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A Psychometric Study of the Adult Attachment Interview Reliability and Discriminant Validity

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The Adult Attachment Interview (AAI) stimulates Ss to retrieve and evaluate attachmentrelated autobiographical memories and has increasingly been used to predict the quality of parent—child interactions and infant—parent attachment relationships. Its reliability and discriminant validity, however, have not yet been examined. In this study, 83 mothers were interviewed twice, 2 months apart, by different interviewers so that the instrument's test—retest reliability and potential interviewer effects can be evaluated. To examine the AAI's discriminant validity, we administered tests for autobiographical memory, intelligence, and social desirability. The reliability of the AAI classifications was quite high over time (78% on the level of the 3 main categories; $\kappa = .63$) and across interviewers. The unresolved category was less stable. The AAI classifications turned out to be independent of non-attachment-related memory, verbal and performance intelligence, and social desirability.

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To assess adults' internal working models with respect to attachment relationships, <u>George</u>, <u>Kaplan</u>, and <u>Main (1985)</u> developed the Adult Attachment Interview (AAI). <u>Main, Kaplan, and</u> <u>Cassidy (1985)</u> defined the internal working model of attachment as a set of rules "for the

organization of information relevant to attachment and for obtaining or limiting access to that information" (p. 67). It has been hypothesized that this working model or current "state of mind" with respect to attachment relationships determines parents' sensitivity to their infants' attachment behavior and, in turn, shapes the infants' own internal working models of attachment (<u>Main & Goldwyn, 1992</u>). Parents' mental representations of their childhood experiences with attachment relationships are thought to determine the degree to which information concerning their infants' attachment needs can be processed freely and without distortion. Insecure parents are believed to distort or block their infants' signals of distress, fear, and anxiety because these signals threaten to affect their own current state of mind with respect to attachment. Secure parents are believed to have worked through their past negative attachment experiences or to have had secure experiences and, therefore, to be able to focus undivided attention on their infants' attachment signals.

The AAI is a semistructured interview that probes alternately for general descriptions of relationships, specific supportive or contradicting memories, and descriptions of current relationships with parents. Adults are asked to retrieve attachment-related autobiographical memories from early childhood and to evaluate these memories from their current perspective. The AAI transcripts are rated for security of attachment as derived from the subjects' present discussion of their attachment biographies (Main & Goldwyn, 1991). The coding of the transcripts is not based primarily on reported events in childhood but rather on the thoughtfulness and the coherency with which the adult is able to describe and evaluate these childhood experiences and their effects (Main & Hesse, 1990). The interview, therefore, does not assess the actual security of childhood attachments, and theoretically, a secure state of mind is not incompatible with an insecure attachment history throughout childhood. The AAI does not even measure adults' perception of their parents' current support in times of stress, because the interview may be classified as secure even when the parents have died or when they still treat their adult children inadequately. Instead, the AAI assesses the current state of mind with respect to attachment in general, and this state of mind is believed to determine attachment relationships with children. The coding system of the AAI leads to adult attachment classifications in three main categories that parallel the Strange Situation attachment classifications for infants (Ainsworth, Blehar, Waters, & Wall, 1978). Autonomous or secure adults (F) tend to value attachment relationships and to consider them important for their own personality. They are able to describe attachment-related experiences coherently, whether these experiences were negative (e.g., parental rejection or overinvolvement) or positive. Dismissing adults (Ds) tend to devalue the importance of attachment relationships for their own lives or to idealize their parents without being able to illustrate their positive evaluations with concrete events demonstrating secure interaction. They often appeal to lack of memory of childhood experiences. Preoccupied adults (E) are still very much involved and preoccupied with their past attachment experiences and are therefore not able to describe them coherently. They may express anger when discussing current relationships with their parents. Dismissing and preoccupied adults are both considered to be insecure. Some autonomous, dismissing, or preoccupied adults indicate through their incoherent discussion of experiences of trauma (usually involving the loss of an attachment figure) that they have not yet completed the process of mourning. Evidence for the continuing presence of unresolved responses to loss are lapses in the monitoring both of reasoning and discourse and reports of extreme behavioral reactions. These adults receive the additional classification Unresolved (U), which is superimposed on their main classification (Main & Goldwyn, 1991). Even autonomous adults may be classified as unresolved because of their answers to questions

about loss experiences, in the context of an otherwise autonomous interview. <u>Main and Goldwyn</u> (1988), however, warned that unresolved loss is difficult to score for individuals who have suffered a major loss within the last year.

Several studies of the predictive validity of the AAI have been carried out. Most of these studies focused on the relation between parent and infant attachment classifications, and it now appears to be established that in 70% to 80% of cases, there is a correspondence between parents' attachment classifications based on the AAI and their infants' Strange Situation attachment classifications: Autonomous adults appear to have secure infants; dismissing adults have insecure-avoidant infants; preoccupied adults have insecure-ambivalent infants; and adults with signs of unresolved mourning have infants rated as disorganized—disoriented (<u>Ainsworth & Eichberg, 1991</u>; <u>Fonagy, Steele, & Steele, 1991</u>; <u>Grossmann, Fremmer-Bombik, Rudolph, & Grossmann, 1988</u>; <u>Main et al., 1985</u>; <u>Main & Goldwyn, 1992</u>; <u>Van IJzendoorn, Kranenburg, Zwart-Woudstra, Van Busschbach, & Lambermon, 1991</u>; for a review, see <u>Van IJzendoorn, 1992</u>]. Furthermore, in several studies a relation between security of adult attachment and quality of parent—child interactions has been established (<u>Bus & Van IJzendoorn, 1992</u>; <u>Crowell & Feldman, 1988</u>; <u>Grossmann et al., 1988</u>; <u>Haft & Slade, 1989</u>; <u>Van IJzendoorn et al., 1991</u>).

Although these first, pioneering studies on the predictive validity of the AAI indicate that it is a promising instrument for explaining the development of infants' attachment to adults, no systematic study of the psychometric properties of the AAI has yet been reported. Methodologically, the use of a semistructured, qualitative instrument like the AAI in the context of quantitative studies has to be regarded as unique. On the one hand, the AAI has been designed to preserve the depth and nuances of natural discourse on autobiographical experiences and to yield insight into the formal and substantial aspects of subjects' thought processes related to attachment; on the other hand, the coding system of the AAI results in rigorous classifications that can be used in quantitative analyses. Although the AAI cannot be considered a "test" in the usual sense because of the semistructured way the information is collected, its outcome appears to be interpreted and applied as if it resulted from a standardized test. Besides predictive validity data, intercoder reliability figures have been the only data provided to legitimize this practice. Although these figures are usually quite substantial, they cannot replace data on other psychometric characteristics of the instrument (Campbell, 1960). In this article, we focus on four psychometric issues: (a) reliability over time and across interviewers, (b) influence of nonattachment-related autobiographical memory, (c) relation to intelligence, and (d) effects of social desirability.

First, because the AAI is a semistructured interview, it is particularly important that its reliability be tested over time and across different interviewers. Therefore, subjects in this study were interviewed twice, 2 months apart, by different interviewers. A period of 2 months was chosen for the following reasons. Although the AAI is a lengthy and complicated interview, a shorter period might have increased the risk that the subjects would remember some of their responses to the first interview when interviewed for the second time, thereby inflating the instrument's reliability. A longer period, however, might have increased the risk that changing life circumstances would influence the subjects' mental representation of attachment experiences; our primary focus was the instrument's reliability under stable conditions and not so much the continuity or discontinuity of AAI classifications under changing life circumstances. Second, the AAI focuses on the current state of mind with respect to attachment, but a large part of the interview consists of discussions of childhood experiences. The AAI classifications may

therefore partially reflect general autobiographical memory abilities. For example, dismissing adults may not remember specific details about their positively described attachment experiences with their parents because of the tendency to keep their current working model of attachmentand related model of self-intact. Alternatively, it could also be hypothesized that dismissing adults are just not able to remember as many childhood experiences in as much detail as autonomous or preoccupied adults. In the latter case, dismissing adults would be unable to provide the interviewer with enough material to back up "idealized" descriptions, but the lack of supporting evidence would be the result of purely cognitive rather than emotional "deficiencies." Third, AAI classifications may be influenced by differences in intelligence. One of the most important criteria for classifying a transcript as secure or insecure is the coherence of the interview (Main & Goldwyn, 1991, p. 39). The coding system defines and operationalizes coherence in terms of Grice's (1975) maxims for optimal discourse: quality, quantity, relation, and manner. In a formal sense, coherence indicates connectedness of thought such that parts of the discourse are clearly related and form a logical whole. It may of course be hypothesized that secure adults present their autobiographical attachment experiences and their current views in a coherent way because they have psychologically worked through these experiences and are consequently able to communicate their feelings openly and freely. Alternatively, it may be hypothesized that the coherence of a transcript is mainly a product of the subject's logical reasoning ability. Subjects who are cognitively able to detect and avoid logical inconsistencies in their narratives may erroneously be rated as more secure emotionally. Differences in cognitive abilities may also play a role in the production of rich and covincing as opposed to poorly verbalized interviews: Subjects who are more able to make use of synonyms, analogies, metaphors, and generally more sophisticated language may convey their autobiographical experiences more fluently than subjects with less developed verbal competencies. Fourth, social desirability, defined as subjects' need to present themselves in a socially desirable light (Crowne & Marlowe, 1960), may determine AAI outcome. The AAI is a semistructured interview in which subject and interviewer communicate in an intensive way about sensitive issues of childhood and daily life. The AAI should be considered a discourse (Main & Goldwyn, 1991) in which subjects need to be stimulated to think and speak naturally about their most personal and delicate memories, emotions, and options. In some cases the interaction between subject and interviewer may facilitate open communication about these sensitive issues. In other cases, however, subjects might feel urged to make a favorable impression on the interviewer, in particular because the interview is carried out in an interactive and personalized setting. For example, dismissing subjects may be viewed as victims of the need to make a favorable impression on the interviewer rather than as individuals who idealize their past attachment experiences because of a need to diminish the importance of disagreeable memories for their personality development.

In summary, we tested whether the AAI classifications were reliable over a 2-month interval and across interviewers, as well as whether they were independent of differences in non-attachment-related autobiographical memory, intelligence, and social desirability.

Method

Procedure

Subjects visited our laboratory twice, about 2 months apart. During the first visit the AAI and a verbal intelligence test were administered. During the second visit, subjects were reinterviewed with the AAI by surprise. They also completed both a nonverbal intelligence test and a memory

test and answered questions about their experiences with the AAI and about relevant events since the first session. Each visit lasted about 1½ hr. At the end of the second session, the subjects were given a questionnaire on memory and social desirability to be completed at home.

Subjects

Eighty-three mothers participated in the study, as part of a larger study of mother—child relationships that required four visits to our laboratory, two of them including the child's presence for observations of mother—child interaction. Potential subjects were identified in the city-hall records for a medium-sized city and its neighboring villages in the western part of The Netherlands. Criteria for participation were the following: (a) Subjects must be between 19 and 33 years, (b) they must be living together with a spouse, (c) they must have a firstborn child of 12 months of age, and (d) they must not be working out of the home for more than 24 hr per week. These mothers were asked to participate in a series of at least four visits to our laboratory within 9 weeks. They were offered \$40 in exchange for their participation. Of those women who met our criteria, 73 (47%) did not participate. Three subjects could not attend the second AAI, 2 because of private problems and 1 because she had started a full-time job. One interview was not recorded because of technical problems.

The remaining sample consisted of 83 mothers (mean age = 27.3 years), 45 (55%) of whom did not work out of the home, 17 (20%) of whom worked out of the home less than 15 hr per week, and 20 (24%) of whom worked between 15 and 24 hr per week. Their mean educational level was 3.7 (SD = 0.9, min = 2, max = 6) on a scale ranging from 1 = less than 6 years of schooling to 6 = at least 16 years of schooling.

Measures Adult Attachment Interview.

The AAI is a semistructured interview that probes alternately for descriptions of the past relationship with parents, specific supportive or contradictory memories, and descriptions of current relationships with parents. After a warm-up question about the composition of the family or origin, the subjects were asked which five adjectives described their childhood relationship to each parent and why they chose these adjectives; to which parent they felt the closest; what they did when-as a child-they were upset, hurt, or ill; what they remembered about separations from their parents; and whether they had ever felt rejected by their parents. Besides these questions about experiences in childhood, subjects were asked how they throught their adult personalities were affected by these experiences; why, in their view, their parents behaved as they did; and how the relationship with their parents had changed over time. After about two-thirds way through the questions, some additional questions were asked about subjects' experiences of loss through death of important figures, both as a child and as an adult.

Five female interviewers conducted the AAI. Each subject was interviewed by different interviewers on the first and second occasions. The second administration of the AAI was explained to the subjects by referring to a new instrument (such as a thermometer) that has to be applied more than once to test its quality. This explanation was readily accepted; no subjects objected to being interviewed again. Each of the 10 possible pairs of interviewers carried out interviews with about 8 subjects, in counterbalanced order. The interviewers were trained by M. H. van IJzendoorn. As the first part of their training, they experienced being interviewed themselves. Subsequently, each interviewer conducted at least five audiotaped practice interviews and at least one videotaped practice interview. The instructor provided detailed feedback, and difficult situations were practiced in role play. During the data collection, the instructor evaluated every fourth interview of each interviewer to prevent deviations from the interview guidelines.

The interviews were conducted at our laboratory in a quiet room with two easy chairs positioned at an angle of 90°. We selected a Sony TCM-1000A cassette recorder with auto-reverse and preend alarm to guarantee a long, uninterrupted recording time. We used this apparatus with two small external microphones (Sony ECM-144) pinned to the clothing of both interviewer and subject. In this way, very brief remarks, slips of the tongue, and other speech errors, which form the basis of several interview scoring rules and classifications, could be recorded accurately. The interviews lasted about an hour and were transcribed verbatim by six typists on the basis of transcribing guidelines provided by Mary Main (personal communication, June 1988). On occasions when the transcriber could not hear what had been said, the interviewer was asked to listen to the tape and to fill in the gap. One third of the transcripts were checked for correctness. We coded the interviews. ¹

Percentage of agreement on 16 cases was 75% ($\kappa = .66$) when interviews were classified into four categories–autonomous (F), dismissing (Ds), preoccupied (E), and unresolved (U)–and 81% ($\kappa = .72$) when three categories–autonomous, dismissing, and preoccupied–were distinguished. The coders agreed on F versus non-F in 88% of the cases ($\kappa = .75$), on Ds versus non-Ds in 88% of the cases ($\kappa = .60$), on E versus non-E in 88% of the cases ($\kappa = .61$), and on U versus non-U in 88% of the cases ($\kappa = .68$). Although the AAI coding system also includes scales for assessing several dimensions of the categories (Main & Goldwyn, 1991), we focused on the AAI classifications, just as <u>Waters (1978)</u> focused on classifications in his study of the reliability of Strange Situation classifications. Whereas the scales can be seen as instrumental in systematizing the classification process, the classifications are at the center of theoretical and empirical studies on adult attachment. Each coder classified only one interview of each subject and was unaware of the classification of the other interview.

Interview characteristics.

The following formal features of the AAI, which are not related to the coding system, were recorded by means of content analyses: (a) the length of the interview, defined as the total number of characters of the WordPerfect 5.1 file containing the transcript; (b) the total number of losses both in childhood and in adulthood; (c) the number of times the subject said that she could not remember something; and (d) the number of times the subject referred to the first interview during the second interview. Coding was carried out by three persons. Mean intercoder reliability for the last three features was .90.

Sources of change.

To examine possible sources of changes in AAI classifications in the 2-month period, we asked subjects some questions concerning the fact that the interview had been conducted twice, in a short interview during the second session immediately after the AAI. We asked the subjects whether they remembered the questions and their answers of 2 months before, how they felt about being interviewed again, and what they perceived as the purpose of the interview. Furthermore, subjects were asked whether they had reflected on the questions posed in the first interview; whether they had talked about the questions with spouses, parents, or friends; and whether their views had changed with respect to topics of the interview during the weeks between the first and second sessions. These interviews were coded by two individuals who were unaware of the reliability of the interview classifications. The mean percentage of agreement was 96%.

Memory.

Because autobiographical memory research is still developing (<u>Loftus, 1991</u>), we decided to combined two different methods of measuring differences in autobiographical memory, a self-report, and a memory test.

The self-report measure, the Long-Term Autobiographical Memory (LAM) test, was constructed for this study and completed by the subjects at home. They were asked to evaluate their own long-term and autobiographical memory abilities on 16 five-point Likert-type items. The items were derived from three self-report meta-memory questionnaires: (a) the Cognitive Failure Questionnaire (CFQ; Broadbent, Cooper, Fitzgerald, & Parkes, 1982), (b) the Everyday Memory Questionnaire (EMQ; Baddeley, Sunderland, & Harris, 1987), and (c) the Memory Scale (MS; Sehulster, 1981). The CFQ considers day-to-day memory failures. The six items with factor loadings greater than .45 on Long-Term Memory Retrieval were selected for the LAM test. Six items from the EMQ were chosen because of their specificity and reference to personal experience (Herrmann, 1982). These items also concern day-to-day memory problems. The last four items were selected from the MS because of their high loadings on the Personal Past Memory factor. These four items aske subjects to evaluate their own memory abilities in comparison to those of others. Four of the 16 LAM items were excluded from further analysis because of skewness greater than 3. We conducted a principal-components analysis to examine the underlying structure of the remaining 12 items of the LAM test. Principal components were orthogonally rotated to the normalized Varimax criterion. Two components, which could be interpreted as Autobiographical Memory (four items, Cronbach's $\alpha = .95$; lower scores indicate better autobiographical memory) and Absent-Mindedness (eight items, Cronbach's $\alpha = .62$; higher scores indicate more absent-mindedness), emerged. The Pearson's product-moment correlation between scores on these scales was .13 (p = .24).

Besides this self-report test, we conducted a memory test-the Latency of Response to Autobiographical Issues (LRAI) test. In an audiotaped interview during the second session, 14 questions were asked about common issues in childhood not related to family attachment experiences (e.g., the color of the first bike, the name of the preschool teacher). Each subject's performance on the test was evaluated in two ways. First, we determined the number of adequate answers. The adequacy of the answers was evaluated in terms of relevance to the question. For example, when the name of the preschool was given instead of the name of the preschool teacher, it was considered inadequate. "Don't know" answers were regarded as inadequate as well, because the topics were so common that all respondents could have provided an answer. Second, the latency time between the last word of the question and the first word of the answer was measured from the audiotape. Latency time provides an indication of subjects' memory abilities, because the time that is needed to find an answer to a specific question reflects the effort to reach the required information (Conway, Rubin, Spinnler, & Wagenaar, 1992; Gruneberg & Morris, 1978; Lloyd & Lishman, 1975; Teasdale & Fogarty, 1979; W.-A. Wagenaar, personal communication, February 1990). Two individuals coded latency time using a voice-key that marked every tenth of a second. Intercoder reliability was .83. Latency times were standardized to adjust for differences in variance between questions. In a principalcomponents analysis of these standardized latency times, there emerged one factor, on which eight questions loaded higher than .30. One question with a factor loading of .26 was also included for reasons of content. The resulting factor therefore consisted of nine items and showed an internal consistency of .73. On none of these nine items did the maximum raw score exceed 60 s, which is considered a limit (Myers, Brewin, & Power, 1992). A subject's score on the LRAI was the mean standardized latency time of the adequate answers to these nine

questions. The Pearson's product-moment correlation between the number of adequate answers and the LRAI was -.16 (p = .16). Correlations between the Autobiographical Memory scale and, respectively, the number of adequate answers and the LRAI were -.24 (p = .04) and .16 (p= .16); correlations between Absent-Mindedness and, respectively, the number of adequate answers and the LRAI were -.12 (p = .28) and .09 (p = .45). These modest correlations between the meta-memory questionnaire and the actual memory test are not uncommon in the field of autobiographical memory research (Herrmann, 1982; Morris, 1983).

Intelligence.

Two separate domains of intelligence were examined: performance IQ and verbal IQ. Performance IQ was assessed by means of Raven's Standard Progressive Matrices (Raven, 1958), which was validated in The Netherlands by Van der Giesen (1957) and Van Weeren (1968). Three subtests of the Groninger Intelligence Test (GIT; Luteijn & Van der Ploeg, 1982) were administered to assess verbal IQ. The GIT is comparable with the Wechsler Adult Intelligence Scale (Wechsler, 1972). The Vocabulary subtest measures the vocabulary of subjects by asking for synonyms of 20 different words. Scores on the Analogical Reasoning subtest are indicative of verbal coherence. For the Fluency I and Fluency II subtests, subjects enumerated during two 1min intervals as many names of, respectively, animals and professions as they could. On the basis of the subtests, a total IQ score was assigned to each subject. The entire GIT, however, consists of more subtests than were used here, and the subset we selected tended to overestimate the total IQ score (Luteijn & Van der Ploeg, 1982).

Social desirability.

To examine subjects' tendency to give socially desirable answers, we used a shortened version of the Marlowe-Crowne social desirability scale (Crowne & Marlowe, 1960), which was validated in The Netherlands by Nederhof (1981). This shortened version consists of 10 statements concerning personal attitudes and traits, each with two response categories (*true* and *false*). The scale provides an assessment of both the tendency to credit oneself with socially desirable but uncommon virtues and the tendency to deny socially undesirable traits. In a principalcomponents analysis, there emerged one factor, on which seven items loaded higher than .30. Two items with negative factor loadings and one with a very small loading were excluded. The resulting factor, Social Desirability, showed moderate internal consistency (Cronbach's $\alpha = .67$).

Results

In presenting our results, we first describe the distribution of AAI classifications and their sensitivity to background variables such as age, educational level, and work. Subsequently, we present results pertaining to the reliability of the interview classifications. Finally, we discuss the discriminant validity of the AAI. Except in the reliability analyses, the classifications of the first interviews were used. In our judgment, an analysis of correlates of only the first interviews would produce the most generalizable results, because the AAI is typically administered only once.

Reliability Background variables.

Of the first 83 interviews, 20 (24%) were classified as dismissing, 46 (55%) as autonomous, and 17 (20%) as preoccupied; with the unresolved classification taken into account as a separate category, 15 (18%) interviews were classified as dismissing, 41 (49%) as autonomous, 13 (16%) as preoccupied, and 14 (17%) as unresolved. The distribution of our sample appeared to be comparable with the combined distribution of 22% dismissing, 62% autonomous, and 16%

preoccupied subjects, of two comparable unselected samples (<u>Ainsworth & Eichberg, 1991</u>; <u>Fonagy et al., 1991</u>), $\chi^2 2$, N = 224 = 1.24, p = .53. ²A comparison with the A, B, C, D Strange Situation distributions (<u>Van IJzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992</u>) showed that the percentage of unresolved classifications in our sample (17%) was comparable with the percentage of disorganized (D; 15%) infant-mother attachment classifications, $\chi^2 1$, N = 389 =0.24, p = .73.

We examined the differences in background variables among the three main groups. Results are presented in <u>Table 1</u>. A significant age effect was found: The mean age of the autonomous subjects was somewhat higher than that of the dismissing and the preoccupied subjects, F(2, 80) = 4.72, p = .01. This effect remained significant when the unresolved group was taken into account, F(3, 79) = 3.12, p = .03. Dismissing, autonomous, and preoccupied subjects did not differ in terms of educational level or hours per week of employment outside the home. However, unresolved subjects turned out to have a somewhat lower level of education, F(3, 79) = 2.71, p = .05.

Test—retest reliability.

Results pertaining to the reliability of the AAI classifications are presented in Table 2. Of the 83 subjects, 65 (78%) were classified in the same main categories twice ($\kappa = .63$). Of the 20 subjects classified as dismissing in the first interview, 14 (70%) were again classified as dismissing, 5 (25%) as autonomous, and 1 (5%) as preoccupied. Of the 46 subjects classified as autonomous in the first interview, 38 (83%) were again classified as preoccupied in the first interview, 13 (76%) were again classified as preoccupied. Of the 17 subjects classified as preoccupied in the first interview, 13 (76%) were again classified as preoccupied, 3 (18%) as autonomous, and 1 (6%) as dismissing. When the resolved classification was taken into account, fewer classifications remained unchanged: Fifty subjects (61%) were classified in the same category in the two interviews ($\kappa = .43$). For 1 subject, data on unresolved loss were incomplete, because she had mistakenly not been asked about loss in adulthood during the second interview. Bearing in mind Main and Goldwyn's (1988) warning about classifying unresolved loss in the case of recently experienced loss, we found that 58 subjects (71%) were classified in the same category twice when these cases were not considered unresolved ($\kappa = .56$).

Subjects whose dismissing, autonomous, or preoccupied classifications changed over the two interviews did not differ from subjects whose classifications remained the same in how they felt about being interviewed again, nor had they different ideas about the purpose of the interview. No differences between the two groups were found in the ability to remember the questions and answers in the first interview 2 months before or in the extent to which the interview was discussed with spouses, parents, and friends. Furthermore, we examined subjects' answers to the questions of whether they had changed their minds about topics of the interview, whether they had reflected on the interview questions after the first session, and whether they thought they had given the same answers at the second session. Small but significant correlations between the answers to these questions were found. The three questions were used as predictors for changes in AAI classifications. ³ This analysis yielded a significant discriminant function, $\chi^2 2$, N = 83 = 6.2, p = .05. Only the latter two questions had reflected more on the first interview, and, interestingly, they more often indicated that they had given the same answers at the second session.

Concerning the interview characteristics, the two AAIs of subjects with different classifications did not differ more than the two AAIs of subjects with the same classifications in length,

frequency of reporting that something could not be remembered, or number of references to the first interview during the second interview. Only subjects with change in unresolved attachment status referred more often to the first interview during the second interview. This was the case for subjects whose first interviews were classified as unresolved as well as for subjects whose second interviews were considered unresolved, F(2, 80) = 6.01, p = .004. Finally, subjects with change in unresolved status did not differ more than the other subjects in the total number of losses mentioned during the first as opposed to the second interview.

Lastly, the influence of the interviewer on test—retest reliability was examined. The 10 pairs of interviewers and status of interview classifications (changed vs. unchanged) were cross-tabulated. This analysis did not yield significant results, $\chi^2 9$, N = 83 = 11.93, p = .22. To test the influence of the interviewer on the classifications more generally, we examined whether particular interviewers were associated with specific classifications. On the level of the three main classifications, no significant associations were found, $\chi^2 8$, N = 83 = 9.32, p = .32. When the unresolved classification was taken into account, this result did not change, $\chi^2 12$, N = 83 = 7.04, p = .85.

Discriminant Validity

Because we expected to find that the attachment categories would not differ in their scores on memory, intelligence, and social desirability, we first conducted a power analysis to examine whether potential differences could be detected in our sample (<u>Cohen, 1977</u>). We formulated a priori contrasts for each of the variables; each contrast tested a specific hypothesis about higher or lower scores for one of the categories. On the basis of one-tailed tests of a priori contrasts at $\alpha = .05$ and estimated effect sizes of d = .80 (r = .37), the power values turned out to be substantial (between .83 and .98). We could therefore conclude that our sample was large enough to detect potential differences between the attachment categories.

Memory.

Indicative of non-attachment-related autobiographical memory were the subjects' self-reports of memory abilities, the number of adequate answers on questions about common issues in childhood, and scores on the LRAI. To test the hypothesis that AAI classifications are independent of autobiographical memory, we conducted a multivariate discriminant function analysis, followed by one-way analyses of variance (ANOVAs) on the separate tests. Results are presented in Table 1. As a more specific test of the hypothesis that dismissing adults may not remember details of their positively described childhoods because of inferior autobiographical memory abilities, we contrasted, a priori, the dismissing subjects with the others. No multivariate differences were found. Contrasting the dismissing with the other subjects yielded no significant differences in either scores on self-reported Autobiographical Memory and Absent-Mindedness or the number of adequate answers, both with and without the unresolved classification taken into account. Interestingly, a significant contrast was found for the LRAI, but in the opposite direction from that which had been hypothesized. Dismissing subjects needed less time to give adequate answers, t(78) = 3.03, p = .004 (separate variance estimate, df = 38.3). When the unresolved classification was taken into account, this contrast disappeared.

Intelligence.

To examine the AAI classifications' independence of verbal and performance intelligence, we conducted multivariate discriminant function analyses and subsequently one-way ANOVAs on the separate tests. Because it was alternatively hypothesized that autonomous adults present their autobiographical attachment experiences and current views in a coherent way on the basis of more advanced logical reasoning abilities, we contrasted, a priori, the autonomous subjects with

the others on most variables. In the cases of Fluency I and II, however, we contrasted the dismissing subjects with the others, because the dismissing transcripts (M = 54,030; SD = 20,843) tended to be shorter than those of the others (M = 64,521; SD = 23,644), F(1, 81) = 3.15, p = .08. Results are presented in <u>Table 1</u>. No multivariate differences were found between subjects' scores on Vocabulary, Fluency I and II, Verbal Coherence, and Raven total IQ. These results did not change when the unresolved classification was taken into account or when the autonomous subjects were contrasted with the others in the separate tests. Contrasting the dismissing subjects with the others to detect a potential difference in fluency did not reveal significant differences either.

Social desirability.

To test the alternative hypothesis that the AAI classification is influenced by the tendency to present oneself in a socially desirable light, we compared the Social Desirability scores of the attachment groups (see Table 1). As dismissing adults might be particularly inclined to give socially desirable answers, their scores were a priori contrasted with those of the other subjects. No significant contrast could be detected. An interesting difference was found, however, between the dismissing and the other subjects' perception of the interview. The dismissing subjects more often thought that the purpose of the interview was to explore the quality of their childhood experiences and that the AAI pertained to their past, $\chi^2 2$, N = 83 = 10.05, p = .004, whereas the other subjects more often expressed the view that the interview was aimed at determining the influence of their past experiences on how they wanted to bring up their own children, $\chi^2 2$, N = 83 = 7.29, p = .03.

Discussion and Conclusion

This study supplied new information about the psychometric qualities of the AAI. Classifications appeared to be quite reliable over a 2-month period. In spite of the semistructured, discourselike character of the interview, interviewer effects appeared to be absent. With respect to discriminant validity, the AAI classifications turned out to be uninfluenced by non-attachment-related autobiographical memory, verbal and performance intelligence, and social desirability. Eighty-three White, lower- to upper-middle-class subjects from intact families participated in our study. This was slightly more than 50% of those invited to take part in the study, a rate of participation that is comparable with those of other studies in the field (e.g., Fonagy et al., 1991). Nevertheless, the self-selection reflected in the modest response rate might have contributed to the high percentage of AAIs that remained unchanged in the 2-month period, because the mothers who were able to commit to four visits to our lab might have had more stable life circumstances. This, of course, restricts the generalizability of our results. It facilitates, however, testing of the instrument's reliability with minimal interference of instability of state of mind as a result of changing life circumstances.

The subjects' employment status–about half did not work out of the home, and the other half worked no more than 24 hr per week–is quite normal for The Netherlands (<u>Clerkx & Van</u><u>IJzendoorn, 1992</u>). Concerning the other background variables, we found two significant effects. First, autonomous subjects were on average somewhat older. This result fits in with the commonsense idea that adults who have more life experience and who have distanced themselves somewhat more from the parental home are able to evaluate their attachment history more objectively. Second, unresolved subjects reported having a lower level of education. It might be hypothesized that this lower educational level caused their incoherency during discussions of

loss. It should be noted, however, that they did not show lower scores on either the verbal or performance intelligence tests.

The reliability of interview classifications was substantial, especially if the limitations on maximum agreement due to imperfect intercoder reliability are taken into account (<u>Van</u> <u>IJzendoorn, 1992</u>). Our intercoder agreement figures for the complicated AAI classification system are comparable with those reported in other studies (e.g., <u>Fonagy et al., 1991</u>). The changes in classifications could not be ascribed either to interviewer effects or to the interview characteristics we measured. It should furthermore be mentioned that the test—retest reliabilities were quite similar for the three main categories. The test—retest reliability of the unresolved classification, however, was lower. This lower reliability could not be ascribed to intercoder reliability, but it is in line with the relatively low reliability over a 1-month period of children's disorganized—disoriented classifications in observations of responses to reunions with parents in a laboratory setting, as reported by <u>Main and Cassidy (1988)</u>. Furthermore, the test—retest reliability was higher when subjects with recent loss were excluded from the unresolved category. It is conceivable that these subjects, who may have been involved in a process of coming to terms with their recently experienced loss, varied in the coherency of their discussions of loss on different occasions.

It might be argued that the 2-month period between the first and the second interview was too short and served to inflate our measurement of the reliability of the AAI, as subjects may have memorized their initial responses and reproduced them in the second interview. There are several reasons why it is implausible that the time interval permitted memorization. First, the interview is usually very long and intricate, and the interviewers are trained to abstain from evaluating subjects' answers: The interview does not include questions with unambiguously right or wrong answers, or with a range of answers that is restricted in any way. Second, the interview is not scored for content–which is easier to memorize–but for coherence of reasoning. Third, the subjects did not expect to participate in the same interview twice, so intentional memorization was not possible. Of course, this does not mean that the subjects had not been thinking about the first interview in the period before the second interview. However, our findings indicated, fourth, that subjects whose classifications changed reflected more on the first interview than subjects with unchanged classifications and that, in general, interviewes were not able to accurately assess similarities and discrepancies between their response patterns in the first and second interview.

Examining the discriminant validity of the AAI, we studied its relations with intelligence and social desirability as well as with non-attachment-related autobiographical memory. Concerning memory, we found that differences in AAI classification cannot be ascribed to differences in non-attachment-related autobiographical memory abilities. In fact, dismissing subjects, who during the AAI often insist on their not being able to remember something, needed even less time to provide adequate answers to questions about issues not related to attachment experiences. This remarkable outcome can be related to results from the Davis (1987) and Myers et al. (1992) studies of "repressors," whose latency times for affective memories about the self and for negative memories were longer than those for nonrepressors, whereas on other memory tasks they performed as well as or even better than nonrepressors. It should be realized, however, that the instruments we used to measure autobiographical memory have to be considered experimental. In fact, the field of autobiographical memory research itself is still developing and remains controversial (Loftus, 1991). Differences in autobiographical memory could best be studied against the background of verifiable autobiographical facts (e.g., Linton, 1978;

<u>Wagenaar, 1986</u>), but the diary method that is implicated in this approach would be inapplicable in relatively short-term studies such as ours. By combining different methods to describe differences in autobiographical memory–a self-report and a latency time measure–we hoped to estimate real memory differences in a way that would be more adequate than any single approach.

No differences in intelligence or social desirability were found among the attachment groups. Subjects were not classified into a certain category because of their vocabulary (cf. <u>Ward</u>, <u>Botyanski</u>, <u>Plunket</u>, <u>& Carlson</u>, 1991) or general logical reasoning ability (which is not the equivalent of metacognitive ability, as could be derived from <u>Main</u>, 1991). Two factors may have minimized the potential bias associated with social desirability. First, the interviewers were trained to conduct the interviews in a friendly but task-oriented atmosphere (<u>Nederhof</u>, 1981). Second, dismissing subjects more often thought that the AAI pertained only to their past. Therefore, they may not have felt the need to make a favorable impression on the interviewer as acutely as would have been the case if they thought they were being subjected to a personality test.

Although this study provides much supporting evidence with respect to the psychometric properties of the AAI, in particular its reliability and discriminant validity, certain limitations have to be taken into account. First, our study was conducted with a sample of middle-class subjects from intact families; because of the moderate participation rate, self-selection may have restricted the generalizability of our results. It is not clear whether the same results would have been obtained in special (e.g., clinical) populations. The predictive validity of the AAI in clinical groups, however, is very promising (Crowell & Feldman, 1988, 1991). Second, it could be argued that the specific cultural character of this study, conducted in The Netherlands, justifies only tentative conclusions about the psychometric properties of the AAI in general. However, it has been demonstrated that infant-mother attachment shows universal features in different cultural contexts (Van IJzendoorn, 1990). Besides, a pilot study with the AAI in The Netherlands indicated its applicability there and showed the expected correspondence with the quality of infant-parent attachment (Van IJzendoorn et al., 1991). Third, we studied the reliability of the AAI over a 2-month period. In the case of the Strange Situation, some studies showed the procedure to be unreliable over a few weeks because of a recency effect (Ainsworth et al., 1978). In other studies it was found that classifications only remained the same over a period of 6 months when child-rearing arrangements and family circumstances remained stable (Thompson, Lamb, & Estes, 1982; Vaughn, Egeland, Sroufe, & Waters, 1979). In our case, the test-retest reliability of the AAI was measured over a time period during which few changes in life circumstances and in physical and mental health status were reported (Bakermans-Kranenburg & Van IJzendoorn, 1992). Under less favorable conditions and across a longer time interval, there may be more changes in AAI classifications that reflect the impact of major life events. Fourth, autobiographical memory is a complex construct, and the validity of our measures-the LAM and the LRAI-should be further examined in future research. Our conclusions about the absence of a relation between autobiographical memory and adult attachment are thus tentative.

The limitations of our study suggest a number of topics for future research. To enable a closer examination of the relation between autobiographical memory and AAI classifications, a test for accuracy of memory should be developed. In existing longitudinal studies that cover a substantial portion of the life span, enough material might have accumulated to enable construction of a memory test for non-attachment-related experiences as observed by researchers or as reported by

subjects in earlier sessions (e.g., Grossmann et al., 1988). Furthermore, future studies should test the AAI's stability over longer time intervals. Such studies would also provide the opportunity to test whether changes in AAI classifications can be systematically related to changes in subjects' life circumstances. Lastly, replication studies using low socioeconomic status samples, clinical groups, and samples from different cultures will be needed to assess the generalizability of our results.

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1

M. J. Bakermans-Kranenburg was trained in coding the AAI at the 1990 Charlottesville, Virginia, workshop conducted by Mary Main and Erik Hesse. M. H. van IJzendoorn received his training at the 1988 Charlottesville workshop conducted by Mary Main, Erik Hesse, and Mary Ainsworth. Both participated in the advanced workshop led by Mary Main and Erik Hesse in Leiden, The Netherlands, in 1991.

2

In this article, all cross-tabulations with expected frequencies less than five in more than 20% of the cells were reanalyzed with the computer program Fisher (<u>Verbeek & Kroonenberg, 1985</u>, 1990), which computes the exact significance level for the chi-square test and in some cases a Monte Carlo estimation of the significance level. In cases of discrepant results, we present exact *p* values. (The program was obtained from iec *pro* GAMMA, P. O. Box 841, 9700 AV Groningen, The Netherlands.)

3

Relations between categorical classifications and continuous measures were investigated by means of a multivariate discriminant function analysis. Traditionally, multivariate analysis of variance is used in experimental settings, whereas multivariate discriminant function analysis is more often applied in correlational studies of existing groups. Both techniques are of course based on similar statistical principles (<u>Kerlinger & Pedhazur, 1973</u>).

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Table 1.

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Table 2.

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