 transcripts from a study of infant-mother attachment conducted by the second coder and were blind to the infants' attachment classifications in this second study. Both raters have been trained by Mary Main in the scoring of the AAI.

For the 32 transcripts of this study, interrater agreement was 66% and 78% for the major classifications in the three- and four-category systems, respectively, compared to 33% and 30% expected by chance alone ( $\kappa = .49$  and  $.69$ ). Interrater agreement in the second sample was 100% and 90%, compared to 58% and 62% expected by chance alone ( $\kappa = 1.00$  and  $.74$ ). Com-

<sup>1</sup> Other procedures and questionnaires were used during this visit and on subsequent visits during the study period, but they are not reported here. They include interviews inquiring about social support, maternal perceptions of their infant and their relationship with the infant, observations of maternal and infant behavior and mother-infant interactions in a variety of contexts, and questionnaires about marital satisfaction, life stresses, maternal self-esteem, infant development, and temperament.

TABLE 1  
CHARACTERISTICS OF THE SAMPLE

	M	SD	Range	%
Mothers (N = 96):				
Age (years) .....	29.17	4.08	20–39	...
Education (years) .....	15.58	2.99	9–27	...
SES computed score .....	44.52	13.57	14–66	...
% Married .....	...	...	...	98
Infants (N = 96):				
Gestational age (weeks) .....	40.19	1.87	34.5–43.0	...
Birthweight (kilograms) .....	3.56	.53	2.3–4.6	...
% Firstborn .....	...	...	...	46
% Male .....	...	...	...	55
Maternal grandmothers (N = 81):				
Age (years) .....	57.26	7.68	41–75	...
Education (years) .....	13.24	3.48	5–23	...
Marital status:				
% Married .....	...	...	...	77
% Widowed .....	...	...	...	13

bined interrater agreement for the three- and four-category systems on the 42 transcripts was 74% and 83%, respectively, compared to 33% and 35% expected by chance alone ( $\kappa = .61$  and  $.74$ ). The coders resolved differences in coding major classifications by discussion, and the consensus classification was used for data analysis.

*Strange Situation (SS; Ainsworth et al., 1978).*—This is a well-known laboratory paradigm consisting of a series of 3-min episodes designed to be increasingly stressful for 12–18-month-old infants. The procedure was videotaped and infant behaviors were coded using four 7-point anchored rating scales for proximity seeking, contact maintaining, avoidance, and resistance and one 9-point anchored rating scale for disorganization (Main & Solomon, 1986, 1990).

Based on patterns of infant behavior directed toward the caregiver, the quality of infant-caregiver attachment was classified into one of four categories: secure, avoidant, resistant, or disorganized/disoriented. In the three-category version of the SS, infants classified as disorganized/disoriented are force-classified into one of the other three categories. The reliability and validity of this procedure have been well documented in numerous investigations. Both raters received training in the coding of the SS from Alan Sroufe and Mary Main.

Interrater reliability was established in two ways. First, one coder who was blind to the grandmothers' and mothers' attachment classifications scored all procedures. An-

other coder, also blind to the grandmothers' and mothers' attachment classifications, rated 28 randomly selected procedures. Interrater agreement was 81% and 82% for the three- and four-category systems, respectively, compared to 71% and 50% expected by chance alone ( $\kappa = .37$  and  $.64$ ). The low  $\kappa$  value (.37) in the context of 81% agreement (three-category system) is due to the fact that 74% of infants in this subsample were classified as secure by both coders. An additional 10 SS procedures from a study examining infant-father attachment in the same sample were coded by the two coders, who were blind to the fathers' attachment classifications. Interrater agreement was 100% and 90% for the three- and four-category systems, respectively, compared to 54% and 51% expected by chance alone ( $\kappa = 1.00$  and  $.81$ ). Thus, interrater agreement (obtained on a total of 38 SS procedures) was 86% and 84% for the three- and four-category systems, respectively, compared to 66% and 48% expected by chance alone ( $\kappa = .61$  and  $.69$ ).

## Results

First, we present the results pertaining to the stability of the AAI classifications within mothers over a 12-month period. In the second section, we examine the transmission of attachment across generations. The AAI and SS data are presented in two ways: (a) the four-category classification system produced by including the AAI unresolved and SS disorganized/disoriented

TABLE 2

## STABILITY OF MOTHER'S AAI FOUR- AND THREE-CATEGORY CLASSIFICATIONS

11-MONTH AAI CLASSIFICATIONS	PREGNANCY AAI CLASSIFICATIONS								TOTAL	
	Autonomous		Dismissing		Preoccupied		Unresolved			
	N	(N)	N	(N)	N	(N)	N	(N)	N	(N)
Autonomous .....	38	(57)	1	(1)	1	(2)	3	(-)	43	(60)
Dismissing .....	0	(0)	4	(6)	0	(0)	0	(-)	4	(6)
Preoccupied .....	1	(2)	1	(3)	5	(13)	1	(-)	8	(18)
Unresolved .....	7	(-)	3	(-)	1	(-)	18	(-)	29	(-)
	46	(59)	9	(10)	7	(15)	22	(-)	84	(84)

NOTE.—Values in parentheses are for the three-category system. Observed match = 77% (90%) vs. 38% (55%) expected by chance alone. Kappa = .63 (.79),  $p < .001$  ( $p < .002$ ). Chi-square = 104.38 (101.10),  $df = 9$  (4),  $p < .001$  (.001). Cramer V = .64 (.78).

classifications, and (b) the original three-category classification system.

#### Stability of AAI Classifications within Individuals

As seen in Table 2, 84 mothers responded to the questions of the AAI both during pregnancy and about 12 months later. When the four-category classification system is used, the concordance between maternal classifications obtained at pregnancy and 12 months later is 77%, compared to 38% expected by chance alone ( $\chi^2 = 104.38$ ,  $df = 9$ ,  $p < .001$ , kappa = .63). With one less category, both the observed and expected concordance rates should increase. Indeed, the three-category AAI classifications obtained during pregnancy remained stable 12 months later in 90% of the mothers, compared to 55% expected by chance alone ( $\chi^2 = 101.10$ ,  $df = 4$ ,  $p < .001$ , kappa = .79).

#### Transmission of Attachment across Generations

**Grandmother-mother.**—The concordance between grandmothers' and mothers' attachment classifications was examined in the 81 dyads for whom data were available. As seen in Table 3, the concordance between mothers' AAI classifications during pregnancy and their own mothers' AAI classifications was significant when the data were examined using the three-category classification system ( $\chi^2 = 43.95$ ,  $df = 4$ ,  $p$

$< .001$ , kappa = .51,  $p < .05$ ) but not when the four-category classification system was used ( $\chi^2 = 25.09$ ,  $df = 9$ ,  $p < .003$ , kappa = .18, N.S.).<sup>2</sup> Note that 44 grandmothers (54%), compared to 24 mothers (30%), were classified as unresolved, and 23 of the unresolved grandmothers had autonomous daughters. Both the three- and four-category chi-squares are significantly different from the expected values. The three-category kappa is significantly different from zero but not the four-category kappa. The failure of the four-category kappa is due to the large number of unresolved grandmothers with autonomous daughters.

**Mother-infant.**—The concordance between mother and infant attachment classifications was examined prospectively (pregnancy AAI and SS) on 88 mother-infant dyads (three infants with a primary disorganized/disoriented classification were dropped from the three-classification analyses because their behavior in the SS was unclassifiable using the three-classification system) and concurrently (11-month AAI and SS) on 82 mother-infant dyads.

As seen in Table 4, there was a 68% match (vs. 41% expected by chance alone) between pregnancy AAI and infant SS when the prospective data of mother-infant dyads were examined with four classifications ( $\chi^2 = 56.60$ ,  $df = 9$ ,  $p < .001$ , kappa = .46).

<sup>2</sup> Mothers' pregnancy AAIs were used for data analysis because more pregnancy than 11-month AAIs were available ( $n = 81$  vs.  $n = 74$ ). The concordance between mothers' (11-month) and their own mothers' AAI classifications was significant when the data were examined using the three-category classification system ( $\chi^2 = 34.93$ ,  $df = 4$ ,  $p < .001$ , kappa = .49,  $p < .001$ ) but not when the four-category classification system was used ( $\chi^2 = 18.38$ ,  $df = 9$ ,  $p < .031$ , kappa = .14, N.S.).

TABLE 3

CORRESPONDENCE BETWEEN MATERNAL GRANDMOTHERS' AAI AND MOTHERS' (Pregnancy) AAI CLASSIFICATIONS, FOUR- AND THREE-CATEGORY SYSTEMS

MOTHERS' AAI CLASSIFICATIONS	MATERNAL GRANDMOTHERS' AAI CLASSIFICATIONS								TOTAL	
	Autonomous		Dismissing		Preoccupied		Unresolved		N	(N)
	N	(N)	N	(N)	N	(N)	N	(N)	N	(N)
Autonomous .....	16	(45)	2	(8)	0	(3)	23	(-)	41	(56)
Dismissing .....	3	(3)	4	(5)	1	(2)	1	(-)	9	(10)
Preoccupied .....	2	(3)	0	(1)	1	(11)	4	(-)	7	(15)
Unresolved .....	5	(-)	1	(-)	2	(-)	16	(-)	24	(-)
	26	(51)	7	(14)	4	(16)	44	(-)	81	(81)

NOTE.—Values in parentheses are for the three-category classification system. Observed match = 46% (75%) vs. 34% (49%) expected by chance alone. Kappa = .18 (.51), N.S. ( $p < .05$ ). Chi-square = 25.09 (43.95),  $df = 9$  (4),  $p < .003$  (.001). Cramer V = .32 (.52).

TABLE 4

CORRESPONDENCE BETWEEN MOTHERS' (Pregnancy) AAI AND INFANTS' SS CLASSIFICATIONS, FOUR- AND THREE-CATEGORY SYSTEMS

INFANTS' SS CLASSIFICATIONS	MOTHERS' (Pregnancy) AAI CLASSIFICATIONS								TOTAL	
	Autonomous		Dismissing		Preoccupied		Unresolved		N	(N)
	N	(N)	N	(N)	N	(N)	N	(N)	N	(N)
Secure .....	40	(56)	4	(4)	0	(0)	8	(-)	52	(65)
Avoidant .....	0	(1)	2	(4)	1	(1)	1	(-)	4	(6)
Resistant .....	1	(3)	1	(2)	4	(9)	1	(-)	7	(14)
Disorganized .....	7	(-)	2	(-)	2	(-)	14	(-)	25	(-)
	48	(60)	9	(10)	7	(15)	24	(-)	88	(85)

NOTE.—Values in parentheses are for the three-category systems, without the adult unresolved and the infant disorganized/disoriented classifications. Observed match = 68% (81%) vs. 41% (58%) expected by chance alone. Kappa = .46 (.55),  $p < .05$  (.05). Chi-square = 56.60 (47.59),  $df = 9$  (4),  $p < .001$  (.001). Cramer V = .46 (.53).

The match between maternal and infant classifications increased to 81% (vs. 58% expected by chance alone) when the three-category classification system was used ( $\chi^2 = 47.59$ ,  $df = 4$ ,  $p < .001$ , kappa = .55).

The concordance rates between maternal AAI and infant SS attachment classifications measured concurrently (about 2 weeks apart) was 74% (vs. 41% expected by chance;  $\chi^2 = 71.20$ ,  $df = 9$ ,  $p < .001$ , kappa = .56) with the four-classification system and was 82% (vs. 58% expected by chance alone;  $\chi^2 = 49.17$ ,  $df = 4$ ,  $p < .001$ , kappa = .57) with the three-classification system.

There were no statistically significant

effects of infant birth order or sex on SS classifications.

*Grandmother-mother-infant.*—Data from 77 grandmother-mother-infant triads were available and were used for analysis.<sup>3</sup> Figure 1 illustrates the complete distribution of three-category attachment classifications among the members of the 77 triads. In order to develop a statistical model of the transmission of attachment from one generation to the next, we used data from the three-category classification system. We began with a model consisting of a 3 × 3 × 3 (grandmother × mother during pregnancy × infant three-category attachment) matrix

<sup>3</sup> Results of analyses using data from mother's pregnancy AAIs are presented because more maternal AAIs (in the context of three-generational data) were available during pregnancy than at 11 months ( $n = 77$  vs.  $n = 74$ ).

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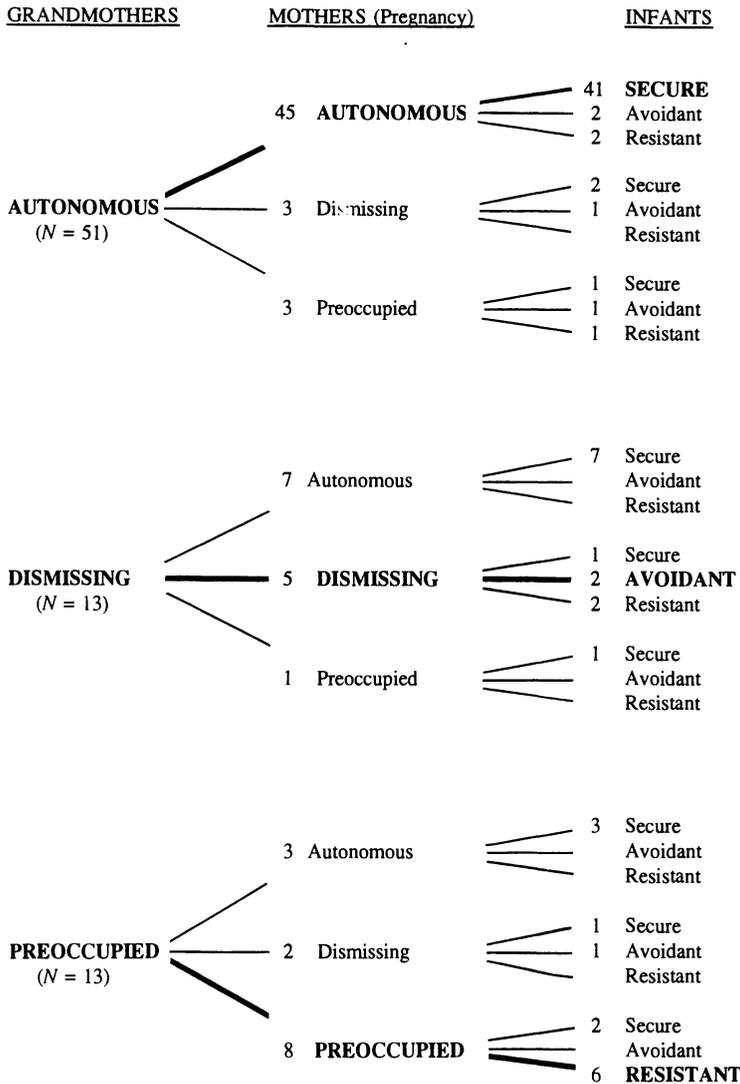


FIG. 1.—Transmission of attachment across three generations (N = 77)

containing 27 cells. The values in the 27 cells correspond to the values in the final numeric column of Figure 1. The use of the three-category classification system was driven by the obvious sparseness of the data, with 77 triads dispersed amongst 27 cells for a mean cell frequency of 2.85. With 64 cells, the cell frequency would drop to 1.2.<sup>4</sup> Using log-linear analysis, we added predictive information in a stepwise cumulative manner until the distribution of observations among the 27 cells was predicted with no significant departure from goodness of fit.

In stage one, the distribution of the tri-

ads was predicted using the simple distribution of attachment in each of the three triad members: grandmother, mother (pregnancy), and child. This model assumes that there is no significant relationship between one generation's attachment and that of any other. The predicted values were significantly different from the observed values for both the three-category (likelihood ratio  $\chi^2 = 73.21$ ,  $df = 20$ ,  $p < .001$ ) and the four-category (likelihood ratio  $\chi^2 = 94.18$ ,  $df = 54$ ,  $p < .001$ ) classification systems. This suggests a significant failure of the predictive model. When the mothers' 11-month AAI classifications are used, comparable results

<sup>4</sup> The four-category data will be made available upon request to the first author.

are obtained for both the three-category (likelihood ratio  $\chi^2 = 70.3$ ,  $df = 20$ ,  $p < .001$ ) and the four-category (likelihood ratio  $\chi^2 = 95.6$ ,  $df = 54$ ,  $p < .001$ ) classification systems.

In stage two, the distribution of triads was predicted using the assumption that the mother's attachment classification during pregnancy has a significant impact on the child's attachment classification. This applies from grandmother to mother, and from mother to infant. This model assumes that any attachment correspondence between grandmother and infant is an indirect effect mediated through the mother. There was no significant difference between the predicted and observed values for the three-category (likelihood ratio  $\chi^2 = 11.05$ ,  $df = 9$ , N.S.) and four-category (likelihood ratio  $\chi^2 = 30.61$ ,  $df = 22$ , N.S.) classification systems. This indicates that the predictive model is successful.

Note that when mothers' 11-month AAI classifications were used in stage two, there was no significant difference between the predicted and observed values for the three-category classification system (likelihood ratio  $\chi^2 = 5.01$ ,  $df = 9$ , N.S.), but there was for the four-category system (likelihood ratio  $\chi^2 = 19.78$ ,  $df = 10$ ,  $p < .05$ ). However, these significant results are considered to be untrustworthy because more than half of the grandmothers were classified as unresolved and more than one-third were classified as autonomous, leaving 11 subjects distributed among 32 cells. The extreme sparseness of the data renders the chi-square values questionable at best.

Information limited to the distribution of attachment classifications *within* generations fails to account for the joint distribution of attachment classifications *across* generations. However, the knowledge of the joint distribution of attachment classifications of mother and child (i.e., both the grandmother-mother classification and mother-infant classification) is sufficient to explain the distribution of the entire data set, including the correspondence between grandmother and infant classifications, as well as among all three generations. In other words, when the pattern of relationships between grandmothers and mothers or else between mothers and infants is known, one can infer all the other relationships among the family members to the limit of the accuracy of the data.

Figure 2 illustrates this point using the four-category classification systems of the AAI and SS. Indeed, one can see how the prediction of the infant's actual attachment classification improves when the mother's attachment classification is known by comparing the base rate and the actual rate. For example, the base rate indicates that 28%, 59%, 5%, and 8% of infants in this sample should be classified as disorganized/disoriented, secure, avoidant, and resistant, respectively. However, compared to the expected base rates, infants of unresolved mothers are 2.07 times more likely to be classified as disorganized, 1.79 times less likely to be classified as secure, 1.25 less likely to be classified as avoidant, and 2.00 times less likely to be classified as resistant. Similarly, compared to the expected base rates, infants of autonomous mothers are 1.86 times less likely to be classified as disorganized/disoriented, 1.41 times more likely to be classified as secure, and 4.00 times less likely to be classified as resistant (no infants of autonomous mothers were classified as avoidant when the four-category classification system was used). Compared to expected base rates, infants are 4.40 times more likely to be classified as avoidant when their mothers are classified as dismissing, and are 7.13 times more likely to be classified as resistant when their mothers are classified as preoccupied.

## Discussion

An important finding from this study is that maternal AAI classifications remained stable from pregnancy to 11 months after delivery in 90% and 77% of cases when the three- and four-category classification systems were used, respectively. These findings suggest that states of mind with respect to attachment are very stable during adulthood. Although the high rate of stability may reflect, in part, the skew in our sample of the distribution of attachment classifications toward security, the preoccupied classification was stable (87% and 71% using the three- and four-classification systems, respectively). Similarly, 76% of mothers classified as unresolved during the pregnancy were also classified as unresolved 12 months later. The dismissing classification was less stable within mothers in our sample (60% and 44% using the three- and four-classification systems, respectively).

Possible mediators of stability within individuals of three-category adult attachment were examined in the 64 mothers for whom

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MOTHERS (pregnancy)	Actual Concordance Rate	INFANTS	Base Rate
UNRESOLVED	.58	<b>DISORGANIZED</b>	.28
	.33	Secure	.59
	.04	Avoidant	.05
	.04	Resistant	.08
AUTONOMOUS	.15	Disorganized	.28
	.83	<b>SECURE</b>	.59
	.00	Avoidant	.05
	.02	Resistant	.08
DISMISSING	.22	Disorganized	.28
	.44	Secure	.59
	.22	<b>AVOIDANT</b>	.05
	.11	Resistant	.08
PREOCCUPIED	.29	Disorganized	.28
	.00	Secure	.59
	.14	Avoidant	.05
	.57	<b>RESISTANT</b>	.08

FIG. 2.—Prediction of infants' four-category SS attachment classifications from base rates and actual concordance rates ( $N = 85$ ).

complete data sets were available. Questionnaire and interview measures of possible mediators of stability, including life stresses, social support, self-esteem, and marital satisfaction, were obtained during pregnancy and 12 months later. We found no significant mediators of stability of adult attachment among these variables. The most likely cause for these negative findings was the low power of any statistic measuring change in the context of high stability. Only five of the 64 subjects in this subsample changed attachment classification over 12 months, leaving little scope for measurement and

analysis of change. Populations at risk for unstable adult attachment should be sought and studied in order to assess the nature and impact of mediators of stability.

The mothers' four-category classification data (reported in Table 2) show interesting phenomena related to the stability of the unresolved classification. There were 19 changes in attachment classification over a period of 12 months (from pregnancy to 11 months after delivery). Of these, 11 were changes to become unresolved and four were changes to cease to be unresolved.

Thus, 79% of the changes in attachment involved the unresolved classification. The other three classifications (autonomous, dismissing, and preoccupied) were involved in 13, 5, and 5 changes, respectively. This observed distribution of changes is significantly different from what would be expected given the underlying distribution of attachment classifications ( $\chi^2 = 20.3$ ,  $df = 3$ ,  $p < .001$ ). Each of the three insecure attachment classifications is overrepresented by a factor of 2. The autonomous classification is underrepresented by a factor of 2.

The AAI transcripts and scores of the 15 subjects who had a change involving the unresolved classification between pregnancy and 11 months were reexamined. Specifically, the number of losses reported and the scores on the Lack of Resolution of Mourning and Lack of Resolution of Trauma scales obtained at pregnancy and 12 months later were compared. Of the four mothers who were first classified as unresolved, one reported a loss at pregnancy but did not report that loss 12 months later, one showed disorientation when discussing the loss at pregnancy but not at 11 months, and two moved from a score of 6 at pregnancy to a score of 5 at 11 months on both the Lack of Resolution of Mourning and the Lack of Resolution of Trauma scales (a score higher than 5 on each of these scales is required for an unresolved classification).

Among the 11 subjects who moved to an unresolved classification at 11 months, no specific pattern could be identified. Three subjects (all classified as autonomous at pregnancy and unresolved at 11 months) experienced a loss shortly after the first AAIs were conducted. One subject (originally classified as dismissing) received an unresolved classification at 11 months after discussing a loss she had not reported at the pregnancy interview. The other seven subjects clearly warranted an unresolved classification at 11 months but not at pregnancy even though they discussed the same losses at both interviews.

In summary, although our data show evidence for the stability of attachment classifications within individuals, the stability rests primarily in the autonomous classification, while insecure classifications are four times as likely to be involved in changes. The determination of unresolved classifications seems to depend on a number of factors. Such factors may be subject-related (e.g., whether the subject reports the loss

and trauma warranting an unresolved classification), interviewer-related (e.g., whether the interviewer probes as extensively as necessary for every death and trauma), rater-related, and system-related.

Our data on the stability of AAI classification within individuals suggest that unresolved status may be quite unstable within some individuals, although the reasons for this remain unclear. Further, the unresolved classification is only weakly predictive across generations.

The finding that 54% of grandmothers, compared to 30% of mothers, were classified as unresolved was somewhat unexpected, although not surprising in hindsight. This finding may reflect the fact that, by virtue of their older age, the grandmothers have experienced more losses, including losses of significant attachment figures such as parents and spouses. In fact, the grandmothers in our sample experienced almost twice as many losses as their daughters ( $M_{\text{grandmothers}} = 4.062$ ,  $SD = 1.826$  vs.  $M_{\text{mothers}} = 2.340$ ,  $SD = 1.695$ ; paired  $t = 7.683$ ,  $df = 80$ ,  $p < .001$ ). The individuals lost through death were often one or both parents, siblings, spouses, and even children. The number of losses through death, combined with the significance of the individuals lost, seem to make older adults more prone to unresolved mourning.

The AAI scoring system does not allow for the determination of when the grandmothers became unresolved following the loss or trauma that led to the unresolved classification. It would be interesting to discover whether the correspondence between grandmothers' and mothers' attachment classifications would be affected if one knew when the grandmothers became unresolved. This observation is especially pertinent when examining the transmission of attachment patterns across generations and it also raises questions about the applicability and meaning of unresolved classifications in older adults (especially unresolved mourning which seems to be so prevalent in the older adults in our sample). Indeed, one could argue that "being" unresolved while raising one's children might impact the children, quality of caregiving, and transmission of attachment across generations quite differently from "becoming" unresolved later in life. Future research should examine these questions and look for possible factors that might place individuals at risk for or

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protect them against unresolved mourning and trauma.

Because the presence of an unresolved classification is dependent on the occurrence of a *specific event* (loss or trauma) in a person's life, one should not expect the unresolved status per se to be transmitted across generations. Whereas the other three classifications (autonomous, dismissing, and preoccupied) assess states of mind with respect to attachment, the unresolved status may be more properly described as a reaction to a specific event in one's life. Indeed, unless the specific event leading to the unresolved status in one individual was shared and similarly experienced by another individual, the impact of the event is not likely to be transmitted from one generation to the next. Further, the event leading to an unresolved status is located in time; once it has occurred, there is no other necessary connection in time between when the event occurred and when the person achieved unresolved status. In the end, while unresolved status in caregivers predicts disorganization in their infants, the absence of a specific event precludes the development of unresolved status. The question of whether and how disorganization in infancy predisposes to unresolved classification later in life should be addressed in future research.

It is worth noting that most of our subjects were from intact, middle- to upper-middle-class families. As was demonstrated with SS classifications in infants from families under stress (Vaughn, Egeland, Sroufe, & Waters, 1979), it is possible that AAI classifications of adults from more stressed and impoverished backgrounds would be less stable.

Nonetheless, our finding of 90% stability of AAI three-category classifications over 12 months in this middle-class sample is compelling. The 90% stability is in keeping with the 73%–96% stability reported in studies examining the stability of SS three-category classifications in middle- to upper-middle-class samples (Main & Weston, 1981; Waters, 1978, 1983). Together, the findings from these and the present study provide strong empirical evidence for Bowlby's (1969/1982) contention that working models of attachment have a propensity for stability within individuals.

Another important finding from this study is that when the three-category systems are used, the mother's AAI classification obtained during pregnancy successfully

predicted her infant's SS classification at infant's age 12 months in 82% of cases. This impressive concordance is somewhat higher than the 66% match recently reported by Fonagy and colleagues (1991), also using the three-category systems. The discrepancy between our results and those of Fonagy et al. is quite consistent with the difference in the distribution of three-category attachment classifications in the two samples. More mothers were classified as autonomous in our sample (71%) than in Fonagy et al.'s (61%). Such increased skew toward the largest classification tends to increase stability as a statistical artifact. Using log-linear analysis, we tested the correspondence between Fonagy et al.'s matrix of mother-child attachment and our own. When the different distribution of attachment classifications in the two studies is taken into account, there is no significant difference between the two matrices (likelihood ratio  $\chi^2 = 4.35$ ,  $df = 4$ , N.S.). A larger number of insecure AAI classifications in our sample would probably have led to a lower concordance rate.

Our findings concerning the stability of adult attachment and the predictive value of maternal attachment assessed during pregnancy on infant attachment assessed at 12 months have implications for the early identification of those mother-infant dyads at risk for the development of relationship problems. Indeed, insecure maternal attachment—as assessed by the three-category classification system—has been overrepresented in clinical infant populations (Benoit, Zeanah, & Barton, 1989; Benoit, Zeanah, Boucher, & Minde, 1992; Crowell & Feldman, 1988; van IJzendoorn, 1993, in press). This suggests that maternal security of attachment may act as a factor protecting against the development of a variety of clinical problems in infants, whereas insecure maternal attachment may act as a risk factor (Benoit et al., 1992). The relation between parental unresolved attachment classifications and the clinical status of infants remains to be examined.

Another significant finding from the present study provides compelling evidence for Bowlby's (1969/1982) contention that internal working models of attachment tend to be perpetuated across generations (i.e., cross-generational stability). When the three-category adult and infant attachment classifications were examined across three generations, 65% of 77 grandmother-mother-infant triads had corresponding attachment classifications in all three generations.

These results must be viewed cautiously because of the skewed distribution of attachment toward security in the sample. Our protocol did not permit the direct exploration of factors that might account for the movement between categories of attachment across generations. Future research in the field should address these important questions.

Several limitations of the present study must be stressed. First, the skewed distribution of attachment classifications toward security and the demographic characteristics of the sample, in particular high maternal education and socioeconomic status, are not representative of the general population. Thus, generalization of our findings to individuals with other demographic characteristics must be cautious. Future studies examining the stability of adult attachment and the transmission of attachment across generations should include subjects who are less educated and are from stressed and impoverished environments. Second, the psychological characteristics of the mothers and grandmothers were not examined in depth in the present study. Evidence about intellectual, personality, and other individual characteristics of parents as they relate to adult attachment would be valuable.

Bowlby (1980, 1969/1982) suggests that what may be transmitted across generations is an internal working model of attachment relationships. Caregivers' states of mind with respect to attachment may be derived from actual and perceived childhood experiences with attachment figures and may influence behavior in caregiving situations. This model of transmission suggests that what may be transmitted across generations may be a state of mind, which is communicated to the child via parental behavior, especially parental response at times of stress (when the attachment system is activated). We hope to explore in future research the questions of whether and how states of mind with respect to attachment relate to parental behavior in "noncaregiving" situations (e.g., play, teaching) or in situations where the attachment system is not activated. Although our study did not directly examine mechanisms of transmission of attachment across generations, the findings add one more link to the chain of evidence that tends to support Bowlby's contentions about attachment. Studies examining both the mechanisms of transmission across generations and the mediators of stability of attachment within individuals and across generations are needed.

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