The Adult Attachment Interview: coherence & validation in adolescents

Beijersbergen, M.D.

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Chapter 1

General Introduction

History of attachment theory

In the 1940s, John Bowlby started to develop attachment theory. Observations of young children being separated from their mothers led him to emphasize the importance of the mother-child relationship (Cassidy, 1999). Early writings on attachment have mainly focused on young children. However, Bowlby (1973) stressed the role of attachment across the lifespan, "from the cradle to the grave": "*For not only young children, it is now clear, but human beings of all ages are found to be at their happiest and to be able to deploy their talents to best advantage when they are confident that, standing behind them, there are one or more trusted persons who will come to their aid should difficulties arise. The person trusted provides a secure base from which his (or her) companion can operate.*" (p. 359). Attachment relationships thus remain important during adolescence and adulthood.

A move to the level of representation

Until the call by Main, Kaplan and Cassidy (1985) to "move to the level of representation" in attachment research, individual differences in attachment relied on the observation of an infant's nonverbal behavior during the stressful Strange Situation Procedure (SSP; Ainsworth, Blehar, Waters, & Wall, 1978). On the basis of Bowlby's (1973, 1980, 1982) description of attachment as a working model or mental representation Main and colleagues (1985) suggested to operationalize individual differences in adult attachment as differences in mental representations of the self in relation to attachment as they emerged from autobiographical narratives about childhood attachment experiences. This approach paved the way for investigating attachment in older children and adults. While in infancy attachment classifications were based on observations of nonverbal behavior, verbal behavior was now suggested to have the potential of being a window to attachment representations (Main et al., 1985). The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; Hesse, 1999; Main, Goldwyn, & Hesse, 2003) was developed to derive an adult's overall state of mind with respect to attachment from the coherence of his or her narrative about attachment experiences in the past.

Development of the AAI

The AAI was first administered in a study of Main, Kaplan and Cassidy (1985) focusing on the relation between parents' attachment representation and infants' strange situation classification 5 years earlier. While reviewing early AAI transcripts, Main was able to correctly predict SSP classifications in many cases (see Hesse, 1999 for an overview). However, no rule system for coding the AAIs had yet been developed. Main and Goldwyn developed a formal AAI coding system using 44 AAI transcripts of the Berkeley longitudinal study. With feedback from the SSP classification of the infant, the coding system was adjusted and revised after categorization of each parent's AAI transcript. The remaining 66 transcripts of the Berkeley study were coded without feedback from SSP classifications. In this second sample, it was found that parents with a secure attachment representation most frequently had infants who had been classified secure in the SSP five years earlier (Main, Hesse, & Kaplan, 2005; Main et al., 1985).

Later it was discovered that lapses in de monitoring of reasoning and discourse during discussions of loss or trauma during the AAI were related to disorganized infant classifications in the SSP. In a subsample of 53 mothers from the Berkeley longitudinal study, it was found that 16% of the mothers who did not show such lapses in discourse had infants who were disorganized, while 91% of the mothers who showed significant lapses did have infants who were classified disorganized 5 years earlier (Main & Hesse, 1990). The unresolved classification thus also showed high correspondence between unresolved attachment in mothers and disorganized attachment in their infants.

Since then a large number of studies has examined the concordance in attachment of parents and their children (e.g., Pederson, Gleason, Moran, & Bento, 1998; Steele, Steele, & Fonagy, 1996). In a meta-analysis Van IJzendoorn (1995) showed that parents transmit their attachment representation to their children. This transmission takes place, at least partially, via parental sensitive responsiveness. Because the association between parental AAI classification and infant SSP classification is not fully explained by parental sensitivity, the existence of a transmission gap became clear.

The AAI protocol and classification system

The Adult Attachment Interview is an hour-long, semi-structured interview (George et al., 1996). After a warming-up question about the family setup, respondents are asked

to describe the relationship they had with their parents as a young child. Next, participants are probed to give five adjectives for the relation they had with each parent. For each adjective a specific incident is asked to support the adjective. Other questions concern being emotionally upset as a child, being physically hurt, and being ill. Then respondents are probed about the first time they were separated from their parents and whether they ever felt rejected by their parents. They are also asked how they think they are affected by their childhood experiences and whether there were any aspects that they would consider to be a setback to their development. Furthermore, individuals are asked why they think their parents behaved as they did. Some questions concern the loss of loved ones, experiences of abuse, and other traumatic experiences. The interviewer then focuses on changes in the relationship with the parents since childhood and how the relationship with the parents is currently. Finally, participants are asked to give three wishes for their own child for twenty years later and what they would hope their children would learn from being parented by them (George, et al., 1996; see also Hesse, 1999).

On the basis of verbatim transcripts of the AAI, individuals are judged as having a secure (F), insecure-dismissing (Ds), or insecure-preoccupied (E) attachment representation (Main et al., 2003). Secure individuals are able to freely value their experiences and yet stay objective regardless of the nature of their experiences. When they describe their parents as warm or loving, they are able to support this claim with examples of specific incidents. When childhood experiences were not so positive secure individuals are reflective, thoughtful, and often implicitly forgiving.

Dismissing participants devalue the importance of attachment relationships and experiences. They tend to emphasize their own strength and independence. Parents are typically described in positive terms, while support is lacking or contradictory evidence is present. Dismissing participants deny or minimize possible negative influences of childhood experiences. For example, a participant may claim to have benefited from being often rejected by parents because it taught him to take care of him or herself (Main et al., 2003).

Preoccupied individuals are still confused and overwhelmed by early attachment relationships and experiences. They are not able to focus fruitfully on the questions; neither do they give objective descriptions of their childhood experiences. Preoccupied persons appear to be angry towards their parents, or their discourse is characterized by vague speech (Main et al., 2003). For example, a preoccupied individual can go on and on about a little mistake his mother made in the past, while also trying to get interviewer agreement by saying *“don’t you think that was ridiculous of my mother to do?”*

On top of their main classification, individuals might be classified as unresolved-disorganized (U) (Main et al., 2003). This classification is given when an individual

shows lapses in the monitoring of reasoning or discourse in reaction to loss or other traumatic events. An example of a lapse in the monitoring of reasoning when talking about a loss is when a participant indicates disbelief that the person is dead, by saying *"My father thinks I am a good mother"* while the father had died before the grandchild was even born. A participant who, for example, pays unusual attention to details of a funeral is showing a lapse in the monitoring of discourse.

When an interview transcript cannot be placed in one of the three organized categories, the interview is judged "cannot classify". This is the case when a transcript has strong characteristics of both the dismissing and preoccupied categories. For example, the participant may idealize mother while being angry with father. This category is rarely present in non-clinical samples (Main et al., 2003).

Coherence of discourse

While Main and Goldwyn's coding system first consisted of general content-oriented descriptions of the AAI categories, they also developed continuous scales which were mainly concerned with the discourse process, namely: coherence of transcript, coherence of mind, metacognitive monitoring, idealization, insistence on lack of memory, derogation of attachment, involving anger, passivity of thought processes, fear of loss of a child, unresolved loss, and unresolved trauma (see Hesse, 1999 for an overview). These state of mind scales were associated with the SSP, with coherence of transcript having the highest correlation with infants' attachment security. Main and Goldwyn (1998) defined coherence as "(…) *a connection or congruity arising from some common principle or relationship; consistency; connectedness of thought such that parts of the discourse are clearly related, from a logical whole, or are suitable or suited and adapted to context."* (p. 44). It was discovered that Main and Goldwyn's new focus fitted well with the work of the linguistic philosopher Grice (Hesse, 1999). Grice (1975) proposed that discourse is coherent when a speaker adheres to the following four maxims:

Quality:	be truthful, and have evidence for what you say
Quantity:	be succinct, yet complete
Relation/Relevance:[1]	be relevant
Manner:	be clear, brief and orderly

[1] Grice referred to this maxim as the maxim of relation. It is however better known as the maxim of relevance. In this thesis we will therefore refer to it as the maxim of relevance.

Secure participants are characterized by coherent discourse. During the AAI they are able to access and reflect on memories while simultaneously maintaining consistent and collaborative discourse (Hesse, 1996). Insecure individuals significantly violate Grice's maxims without licensing; they violate the maxims without directly appealing to Grice's Cooperative Principle or without appealing to the maxim of quality when violating one of the other three maxims (Mura, 1983). For example, a violation of the maxim of quantity is licensed when the participant says "I am sorry but I would rather not go into that". Dismissing participants typically violate the maxims of quality and quantity (Hesse, 1999). They are not able to give evidence for the positive evaluations they provide or even contradict themselves. Dismissing individuals are also very succinct, for example by claiming lack of memory. Preoccupied individuals tend to make transgressions of the maxims of quantity, relevance and manner. They tell long stories, focus on issues they are not asked for, and use angry or passive speech. The two different forms of insecure attachment representations are thus characterized by different forms of incoherent discourse (Main et al., 2003). The importance of the coherence scale in the AAI was also shown empirically by Waters, Treboux, Fyffe, and Crowell (2001) who found that the scale for coherence of transcript is the most important component of an empirically derived continuous security score.

The AAI as a research tool

The validity and reliability of the AAI has been established thoroughly in adult samples (Hesse, 1999). AAI classifications are predictive of parents' responsiveness to their children and of infant's attachment security (see for a meta-analysis Van IJzendoorn, 1995). Evidence for the discriminant validity of the AAI comes from research showing that AAI classifications are independent of memory abilities (Bakermans-Kranenburg & Van IJzendoorn, 1993; Sagi et al., 1994), intelligence (Bakermans-Kranenburg & Van IJzendoorn, 1993; Sagi et al., 1994; Steele & Steele, 1994; see for an exception Crowell et al., 1996), general discourse style (Crowell et al., 1996), and tendency to give social desirable answers (Bakermans-Kranenburg & Van IJzendoorn, 1993; Crowell et al., 1996). Finally, test-retest stability of the AAI is confirmed by four studies revealing that when AAIs are administered two times with a time of 2 to 22 months in between, stability of classifications is high (Bakermans-Kranenburg & Van IJzendoorn, 1993; Benoit & Parker, 1994; Crowell, Treboux, & Waters, 2002; Sagi et al., 1994).

To become a reliable coder of the AAI, a 2-week training institute and 30-case reliability check are necessary. Not only is becoming a reliable coder and coding

interviews time-consuming, all interviews also need to be transcribed verbatim before coding can begin. The AAI is thus a labor-intensive research tool (Hesse, 1999).

Nevertheless, the AAI has been applied in a large number of studies in many different countries (when only counting studies using Main et al.'s classification system, the AAI was applied to 105 samples; Van IJzendoorn & Bakermans-Kranenburg, in press). Researchers using the AAI have focused on a wide variety of topics and samples. For example, the AAI was used in studies on parent-child interactions (e.g., Roisman, Madsen, Henninghausen, Sroufe, & Collins, 2001; see Van IJzendoorn, 1995 for a meta-analysis on parental sensitivity), psychopathology (see Dozier, Stoval, & Albus, 1999 for an overview), and intervention effects (e.g., Bosquet & Egeland, 2001; Bakermans-Kranenburg, Juffer, & Van IJzendoorn, 1998). Samples included adults and adolescents with or without their children, parents, and romantic partners (e.g., Simpson, Rholes, Oriña, & Grich, 2002; Treboux, Crowell, & Waters, 2004). Some participants came from low socio-economic classes, others from middle or high socio-economic backgrounds (see Van IJzendoorn & Bakermans-Kranenburg, 1996 for an overview). Individuals were part of biological families or adoptive families (e.g., Caspers, Yucuis, Troutman, Arndt, & Langbehn, 2007; Irhammer & Bengtsson, 2004). Some of the participants belonged to clinical groups (see Van IJzendoorn & Bakermans-Kranenburg, in press for an overview). Overall, these studies have shown that the AAI has the potential of classifying persons as having a certain mental representation with respect to attachment in such a way that a wide variety of a person's behavior and personality may be predicted.

In an attempt to make the measurement of attachment representation less intensive and more easily accessible a number of self-report instruments have been developed such as the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987), and the Reciprocal and Avoidant Attachment Questionnaires for adults (West, Sheldon, & Reiffer, 1987; see for an overview Crowell, Fraley, & Shaver, 1999; Hesse, 1999). However, assessing unconscious processes by individuals' consciousness reports is difficult if not impossible. Studies investigating the association between self-reports and AAI classifications found no proof for the convergent validity of these instruments (De Haas, Bakermans-Kranenburg, & Van IJzendoorn, 1994; see for an overview Crowell et al., 1999; Hesse, 1999).

Alternatives to the AAI coding system

Although Main, Goldwyn, and Hesse's (2003) classification system is the "gold standard" to code AAIs, two alternative systems have been developed to analyze AAIs: Fremmer-Bombik's system (see Grossmann, Fremmer-Bombik, Rudolph, &

Grossmann, 1988) and Kobak's Q-sort (1993). Of these, Kobak's Q-sort is the most widely used. It consists of 100 items which are mostly derived from descriptions in Main et al.'s coding system. Each AAI transcript should be sorted by two persons, one of whom needs to be a reliable coder of Main et al.'s classification system. Participants may receive scores on the secure/anxious and deactivation/hyperactivation dimensions (Kobak, Holland, Ferenz-Gillies, Fleming, & Gamble, 1993) as well as for secure, dismissing and preoccupied attachment representations (e.g., Zimmermann, 2004). The overlap between AAI classifications based on Kobak's Q-sort and Main and Goldwyn's system ranges between 61% and 74% (see Hesse, 1999 for an overview).

This Q-sort has been used in studies reporting impressive findings; for example, relations have been found with mother-adolescent interactions (Kobak et al., 1993), physiological responses during the AAI (Dozier & Kobak, 1992), and symptom expression (Cole-Detke & Kobak, 1996). However, in contrast with Main et al.'s coding system, the unresolved and cannot classify categories cannot not be identified with Kobak's Q-sort. In addition, an individual's childhood experiences influence the dimension/representation score, whereas Main et al.'s (2003) system exclusively focuses on narrative form not content. This is an important difference because the childhood experiences a person describes during the AAI may be influenced by an individual's current mood (Roisman, Fortuna, & Holland, 2006). Kobak's Q-sort thus has two important disadvantages over Main et al.'s (2003) coding system.

Aims and outline of the dissertation

Although much research has been done with the AAI, many questions are still remaining. The current thesis aims to extend our insight in some of the potentials and limitations of the AAI. More specifically, the aim of the thesis is to find an answer to the following three questions:

(1) Do attachment experts, linguists and non-experts define coherence in attachment interviews differently?
(2) Is the AAI a valid instrument to measure attachment representation in adolescents?
(3) Do persons with divergent attachment representations differ in physiological responses to the AAI and to a mother-adolescent conflict interaction task (construct validity)?

In chapter two, we investigate whether attachment experts, linguists and non-experts define coherence in attachment interviews differently. If there is no difference in the definition of coherence by these groups, attachment interviews might be coded with a measure for coherence by other coders than attachment experts, or even with the help of advanced computer programs. The AAI would then become a more easily accessible and less labor intensive tool for researchers as well as for clinicians.

In contrast with application to adult samples (see Bakermans-Kranenburg, 1993, for the first systematic validation of the AAI), the psychometric properties of the AAI have not been examined systematically in adolescent samples even though the AAI has been used widely in these samples too. In the third chapter we test whether the AAI may also be applied to a group of adolescents. We examine whether adolescents' attachment representations are related to mothers' sensitive responsiveness, mother-adolescent interactions patterns, perceived support, and emotional investment in others versus in self. As a test of the discriminant validity of the AAI we examine possible associations of attachment classifications with temperament and intelligence.

In chapter four, we investigate whether AAI classifications are related to differences in stress regulation during the AAI and during a mother-adolescent conflict interaction task. We hypothesize that during the AAI dismissing individuals may experience more stress than secure individuals because of their defensive strategy. During the conflict interactions task dismissing as well as preoccupied participants are expected to be more stressed than secure individuals.

The results of this series of studies are summarized and discussed in the last chapter. Finally, we describe limitations of our studies and directions for future research.

Chapter 2

The Concept of Coherence in Attachment Interviews: Comparing Attachment Experts, Linguists, and Non-Experts

Beijersbergen, M.D., Bakermans-Kranenburg, M.J., & Van IJzendoorn, M.H. (2006). *Attachment & Human Development, 8,* 353-369.

Abstract

Coherence is a central construct in attachment interviews. Nevertheless, the concept has never been the main focus of a study in the attachment field. The present study examined whether coherence in attachment interviews is defined differently by experts trained in attachment theory, by linguists, and by non-experts. The 72-item Coherence Q-sort (CQS) was used to determine the profile of a prototypical coherent interview. Results indicated that attachment experts could be reliably distinguished from the (combined) other groups: attachment experts emphasized quality and manner more than all other groups, linguists emphasized quantity and relevance more than attachment experts, and higher educated non-experts valued relevance more than attachment experts. Defining coherence in attachment interviews is thus more than just applying Grice's linguistic maxims; expertise in attachment theory is critical for defining interview coherence. Consequences for the coding of the AAI by non-attachment experts, as well as computer coding (im)possibilities are discussed.

Introduction

Coherence is a central construct in attachment interviews (Main, Goldwyn, & Hesse, 2003; Waters, Treboux, Fyffe, & Crowell, 2001; Zeanah, Benoit, & Barton, 1994). An essential feature of these interviews is that participants are asked for general evaluations of relationships and/or events as well as actual evidence supporting these evaluations. Examples of frequently used interviews in the field of attachment are the Adult Attachment Interview, (AAI; George, Kaplan, & Main, 1996; Main et al., 2003), the Current Relationship Interview (CRI; Crowell & Owens, 1996), and the Working Model of the Child Interview (WMCI; Zeanah, et al., 1994). Participants can be classified as having a secure or insecure attachment representation in the AAI and CRI, and having a secure or insecure representation of their infants in the WMCI. During these interviews participants are faced with two tasks: (1) producing and reflecting upon memories related to attachment while simultaneously (2) maintaining coherent discourse with the interviewer (Hesse, 1996). Adults with a secure attachment representation are able to fluidly shift their attention between these two tasks. Hesse (1999) suggested that this flexibility of attention may be a necessary prerequisite to sensitive and responsive caregiving.

When can discourse be called coherent? The linguistic philosopher Grice (1975) formulated a general principle for rational, coherent discourse, called the Cooperative Principle: “Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged” (p. 47). Four maxims fall under this principle, namely:

Quality:	be truthful, and have evidence for what you say
Quantity:	be succinct, yet complete
Relation/Relevance:[1]	be relevant
Manner:	be clear, brief and orderly

In coherent discourse, participants adhere to these four maxims. Grice (1975) proposed that the maxims are not arbitrary conventions, but rational principles for cooperative exchanges. Conversational participants seem to assume that, ceteris paribus and in the absence of indications to the contrary, the Cooperative Principle and the maxims will be observed. However, participants may sometimes fail to fulfill a maxim: they may quietly violate a maxim, opt out, face a clash of maxims, or flout a maxim. Mura (1983) noted that violations of the maxims are legitimate when they are

[1] Grice referred to this maxim as the maxim of relation. It is however better known as the maxim of relevance. In this paper we will therefore refer to relation as the maxim of relevance.

licensed by directly appealing to Grice's Cooperative Principle or by appealing to the maxim of quality when violating one of the other three maxims. An example of licensing a violation of the maxim of quantity is "I am sorry but I would rather not go into that". Of the four maxims, Grice (1975) suggested that quality might be seen as the most important maxim. The other maxims are supposed to be applicable only on the assumption that the maxim of quality is satisfied. Grice (1975, p. 46) also noted that a part of the maxim of quantity, be succinct, is perhaps not necessary because it will be covered by the maxim of relevance.

In attachment interviews, individuals are classified on the basis of the properties of their discourse. These properties are consonant with Grice's Cooperative Principle and the four maxims (Hesse, 1999). Discourse is called coherent when the participant is able to access and evaluate memories while simultaneously remaining truthful (quality) and collaborative (quantity, relevance, and manner) (Hesse, 1996). In the AAI, secure participants only marginally violate Grice's maxims. When a speaker commits transgressions of Grice's maxims, the interview discourse is considered less coherent. It should be noted that the protocol of the AAI is suggested to have the potential of surprising the unconsciousness. Because of the relative rapid pace of the interview and the many complex questions, ample opportunities are provided to violate Grice's maxims such as by contradictions (George et al., 1996). Insecure dismissing adults typically violate the maxims of quality and quantity. These adults are not able to give evidence for the positive evaluations they provide or even contradict themselves, and they may claim lack of memory. Insecure preoccupied adults tend to make transgressions of quantity, relevance and manner. They tell long stories, drift away from the main topic of the question and use angry or passive speech. The two different forms of insecure attachment representations are thus characterized by different forms of incoherent discourse (Main et al., 2003). The importance of the coherence scale in the AAI was shown empirically by Waters and colleagues (2001) who found that the coherence of transcript scale is the most important component of an empirically derived continuous security score.

Grice's maxims, which have been applied to the study of attachment, are rooted in the field of linguistics. In linguistics, Grice's maxims have been discussed extensively almost from the beginning (see Haberland & Mey, 2002, for a review). One major question is whether it is necessary to have four maxims. Horn (1989), for example, only focuses on two principles: the Q-principle (quantity) and the R-principle (relevance). Moreover, Sperber and Wilson (1995) posit in their theory of relevance that only one maxim is needed. They argue that everything said would be guided by the principle of relevance: what people say is relevant or else they would not say it. In their view of communication people try to minimize efforts and maximize rewards when processing information. This theory has received much support (Blakemore,

1987; Carston, 1987; Kempson, 1987) as well as much criticism (Giora, 1997; Levinson, 1989; Seuren, 1988). A frequent objection against the theory of relevance is that because of its emphasis on economically rational behavior, important factors that do play a role in human communication have been excluded (Hinkelman, 1987; Mey & Tabot, 1988). Wilks (1987, p. 735) for example argued that relevance "is always to someone" and cannot be defined objectively.

Despite the discussion surrounding Grice's maxims, some or all are still used in work on linguistics. Saygin and Cicekli (2002), for example, investigated the relation between Grice's maxims and the success of computers in imitating human language use by applying a variant of the Turing Test (Turing, 1950; for a review see Saygin, Cicekli & Alkman, 2000).[2] A computer, a human being, and an interrogator are involved in this test. The interrogator stays in a separate room and needs to find out which one of the two entities he or she is conversing with is the human. Saygin and Cicekli (2002) used conversation excerpts of the interrogator and the computer. Subjects were asked whether the computer was successful in imitating human language use and whether the conversational maxims were violated. It was found that violations of the maxims of quantity and relevance revealed the identity of the computer, while manner violations were seen as human-like.

Although coherence is a central construct in attachment interviews, most studies only report on attachment classifications. For example, it has been shown that attachment representation is associated with infant's attachment security, parent's sensitivity (Hesse, 1999; Van IJzendoorn, 1995), social adjustment (Crowell et al., 1996) and psychopathology (Patrick, Hobson, Castle, Howard, & Maughan, 1994; Rosenstein & Horowitz, 1996; see Dozier, Stovall, & Albus, 1999, for an overview). Some studies also use coherency scores. Fonagy, Steele, and Steele (1991) showed that in the AAI mothers of securely attached infants had the highest coherence scores, significantly distinguishing them from mothers of avoidant infants. Dickstein and colleagues found an association between parent's coherence during family narratives and (observed as well as self-reported) family functioning (Dickstein, St. Andre, Sameroff, Seifer, & Schiller, 1999). In a study on preschool coherence, a relation was found with infants' attachment security (Sher-Censor & Oppenheim, 2004). These studies demonstrate the existence of a link between coherence and other important attachment constructs.

Some researchers compared groups of clinical and non-clinical subjects to examine, among other things, whether they showed different levels of coherence.

[2] In the original Turing Test gender was an important issue. A man and a computer had to convince the interrogator that they were women. Later work with the Turing Test mostly ignored the gender issue (Saygin, Cicekli, & Akman, 2000).

Fonagy and colleagues (1996), for example, showed that psychiatric (non-psychotic) inpatients were less able to maintain coherent discourse than case matched control subjects. Upper middle-class subjects who had been psychiatrically hospitalized at age 14, were found to be less coherent in the AAI than control subjects when they were 25 years of age (Allen, Hauser, & Borman-Spurell, 1996). Recently, Barone (2003) found that a clinical group with borderline personality disorder had dramatically lower scores on coherence than the non-clinical group. Clinical and non-clinical groups, therefore, seem to differ in coherence of discourse in the AAI.

The AAI is a labour-intensive instrument: not only because of the coding process itself, but also because of the training necessary to become a reliable coder. Computer-based linguistic content analyses might make the coding of AAIs less time consuming and more accessible for non-attachment experts. Buchheim and Mergenthaler (2000) analyzed interview transcripts of 10 dismissing, 10 preoccupied and 20 autonomous adults with a text analysis computer program. They assessed (1) *emotional tone* by measuring the proportion of word forms which express affect, (2) *abstractness* by measuring the proportion of abstract word forms, e.g., words ending in -ness, -ment, or –tion, (3) *emotion-abstraction patterns* by looking at the interaction of emotional tone and abstraction, and (4) *referential activity* on the basis of the proportions of words standing for the concreteness, specifity, clarity and imagery of a text. Significant differences among the three attachment categories were found for emotional tone and referential activity. Dismissing adults scored the lowest on both aspects, while preoccupied adults scored the highest and autonomous adults scored in between. A discriminant analysis with emotional tone and referential activity as predictors correctly predicted membership of the three attachment groups in 60 percent of the cases (Buchheim & Mergenthaler, 2000).

Appelman (2000) also applied computer-based text analyses to AAIs, assessing emotional tone, abstractness and referential activity of the AAI fragments where the subjects are asked for adjectives describing the relationship with each of their parents and for evidence supporting those adjectives. Secure respondents scored higher on emotional tone and referential activity than insecure respondents, but no differences were found for abstraction. The dismissing and preoccupied transcripts did not significantly differ from each other on any of the linguistic measures.

Computer programs thus identified differences among the attachment groups. However, the programs did not assess coherence. Buchheim and Mergenthaler (2000, p. 403-404) noted that “neither the Emotion-Abstraction Patterns nor the CRA [CRA = Computerized Referential Activity] can measure this aspect.… mere consideration of the score on the language measures within the attachment groups is not suitable as a direct substitution of a complex discourse analysis of the AAI.” They proposed that future research should focus on identifying linguistic markers for

coherence. So far no new results with respect to measuring coherence with computer programs have been reported.

Despite the importance of coherence in attachment interviews, the concept has never been the main focus of a study on attachment. The purpose of the present paper is to examine whether people of diverse backgrounds define coherence differently. The question is whether coherence as referred to by attachment experts pertains to the same construct as when it is defined by linguists and non-experts, or whether the meaning of coherence is different for attachment experts who apply it to attachment interviews. If there is no difference in the definition and use of coherence among the various groups, attachment interviews might be coded with a measure for coherence by other coders than attachment experts, or even with the help of advanced computer programs.

It may not be necessary to have thorough knowledge of attachment theory and research to be able to observe coherence in attachment interviews. Knowledge of linguistics may be sufficient since attachment interviews are coded on the basis of properties of the discourse, which are consonant with Grice's maxims. Moreover, the question is whether training in Grice's maxims is necessary. Grice suggested that rational language use presupposes adhering to the four maxims. So it may even be that competent language users, without any education in attachment theory or Grice's maxims, are intuitively able to define coherence adequately. In contrast, it might be argued that competent language users may not be able to make their underlying assumptions explicit when defining coherence in attachment interviews. To get insight into this matter we have conducted an empirical conceptual study of coherence.

In the present study, the ideas of four groups of participants regarding coherence were compared: attachment experts, linguists, higher educated non-experts, and lower educated non-experts. In a preliminary analysis, we investigated the associations among the four maxims (quality, quantity, relation, and manner) of coherence. Since they represent different concepts, they were not expected to be strongly associated. We then examined whether we could correctly predict if participants were attachment experts or not. It was hypothesized that we would be able to distinguish the attachment experts from the combined other groups because of the difference in specific attachment-related expertise. Concerning the separate groups, we expected that it would be difficult to predict whether participants were attachment experts or linguists, because both have been educated in Grice's maxims. We hypothesized that we would be able to distinguish attachment experts from the two groups of non-experts, because of the difference in education regarding coherence. More specifically, it was expected that attachment experts would mainly differ from non-experts in emphasizing the maxim of quality. The maxim of quality is suggested by Grice as the most important maxim, so we expected that attachment

experts would emphasize this maxim more heavily than non-experts would do. Including a group of lower educated non-experts enabled us to test whether a certain level of education is a necessary or sufficient condition to describe coherence similarly to attachment experts. When, contrary to our expectations, both higher and lower educated non-experts cannot be distinguished from the attachment experts, we may conclude that every rational language user should be able to rate coherence in attachment interviews.

Method

Participants

Thirty two participants were involved in the present study: 9 experts in the field of attachment, 6 linguists, 8 higher educated (HE) non-experts, and 9 lower educated (LE) non-experts. The selection criterion for attachment experts was participation in an AAI Institute. This Institute is an intensive, two week training workshop in coding the AAI. During the training, attachment and coherence are central constructs. The linguists were required to have obtained a PhD in their field. The two groups of non-experts were required to lack any specific knowledge of attachment theory or linguistics. The educational level of the LE non-experts was senior secondary vocational education or higher vocational education and the HE non-experts' education was at PhD-level. Table 1 presents an overview of the background variables for all groups.

The attachment experts were all female and between 29 and 67 years old (M = 46.9 years, SD = 10.8). Six had the Dutch nationality, two were American and one was British. They had obtained a Master degree or PhD (M = 6.9, SD = 0.3, on a scale ranging from 1 = pre-school to 7 = post-doctorate/PhD) and had participated in an AAI Institute between 1995 and 2002. The linguists were male, aged 53 to 66 years (M = 57.3 years, SD = 5.0). Four of them were Dutch, one was Dutch/New Zealander and one had the Danish nationality. As indicated, they all had a PhD in linguistics. The group of higher educated non-experts consisted of eight women between 33 and 54 years of age (M = 41.6 years, SD = 8.1). All of them had the Dutch nationality, except for one, who was from New Zealand. They had completed a PhD. The group of lower educated non-experts consisted of two males and seven females. They were between 23 and 71 years old (M = 38.0, SD = 14.4). Eight of them were Dutch and one had the British nationality. The mean educational level of the LE non-experts was 4.4 (SD = 0.5).

Table 1

Background Variables of the Participants

Variable	Attachm experts	Linguists	HE non-experts	LE non-experts	Total
N	9	6	8	9	32
Female (%)	100.0	0.0	100.0	77.8	75.0
Dutch nationality (%)	66.7	83.3	87.5	88.8	81.3
Age (years)	46.9 (10.8)	57.3 (5.0)	41.6 (8.1)	38.0 (14.4)	45.0 (12.2)
Educational level[a]	6.9 (0.3)	7.0 (0.0)	7.0 (0.0)	4.4 (0.5)	6.3 (1.2)

Note. Attachm = Attachment. HE = higher educated. LE = lower educated. Standard deviations are shown in parenthesis.

[a]Educational level is assessed with a scale ranging from 1 = pre-school to 7 = post-doctorate/PhD.

The four groups of participants differed significantly with regard to age (F (3, 28) = 4.37, p = .01), gender (χ^2 = (3, N = 32) 22.96, p < .01), and educational level (χ^2 (3, N = 32) = 28.24, p < .01). The significant difference in educational level follows from the inclusion of lower educated non-experts in the sample.

Measures

Coherence Q-sort (CQS)

The Coherence Q-sort was developed as a measure for assessing coherence of discourse in interviews about attachment.[3] The instrument is based on the guidelines for scoring and classifying the AAI (Main et al., 2003). Four experts, who were trained in the AAI scoring and classification systems, each independently formulated 30 items indicating either coherence or incoherence. From this set of 120 items, 78 items were used in a pilot study of 32 interviews. During the pilot, items were adjusted when necessary and discarded when redundant. In addition, we added filler-items and items concerning the way in which the interview had been conducted. In its final state, the Coherence Q-sort consists of 72 items (see Table 4). Seven of these items are fillers and three items concern the interview protocol, the interview context, or the performance of the interviewer. The other 62 items pertain to coherence. More specifically, they refer to one of Grice's four maxims, as follows: 22 items concern quality, 10 items concern quantity, 8 items focus on relevance, and 22 items focus on manner (see Table 2). Examples of items indicative of the maxim of quality are "has evidence for what he says" and, as indicative of a violation of the maxim of quality, "contradicts himself during the interview without noticing". An item concerning quantity

[3] The developers of the CQS and the participants in this study are different persons.

is “answers in an extremely concise way”. Items indicative of relevance and manner are respectively “does not drift away from the main topic of the question” and “does not substitute nonsense words for parts of the sentences”.

The 72 items of the CQS are sorted into nine piles, ranging from *does not fit at all* with the interview to *fits very well* with the interview. The distribution of the items is forced and uniform, with eight items per pile.

Procedure

The participants were asked to sort the Coherence Q-sort for the hypothetically most coherent interview transcript (below referred to as ‘prototypical coherent interview’) such as the Adult Attachment Interview. Rather than giving the participants an interview transcript, we asked them to imagine what the ideally coherent interview would look like. They were informed that in these interviews participants are asked for general evaluations of relationships and/or events as well as concrete evidence supporting these evaluations. Furthermore, we instructed them in Grice’s maxims and gave descriptive illustrations of violations of these maxims. Finally, they were asked to put the three items about the interview protocol, the interview context, and the interviewer in the middle pile, because these are not applicable when sorting the CQS for a prototypical coherent interview. Background information of the participants, such as gender, age, and educational level was obtained with a short questionnaire.

Reliability

As can be seen from Table 2, interrater reliabilities for coherence ranged from .67 for the lower educated non-experts to .86 for the attachment experts. The reliabilities for Grice’s maxims were satisfactory for all groups of sorters (see Table 2). For coherence as well as for the separate maxims, the reliabilities for the combined groups were also adequate.

Data-analysis

Items indicative of incoherence were recoded into reverse order, and scores for Grice’s maxims were calculated as the average score of the corresponding items. First, we calculated the correlations among the maxims. Second, means and standard deviations for each maxim were computed per group. For each group of participants ANOVAs and Kruskal-Wallis tests were conducted to examine whether the maxims differed significantly from each other. Finally, discriminant analyses were conducted to predict group membership from Grice’s criteria.

Table 2

Interrater Reliabilities of the CQS

		Interrater reliability			
Category	Items (N)	Attachm experts	Linguists	HE non-experts	LE non-experts
Quality	22	.87	.84	.64	.72
Quantity	10	.81	.86	.71	.67
Relevance	8	.88	.94	.75	.88
Manner	22	.85	.75	.63	.59
Coherence[a]	62	.86	.84	.67	.79

Note. The seven filler-items and the three interview items were omitted. Attachm = attachment. HE = higher educated. LE = lower educated.

[a]The Coherence scale consists of the items of the 4 scales (Quality, Quantity, Relevance, and Manner).

Results

Correlations

Table 3 shows the correlations among the four maxims. Relevance and manner were negatively correlated: participants who assigned higher values to manner, considered relevance of less importance.

Differences on Grice's maxims

Means and standard deviations per item are presented in Table 4, and means and standard deviations for each maxim are shown in Table 5. For each of the four groups of participants, ANOVAs and Kruskal-Wallis tests were conducted to examine whether the maxims were valued differently. Both parametric and non-parametric tests were significant for all groups (see Table 5 for parametric statistics[4]). Tukey post hoc tests revealed that attachment experts valued quality and relevance significantly more than quantity. Linguists and both groups of non-experts emphasized relevance more than the other three maxims. Finally, linguists gave more weight to quantity than to manner.

[4] Statistics of the non-parametric tests were similar to those of the parametric tests.

Table 3

Correlations between Grice's Maxims

	Quality	Quantity	Relevance	Manner
Quality	--	-.14	-.13	.24
Quantity		--	.26	-.25
Relevance			--	-.42*
Manner				--

Note. $N = 32$.

*$p < .05$.

Predicting group membership

Discriminant function analysis (DA) was performed using Grice's maxims as predictors of membership of two groups: attachment experts versus the combined other groups. The latter group consisted of linguists, higher educated non-experts and lower educated non-experts. In addition, with an exploratory aim, we conducted three discriminant analyses to distinguish the attachment experts from each of the other three groups separately. Although sample sizes of the groups were small (range: 6 to 23), DA could be performed because the sample size of the smallest group still exceeded the number of predictor variables (Tabachnick & Fidell, 2001). Evaluations of the assumptions of DA revealed no serious threat to multivariate analysis.

Table 4

Content Categories, Group Means, and Standard Deviations per Item

Item	Item description	Category	Attachm experts	Linguists	HE non-experts	LE non-experts
54	is consistent, that is, later information is consistent with earlier information	Qual	8.9 (0.3)	8.8 (0.4)	8.6 (0.7)	8.4 (0.7)
41	has evidence for what he says	Qual	8.8 (0.4)	8.5 (0.8)	8.6 (0.5)	8.0 (0.9)
61	uses fresh, authentic speech	Man	8.8 (0.7)	7.5 (1.2)	6.8 (1.2)	7.2 (1.5)
7	displays metacognitive monitoring, that is, reflects on the processes of thinking and recall that take place during the interview. For example '…Oh dear, that's completely contradictory to what I just said.'[a]	Qual	8.6 (1.0)	7.2 (1.0)	6.6 (1.8)	5.2 (2.5)
1	provides sufficient context for the interviewer to be able to understand the answers	Quan	8.3 (0.9)	8.8 (0.4)	8.6 (0.7)	7.8 (0.7)
42	reasonable evaluation of effects of experiences or events on self	Qual	8.3 (0.7)	7.3 (0.8)	7.8 (0.7)	7.7 (0.9)
24	provides adequate illustrations with general evaluations when asked for	Qual	8.2 (0.8)	8.7 (0.5)	8.4 (0.7)	7.8 (0.8)
20	is cooperative, for example keeps the interviewer informed about his reasoning	Qual	8.0 (1.1)	8.7 (0.5)	7.5 (0.9)	8.6 (0.7)
72	responds consistently, but with varied answers throughout the interview[b]	Qual	8.0 (1.1)	8.0 (0.9)	8.5 (0.8)	5.2 (3.2)
47	is involved in the interview without losing track of the interviewer	Quan	7.9 (1.1)	8.3 (0.8)	7.5 (1.2)	8.4 (0.7)
6	does not drift away from the main topic of the question	Rel	7.7 (0.5)	8.7 (0.5)	8.6 (1.1)	8.0 (0.7)
55	does not avoid answering a question by addressing another issue	Rel	7.7 (0.9)	7.8 (1.2)	7.9 (1.2)	6.7 (2.5)
68	the interview can easily be understood	Man	7.7 (1.1)	7.7 (1.5)	7.0 (1.8)	7.8 (1.1)

Item	Item description	Category	Attachm experts	Linguists	HE non-experts	LE non-experts
38	shows that he is still reflecting on some of his opinions	Qual	7.6 (0.9)	6.3 (0.5)	7.0 (1.6)	6.4 (2.5)
15	does not finish discussion of topic prematurely	Quan	7.3 (0.5)	8.7 (0.5)	8.0 (0.9)	7.4 (1.6)
17	talks about relationships in a spontaneous way	Man	7.3 (1.2)	6.2 (1.0)	7.1 (1.0)	7.0 (1.5)
40	presents a personal account of events	Man	7.3 (0.9)	6.8 (0.8)	6.9 (1.6)	7.2 (2.0)
65	does not substitute nonsense words for parts of the sentences	Man	7.3 (0.7)	6.3 (2.2)	6.6 (0.7)	7.2 (0.8)
9	no remarkable slips of the tongue, for example no slips of the tongue in which the person talked about is confused with the self[c]	Man	7.2 (1.1)	6.5 (0.8)	6.4 (0.9)	6.8 (1.4)
56	does not use exaggerated language in the context of the discourse	Man	7.2 (1.1)	6.8 (1.2)	7.3 (0.5)	7.2 (1.0)
59	does not trail off, finishes sentences	Man	7.2 (0.7)	7.2 (1.0)	7.5 (0.9)	8.2 (0.7)
63	reader agrees with evaluations of events and persons	Qual	7.2 (1.5)	5.5 (1.4)	5.5 (1.3)	6.2 (1.4)
2	varied description of (different) people, variation in thematic content of adjectives	Qual	7.0 (0.9)	6.5 (1.4)	6.0 (1.2)	7.0 (1.3)
57	corrects the interviewer when he incorrectly mirrors his answers	Qual	7.0 (1.3)	8.2 (1.2)	8.4 (0.7)	7.4 (2.2)
4	does not present exaggerated comparisons, as in ‘my childhood was like I was in prison’	Man	6.8 (1.0)	6.8 (0.4)	6.3 (1.4)	4.7 (2.3)
45	thinks before answering	Man	6.6 (1.0)	7.5 (0.5)	8.5 (0.5)	8.6 (0.7)
66	talks about ‘I’, not about ‘you’ and ‘we’	Man	6.6 (0.9)	5.2 (1.0)	6.6 (1.7)	5.4 (2.6)
14	uses colorful language	Fill	5.8 (0.4)	6.2 (0.8)	5.5 (1.1)	6.1 (1.6)
16	uses grammatically correct sentences	Fill	5.8 (0.7)	6.0 (1.1)	6.9 (1.0)	7.3 (1.3)
28	is humorous	Fill	5.8 (0.8)	6.5 (1.5)	5.8 (1.5)	6.1 (0.8)
27	frequently asks the interviewer to clarify questions	Fill	5.3 (0.9)	5.5 (1.9)	6.5 (1.3)	5.1 (1.9)
22	uses slang	Fill	5.1 (0.6)	4.2 (1.5)	4.0 (1.3)	3.2 (1.7)
53	frequently uses the word ‘however’	Fill	5.1 (0.6)	5.5 (0.8)	5.1 (1.1)	4.3 (1.2)
23	provides a factual story without emotional evaluations	Man	4.9 (0.8)	6.7 (1.0)	6.4 (1.2)	6.3 (2.1)

Item	Item description	Category	Attachm experts	Linguists	HE non-experts	LE non-experts
60	provides more information than needed	Quan	4.8 (0.8)	2.5 (1.0)	4.1 (2.0)	5.1 (1.5)
46	uses rude language	Fill	4.7 (1.4)	4.3 (1.0)	2.8 (1.3)	2.6 (1.7)
34	tells complex or long story	Quan	4.6 (0.9)	2.8 (0.8)	3.1 (1.8)	2.4 (1.1)
13	describes limited repertoire of events	Qual	4.0 (1.0)	4.2 (1.5)	3.9 (1.2)	5.7 (1.5)
35	is reluctant to speak	Quan	3.9 (1.4)	3.3 (1.2)	2.4 (1.1)	3.4 (1.7)
52	answers in an extremely concise way	Quan	3.7 (1.9)	5.2 (2.6)	7.1 (2.2)	5.3 (2.1)
18	fails to provide general description	Qual	3.6 (1.3)	3.8 (1.2)	3.6 (0.7)	3.2 (1.9)
21	discusses issues that are not relevant for the interview	Rel	3.4 (1.0)	1.8 (0.8)	2.4 (1.4)	2.6 (1.2)
49	often uses general statements, for example ‘my mother always took me to the swimming pool’ or ‘my mother is a nice person’	Qual	3.4 (0.7)	4.3 (1.4)	4.4 (1.3)	4.2 (1.0)
32	talks about persons or events that were not introduced	Man	3.0 (1.7)	2.5 (0.8)	2.9 (1.6)	4.0 (1.9)
37	uses long (not broken) sentences containing several different messages	Man	2.9 (1.1)	3.0 (0.9)	3.5 (1.9)	3.2 (1.9)
58	fails to recall events	Qual	2.9 (1.3)	2.5 (1.0)	2.8 (1.0)	2.6 (1.4)
62	frequently uses stopgaps or fillers rather than finishing (part of) a sentence, for example ‘… and this and that.’[d]	Man	2.9 (1.3)	3.2 (1.0)	3.3 (1.2)	3.3 (1.5)
69	upbeat endings to descriptions of negative aspects/events	Qual	2.8 (2.0)	5.7 (0.8)	3.4 (1.2)	3.4 (1.5)
8	tries to convince the interviewer	Man	2.7 (1.2)	4.7 (0.8)	5.1 (1.4)	5.4 (1.5)
11	often uses global evaluations without concrete illustrations	Qual	2.7 (1.0)	3.0 (0.9)	3.6 (1.1)	3.6 (1.7)
36	uses angry or accusative language	Man	2.7 (1.2)	3.2 (1.5)	2.8 (1.0)	2.1 (1.5)
70	repeats himself in answering different questions, without adding new information	Quan	2.7 (0.9)	1.8 (1.0)	3.3 (2.1)	3.2 (1.9)
48	is incomplete, that is, provides insufficient information	Quan	2.6 (1.0)	1.8 (1.0)	2.1 (1.6)	3.0 (1.2)

Item	Item description	Category	Attachm experts	Linguists	HE non-experts	LE non-experts
51	uses canned speech such as jargon, slogans and psychobabble	Man	2.6 (1.1)	3.3 (1.4)	2.8 (1.5)	3.4 (1.6)
5	goes on and on about a subject	Quan	2.4 (0.9)	2.2 (0.8)	2.5 (0.9)	2.9 (0.9)
44	answers as if he did not hear the question	Rel	2.4 (1.0)	1.7 (1.2)	1.6 (0.7)	2.0 (1.1)
50	often quotes (other) persons without introducing the quotation properly	Man	2.4 (1.2)	3.2 (1.2)	2.1 (0.6)	4.0 (1.8)
25	often forgets the question that started his response	Rel	2.3 (0.9)	1.8 (0.8)	2.0 (1.1)	2.4 (1.7)
30	circles around the subject, that is, does not come to the point	Rel	2.3 (1.2)	1.3 (0.5)	1.5 (0.8)	2.1 (0.8)
3	supports general evaluations with (other) general evaluations rather than with concrete illustration	Qual	2.2 (1.1)	3.8 (2.0)	4.0 (1.7)	3.8 (1.6)
10	uses non-logical explanations or interpretations	Qual	2.2 (1.1)	2.2 (1.0)	1.9 (1.1)	2.3 (1.0)
39	confuses past and present tense in talking about the past several times	Man	2.2 (1.1)	4.3 (0.8)	3.0 (1.4)	3.3 (1.5)
26	contradicts himself during the interview without noticing	Qual	2.0 (1.0)	1.2 (0.4)	1.8 (1.2)	2.0 (1.2)
31	changes evaluations within the interview without noticing	Qual	2.0 (0.9)	1.7 (1.2)	2.6 (1.4)	2.8 (1.3)
64	repeatedly brings up the same not-relevant issue	Rel	2.0 (0.9)	1.2 (0.4)	2.3 (1.3)	2.8 (1.5)
43	displays ‘mindreading’, that is, thinks that he completely knows other people’s motives	Qual	1.8 (0.8)	3.7 (1.0)	2.8 (1.3)	3.0 (1.1)
19	gets lost in the interview, loses sight of the interview context	Rel	1.7 (0.7)	1.3 (0.5)	1.6 (0.7)	1.1 (0.3)
71	is angry with the interviewer as if he is part of the story	Man	1.4 (1.0)	2.3 (1.5)	2.4 (0.9)	2.4 (1.7)
67	uses convoluted, entangled sentences that remain difficult to comprehend even after re-reading	Man	1.1 (0.3)	2.0 (0.9)	1.9 (1.1)	1.8 (0.7)

Item	Item description	Category	Attachm experts	Linguists	HE non-experts	LE non-experts
12	the interviewer conducts the interview appropriately, for example probes when necessary and does not ask suggestive questions	Interv				
29	the interview is conducted in an appropriate context, for example there are no interruptions by persons or a telephone	Interv				
33	the interview protocol consists of general questions to elicit a general description, and specific questions to elicit evidence for the description	Interv				

Note. Attachm = Attachment. HE = higher educated. LE = lower educated. Qual = Quality. Quan = Quantity. Rel = Relevance. Man = Manner. Fill = Filler. Interv = Interview item. Participants were instructed to put interview items in pile 5 since there was no actual transcript for which the items were sorted; therefore, no means are presented for these items.

[a]recognition of an appearance-reality distinction; recognition of representational diversity; recognition of representational change; monitoring for, for example possible logical contradictions.

[b]consistent & varied -> item is placed high, consistent but not varied -> lower, not consistent but varied -> even lower, not consistent & not varied -> lowest.

[c]an example of a slip is 'I died when my father was 14'.

[d]'You know' does not fall into this category.

Table 5

Means and Standard Deviations for Grice's Maxims per Group

	Quality		Quantity		Relevance		Manner				
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*df*	*Post hoc*
Attachment experts	7.64	0.43	6.90	0.28	7.64	0.41	7.33	0.36	7.94**	3, 32	rel qual > quan**
Linguists	7.17	0.37	7.62	0.34	8.42	0.25	6.64	0.38	29.48**	3, 20	rel > qual man*** rel > quan** quan > man***
HE non-experts	7.19	0.37	6.95	0.52	8.14	0.39	6.86	0.28	17.51**	3, 28	rel > qual quan man**
LE non-experts	6.88	0.45	6.76	0.45	7.71	0.51	6.72	0.50	8.55**	3, 32	rel > qual quan man***
Others combined	7.07	0.42	7.05	0.56	8.04	0.49	6.75	0.39	33.18***	3,88	rel > qual quan man***

Note. HE = higher educated. LE = lower educated. Qual = Quality. Quan = Quantity. Rel = Relevance. Man = Manner.

**$p < .01$. ***$p < .001$.

Attachment experts versus combined other groups

When predicting group membership for attachment experts versus the combined other groups a significant function was found, χ^2 (4, N = 32) = 20.58, p < .01. Three of Grice's maxims significantly distinguished the attachment experts from the combined other groups (quality, relevance, and manner, see Table 6). Quality (.61) and manner (.67) were the best predictors; relevance had a somewhat lower loading (-.38) on the discriminant function. Attachment experts ranked quality and manner items higher than the combined other groups, whereas the combined other groups assigned more weight to relevance than attachment experts. With the jackknifed classification procedure, 27 participants (84.4%) were classified correctly. There were no attachment experts among the incorrectly classified participants.

Attachment experts versus separate groups

Discriminant analyses were also performed for attachment experts versus linguists, attachment experts versus HE non-experts, and attachment experts versus LE non-experts, to explore the specific differences between these groups. First, the attachment experts could be reliably separated from the linguists, χ^2 (4, n = 15) = 23.36, p < .01. All four maxims were significant predictors. Attachment experts scored higher on quality and manner than linguists, whereas linguists emphasized quantity and relevance more than attachment experts. When classifying these participants in one of the two groups, all but one (n = 14, 93.3%) were correctly classified. The participant who was classified incorrectly was a linguist.

When distinguishing attachment experts from higher educated non-experts, a significant function was found (χ^2 (4, n = 17) = 16.19, p < .01) in which quality, relevance, and manner were significant predictors. Attachment experts had higher scores on quality and manner than the HE non-experts, whereas HE non-experts assigned more weight to relevance than attachment experts. The number of correctly classified participants was also high for this function: 14 out of 17 (82.4%). One attachment expert and two HE non-experts were incorrectly classified.

Finally, the attachment experts were reliably separated from the lower educated non-experts, χ^2 (4, n = 18) = 16.28, p < .01. Attachment experts emphasized quality and manner significantly more than the LE non-experts. Of the 18 participants, 17 (94.4%) were correctly classified. The only incorrectly classified participant was a LE non-expert.

Table 6

Discriminant Function Analyses of Grice's Maxims

	Attachment - Others combined		Attachment - Linguists		Attachment - HE non-experts		Attachment - LE non-experts	
Predictor	Corr	*F* (1,30)	Corr	*F* (1,13)	Corr	*F* (1,15)	Corr	*F* (1,16)
Qual	.61	12.06**	.22	4.81*	.37	5.16*	.61	13.21**
Quan	-.13	0.57	-.46	19.89**	-.04	0.06	.14	.66
Rel	-.38	4.77*	-.43	17.39**	-.43	6.74*	-.05	.10
Man	.67	14.80**	.36	12.65**	.49	8.99**	.50	8.84**

Note. Attachment = Attachment experts. Others combined = Combined other groups. HE = higher educated. LE = lower educated. Qual = Quality. Quan = Quantity. Rel = Relevance. Man = Manner. Corr = Correlations of predictors with the discriminant function.

*$p < .05$. **$p < .01$.

Discussion

The present study demonstrates that attachment experts can be reliably distinguished from the (combined) other groups with regard to defining coherence in attachment interviews. When examining the differences between attachment experts and each of the three other groups separately, we found that (1) attachment experts had higher scores on quality and manner than linguists, whereas linguists emphasized quantity and relevance more; (2) attachment experts assigned also more weight to quality and manner than higher educated non-experts, whereas higher educated non-experts had higher scores on relevance; (3) again, attachment experts emphasized quality and manner more than lower educated non-experts. Within group comparisons showed that attachment experts valued quality and relevance more than quantity, while all other groups gave more weight to relevance than to any of the other maxims. In contrast to our hypothesis, not only the HE and LE non-experts but also the linguists could be reliably distinguished from attachment experts. It seems that knowledge of Grice's maxims is not enough to define coherence in attachment interviews similarly to attachment experts; knowledge of attachment theory appears to set them apart from linguistic experts.

How can we explain the differences we found between the attachment experts and the other three groups? A possible reason for the stronger emphasis of attachment experts on quality may be that they have followed Grice (1975) more in his suggestion that quality can be seen as the most important of the four maxims.[5] In the Main et al. (2003) coding system quality also is heavily emphasized. In the field of linguistics, some researchers only distinguish relevance and quantity, whereas others consider relevance as the uniquely significant maxim. Relevance and quantity have therefore received much attention (see Haberland & Mey, 2002, for a review), which may have led linguists to emphasize quantity and relevance. Attachment experts scored also higher on quality and manner than both groups of non-experts. These maxims are possibly the most difficult to comprehend for participants who are new to this theory, and the non-experts may therefore have given less weight to these two maxims. The results of our study are in agreement with the findings of a study on computers imitating human language use (Saygin & Cicekli, 2002). Linguists and non-experts may have seen violations of manner as human-like and have therefore given less weight to this maxim, while stressing the maxims of quantity and relevance, which were indeed marked as violations uncovering the identity of the computer in Saygin and Cicekli's (2002) study.

[5] Note that as a consequence of the use of the q-sort methodology a group of participants cannot have higher scores on all maxims than any other group.

The different theoretical background of attachment experts and linguists might also explain the differences in their ratings of dimensions of coherence. In the AAI Grice's maxims are used not merely to assess coherence but also for the purpose of classifying adults as demonstrating a secure or insecure attachment representation. An important difference with linguists and non-experts is that in attachment interviews, attachment experts as coders try to infer the underlying defensive mechanisms used by the respondent to process attachment-related experiences (George & West, 2001; Main, Kaplan, & Cassidy, 1985). These processes operate mostly outside awareness (Bowlby, 1980; Main, 1990, 1999). Dismissing adults, for example, would typically show deactivation of the attachment system (Cassidy & Kobak, 1988; George & West, 2001; Solomon, George, & De Jong, 1995). These adults systematically exclude attachment-relevant information from the consciousness to minimize mental suffering (Bowlby, 1980; Main, 1999; Peterfreund, 1971). As a result, dismissing respondents are typically unable to give evidence for what they claim was a perfectly normal or very nice childhood. In these cases attachment experts may be likely to judge the interview as more incoherent than linguists, who may interpret this lack of evidence as common lack of memory. In contrast to what is the case for linguists, the concept of coherence might thus refer to an underlying psychological component when assessed by attachment experts in attachment interviews. This explanation can easily be tested, by systematically varying the type of interview that is considered, extending the range to non-attachment, non-psychological interviews.

The results of the current study have important implications for the application of q-sorts for coherence in attachment research. Coherence as measured by the CQS is not defined similarly by attachment experts and linguists or non-experts. It seems that the CQS cannot be applied to attachment interviews without training in attachment theory and research. Our study does not provide evidence that the CQS has the potential for making the scoring of AAIs more accessible for non-attachment experts. Future research should investigate whether psychologists and clinicians without specific training in the AAI define coherence similarly as attachment experts. When they do, there would be the opportunity to make the coding of attachment interviews more accessible for non-attachment experts by using the CQS. It is, however, an empirical question whether they are able to apply their psychological knowledge to the assessment of coherence in attachment interviews without specific training in coding attachment interviews.

Applying the concept of coherence to attachment interviews requires more than linguistic knowledge. It can therefore be concluded that the requirements for a computer program capable of coding AAIs are far beyond the current state of the art in computerized text analysis. Counting words that are indicative of expressed affect or measuring emotion-abstraction patterns only partially overlaps with analyzing

discourse characteristics and their psychological meaning. The possible underlying psychological component of coherence might be uncovered by asking attachment experts to think aloud (Ericsson & Simon, 1993) when coding AAIs. Vital rules might then be derived that can be imputed into computer programs. However, connecting general statements in the beginning of the interview with more specific evidence in later parts requires narrative competence still beyond the power of the computer. Coding AAIs will therefore remain an activity that, unfortunately, takes a lot of human effort.

Although the CQS may not be an easy alternative to the Adult Attachment scoring and classification systems (Main et al., 2003), an important aspect of the CQS might be implemented in the classification systems. The CQS distinguishes various aspects of coherence, whereas in the traditional coding system indications of coherence and incoherence are only summarized in one score on a 9-point rating scale. Additional 9-point rating scales may be developed for each of the four maxims so that the different aspects of (in)coherence can be assessed and examined. Such rating scales would make it possible to test whether violations of specific maxims are associated with specific types of parental insensitivity. Our study makes clear that the various maxims may indeed index different dimensions and these may be related to different behavioral implications.

This study also contributes to the discussion surrounding Grice's maxims as described in the Introduction. When inspecting the correlations between the maxims (range: -.42 to .26), it appears that coherence cannot be characterized by only one dimension. If the categorization of the items was somehow inaccurate, interrater reliabilities would have been lower and correlations higher. Therefore, the empirical evidence suggests that Grice's maxims cannot conceptually be reduced to one dimension. The unexpected negative association between manner and relevance might be a consequence of a choice participants made between content and form. The maxim of manner refers to the clarity of the words and sentences being used, while the focus of relevance is whether the content of an answer is in agreement with what the person is asked for.

In the present study the participants did not sort the CQS for an actual Adult Attachment Interview transcript. We asked the sorters what in their opinion were the characteristics of the ideally coherent interview, and this may not be identical to observing which maxims they actually would rely on when assessing the coherence of an interview transcript. This may be seen as a limitation of our study. However, differences among coders in the interpretation of (parts of) a real interview transcript would confound their scores with their definition of what is essential for coherence.

When interpreting the results it should be noted that this is a pilot study: an exploratory conceptual study on coherence in a relatively small sample. Future studies are needed to draw more definite conclusions. Nevertheless, our various analytical strategies point into the same direction: Defining coherence in attachment interviews is more than just applying Grice's linguistic maxims; expertise in attachment theory is determining the way in which coherence of attachment interviews is defined.

Chapter 3

Validity of the Adult Attachment Interview in Adolescents: Associations with Conflict Interactions, Emotional Investment, and Relational Support

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Abstract

The present study investigated the validity of the Adult Attachment Interview (AAI; Main, Goldwyn, & Hesse, 2003) in a sample of adolescents. Participants were 156 14-year-old adolescents, who were internationally adopted before 6 months of age. Construct validity of the AAI was apparent from the following: (1) during a conflict interaction task secure adolescents displayed more autonomy than dismissing adolescents, while mothers of secure adolescents showed more relatedness than mothers of insecure participants, (2) dismissing individuals invested emotionally less in others than secure and preoccupied adolescents, and (3) secure adolescents reported more relational support than insecure adolescents. Intelligence and perceived temperament were unrelated to attachment classification, supporting the discriminant validity of the AAI. In conclusion, the AAI appears to be a valid instrument to measure attachment representation in (adopted) adolescents.

Introduction

The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; Main, Goldwyn, & Hesse, 2003) is a widely applied instrument to measure current state of mind with respect to attachment. It has been used in clinical and non-clinical samples, and in adult as well as in adolescent samples (see for an overview Hesse, 1999). The validity and reliability of the AAI has been established extensively in adults (Bakermans-Kranenburg & Van IJzendoorn, 1993; Hesse, 1999; Van IJzendoorn, 1995). No systematic, psychometric study has yet focused on adolescents while an increasing number of studies using the AAI are conducted in this age group (e.g., Marsh, McFarland, Allen, Boykin-McElhaney, & Land, 2003[1]; Mayseless & Scharf, 2007; Roisman, Madsen, Henninghausen, Sroufe, & Collins, 2001; Zimmermann, 2004[1]). The present study investigates the validity of the AAI when administered to adolescents.

Attachment in Adolescence

An important developmental task for adolescents is to acquire independency of their parents (see Allen & Land, 1999, for an overview). Autonomy is suggested to be best developed in the context of a secure relationship with the adolescent's parents. Similar to infants, adolescents need to explore their environment while preserving relatedness with their attachment figures. Bowlby (1982) noted that the relationship between parents and older children becomes more complex in the sense that true collaboration as well as intractable conflict becomes possible. In a secure goal-corrected partnership parents and children constantly make adjustments to suit the other and at the same time make demands for themselves, resulting in a constant give and take (Bowlby, 1982, p. 355). Compared to younger children, adolescents have more cognitive capacities (Keating, 1990) and they are better able to differentiate between themselves and others (Bowlby, 1973). These capacities enable adolescents to reevaluate the relationship with their parents (Allen & Land, 1999). On the other hand, most adolescents are still living under their parents' roof and are financially dependent on their parents, which may interfere with the establishment of emotional autonomy and with objectively working through the relationship with their parents. Consequently, adolescents may react differently to the AAI compared to adults. Therefore, the validity of the AAI and the correlates of AAI classifications for adults may not be fully applicable to adolescents (Weinfield, Whaley, & Egeland, 2004).

[1] All studies in this chapter marked with "[1]" used Kobak's Q-sort to measure adolescent attachment.

The Adult Attachment Interview (AAI)

During the AAI participants are asked about their childhood experiences with their parents and how they think they were affected by them (Main et al., 2003). On basis of verbatim transcripts of the AAI, participants are judged as having a secure, dismissing, or preoccupied attachment representation. Secure individuals are characterized by coherent interview discourse. They are able to openly communicate about their childhood experiences and yet stay objective regardless of the nature of their experiences. Insecure persons significantly violate Grice's (1975) maxims of coherence without licensing these violations. Insecure dismissing individuals are typically unable to give evidence for the positive evaluations of their parents or they contradict themselves. Individuals with an insecure preoccupied mental representation are still confused and overwhelmed by their childhood experiences as indicated by angry or vague speech. If participants show a breakdown in strategy when talking about loss or trauma, they are classified unresolved on top of their main classification (Main et al., 2003).

Research Using the AAI with Adolescents

A substantive number of researchers have administered the AAI with adolescents (see for an overview Allen & Land, 1999). The normative distribution of attachment classifications in non-clinical adolescent samples appears to be 56% secure, 33% dismissing, and 11% preoccupied (Van IJzendoorn & Bakermans-Kranenburg, in press). This distribution differs only slightly from the distribution of non-clinical mothers, due to a marginal overrepresentation of dismissing classifications and an underrepresentation of preoccupied classifications.

Short-term stability of AAI classifications in adolescence has been examined with promising results. In a study on Italian adolescents, stability of the AAI classifications was considerable when 10-year olds were reassessed 4 years later (Ammaniti, Van IJzendoorn, Speranza, & Tambelli, 2000). Using Kobak's Q-sort (Kobak, Holland, Ferenz-Gillies, Fleming, & Gamble, 1993), Allen, Boykin-McElhaney, Kuperminc, and Jodl (2004) as well as Zimmermann and Becker-Stoll (2002) reported substantial stability of attachment representation from 16 to 18-years of age.

In several (but not all) longitudinal studies the attachment representations of adolescents have been found to be related to their attachment classifications in infancy and early childhood. The Berkeley longitudinal study of attachment was the first to relate infants' Strange Situation Procedure (SSP; Ainsworth, Blehar, Waters, & Wall, 1978) classifications to the AAI classifications at 19 years of age. Secure versus insecure infant attachment classifications predicted secure versus insecure AAI classifications. In cases where security status changed over the 19 year period, this

was related to intervening trauma (for an overview see Main, Hesse, & Kaplan, 2005). Hamilton (2000) found similar results. In a sample of 16-year old German adolescents, however, no direct relation was found between the SSP and the AAI as rated with Kobak's Q-sort methodology (Zimmermann, Fremmer-Bombik, Spangler, & Grossmann, 1997). In this study, continuity existed at the attachment behavior level from infancy to childhood (age 10) and at the representational level from childhood to adolescence. Three other studies (Lewis, Feiring, & Rosenthal, 2000[1,2]; Sagi-Schwartz & Aviezer, 2005; Weinfield et al., 2004) found no continuity between attachment in infancy and in adolescence. However, environmental influences were associated with (dis-)continuity of attachment. According to a recent meta-analysis continuity of attachment from infancy to adolescence seems to be the rule (Fraley, 2002) but lawful discontinuity exists as a consequence of developmental and environmental changes (Allen & Land, 1999).

Because attachment is transmitted from one generation to the next (Van IJzendoorn, 1995), maternal and adolescent attachment representations may be expected to show substantial concordance. Rosenstein and Horowitz (1996) indeed reported high similarities in attachment for the three-way classification in a clinical sample. Furthermore, parents with a secure mental representation have been documented to be more sensitive to their children than insecure parents (see Van IJzendoorn, 1995 for a meta-analysis) and sensitive parents more often have securely attached children (De Wolff & Van IJzendoorn, 1997). To our knowledge no study has tested the association between adolescents' attachment representations and their parents' sensitivity, although some studies involved constructs which are conceptually linked to sensitivity. These studies indicate a relation between adolescents' attachment representation and parent-adolescent interaction. For example, Allen and colleagues (2004) revealed that dyadic relatedness shown in conflict interactions between mothers and their 16-year-old children was related to adolescent attachment security as measured with Kobak's Q-sort at 16 and 18 years of age. Roisman et al. (2001) revealed that parent-child interactions at age 13 were associated with AAI classifications and AAI coherence at age 19.

The validity of the AAI for adolescents has been supported by studies relating adolescent attachment representation to developmental outcomes. For example, adolescents with a secure attachment representation display better personality functioning (Zimmermann & Grossmann, 1997[1]) and fewer behavior problems (Adam, Sheldon-Keller, & West, 1996; Lewis et al., 2000[1]). They also have more positive friendships (Mayseless & Scharf, 2007; Zimmermann, 2004[1]) and show better school adjustment (Bernier, Larose, Boivin, & Soucy, 2004).

[2] It should be noted that in this study a modified SSP was used to measure infant attachment.

Evidence for the construct validity of the AAI when applied to adolescents may also be found in the area of perceived support. Dismissing and preoccupied adolescents may report less support than secure adolescents because of the less satisfying relationships they have with significant others (Main, 1990). Evidence concerning the link between attachment and support is however inconclusive. For example, Kobak and Sceery (1988) found that dismissing adolescents reported perceiving less support than secure and preoccupied adolescents, whereas Zeanah et al. (1993) did not reveal a relation between (adult) attachment representation and perceived support.

More evidence for the construct validity of the AAI in adolescents may be found by examining the association between attachment representation and emotional investment in others versus in self. Because dismissing individuals emphasize their independence and dismiss the importance of attachment relationships (Hesse, 1999) they would be expected to emotionally invest less in others than non-dismissing individuals (see also Mikulincer & Shaver, 2007). Secure persons, in contrast, do value attachment relationships, and preoccupied individuals feel emotionally very dependent on others (Hesse, 1999) and may therefore invest more in others and less in themselves. No studies using the AAI have yet explored this issue.

Discriminant validity of the AAI in adolescent samples requires that AAI classifications are independent of intelligence and temperament. Three studies investigating the link with intelligence found no significant association (Rosenstein & Horowitz, 1996; Ward & Carlson, 1995; Zimmermann, Maier, Winter, & Grossmann, 2001[1]). De Haas, Bakermans-Kranenburg, and Van IJzendoorn (1994) showed that there was no association between AAI classification and temperament in an adult sample. However, this relation has not yet been investigated in an adolescent sample.

AAI and Adoptive Status

In the current study we administered the AAI with adopted adolescents. To date only three studies have reported on the AAI in adult adoptees, two of them with overlapping samples (Caspers, Cadoret, Langbehn, Yucius, & Troutman, 2005; Caspers, Yucuis, Troutman, Arndt, & Langbehn, 2007; Irhammar & Bengtsson, 2004). Irhammar and Bengtsson (2004) reported that the adoptees did not significantly differ from the norm group with respect to the distribution of attachment classifications. Secure attachment was related to adoption at a younger age. Furthermore, participants' self-esteem and mental health tended to be better in secure versus dismissing or preoccupied persons. The other two studies included more dismissing and fewer preoccupied individuals compared to the normative distribution, but this might (also) be due to the fact that they included adoptees who were originally

selected on the basis of the psychiatric status of their birth parents (Caspers et al., 2007). Biologically unrelated siblings showed 61% concordance of attachment, pointing at the importance of shared environment for attachment representation (Caspers et al., 2007).

The Present Study

This study is the first to systematically investigate the validity of the AAI in a group of adolescents. Construct validity of the AAI is tested by examining the associations with (1) maternal sensitivity, (2) mothers' and adolescents' autonomy-relatedness behaviors during conflict interaction, (3) adolescents' emotional investment in self versus others, and (4) adolescents' perceived support. We also investigate whether attachment is unrelated to temperament and intelligence, thereby examining the discriminant validity of the AAI.

Methods

Participants

Participants were 156 internationally adopted adolescents, who were involved in a study which started in infancy (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005; Beijersbergen, Bakermans-Kranenburg, Van IJzendoorn, & Juffer 2007; Jaffari-Bimmel, Juffer, Van IJzendoorn, Bakermans-Kranenburg, & Mooijaart, 2006). AAIs of two participants could not be coded due to technical problems. In addition, two AAIs were not classifiable because the adolescents were not able to understand the questions of the AAI as a consequence of (very) low IQ (IQs of 58 and 82, respectively). We therefore report on 152 adolescents.

Mean age of the adopted adolescents was 14.4 (*SD* = 0.53). Sixty-eight were male and 84 were female. They were adopted before the age of 6 months (*M* = 10.0 weeks; *SD* = 5.30) from Sri Lanka (*n* = 94), South Korea (*n* = 38), and Colombia (*n* = 20) to the Netherlands. The adoptive families predominantly belonged to middle-class or upper middle-class (Jaffari-Bimmel et al., 2006). At the time of birth of the children adoptive mothers were 33.1 years of age (*SD* = 3.55, *N* = 142), and fathers were 35.0 years old (*SD* = 3.55, *N* = 141).

Procedure

The adoptive families were randomly recruited through Dutch adoption organizations. When the children were 5, 6, 9, and 12 months old, the families were visited at home. At 12, 18, and 30 months the mothers and children came to the laboratory. At 7 years

of age, the families were again visited at home. The current study reports on the follow-up at 14 years of age. Adolescents participated in 3.5 hour home visits together with their mothers, except for four families where the fathers participated (because of divorce or death of the adoptive mother). Results were similar when these fathers were excluded from the analyses. During the home visits the AAI was administered with the adolescents, as well as an intelligence test and a test for emotional investment. Furthermore, the adolescents completed a support questionnaire and participated in a problem-solving and conflict interaction task with their mothers. The mothers were asked to complete a temperament questionnaire about their children. Informed consent was obtained from the adoptive parents at the start of the longitudinal study and again at each follow-up study. For the current study, the adoptive families were contacted first by letter and then by phone. At the start of the home visit, informed consent was obtained from the adoptive mother (or father, see above), and the adolescent was provided with an opportunity to assent or decline participating prior to the assessments. Procedures and measures of this study were reviewed and approved by the board of the Institute for the Study of Education and Human Development at Leiden University.

Measures

Adult Attachment Interview (AAI)

The Adult Attachment Interview (George et al., 1996; Hesse, 1999; Main et al., 2003) is an hour-long, semi-structured interview which assesses an individual's current state of mind with respect to attachment. In this interview respondents were asked about their childhood experiences with their adoptive parents and how they thought they were affected by them. Other questions concerned experiences of loss and trauma. Finally, respondents were invited to describe possible changes in the relationship with their adoptive parents since childhood and the current relationship with them.

Respondents' interview transcripts were classified as: secure (F), dismissing (Ds), or preoccupied (E). Secure individuals freely describe their experiences and yet stay objective regardless of the nature of their experiences. Dismissing individuals are typically unable to give evidence for the positive evaluations of their parents or they even contradict themselves. Individuals with a preoccupied representation use angry language when talking about their parents or their discourse is characterized by vague speech. The Unresolved classification may be given on top of a person's main classification when he or she shows lapses in the monitoring of reasoning or discourse (or reports extreme behavioral reactions) in reaction to loss or other traumatic events (Main et al., 2003). Participants also receive a score for *coherence of transcript*. This is a 9-point rating scale indicative of the consistency and collaboration

of the participant: adolescents with secure attachment representations have a score of 5 or higher while insecure adolescents have scores lower than 5 (Main et al., 2003). The AAIs were coded by the first author. For inter-rater reliability, 18 interviews were also classified by the third author. Inter-rater agreement was 78% (κ = .64) for three-way classifications (secure, dismissing, and preoccupied) and 83% (κ = .77) for four-way classifications (secure, dismissing, preoccupied, and unresolved). Intra-class correlation for the coherence scale was .71. Disagreements between coders were resolved by discussion.

Of the 152 adopted adolescents, 57 (37.5%) were secure, 62 (40.8%) dismissing, and 33 (21.7%) preoccupied. When the unresolved category was taken into account the following attachment distribution was found: 50 (32.9%) secure, 57 (37.5%) dismissing, 19 (12.5%) preoccupied, and 26 (17.1%) unresolved. The distribution of classifications of the current sample differed significantly from the normative distribution in non-clinical adolescent samples (Van IJzendoorn & Bakermans-Kranenburg, in press) for both the three-way distribution (χ^2 (2, N = 152) = 30.74, p < .01) and the four-way distribution (χ^2 (3, N = 152) = 15.36, p < .01). The adopted adolescents more often had an insecure attachment representation.

Maternal sensitive responsiveness

Mothers and adolescents were invited to participate in a 10-minute problem-solving task. The adolescents were asked to solve eight difficult puzzles (Tangram). The mothers were given the solutions of the puzzles and were asked to assist their children. The Erickson sensitivity scales (Egeland, Erickson, Clemenhagen-Moon, Hiester, & Korfmacher, 1990; Erickson, Sroufe, & Egeland, 1985) were used to measure maternal sensitive responsiveness. Mothers were rated on four 7-point rating scales: supportive presence, intrusiveness, sensitivity and timing, and clarity of instruction. The hostility scale was not included in the analyses because of low variance. One dyad was excluded from the analyses because the mother and adolescent misunderstood the task. The Erickson scales were originally developed for coding maternal sensitive responsiveness in early childhood. Stams, Juffer, and Van IJzendoorn (2002) adapted these scales for middle childhood. Test-retest reliability and convergent validity at this age were satisfactory (Stams et al., 2002). We adjusted the scales for use in adolescence by applying an age-adequate task and taking into account the more frequent verbal interaction between mothers and adolescents compared with the more frequent physical contact between mothers and children in (early) childhood.

Inter-coder reliability was tested on 30 cases. Intra-class correlations ranged from .91 (sensitivity and timing) to .95 (intrusiveness & clarity of instruction) (Jaffari-Bimmel et al., 2006). The four scales were highly correlated (range r .57 to .90, p < .01). A

principal component analysis pointed to a one-dimensional solution explaining 81% of the variance. The overall score for maternal sensitive responsiveness was computed by averaging the standardized scale scores (with intrusiveness reversed). Cronbach's alpha was .92.

Family Interaction Task (FIT)

Using a revealed differences task (Strodtbeck, 1951) we investigated the patterns of conflict interaction shown by the adolescents (see Allen et al., 2003; Kobak, Sudler, & Gamble, 1991). Mothers and adolescents were asked to discuss and try to reach consensus on an issue on which they disagreed. Examples of issues are money and grades. The interactions were coded using the autonomy and relatedness coding system of Allen and colleagues (1994). Mothers and adolescents each received scores ranging from 0 to 4 on four scales (derived from nine subscales): (a) *exhibiting autonomy* (states reasons clearly for disagreeing, confidence in stating thoughts and opinions) (b) *inhibiting autonomy* (recanting a position, overpersonalizing, pressures to agree) (c) *exhibiting relatedness* (validates/agrees/positively reacts to other person, engaged interaction), and (d) *inhibiting relatedness* (distracting/ignoring, hostile/devaluing statements). For both adolescents and mothers, the subscale 'recanting a position' was excluded from the inhibiting autonomy scale because it was not associated with the other subscale(s) due to lack of variance. Because the inhibiting autonomy and inhibiting relatedness scales were strongly correlated (adolescents $r = .72$, $p < .01$; mothers $r = .52$, $p < .01$), they were combined into one scale, *inhibiting autonomy-relatedness*. Internal consistencies of the final scales were moderate to high (range: .55 to .82). Mean inter-rater reliability between an expert and the two coders was .77 (range: .52 to .92, $n = 30$). Except for the reliability cases where scores from the coders were averaged, each mother-adolescent dyad interactive behavior was coded by one person.

In addition to the separate scales, principal component analysis was conducted deriving one factor from the six scales (three mother and three adolescent scales). The factor (explained variance 30%) was an index for *positive interaction* including the exhibiting autonomy and exhibiting relatedness scales of the mother and the adolescent (standardized before combined into one scale). Table 1 shows means and standard deviations for the FIT. Scale scores were missing for two dyads; in one case because no parent was present during the session, and in the other case as a consequence of technical recording problems of the procedure.

Table 1

Means and Standard Deviations of Indexes of Socio-Emotional Development, Temperament and Intelligence per AAI Classification

	F[a]	Ds[b]	E[c]	nonF[d]	Total[e]
Construct validity					
Maternal sensitivity	0.15 (0.88)	-0.15 (0.88)	0.02 (0.93)	-0.09 (0.90)	0.00 (0.90)
Adolescents					
Exhibiting autonomy	2.39 (0.69)	2.00 (0.75)	2.35 (0.84)	2.12 (0.79)	2.22 (0.76)
Exhibiting relatedness	1.65 (0.59)	1.64 (0.60)	1.67 (0.62)	1.65 (0.60)	1.65 (0.60)
Undermining autonomy-relatedness	1.07 (0.78)	0.86 (0.72)	1.03 (0.74)	0.92 (0.73)	0.98 (0.75)
Mothers					
Exhibiting autonomy	3.16 (0.64)	3.06 (0.57)	3.21 (0.65)	3.11 (0.60)	3.13 (0.61)
Exhibiting relatedness	2.18 (0.50)	1.93 (0.64)	2.00 (0.67)	1.95 (0.65)	2.04 (0.61)
Undermining autonomy-relatedness	0.93 (0.56)	0.91 (0.58)	1.06 (0.63)	0.96 (0.60)	0.95 (0.58)
Positive interaction	0.12 (0.59)	-0.15 (0.67)	0.07 (0.75)	-0.07 (0.70)	0.00 (0.67)
Emotional investment	.85 (.09)	.80 (.10)	.87 (.08)	.83 (.10)	.83 (.09)
Perceived support	0.16 (0.53)	-0.07 (0.62)	-0.12 (0.64)	-0.09 (0.62)	0.00 (0.60)
Discriminant validity					
Perceived temp	-0.05 (0.55)	0.04 (0.66)	-0.04 (0.65)	0.01 (0.65)	-0.01 (0.61)
Intelligence	100.8 (12.74)	100.4 (13.02)	100.5 (14.18)	100.5 (13.36)	100.6 (13.09)

Note. F = secure. Ds = dismissing. E = preoccupied. NonF = insecure. Temp = temperament.
[a]Range *n* = 53-57. [b]Range *n* = 55-62. [c]Range *n* = 31-33. [d]Range *n* = 86-95. [e]Range *n* = 140-152.

Relational Support Inventory (RSI)

The Relational Support Inventory (Scholte, Van Lieshout, & Van Aken, 2001) was used to measure relational support as perceived by the adolescents. The questionnaire consisted of 26 items constituting five scales: (a) emotional support (warmth versus hostility), (b) respect for autonomy (vs. limit setting), (c) quality of information (vs. withholding of information), (d) convergence of goals (vs. opposition of goals), and (e) acceptance. For each item adolescents gave separate scores for mother, father, sibling, and a close friend on a 5-point scale, ranging from *very untrue* to *very true*. If a participant had more siblings, they reported on the sibling closest in age. Principal component analysis revealed a one-dimensional solution (explained variance 38%). We therefore computed a total score for perceived relational support by averaging the standardized scores of all scales for all support providers. Internal consistency of this scale was high (α = .91).

Eggs in the basket

The *Eggs in the basket*-task (Topham, 1973; see also Burns & Dunlop, 2001) was used to measure emotional investment. The experimenter explained that each of the five baskets (equipped with nameplates) that were placed in front of the participant stood for a specific person: one for the self, one for the adoptive mother, one for the adoptive father, one for the sibling in the adoptive family (when there were more siblings, the one closest in age), and one for the birth mother. Eleven eggs were put into the self-basket. The adolescents were asked to distribute the eggs over the baskets: how much did they want to give to their adoptive mother, how much to their adoptive father, etc., and how much did they want to keep for themselves? We computed the proportion of eggs given to others as an indicator for emotional investment in others versus in self.

Perceived temperament

Mothers filled in the Dutch Temperament Questionnaire (Kohnstamm, 1984) for their children. This 19-item questionnaire is an adaptation of the Infant Characteristics Questionnaire (Bates, 1980; Bates, Freeland, & Lounsbury, 1979) and is scored on a 7-point scale. Items concern sociability, persistence, adaptability, and mood. For an age-adequate adaptation a few words were rephrased for the current sample of adolescents (Jaffari-Bimmel et al., 2006). An overall score for the adolescent's difficult temperament was calculated by averaging the standardized item-scores. Internal consistency of the overall scale was high (α = .91).

Intelligence
Intelligence was measured with three subtests of the Groningen Intelligence Test (GIT; Luteijn & Van der Ploeg, 1983), namely: cipher, enumerate words, and word matrices. Mean IQ score of the adopted adolescents was 100.6 (*SD* = 13.09; see Table 1).

Health condition at placement
Health condition at adoptive placement was an index for the health condition of the infant from birth to placement in the family (Stams et al., 2002). Information for this index was gathered in the first interview with the parents when the infants were 5 months old. Health condition at placement was calculated by the standardized summation of (a) birth weight, (b) incidence of prematurity, and (c) health problems at placement (reversely coded).

Socioeconomic status (SES)
Socioeconomic status of the adoptive families was assessed when the children were 7 years old, combining the educational and vocational background of both parents (for more details see Stams et al., 2002). Scores for SES correspond to socioeconomic strata as follows: 3 to 9 lower class, 9 to 12 middle class, and 12 to 16 upper-class. Mean SES of the families was 10.0 (*SD* = 2.65, *N* = 147).

Data-analyses

The security-insecurity distinction as well as the three-way and four-way attachment classifications were used in the analyses. In addition, the continuous AAI coherence scale was used. Adolescents who did not have a sibling, father or mother were excluded from the analyses for emotional investment. Following Keppel and Wickens' (2004) recommendation concerning extreme scores, we included outliers in the analyses. Results remained similar when outliers were changed into the next most extreme scores (Tabachnick & Fidell, 2001).

First, we investigated whether background variables such as gender and country of birth were unrelated to attachment classification and AAI coherence scores. Next, correlations between the autonomy-relatedness scales are reported. The associations between indexes of socio-emotional development, temperament, and intelligence were also examined. We then tested the construct validity of the AAI by examining the relations between attachment and sensitivity, autonomy-relatedness, perceived relational support, and emotional investment. Testing the associations with temperament and intelligence concerns the discriminant validity of the AAI. When overall analyses showed significant effects, post-hoc tests were used to examine how

groups differed from each other on the variable under investigation. In addition, when a multivariate analysis showed no significant effect while we held specific hypotheses, univariate analyses were conducted (see below).

Results

Preliminary Analyses

We examined whether attachment representation and AAI coherence were independent of gender, country of birth, SES, health condition or age at adoptive placement, and age at time of assessment. Attachment classifications and coherence scores were not associated with any of these variables.

Next, associations between the subscales of the FIT were investigated. Adolescents who displayed more relatedness displayed more autonomy (r = .30, p < .01) and less inhibiting autonomy-relatedness (r = -.24, p < .01). Adolescents who inhibited autonomy-relatedness more also displayed more exhibiting autonomy (r = .39, p < .01). The mother scales showed the same pattern of correlations (r = .19, p < .05; r = -.24, p < .01; r = .21, p < .05; respectively). Concerning the relations between the mother and adolescent scales, we found that: (1) adolescents who displayed more autonomy had mothers who displayed more relatedness (r = .27, p < .01) and more inhibition of autonomy-relatedness (r = .18, p < .05); (2) adolescents who showed more relatedness had mothers who showed more relatedness (r = .49, p < .01) and autonomy (r = .16, p < .05); and (3) adolescents who inhibited autonomy-relatedness had mothers who inhibited autonomy-relatedness as well (r = .33, p < .01).

Adolescents who experienced more support from others had more positive interactions during disagreements with their mothers (see Table 2). In addition, their mothers perceived them as having a less difficult temperament. Mothers who were more sensitive when their children were solving puzzles had more positive interactions during disagreements. Emotional investment in others and intelligence were not related to any of these variables.

Construct validity

Maternal sensitive responsiveness

Maternal sensitive responsiveness during the puzzles was not related to attachment classification (secure-insecure: t (148) = -1.56, p = .12; three-way classification: F (2, 147) = 1.56, p = .21; four-way classification: F (3, 146) = 0.37, p = .77). Maternal sensitive responsiveness was not associated with coherence of transcript either (r = .06, p = .45).

Table 2

Correlations between Indexes of Socio-Emotional Development, Temperament and Intelligence

	1.	2.	3.	4.	5.
1. Maternal sensitivity	-				
2. Positive interaction	.27**	-			
3. Emotional investment	.05	.12	-		
4. Perceived support	.01	.24**	.13	-	
5. Temperament	.15	-.08	-.06	-.34**	-
6. IQ	-.01	-.01	-.09	.07	-.09

Note. Range N = 129-151.

**p < .01.

Autonomy-relatedness

First, the relation between adolescents' autonomy-relatedness behavior and attachment representation was investigated. Using the secure-insecure distinction, a MANOVA showed no overall effect for adolescents' autonomy relatedness, F (3, 146) = 1.61, p = .19. However, we held a priori hypotheses regarding the different types of adolescents' interactive behaviors. Therefore, univariate analyses were conducted because they are more efficient in setting light on specific effects. In addition, univariate analyses have more power than multivariate analyses. If the sphericity assumption holds, which was the case in our analyses, ANOVA's may be preferred over MANOVA (Keppel & Wickens, 2004). Therefore, we also report results of univariate analyses. A significant effect was found for exhibiting autonomy, F (1, 148) = 4.35, p < .05, η^2 = .03. Secure adolescents displayed more autonomy than insecure adolescents (see Table 1). Further univariate analyses with the three and four-way classifications also revealed significant differences for the exhibiting autonomy scale (F (2, 147) = 4.56, p < .05, η^2 = .06; and F (3, 146) = 3.20, p < .05, η^2 = .06, respectively): secure adolescents showed more autonomy during interactions with their mothers than dismissing adolescents. Coherence was not related to adolescents' autonomy-relatedness behavior (exhibiting autonomy r = .13, p = .12; exhibiting relatedness r = .07, p = .38; inhibiting autonomy-relatedness r = .02, p = .82).

We also examined mothers' autonomy-relatedness behavior. Mothers of secure adolescents showed more relatedness during the conflict interaction task than mothers of insecure adolescents (t (138) = -2.36, p < .05; see Table 1). No differences were found on the exhibiting autonomy or inhibiting autonomy-relatedness scales (F (1, 148) = 0.22, p = .64; and F (1, 148) = 0.08, p = .78). Using the three and four-way classifications, no differences were found for mothers' behavior during the interaction with their adolescents (F (6, 290) = 1.27, p = .27; F (9, 351) = 1.07, p = .38). Mothers

who showed more relatedness tended to have adolescents with higher AAI coherence (r = .16, p = .06).

No significant differences in positive interaction appeared using the secure-insecure distinction (t (148) = -1.75, p = .08), three or four-way classifications (F (2, 147) = 2.73, p = .07; F (3, 146) = 1.97, p = .12). Adolescents with higher AAI coherence scores had more positive interactions with their mothers during disagreements (r = .16, p < .05).

Perceived relational support

Secure adolescents (M = 0.16, SD = 0.53) reported more relational support than insecure adolescents (M = -0.09, SD = 0.62; t (139) = -2.42, p < .05). No differences were found in relational support with the three- or four-way classifications (F (2, 138) = 2.96, p = .06; F (3, 137) = 2.48, p = .06). Coherence during the AAI was positively related to perceived support (r = .22, p < .01).

Emotional investment

Adolescents with secure or insecure attachment representations did not differ in emotional investment as expressed in the number of eggs they gave to others (t (138) = -1.14, p = .26). However, using the three-way classifications (F (2, 137) = 7.43, p < .01, η^2 = .10) we found that dismissing participants gave less eggs to others than secure or preoccupied participants (*mean difference* = -.05, SE = .02, p < .05; *mean difference* = -.07, SE = .02, p < .01; respectively). The four-way classification showed a similar significant difference between dismissing and preoccupied adolescents (*mean difference* = -.07, SE = .02, p < .05, η^2 = .08). Coherence was not related to emotional investment (r = .12, p = .16, N = 140).

Discriminant validity

Adolescents' attachment representation was unrelated to temperament (secure-insecure: t (150) = 0.65, p = .52; three-way: F (2, 149) = 0.41, p = .66; four-way: F (3, 148) = .67, p = .57). The correlation between coherence and temperament was not significant either (r = -.12, p = .13). Moreover, the attachment classifications were independent of intelligence for the secure-insecure split, three-way, and four-way classifications (t (149) = -.17, p = .87; F (2, 148) = .02, p = .99; F (3, 147) = .32, p = .81, respectively). Intelligence was not related to coherence either (r = .08, p = .33).

Discussion

The present study provides evidence for the construct validity of the AAI in adolescents. We found that during a conflict interaction task secure adolescents displayed more autonomy than dismissing adolescents, while mothers of secure adolescents showed more relatedness than mothers of insecure participants. With regard to emotional investment, it appeared that dismissing individuals invested less in others than secure and preoccupied adolescents. In addition, secure adolescents reported more relational support than insecure adolescents. Finally, perceived temperament and intelligence were unrelated to AAI classifications, supporting the AAI's discriminant validity.

As hypothesized, we found that dismissing adolescents invested emotionally less in others than secure and preoccupied adolescents. This finding supports the notion that dismissing individuals value relationships less than non-dismissing individuals. This may be a consequence of their experiences with rejection in the past when they turned to their parents for comfort (Main et al., 2003). Dismissing adolescents' attitude towards investment in relationships with important others may also be displayed in peer relationships and romantic relationships. Downey, Feldman, and Ayduk (2000) reported that romantic relationship investment was negatively related to avoidant attachment and positively related to ambivalent attachment as measured with the Adult Attachment Style Questionnaire (Levy & Davis, 1988).

The present study revealed that secure adolescents perceived more relational support than insecure adolescents. This is consistent with evidence that attachment security is usually related to more positive interactions with parents (e.g., Allen, Porter, McFarland, Marsh, & Boykin-McElhaney, 2005[1]; Allen, Porter, McFarland, Boykin-McElhaney, & Marsh, 2007[1]; Kobak et al., 1993[1]) and more positive relationships with friends (Mayseless & Scharf, 2007; Zimmermann, 2004[1]).

Contrary to our expectation, concurrent maternal sensitivity was not associated with adolescent attachment classification. The task we used to measure sensitivity might not have been ecologically valid for this age period. During adolescence solving difficult puzzles with your mother is not a regular situation. The conflict interaction task that was applied to measure autonomy-relatedness may be a more appropriate setting. As hypothesized, we did find differences in displayed relatedness between mothers of secure and insecure adolescents. Future research on mothers' sensitivity towards their adolescent children might include problem-solving situations which are regularly encountered by these dyads, for example helping with a difficult homework task.

Exhibiting autonomy and inhibiting autonomy-relatedness were related in our sample. Participants who tried to solve a disagreement with more positive strategies also used more negative ones. This rather unexpected outcome resembles Van Zeijl and colleagues' (2006) finding that mothers using more positive discipline strategies also used more negative discipline. These findings may indicate that participants who feel disappointed about the effects of one of the strategies tend to turn to the other.

The Adoptive Status of the Adolescents

The current sample is special because of the adoptive status of the adolescents. The distribution of attachment classifications in our sample differed from the normative adolescent distribution in that fewer participants had a secure attachment representation. This may (partly) be the consequence of the adoptive status of the adolescents. They experienced a separation from their birth parents and possibly also from other attachment figures. They may still experience the consequences of the loss of these persons even when they do not explicitly remember them. Additionally, their adoptive status may be an issue during adolescence in particular, because of the process of identity formation in this stage of life (Brodzinsky, 1990; Brodzinsky, Schechter, & Henig, 1992; but see Juffer & Van IJzendoorn, 2007). Caspers and colleagues (2007; Caspers et al., 2005) also found in their adoption sample a distribution which was significantly different from the norm distribution, although their sample included more dismissing and fewer preoccupied adopted adults.

The adopted adolescents in our sample may, nevertheless, not be too different from other adolescents. They were adopted at a very early age (before 6 months, at 10 weeks on average) and were not characterized by special needs. Their mean IQ score was not different from the norm for 14-15 year olds (t (150) = 0.57, p = .57). Finally, although they had less optimal scores for inhibiting autonomy-relatedness compared to a high school sample (Allen & Hauser, 1996), they exhibited more optimal autonomy behaviors compared to an academic low risk group (Boykin-McElhaney & Allen, 2001).

Interestingly, adolescents' AAI classifications were associated with mothers' relatedness during conflict situations, even though there was no genetic bond between the adoptive mothers and their children. This points to the importance of the environment for the development of attachment representations, which is supported by a study of Caspers and colleagues (2007) reporting 61% concordance in attachment representation of genetically unrelated siblings. In addition, Constantino et al. (2006) reported that for non-twin siblings the concordance in attachment representation was as strong as that for monozygotic twins.

Implications for Research, Policy, and Practice

In the last two decades, research has shown that insecure attachment representations as measured with the AAI are associated with psychiatric disorders (see for a meta-analysis Van IJzendoorn & Bakermans-Kranenburg, in press). Of the clinical individuals, fewer than 30% showed a secure attachment representation. Internalizing disorders seem to be associated with preoccupied and unresolved attachment classifications, whereas externalizing disorders tend to be related to dismissing and preoccupied attachments. The current study implies that the AAI may also be used with clinical adolescents (see for example Zegers, Schuengel, Van IJzendoorn, & Janssens, 2006). Administering the AAI with clinical adolescents who are followed over time (e.g., Allen, Hauser, & Borman-Spurell, 1996) may provide more insight in their development and may yield indications for successful interventions in this group.

Conclusion

In conclusion, the valid assessment of attachment representations with the AAI is not restricted to adults; our study showed the AAI's construct validity when used with (adopted) adolescents. A substantive next step would be to administer the AAI to adoptive parents. This would provide a unique opportunity to relate adopted children's attachment representation with their parents' attachment representation, and to test the intergenerational transmission hypothesis in a biologically unrelated sample of parent-adolescent dyads.

Chapter 4

Stress Regulation in Adolescents: Physiological Reactivity during the Adult Attachment Interview and Conflict Interaction

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Abstract

The current study examined whether adolescents' attachment representations were associated with differences in emotion regulation during the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996) and during a mother-adolescent conflict interaction task (FIT; Allen et al., 2003). Participants were 156 14-year-old adolescents. Dismissing adolescents showed less stress reactivity (as recorded with interbeat intervals) during the AAI than secure adolescents. However, during the FIT dismissing adolescents showed more stress. No differences in physiological reactivity were found between individuals with resolved or unresolved loss or trauma during the AAI or FIT. Our results indicate that dismissing adolescents may effectively use a defensive strategy during the AAI, but less so in direct conflict interaction with their attachment figure.

Introduction

According to attachment theory internal working models of attachment influence emotion regulation, both in (early) childhood and in adolescence and adulthood (Cassidy, 1994; Main, Kaplan, & Cassidy, 1985). Physiological parameters provide an excellent opportunity to test this hypothesized link (Spangler & Zimmermann, 1999), but research in this area is still scarce. Using physiological measures, the current study examined whether adolescents' working models of attachment (or attachment representations) are associated with their emotion regulation during two situations in which the attachment system is activated: during the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; Hesse, 1999; Main, Goldwyn, & Hesse, 2003) and during a dyadic (mother-adolescent) conflict interaction task (Allen et al., 2003; Kobak, Sudler, & Gamble, 1991; Strodtbeck, 1951).

Emotion regulation patterns can be seen as part of an adaptive strategy with the goal of maintaining the relationship with the attachment figure (Cassidy, 1994). Individuals are suggested to have flexible or inflexible styles of emotion regulation, developed as the result of particular caregiving histories. Infants with secure attachment relationships as well as adults with secure attachment representations are characterized by open, flexible emotional expressions (Bretherton, 1990; Cassidy, 1994). For example, during the AAI secure adults are able to talk coherently about positive as well as negative childhood experiences (Hesse, 1999). Individuals with insecure attachment representations typically show a restricted range of emotions. Dismissing persons are suggested to systematically suppress emotions; they would mask negative affect. Evidence for the nature of this defensive strategy is still limited. Nevertheless the first studies using physiological measures (Dozier & Kobak, 1992; Roisman, Tsai, & Chang, 2004) show that dismissing individuals experience stress although it is not displayed overtly. Preoccupied individuals, in contrast, heighten emotion expression (Main, 1990; Kobak, Holland, Ferenz-Gillies, Fleming, & Gamble, 1993). It has been hypothesized that they show greater negative reactivity than they would actually feel (Cassidy, 1994). Even though these emotion regulation strategies may be adaptive in the relationship with the attachment figure (not being rejected or gaining attention from an unavailable caregiver, respectively) they may be maladaptive in other contexts and have negative psychological and developmental consequences (Cassidy, 1994; Cassidy & Kobak, 1988; Main, 1990).

Internal working models of attachment may also have an impact on the regulation of attention. Dismissing individuals are hypothesized to systematically exclude attachment-relevant information (see Bowlby, 1980; Main, 1999). As a consequence, dismissing persons would usually be unable to give evidence for what they claim was

a perfectly normal or very nice childhood. Preoccupied persons, on the contrary, show a strong focus on attachment relationships and experiences (Hesse, 1999). Moreover, it has been suggested that during information-processing their attention is centered on negative emotions (Spangler & Zimmermann, 1999).

In contrast to individuals with organized attachment classifications, unresolved individuals show a momentary breakdown in their strategy (Hesse, 1999; Lyons-Ruth & Jacobvitz, 1999; Main et al., 2003). Adults are classified as unresolved when they show lapses in the monitoring of reasoning or discourse (or report extreme behavioral reactions) when talking about loss or other trauma (Main et al., 2003). These lapses are suggested to be indicative of a sudden absorption involving traumatic memories (Hesse & Main, 2006; Madigan et al., 2006). It has been proposed that these adults may be impaired in emotion regulation when confronted with traumatic experiences (Spangler & Zimmermann, 1999).

Emotions affect physiological responses (Brownley, Hurwitz, & Schneiderman, 2004; Dawson, Schell, & Filion, 2004; Hagemann, Waldstein, & Thayer, 2003). Physiological responses are a result of the activity of the autonomic nervous system (ANS) (Porges, 1995). This system consists of two subsystems: the parasympathetic nervous system (PNS) and the sympathetic nervous system (SNS). Both originate in the brainstem and influence the regulation of organs such as heart, lungs, and kidneys, as well as sweat glands, and blood vessels. The PNS is involved in growth and restorative processes in the body. The SNS promotes metabolic output as a reaction to challenges from the environment. This branch quickly mobilizes existing reserves of the body when a situation requires a fight-or-flight reaction. To get insight into the activity of the ANS in situations in which emotions are elicited, measures like interbeat interval (IBI), heart rate variability (RMSSD), and skin conductance level (SCL) have been used (Bradley, 2004). IBI is an indicator for the time between two consecutive beats of the heart. When a person is under stressful behavior challenge (or e.g., exercising) his or her heart rate may fasten, therefore, IBI will be shorter. RMSSD may be lower under the same challenge (Brownley et al., 2004). The level of electrodermal activity as indexed by SCL is influenced by increases and decreases in sweat in the eccrine sweat glands (Boucsein, 1992; Dawson et al., 2004). More emotional arousal will result in higher SCL levels (Bradley, 2004). It is important to note that these physiological measures are differentially influenced by the SNS and PNS: IBI is influenced by both (Brownley et al., 2004), while RMSSD is primarily influenced by the PNS (Hagemann et al., 2003), and SCL is influenced by the SNS (Dawson et al., 2004). These measures can provide a window on emotions that may or may not be expressed overtly.

In attachment research the potential of psychophysiological parameters is increasingly used for enhancing our understanding of emotion regulation in individuals

with different attachment patterns (e.g., Oosterman & Schuengel, 2007; Spangler & Grossmann, 1993; Sroufe & Waters, 1977; Stevenson-Hinde & Marshall, 1999; Zelenko et al., 2005). Only two studies, however, have examined physiological stress regulation during the AAI. Dozier and Kobak (1992) examined whether SCL reactivity during the AAI was associated with attachment representation. They hypothesized that deactivation (a strategy preferred by individuals with a more dismissing representation), as contrasted with hyperactivation (that is more characteristic of preoccupied representations) would be related to SCL because of its relation to behavioral inhibition (Fowles, 1980). Their findings revealed that individuals using deactivating strategies were indeed more stressed during the AAI, especially during questions concerning attachment-relevant memories and questions calling for reflection upon attachment relationships. Roisman et al. (2004) extended this line of research by including cardiovascular reactivity (as measured with IBI, pulse transmission time to the finger, and pulse transmission time to the ear) as well as skin conductance reactivity during the AAI. Convergent with their expectations, deactivation was related to SCL reactivity but not to cardiovascular reactivity (which is suggested to be indicative of behavioral activation, see Fowles, 1980). In conclusion, both studies showed an association between deactivation and increased stress during the AAI as indicated by sympathetic reactivity.

Differences in emotion regulation patterns may not only be evident during the AAI, they may also appear in other situations in which the attachment system is activated, such as in dyadic conflict interactions (Allen et al., 2003; Feeney & Cassidy, 2003). During discussions of disagreements with their parents, adolescents need to establish autonomy while also maintaining relatedness. In such conflict situations, secure individuals are supposed to be better able to balance exploration (e.g., autonomy strivings) and attachment (e.g., relatedness) than insecure individuals (Allen & Land, 1999). Roisman (2007) conducted a study on stress reactivity in adults during a discussion with their romantic partners. This study revealed that deactivation was related to SCL reactivity, while hyperactivation was associated with HR reactivity. Attachment security was related to less SCL reactivity during interactions with romantic partners. Respiratory sinus arrhythmia (RSA, an index of vagal tone, influenced by the parasympathetic branch) was not associated with attachment. No studies have yet investigated the link between attachment and stress reactivity during interactions between parents and their adolescent children.

The relation between attachment representation and patterns of interaction during conflict resolution has been examined before. Allen and Hauser (1996) reported that young adults' coherence of discourse during the AAI could be predicted from their mothers' promoting autonomy and relatedness 11 years earlier. Using Kobak's Q-sort (1993), Allen and colleagues (2003) revealed that dyadic relatedness

shown in conflict interactions between mothers and 16-year-old adolescents was related to adolescent attachment security. Kobak and colleagues (1993) demonstrated that secure adolescents and their mothers were characterized by less dysfunctional anger and less avoidance of problem-solving during conflict interactions. More dysfunctional anger as well as more maternal dominance was displayed in interactions between adolescents with deactivating strategies and their mothers. Secure adolescents appeared to show a balance between their mother's and their own assertiveness.

In the current study we examined physiological reactivity during the AAI and during an interaction task in which mothers and adolescents tried to reach consensus in an area of disagreement. It was expected that dismissing adolescents would experience more stress during the AAI than secure participants because of their hypothesized defensive strategy during the task of reflecting on early attachment experiences. In accordance with previous studies, no differences between preoccupied and secure adolescents were expected. Furthermore, unresolved individuals might show more reactivity during the questions concerning loss and (other) trauma. Regarding the conflict interaction task (FIT), we hypothesized that dismissing as well as preoccupied individuals would be more stressed than adolescents with secure attachment representations. No differences were expected between adolescents with resolved or unresolved states of mind since it seems unlikely that the interaction task on a disagreement would trigger memories of loss or trauma. Finally, it was expected that secure adolescents would show more autonomous-relatedness during conflict interaction than insecure adolescents.

Method

Participants

Participants were 156 14-year-old internationally adopted adolescents, who took part in a longitudinal study which started in infancy (Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005; Jaffari-Bimmel, Juffer, Van IJzendoorn, Bakermans-Kranenburg, & Mooijaart, 2006). We report on 152 participants, because in two cases the Adult Attachment Interviews (AAIs) of the adolescents could not be coded due to technical problems and two other AAIs were not classifiable because the respondents did not understand the questions due to (very) low intellectual level (IQs of 58 and 82, respectively).

Sixty-eight boys and 84 girls were involved in the current study (see Table 1). All children were adopted before the age of 6 months (*M* = 10.0 weeks; *SD* = 5.30). They came from Sri Lanka (*n* = 94), South Korea (*n* = 38), and Colombia (*n* = 20). The adoptive families predominantly belonged to middle-class or upper middle-class (Jaffari-Bimmel et al., 2006). Mean age of the adoptive mothers at the time of the birth of the children was 33.1 (*SD* = 3.55, *N* = 142) and of the adoptive fathers 35.0 (*SD* = 3.55, *N* = 141).

Procedure

The adoptive families were randomly recruited through Dutch adoption organizations. When the children were 5, 6, 9, and 12 months old, the families were visited at home. At 12, 18, and 30 months the mothers and children came to the laboratory. At 7 years of age, the families were again visited at home. During these visits mother-child interactions were observed, the child was involved in an intelligence test, and the mothers participated in an interview and completed questionnaires. The current study reports on the data collected at a follow-up at 14 years of age. Adolescents participated in 3.5 hour home visits together with their mothers, except for four families where the fathers participated (because of divorce or death of the mother). Results were similar when these fathers were excluded from the analyses. During the visits the AAI was administered with the adolescents, as well as an intelligence test. The adolescents also completed questionnaires and participated in an interaction task with their mothers. One questionnaire (used as baseline for the physiological measures during the AAI) and the AAI were completed in a separate room, without the mother present. A second questionnaire, used as baseline for the physiological measures during the FIT, was completed in the presence of the mother. During the entire session the adolescents were connected to the VU-AMS recording device (the Vrije Universiteit Ambulatory Monitoring System; AMS 36; Groot, De Geus, & De Vries, 1998; see also Jaffari-Bimmel, Van IJzendoorn, Bakermans-Kranenburg, Juffer, & De Geus, in press). Participants were informed that their heart rate and skin conductance level was monitored in order to examine whether particular aspects of the home visit were more stressful than other aspects.

Table 1

Descriptive Statistics: Demographics and Background Variables

	Secure[a] (*n* = 57)		Dismissing[b] (*n* = 62)		Preoccupied[c] (*n* = 33)		Resolved[d] (*n* = 110)		Unresolved[e] (*n* = 23)		Total[f] (*N*= 152)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Health condition at placement	.36	.14	.36	.14	.38	.11	.36	.14	.37	.13	.37	.13
Age at placement (in weeks)	9.9	5.40	10.6	5.45	8.8	4.77	10.1	5.40	9.3	4.57	10.0	5.30
Age at time of assessment	14.5	0.54	14.3	0.48	14.5	0.62	14.4	0.55	14.4	0.51	14.4	0.53
IQ	100.8	12.74	100.4	13.02	100.5	14.18	100.3	12.94	99.4	11.98	100.6	13.09
SES	10.0	2.60	10.1	2.64	10.0	2.82	9.8	2.79	10.5	2.18	10.0	2.65
Smoking	2.1	1.27	2.1	1.47	2.0	1.30	2.1	1.35	2.0	1.22	2.1	1.35
Number of sports	1.4	0.89	1.4	1.10	1.5	1.16	1.4	1.04	1.7	1.06	1.4	1.03
Number of words during AAI[g]	1907	599.0	1356	529.1	2823	1425.7	1821	998.5	2261	1095.3	1881	992.2
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Sexe (*N* male)	19	33.3	34	54.8	15	45.5	47	42.7	12	52.2	68	44.7
Country of origin												
Sri Lanka	31	54.4	38	61.3	25	75.8	66	60.0	16	69.6	94	60.9
South Korea	18	31.6	15	24.2	5	15.2	31	28.2	2	8.7	38	25
Colombia	8	14	9	14.5	3	9.1	13	11.8	5	21.7	20	13.2

Note. As we only included adolescents who did experience loss or trauma in the resolved and unresolved categories, the total *n* for this subgroup is 133.

[a]Range *n* = 54-57. [b]Range *n* = 61-62. [c]Range *n* = 30-33. [d]Range *n* = 108-110. [e]Range *n* = 22-23. [f]Range *N* = 147-152. [g]Number of words used during responses to AAI questions 6 to 11, except for 9a which is about abuse.

Measures

Adult Attachment Interview

The Adult Attachment Interview (AAI; Main et al., 2003) is an hour-long, semi-structured interview which assesses an individual's current state of mind with respect to attachment. In this interview respondents were asked about their childhood experiences with their adoptive parents and how they thought they were affected by them. Other questions concerned experiences of loss and trauma. Finally, respondents were invited to describe possible changes in the relationship with their adoptive parents since childhood and the current relationship with them. On basis of verbatim transcripts of the AAI the adolescents were judged as having a secure (F), dismissing (Ds), or preoccupied (E) attachment representation. The discourse of secure individuals is coherent. They are able to freely value their experiences and yet stay objective regardless of the nature of their experiences. Individuals with an insecure attachment representation significantly violate Grice's (1975) criteria for coherence. Dismissing individuals typically idealize their parents and claim lack of memory for their childhood. In rare cases they derogate their attachment experiences. Individuals with a preoccupied state of mind are still confused and overwhelmed by their childhood experiences. They are angry towards their parents or their discourse is characterized by vague speech (Main et al., 2003). On top of their main classification, individuals may be classified as unresolved-disorganized (U) when they show lapses in the monitoring of reasoning or discourse in reaction to loss or other traumatic events (Main et al., 2003).

Previous studies provided preliminary evidence for the validity of the AAI in adolescent samples. For example, continuity of attachment from infants' Strange Situation classifications (Ainsworth, Blehar, Waters, & Wall, 1978) to adolescents' AAI classifications has been reported (e.g., Hamilton, 2000; Main, Hesse, & Kaplan, 2005). In addition, adolescent attachment representations as assessed with the AAI were associated with several developmental outcomes in the predicted way (e.g., Adam, Sheldon-Keller, & West, 1996; Mayseless & Scharf, 2007). Although these studies usually involved adolescents with a mean age of 16 years or older, one study reported considerable stability of the AAI classifications when 10-year olds were reassessed 4 years later (Ammaniti, Van IJzendoorn, Speranza, & Tambelli, 2000). In addition, using Kobak's Q-sort (1993), Allen et al. (Allen, Porter, McFarland, Boykin-McElhaney, & Marsh, 2007; Allen, Porter, McFarland, Marsh, & Boykin-McElhaney, 2005) found associations between 14-year olds' attachment representations and mother-adolescent and father-adolescent interactions one year earlier. The validity of the AAI in (early) adolescence thus looks promising.

The AAIs were coded by the first author. For inter-rater reliability, 18 randomly selected interviews were also coded by the second author. Inter-rater agreement was 78% (κ = .64) for three-way classifications (secure, dismissing, and preoccupied) and 83% (κ = .77) for four-way classifications (secure, dismissing, preoccupied, and unresolved). Disagreements between coders were resolved by discussion. Intra-class correlation for the overall unresolved score was r = .89. Finally, a continuous dismissing score was derived by using the maximum score of an individual on the following scales: idealization of mother, idealization of father, derogation of mother, derogation of father, overall derogation of attachment. Intra-class correlation for the dismissing score was r = .71.

Of the 152 adopted adolescents, 57 (37.5%) were secure, 62 (40.8%) dismissing, and 33 (21.7%) preoccupied. Taking the unresolved category into account, the distribution was: 50 (32.9%) secure, 57 (37.5%) dismissing, 19 (12.5%) preoccupied, and 26 (17.1%) unresolved. The distribution of classifications in our sample differed significantly from the normative distribution in non-clinical adolescent samples (Van IJzendoorn & Bakermans-Kranenburg, in press) for the three-way distribution (χ^2 (2, N = 152) = 30.74, p < .01) as well as for the four-way distribution (χ^2 (3, N = 152) = 15.36, p < .01). In the current sample, the insecure categories were overrepresented while the secure category was underrepresented.

In order to test the validity of the AAI in the present sample, we investigated whether emotional investment in others versus self was related to adolescents' AAI classifications. Because dismissing individuals tend to emphasize their independence and dismiss the importance of attachment relationships (Hesse, 1999), they were expected to emotionally invest less in others than non-dismissing individuals who value attachment relationships (secure individuals) or feel emotionally very dependent on others (preoccupied individuals) (see Mikulincer & Shaver, 2007). Our findings confirmed this hypothesis (Beijersbergen, Van IJzendoorn, Bakermans-Kranenburg, & Juffer, 2007), providing additional support for the validity of the AAI when used with adolescents.

Attachment classification was not associated with gender, country of birth, socioeconomic status, health condition or age at adoptive placement, age at time of assessment, number of sports, smoking, or intelligence. A significant association was found between number of words used during the AAI and attachment classification, with preoccupied individuals using the most words, while dismissing individuals gave the shortest answers (F (2, 149) = 33.85, p < .01).

Family Interaction Task (FIT)

Using a revealed differences task (Strodtbeck, 1951) we investigated the patterns of interaction between adolescents and their mothers (Allen et al., 2003; Kobak et al., 1991). Mothers and adolescents were asked to discuss and try to reach consensus on an issue on which they disagreed. Examples of issues are money and grades. Before the discussion started, they listened to a tape (which had been recorded in absence of the mother) on which the adolescent stated his or her opinion about the disagreement, as well as the opinion the adolescent thought the mother had. Then they started the discussion. When they finished talking about the indicated topic before the 10 minutes were over, they were asked to continue the discussion by talking about another topic on which they disagreed.

The interactions were coded with the autonomy and relatedness coding system of Allen and colleagues (Allen et al., 1994). Adolescents received scores ranging from 0 to 4 on four scales (derived from nine subscales): (a) *exhibiting autonomy* (states reasons clearly for disagreeing, confidence in stating thoughts and opinions) (b) *inhibiting autonomy* (recanting a position, overpersonalizing, pressures to agree) (c) *exhibiting relatedness* (validates/agrees/positively reacts to other person, engaged interaction), and (d) *inhibiting relatedness* (distracting/ignoring, hostile/devaluing statements). The subscale 'recanting a position' was excluded from the inhibiting autonomy scale because it was not associated with the other two subscales as a consequence of lack of variance. Because the inhibiting autonomy and inhibiting relatedness scales were strongly correlated (r = .72, p < .01), they were combined into one scale, *inhibiting autonomy-relatedness*. The scales concerning exhibiting autonomy and exhibiting relatedness were not combined because the correlation between these scales was modest (r = .29, p < .01). The discussions were coded by two different coders who were unaware of other characteristics of the dyads and who were both trained by an expert who received training from dr J.P. Allen. Mean inter-coder reliability between the expert and the two coders was .79 (range: .68 - .92, n = 30). Internal consistency of the three major scales used in the analyses was adequate (exhibiting autonomy α = .82, exhibiting relatedness α = .60, inhibiting autonomy-relatedness α = .82).

Table 2 presents means and standard deviations of the autonomy-relatedness scales. Scale scores were missing for one participant because no parent was present during the session. The autonomy-relatedness scales for one other adolescent could not be scored because of technical problems with the recording.

Table 2

Scores on Autonomy-Relatedness Scales per Attachment Classification

	F (n =56)[a]	Ds (n = 61)[a]	E (n= 33)	nonU (n = 108)[b]	U (n = 23)	Total (N = 150)[c]
Exhib autonom	2.39	2.00	2.35	2.26	2.17	2.22
	(0.69)	(0.75)[c]	(0.84)	(0.78)	(0.71)	(0.76)
Exhib related	1.65	1.64	1.67	1.61	1.79	1.65
	(0.59)	(0.60)	(0.62)	(0.57)	(0.66)	(0.60)
Underm	1.07	0.86	1.03	0.94	1.10	0.98
autonom-related	(0.78)	(0.72)	(0.74)	(0.73)	(0.82)	(0.75)

Note. F = secure. Ds = dismissing. E = preoccupied. NonU = resolved. U = unresolved. Exhib = exhibiting. Autonom = autonomy. Related = relatedness. Underm = undermining. As we only included adolescents who did experience loss or trauma in the resolved and unresolved categories, the total n for this subgroup is 133.

[a]FIT is missing for one participant in this group. [b]FIT is missing for two participants in this group.

[c]*Mean difference dismissing-secure* = 0.39, *SE* = 0.14, $p < .05$.

Physiological measures

The VU-AMS recording device (Groot et al., 1998) was used to measure Interbeat Interval (IBI), Root Mean of the Squared Successive Differences (RMSSD, an index for heart rate variability), and galvanic Skin Conductance Level (SCL). These measures were selected to replicate (IBI and SCL) and extend prior work (RMSSD) by Dozier and Kobak (1992) and Roisman and colleagues (2004). Before placing the electrodes of the VU-AMS device, the adolescents rubbed their skin firmly with alcohol. Then three disposable ECG electrodes were placed on the chest: the first was placed at the jugular notch of the sternum, between the collarbones; the second was placed below the left breast, 4 centimeters (1.5 inch) under the nipple, between two ribs; the last electrode was placed at the right side of the chest between the lower two ribs. The SCL electrodes were placed on the thenar and hypothenar eminences of the palms of the hands. The VU-AMS device continuously recorded IBI. RMSSD was calculated based on the raw IBI data and was sampled every 10 seconds. SCL was sampled every 500 milliseconds. The quality of the signal and attachment of the electrodes were checked by online monitoring of the physiological data.

The VU-AMS device failed to record physiological data during one home visit. SCL recordings were unreliable for one participant, and another participant had unreliable physiological recordings during the AAI. For one adolescent the equipment failed to record physiology after the introduction of the FIT. The corresponding data was excluded from the analyses.

Physiological values during the answers to the following AAI questions were used in the analyses (George et al., 1996): (6) When you were upset when you were little, what did you do, what would happen? Can you think of specific incidents? Physically

hurt? Ill? (7) Could you describe your first separation from your parents? (8) Did you ever feel rejected as a child? What did you do? Do you think your parents realized they were rejecting you? (8a) Were you ever frightened or worried as a child? (9) Were your parents ever threatening with you – maybe for discipline or jokingly? (9a) Some people have memories of some kind of abuse. Did that ever happen to you, or in your family? (10) How do you think your overall experiences have affected your adult personality? (10a) Are there any aspects to your early experiences that you feel were a setback in your development? (11) Why do you think your parents behaved as they did, during your childhood? (13) Did you experience the loss of a parent or other close loved one? and (14) Have you had any other experiences which you would regard as potentially traumatic? These questions were selected because we expected that they would show the largest differences in physiological reactivity between the organized secure and insecure attachment strategies (e.g., questions 6 to 9 and 10 to 11) or between persons with an resolved or unresolved state of mind (e.g., questions 9a, 13, and 14). The last three minutes of the episode in which the adolescents were alone completing a questionnaire was used as baseline for the AAI. Because seven adolescents did not fill in the questionnaire, they could not be included in the analyses.

During the Family Interaction Task, physiological values were recorded for 4.5 minutes starting from the moment the dyad began the discussion. After 4.5 minutes a number of mothers and adolescents drifted away from the original task and began a conversation about non-problem issues, for example about the day at school. The last three minutes of the episode in which the adolescents completed a questionnaire in the presence of the mother was used as baseline for the FIT. Two adolescents did not fill in this questionnaire, and were therefore excluded from the analyses.

Implausible physiological values were deleted (Groot et al, 1998; De Geus, 1996). Physiological reactivity was calculated per AAI question for IBI, RMSSD, and SCL by subtracting means of the AAI baselines from the means during the selected AAI questions. Physiological reactivity during the FIT was computed by subtracting the FIT baseline from the means during the FIT. More reactivity, and thus more stress, is indicated by higher SCL, lower IBI, and lower RMSSD difference scores. Covariates (gender, country of birth, health condition or age at adoptive placement, age at time of assessment, SES, number of sports, smoking, intelligence, and number of words used during the AAI) were only included if they were associated with the dependent as well as the independent variables. Following Keppel and Wickens' (2004) recommendation concerning extreme scores, we included outliers in the analyses. Results remained similar when outliers were changed into the next most extreme scores (Tabachnick & Fidell, 2001).

Intelligence

Intelligence was included because it may affect heart rate: higher IQ has been associated with heart rate deceleration (Lewis & Wilson, 1970; but see Farrington, 1997, for an exception). The adolescents completed the abbreviated Groningen Intelligence Test (GIT; Luteijn & Van der Ploeg, 1983). The following three subsets were included: cipher, enumerate words, and word matrices. Mean IQ score was 100.6 (*SD* = 13.09).

Physical condition and smoking

Physical health and smoking influence heart rate (De Geus, Boomsma, & Snieder, 2003; Farrington, 1997; Vander, Sherman, & Luciano, 2001). We therefore asked participants in which sports they had been active in the previous year. Participants were also asked to rate on a five-point scale how much they smoked (1 = never to 5 = often).

Health condition at placement

Health condition at adoptive placement was used as an index for the health condition of the infant from birth to placement in the family (Stams, Juffer, & Van IJzendoorn, 2002). Information for this index was gathered in the first interview with the parents, which was conducted when the infants were 5 months old. Health condition at placement was calculated by the standardized summation of (a) birth weight, (b) incidence of prematurity, and (c) health problems at placement (reversely coded). Health problems at placement included for example symptoms of malnourishment, dehydration, anaemia or paratyphoid. Higher scores represent better health condition at placement. Mean score was 0.37 (*SD* = 0.13).

Socioeconomic status (SES)

Socioeconomic status of the adoptive families was assessed when the children were 7 years old, combining the educational and vocational background of both parents (for more details see Stams et al., 2002). Scores for SES correspond to socioeconomic strata as follows: 3 to 9 lower class, 9 to 12 middle class, and 12 to 16 upper-class. Adoptive families had a mean SES of 10.0 (*SD* = 2.65).

Data Analysis

First, analyses were conducted for physiological reactivity during the AAI. Linear mixed models were run with attachment representation, question, and the interaction between question and attachment representation as fixed effects. We also tested whether subject should be included as a random effect and which covariance

structure should be used for the error term. For each physiological measure the best fitting models were selected using Akaike's Information Criterion and log likelihood (Fitzmaurice, Laird, & Ware, 2004). Post-hoc tests were conducted to test whether secure individuals significantly differed from dismissing and preoccupied individuals with regard to physiological reactivity during the AAI. Finally, we calculated correlations between the dismissing score and physiological reactivity.

For the analyses concerning unresolved loss, we selected the participants who did report loss or trauma during the AAI (n = 133). Since all adolescents were adopted before the age of 6 months and they were asked about their own memories concerning loss or trauma, all reported experiences concerned post-adoption loss or trauma. Linear mixed model analyses were conducted with the classification unresolved with respect to loss or trauma, question, and the interaction between question and unresolved attachment as fixed effects. Correlations were calculated between the overall unresolved score (for either loss or other trauma) and physiological reactivity.

Next, physiological reactivity during the FIT was examined. We conducted the same analyses (three-way classifications and resolved versus unresolved classifications; dismissing score and unresolved score) as for the AAI data. Finally, reactivity during the selected AAI questions was averaged to compare reactivity during AAI and FIT. We tested whether one task was more stressful than the other, whether persons with different attachment classifications differed in reactivity during both tasks, and whether there was an interaction effect between task and attachment.

Results

Preliminary Analyses

With a MANOVA we tested for significant differences in autonomy-relatedness between adolescents with divergent attachment classifications. The overall effect was not significant (F (6, 290) = 1.60, p = .15). However, since we had a priori hypotheses regarding the different types of adolescents' interactive behaviors and the sphericity assumption held, univariate analyses (that are more powerful than multivariate analyses) were conducted (Keppel & Wickens, 2004). A significant effect was found for exhibiting autonomy (F (2, 147) = 4.56, p < .05). Secure adolescents (EM = 2.39, SE = 0.10) had higher scores on this scale than dismissing adolescents (EM = 2.00, SE = 0.10). Exhibiting autonomy during the FIT was also negatively associated with the AAI dismissing scale (r = -.18, p < .05). No association was found between the

dismissing scale and showing relatedness (r = -.03, p = .69) or inhibiting autonomy-relatedness (r = -.03, p = .68).

Unresolved and not-unresolved adolescents showed no differences in autonomy-relatedness scores (F (3, 127) = 2.42, p = .07). Moreover, none of the correlations between the autonomy-relatedness scales and the unresolved score in the group of adolescents who experienced loss or trauma (n = 131) was significant (exhibiting autonomy r = .06, p = .49; exhibiting relatedness r = .17, p = .06; inhibiting autonomy relatedness r = .16, p = .08).

Physiological Reactivity during the AAI

Means and standard deviations of the raw physiological data during baseline as well as during the AAI-questions are presented in Table 3. Neither secure, dismissing, and preoccupied participants, nor resolved and unresolved participants had significantly different baselines for IBI, RMSSD, or SCL. However, in the group who experienced loss or trauma, country of birth was significantly associated with mean SCL baseline (F (2, 120) = 5.34, p < .01). Adolescents adopted from Korea had higher baseline levels for skin conductance than adolescents from Sri Lanka.

Associations between physiological reactivity during the AAI and background variables

A significant relation was found between IBI reactivity and age at time of the assessment. Furthermore, RMSSD reactivity was related to smoking and gender. SCL reactivity was associated with the following variables: age at adoptive placement, age at time of assessment, country of origin, and number of words used during the AAI.[1]

For the adolescents who experienced loss or other trauma, we found a relation between IBI reactivity and intelligence. In this subgroup, SCL reactivity was associated with age at time of assessment, number of sports and number of words used during the AAI. Because number of words used during the AAI was related to SCL reactivity as well as to the three-way attachment classification, we used this variable as a covariate in all pertinent analyses.

[1] A table presenting all statistics concerning the relations between physiological reactivity and background variables for the total group as well as for the group who experienced loss or trauma is available upon request.

Table 3

Raw Physiological Values for the Baseline and AAI-questions

	IBI[a]		RMSSD[b]		SCL[c]	
Question	*M*	*SD*	*M*	*SD*	*M*	*SD*
Baseline	779.85	92.73	54.33	26.72	11.26	7.96
Upset	761.31	94.37	48.76	23.54	11.54	7.95
Separation	761.68	92.78	49.75	24.18	11.52	7.65
Rejection	779.64	99.11	50.69	25.77	11.39	7.44
Frightened	764.80	96.55	50.69	26.44	11.58	7.69
Threatened	776.75	101.40	50.74	26.60	11.62	7.55
Effects	770.32	95.10	50.19	23.93	11.73	7.50
Setback	780.90	105.11	52.98	28.35	11.54	7.47
Why behaved	769.39	96.14	51.24	26.41	11.65	7.49
Abuse	786.45	105.33	52.14	28.26	11.66	7.45
Loss	770.83	98.49	52.39	27.58	11.67	6.97
Other trauma	774.44	98.04	52.82	28.77	11.79	7.26

Note. IBI = Interbeat Interval. RMSSD = Root Mean of the Squared Successive Differences. SCL = Skin Conductance Level.

[a]*N* =150, except for baseline IBI (*N* = 141). [b]*N* ranges between 147 and 149, except for baseline RMSSD, (*N* = 139). [c]*N* = 149, except for baseline SCL (*N* = 142).

Differences between secure, dismissing, and preoccupied adolescents

A linear mixed model for IBI reactivity with a diagonal covariance structure and subject included as a random effect showed that attachment representation, question, and the interaction between question and attachment representation were all significant (F (2, 140) = 3.37, $p < .05$; F (7, 235) = 14.09, $p < .01$; F (14, 235) = 1.77, $p < .05$, respectively[2]). Adolescents appeared to be most reactive during the questions related to being upset and being separated (respectively M = 17.86, SD = 51.64; M = 18.12, SD = 50.79). In contrast, they showed least reactivity during the setback question (M = -2.17, SD = 53.97). Post-hoc tests revealed that dismissing participants showed less IBI reactivity than secure ones (*Mean difference* = -22.60, SE = 8.91, df = 140, $p < .05$) indicating that they were less stressed than secure adolescents (see Figure 1). No differences were found between secure and preoccupied adolescents (*Mean difference* = -6.29, SE = 10.84, df = 140, p = .99). Finally, the interaction between attachment and question revealed that for the questions on separation (t (201) = 2.27, $p < .05$) and threat (t (218) = 2.24, $p < .05$), preoccupied adolescents showed an increase in IBI reactivity (i.e., a decrease in difference score, indicating more stress) while secure individuals displayed a decrease in IBI reactivity.

[2] Corrected for multiple comparisons.

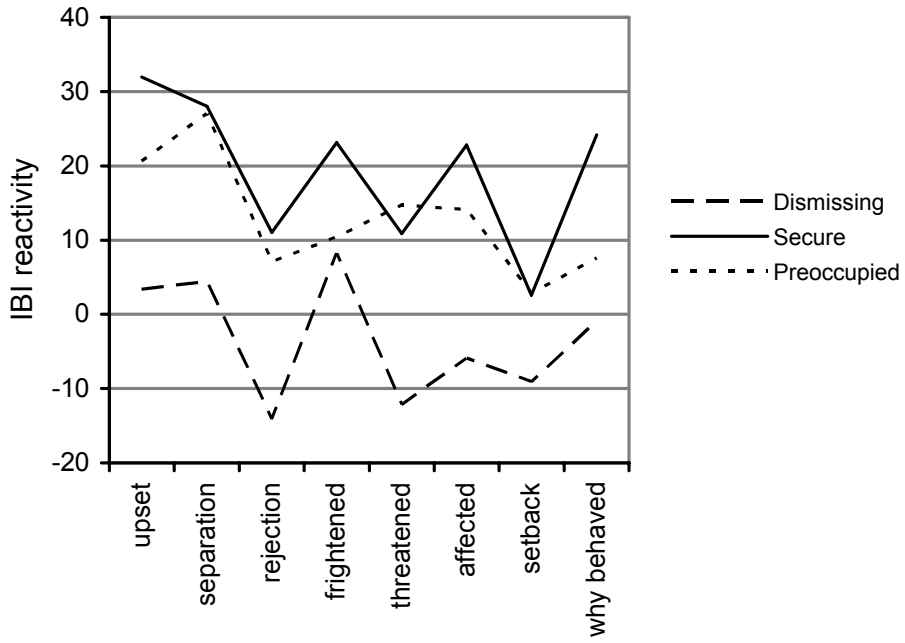

Figure 1
IBI reactivity of secure, dismissing, and preoccupied adolescents during the AAI

Adolescents with secure, dismissing, or preoccupied classifications did not differ significantly from each other on RMSSD reactivity (F (2, 137) = 0.81, p = .45) or SCL reactivity (F (2, 141) = 1.35, p = .26). Participants displayed more SCL reactivity during the question how they were affected by their childhood than during the question on rejection (*Mean difference* = 0.36, *SE* = 0.11, *df* = 585, $p < .05$). When the outliers were changed into the next most extreme scores, the adolescents also showed more SCL reactivity during the frightening and threatening questions than during the rejection question (*Mean difference* = 0.23, *SE* = 0.07, *df* = 912, $p < .05$; *Mean difference* = 0.27, *SE* = 0.09, *df* = 905, $p < .05$). Because the results of the analyses with SCL reactivity did not change whether or not number of words used during the AAI was included, only the statistics of the analyses without number of words as covariate are presented.

Dismissing score

Controlling for background variables which were associated with the physiological measures and the dismissing score, we found that IBI reactivity was associated with the dismissing scale during the questions concerning being upset and when asked for effects of childhood experiences (r = -.18, p < .05; r = -.22, p < .05, respectively). A trend was found for the relation between the dismissing score and the question about separations (r = -.16, p = .06). When the outliers were changed into the next most extreme scores the correlation between the dismissing scale and IBI reactivity during the question about rejection was also significant (r = -.17, p < .05). Adolescents with higher dismissing scores tended to show less reactivity (higher IBI difference scores), indicating less stress during these questions. RMSSD and SCL reactivity were not related to the dismissing scale during any of the selected AAI-questions (RMSSD separate scores for gender: range r -.23 to .19, p = ns; SCL range r -.04 to -.08, p = ns).

Do adolescents with and without unresolved attachment classifications differ in physiological reactivity during the AAI?

The results for SCL reactivity remained the same when number of words was included in the analysis as a covariate, we therefore only report statistics of the linear mixed model for SCL reactivity without number of words. The linear mixed models for IBI, RMSSD, and SCL had a diagonal covariance structure and included subject as a random effect. Question was a significant predictor for IBI (F (2, 158) = 9.69, p < .001): All adolescents showed more IBI reactivity (M = 12.45, SD = 49.09) during the loss question, indicating that this question was more stressful than the questions concerning abuse (M = 6.32, SD = 53.69) and other trauma (M = 9.90, SD = 53.39). In none of the tests unresolved attachment with respect to loss or trauma was a significant predictor of physiological reactivity (IBI, F (1, 127) = 0.42, p = .52; RMSSD, F (1, 120) = 0.42, p = .52; SCL, F (1,123) = 0.03, p = .86). Stress reactivity was neither related to the unresolved loss score.

Physiological Reactivity during the FIT

In order to keep the analyses concise and focused, we decided to follow through only on IBI reactivity during the FIT because adolescents with different attachment representations differed in IBI reactivity during the AAI. Mean IBI baseline value was 794.11 (*SD* = 110.46). Boys had higher IBI baseline scores than girls (total group *t* (112) = -3.41, *p* <.01; group with loss/trauma *t* (97) = -2.86, *p* <.01). However, no gender differences were found in IBI reactivity during the FIT (total group, *t* (145) = -0.74, *p* = .46; group with loss/trauma, *t* (127) = -0.92, *p* = .36). During the FIT mean IBI score was 775.63 (*SD* = 104.82).

Secure, dismissing, and preoccupied adolescents

Means of IBI reactivity for the three attachment classifications were 9.43 (*SD* = 46.81) for secure adolescents, 30.90 (*SD* = 58.33) for dismissing adolescents, and 9.87 (*SD* = 52.00) for preoccupied adolescents. The contrast for secure versus dismissing adolescents showed a significant difference (*Difference* = 21.48, *SE* = 9.84, *p* < .05): dismissing adolescents showed more reactivity and were thus more stressed than secure adolescents during the FIT. The dismissing scale was significantly associated with IBI reactivity (*r* = .18, *p* < .05). Adolescents with higher dismissing scores were more stressed (lower scores indicate more stress).

IBI reactivity during the FIT and unresolved loss/trauma

No significant differences were found for IBI reactivity between adolescents with or without an unresolved attachment classification (*F* (1, 127) = 0.87, *p* = .35). In addition, the unresolved score was not correlated to IBI reactivity during the FIT (*r* = -.03, *p* = .76, *n* = 129).

IBI Reactivity during the AAI and during the FIT

A linear mixed model was run with IBI reactivity as dependent variable and task and attachment classification as independent variables. There was no significant main effect for task or attachment (*F* (1, 280) = 1.33, *p* = .25; *F* (2, 280) = .07, *p* = .93, respectively). The interaction between task and attachment was significant (*F* (2, 280) = 6.18, *p* < .01). As can be seen in Figure 2, in comparison with the secure adolescents, dismissing adolescents were more stressed during the FIT whereas they were less stressed during the AAI (*t* (280) = -3.34, *p* < .01).

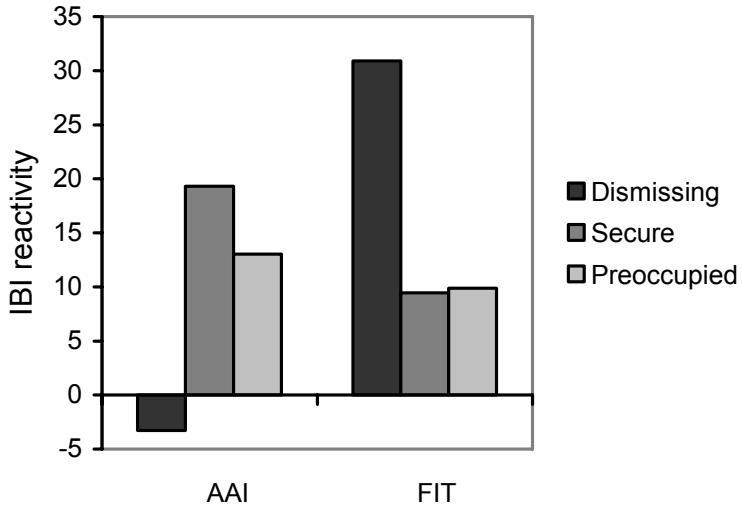

Figure 2
Differences in IBI reactivity during the AAI and during the FIT

Discussion

The current study investigated whether attachment classification was related to physiological reactivity during the AAI (Main et al., 2003) and during a dyadic interaction task (FIT, Allen et al., 2003; Kobak et al., 1991; Strodtbeck, 1951). Using IBI reactivity, dismissing participants showed less stress during the AAI than secure adolescents. However, during the conflict interaction task, involving a discussion with their mother on an issue on which they disagreed, dismissing adolescents showed more stress. Furthermore, in the AAI preoccupied individuals showed elevated stress reactivity while secure individuals displayed decreases in stress reactivity during questions about separation and threat. We found no differences in physiological reactivity between adolescents with a resolved or unresolved state of mind during the AAI or during the FIT. In addition, IBI reactivity was compared during the AAI and during the FIT. It appeared that there were no differences in IBI reactivity between the two tasks, and there was no overall effect for attachment. However, a significant interaction effect revealed that in comparison with secure adolescents, dismissing adolescents were more stressed during the FIT and less stressed during the AAI.

Our study extends previous research with a broader spectrum of physiological measures during the AAI. Moreover, we examined not only associations with secure, dismissing, and preoccupied attachment classifications, but also tested whether

individuals with and without unresolved loss showed different physiological reactivity during the pertinent AAI questions on loss and (other) trauma. We used Main et al.'s classification system (2003) instead of Kobak's Q-sort (1993) (as was done in previous studies). Furthermore, the present study was conducted in the home, whereas prior studies conducted the AAI in a laboratory setting (the latter setting may be more stressful than the home). Fourth, the current study is the first that focused on physiological reactivity shown by persons with different attachment representations during a mother-adolescent conflict interaction task. Finally, our sample consisted of adolescents. The present findings extend previous physiological investigations by using different methodology in a younger sample. The focus on physiology in adult attachment research is relatively new. Further studies are necessary to draw more definite conclusions regarding physiological reactivity in attachment relevant situations, in adolescents as well as in adults.

Dismissing adolescents did not experience more stress during the AAI, whereas they did show more stress than secure adolescents during the FIT. Both tasks place different demands on the participants. During the AAI participants are asked to produce their childhood memories and reflect on them (Hesse, 1999). Our findings suggest that dismissing adolescents are less open to the challenge of the AAI than secure adolescents, and are able to cope with the interview in a somewhat superficial manner. They might therefore experience less stress during the AAI, but it seems impossible to be uninvolved and detached during a direct interaction task with their mother with the goal of reaching consensus in an area of disagreement. We thus propose that the defensive strategy of dismissing adolescents might be effective during the AAI even at an early stage of information processing, and that they are less open to seriously address the questions compared to secure adolescents. This hypothesis has been suggested before. In a study using the Stroop test (Zeijlmans Van Emmichoven, Van IJzendoorn, De Ruiter, & Brosschot, 2003) persons with a secure attachment representation showed slower response latencies than insecure persons. Moreover, clinical subjects with a secure attachment representation had the largest response times to threat words. The authors therefore hypothesized that secure individuals may be more open to this type of threatening information that is carefully processed whereas dismissing individuals exclude this unbalancing information at an early stage.

It should be emphasized that this hypothesis of effectively excluding attachment-related memories and experiences at an early stage of information processing may pertain to adolescents only, as prior work on adults did show a different picture. Adolescents are different from adults in that they did not have had much time to work through their attachment experiences, and are in the process of becoming less dependent on their parents (Allen & Land, 1999; Van IJzendoorn & Bakermans-

Kranenburg, in press). Adolescents also differ from adults in that their brain is not yet fully developed (see for a review Blakemore & Choudhury, 2006). Maturation of the frontal cortex continues into adolescence. MRI studies have shown changes in white and gray matter during adolescence which may be indicative of increased axonal myelination and synapse proliferation. These changes may account for the lower capacity of adolescents to control and coordinate their thoughts and behavior (executive function, including selective attention, decision-making, voluntary response inhibition, and working memory) as compared to adults. Adolescents may thus show a different pattern of associations between AAI representations and (physiological) responses because of their transitional life stage (becoming less dependent on their parents) and their less developed cognitive functioning (less mature frontal cortex).

In contrast to their physiological reactivity during the AAI, dismissing adolescents were more stressed than secure adolescents during the FIT. When the dismissing adolescents are in direct interaction with their mother, they may have less opportunity to effectively use defensive processes and they may thus experience more stress than secure adolescents. In the FIT the stakes may be felt to be higher because the discussion pertains to present real-life conflict issues and the mother may play a more demanding or provocative role than an unknown interviewer who is not able to check the validity of any response. This result converges with a study of Roisman (2007) in which deactivation was associated with SCL reactivity during the discussion of a disagreement with the participant's romantic partner.

A second explanation for the higher IBI reactivity of the dismissing adolescents versus the secure adolescents during the FIT may be found in their mothers' contribution during this task. Mothers' interactions during the discussion vary across dyads and may be dependent on the adolescent's behavior. The interactive behavior of mothers of dismissing adolescents might be more stress evoking than that of mothers of their secure counterparts. In fact, during the FIT both dismissing adolescents and their potentially dismissing mothers contribute to the conflict interaction which might exacerbate the tensions in the relationship compared to stress felt during the unilateral AAI narrative.

Preoccupied adolescents differed from adolescents with a secure attachment representation only in their response to the questions on separation and threat during the AAI. During the FIT they did not differ in reactivity from secure adolescents. The strategy of these individuals is to maximize attention to attachment relationships and experiences (Hesse, 1999). The AAI and the FIT thus seem not to challenge preoccupied adolescents like they do dismissing individuals; which fits nicely with the idea that preoccupied persons are used to talk about relationships and emotional experiences. In addition, the FIT provides preoccupied individuals with the undivided attention of their attachment figure. During the AAI questions regarding separation and

threat these individuals may be especially triggered to recall anxious experiences and as a consequence show elevated stress reactivity. Roisman (2007) showed that hyperactivation was associated with more heart rate reactivity during a discussion between romantic partners. However, relationships between adolescents and their parents and between romantic partners have different characteristics. Romantic partners may decide to end the relationship which raises intense feelings of anxiety in preoccupied individuals, whereas even preoccupied adolescents may always feel the strong bond of their parents –whether or not this bond is insecure.

We found differences in cardiac reactivity as opposed to SCL reactivity. Because no difference in RMSSD reactivity (which is an indicator of parasympathetic activation) was found between adolescents with a dismissing or secure attachment representation, we tentatively speculate that differences in IBI reactivity may be mainly due to differences in sympathetic activation (see Roisman, 2007). Activation of the sympathetic branch has been associated with deactivation of attachment before (e.g., Dozier & Kobak, 1992; Roisman, 2007; Roisman et al., 2004). This seems to be in contrast with the result that SCL reactivity was not associated with adolescent attachment; however, the lack of findings for SCL may (partly) be a consequence of the various ethnicities represented in the current sample. SCL is suggested to be influenced by a person's ethnicity: for example, White participants tend to have higher SCL levels than Black participants (Boucsein, 1992). As our sample consisted of adolescents with different ethnic backgrounds, this may have been a problem for our SCL recordings. Although we controlled for possible associations between SCL and country of origin, a more specific measure for ethnicity may be needed as even adolescents from the same country may vary widely in skin color.

The current study is the first that focused on psychophysiological stress reactivity shown by resolved versus unresolved persons during the AAI. The lack of differences between resolved and unresolved adolescents could be due to the way we measured physiological reactivity. Unresolved loss is characterized by a *momentary* breakdown in strategy during discussions of loss, abuse or trauma (Hesse & Main, 2000). We only focused on reactivity during the loss, abuse and trauma questions but experiences of loss and trauma may also be discussed in other parts of the AAI. Moreover, the breakdown in strategy is usually very brief (Hesse, 1999; Hesse & Main, 2000), consequently physiological changes may also have been momentary rather than during the entire response to these questions. Future research should try and connect the moment of breakdown in speech during the AAI with the recordings of physiological reactivity.

Although the adolescents in our sample were adopted, they may not be too different from other adolescents. They were adopted in infancy at a very early age (before 6 months) and were not selected for special needs. Their mean IQ score was

not different from the norm for 14-15 year olds (t (150) = 0.57, p = .57). Moreover, although they had less optimal scores for inhibiting autonomy-relatedness compared to a high school sample (Allen & Hauser, 1996), they exhibited more optimal autonomy behaviors compared to an academic low risk group (Boykin-McElhaney & Allen, 2001).

A limitation of the current study may be that during the baseline periods, adolescents completed a questionnaire, whereas they answered interview questions or were involved in a discussion during the two target tasks. Speaking versus completing a questionnaire may differentially influence physiological activity (e.g., Berntson et al., 1997). However, we were not so much interested in the comparison of physiological response during baseline and these two tests. Our focus pertained to physiological differences in reactivity between adolescents with different attachment representations. We controlled for number of words when necessary, but the findings remained the same.

In sum, the current study is the first to investigate physiological reactivity in adopted adolescents during the Adult Attachment Interview and during a dyadic conflict interaction task. We propose that dismissing adolescents seem to be able to effectively use their defensive strategy during the AAI as they show less stress reactivity than adolescents with a secure attachment representation, but they are more stressed than secure adolescents in direct interaction with their mothers around a conflict issue. Attachment representations thus play an important role in emotion regulation in attachment relevant conflict situations, also during adolescence.

Chapter 5

Summary and Discussion

Introduction

The Adult Attachment Interview (AAI; George, Kaplan, & Main, 1996; Main, Goldwyn, & Hesse, 2003) was developed in the early 1980s to measure an adult's overall state of mind with respect to attachment. Since then it has been applied in many studies in the field of attachment (Hesse, 1999). This thesis aimed to shed light on some of the potentials and limitations of the AAI. First, we examined whether the concept of coherence in attachment interviews was defined differently by attachment experts, linguists, and non-experts. When there are no differences, the AAI may become more accessible for non-attachment experts when using a measure for coherence. Second, we addressed the question whether the AAI is a valid instrument for measuring attachment representation in adolescents. Finally, we tested whether the AAI has the potential of differentiating adolescents who responded differently in a physiological sense to two attachment relevant situations: the AAI and an adolescent-mother conflict interaction task (construct validity). In the current chapter the results of the three studies are summarized and discussed. Finally, implications for further research are described.

The concept of coherence in attachment interviews: summary and limitations

Our study on coherence in attachment interviews showed that attachment experts constitute a distinct group when asked to define coherence: attachment experts emphasize quality and manner more than all other groups, linguists emphasize quantity and relevance more than attachment experts, and higher educated non-experts value relevance more than attachment experts. Attachment experts may have emphasized quality more because Grice (1975) as well as Main et al. (2003) heavily emphasized this maxim. In contrast, the maxims of quantity and especially relevance have received the most attention in the field of linguistics. Non-experts may have given less weight to quality and manner because these maxims may be the most difficult to comprehend for outsiders. Another possible reason for the differences between attachment experts and linguists is that the concept of coherence might refer to an underlying psychological component for attachment experts, while this is not the case for linguists.

A limitation of this study is that participants were asked what they *thought* would be the characteristics of the ideally coherent interview. This may not be identical to observing what maxims they would actually rely on when assessing coherence of a

specific interview transcript. However, differences among coders in the interpretation of (parts of) an actual interview transcript would confound their scores with their definition of what is vital for coherence.

A second limitation pertains to the sample size of the study; the group sizes ranged from 6 for linguists to 9 for the attachment experts and lower educated non-experts. Future studies are necessary to draw more definite conclusions. However, the various analytical strategies all pointed into the same direction: expertise in attachment theory is critical for defining coherence in attachment interviews.

The AAI as a rich but labor-intensive research tool

Because coherence (as measured with the CQS) is not defined similarly by attachment experts and linguists or non-experts, it seems that the CQS cannot be applied to attachment interviews without training in attachment theory and research. Therefore, the CQS does not appear to provide the opportunity to make scoring of the AAI more accessible to non-attachment experts from other fields than the behavioral sciences. Nevertheless, it may be possible that psychologists and clinicians are able to apply their psychological knowledge to the assessment of coherence in attachment interviews without specific training in coding attachment interviews; training in Grice's criteria (1975) may be sufficient for this group. Further research should address this question.

Because linguistic knowledge is not sufficient to be able to apply the concept of coherence in attachment interviews, the requirements for a computer program capable of coding AAIs seem far beyond the current state of art in computerized text analysis. Some programs have already been developed (see Appelman, 2000; Buchheim & Mergenthaler, 2000) but on the basis of our findings it is doubtful whether the automatic coding of the AAI will ever be successful. This is of course unfortunate because of the time-consuming nature of the coding process. However, the transcribing process can be made easier with the computer program called *Dragon NaturallySpeaking* (2007) that is able to recognize speech. For this program it is necessary that the speaker articulates clearly and states the places where interpunction is needed. Consequently, AAI recordings need to be dictated to the computer. Nevertheless, researchers using this program will need approximately half the time which is usually necessary to transcribe and check AAI recordings. Although coding AAIs will remain an activity that takes a lot of human effort, the transcribing process can thus be made easier with a computer program.

An easily applicable measure has recently become available to assess script-like representations of secure base experiences (Waters & Waters, 2006). Secure base scripts are based on childhood experiences (Waters & Waters, 2006) and may be seen as part of mental representations or as stepping stones to attachment representations (Bakermans-Kranenburg, 2006). It is hypothesized that individuals who experienced secure base support in infancy and childhood have knowledge of and easy access to secure base scripts (Waters & Waters, 2006). The task consists of a prompt-word outline: participants need to formulate a story based on a story title and 12-14 words (suggesting a setting, some actors, key content, and activities). A score is given based on the extent to which the participant's story is organized around the secure base script (Waters & Waters, 2006). Research has shown that script-like representations are substantially associated with AAI coherence scores (Coppola, Vaughn, Cassibba, & Constantini, 2006; Dykas, Woodhouse, Cassidy, & Waters, 2006; Waters & Rodrigues-Doolabh, 2001). In addition, results concerning the association of secure base scripts with maternal sensitivity (Coppola et al., 2006), infant attachment classifications (Tini, Corcoran, Rodrigues-Doolabh, & Waters, 2003), and AQS-security scores (Bost et al., 2006; Verissimo & Salvaterra, 2006) are promising. A remarkable difference between the method using secure base scripts and the AAI pertains to coherence. Whereas coherence is central in Main et al.'s (2003) coding system for the AAI, the secure base script method does not assess coherence as it focuses on content. In addition, preoccupied individuals cannot be distinguished from dismissing individuals with the prompt-word outlines. Finally, unresolved loss or trauma cannot be coded with this measure. Therefore, although prompt-word outlines are easy to apply in research (Waters & Waters, 2006), we expect that the AAI will remain the gold standard for assessing attachment representations.

Our study on coherence points to a potential of the AAI that has not been examined yet. At this moment the coding system of the AAI includes a 9-point rating scale for coherence, but does not distinguish the various aspects of coherence as is the case in the CQS. An additional 9-point rating scale for each of Grice's maxims would make it possible to test whether violations of different aspects of coherence are associated with specific types of parental insensitivity.

The validity of the AAI in adolescents: summary and limitations

We demonstrated the construct validity of the AAI in adolescents: (1) during a conflict interaction task secure adolescents displayed more autonomy than dismissing

adolescents and mothers of secure adolescents showed more relatedness than mothers of insecure adolescents, (2) dismissing individuals invested less in others than secure and preoccupied adolescents, (3) secure adolescents reported more relational support than insecure adolescents, and (4) temperament and intelligence were unrelated to attachment classification.

The effect sizes we found for adolescents' exhibiting autonomy behaviors and emotional investment in others were small to medium according to Cohen's (1988) criteria. This may be not too surprising because both variables are expected to be influenced by other factors as well, e.g., adolescents' exhibiting autonomy behavior may also depend on mothers' interactive behavior (see Chapter 2) and adolescents' current mood.

In contrast to our expectations, maternal sensitivity when solving difficult puzzles (Tangram) was not associated with adolescent attachment classification. This may be the consequence of the task we used to measure sensitivity: it might not have been ecologically valid. Future research on mothers' sensitivity towards their adolescent children might include problem-solving situations which are regularly encountered by these dyads, for example helping with a difficult homework task.

While most AAI studies are conducted in the lab, we administered the AAI in the homes of the adolescents. We conducted home visits because we preferred to observe mother-adolescent interactive behaviors in the natural setting. In addition, the families, who lived all over the Netherlands, were hypothesized to be more willing to participate in the study when they did not have to travel for hours to the lab. Because of the home setting, the adolescents might have had more difficulty to think and talk objectively about their relationship with their parents. This may partially explain why more adolescents in the current sample were classified dismissing than in the normative distribution. However, the AAI was conducted in a separate room to ensure that they would feel as free as possible in the home setting to talk about their (childhood) relationship with their parents.

A second limitation of this study pertains to the coding procedure of the FIT. Interactive behavior of each member of the dyad was scored by one coder. Therefore, we cannot rule out the possibility that the coder was influenced by the scores given to the adolescent when coding mother behavior and vice versa. This procedure evidently excludes the possibility to use mother scores to predict adolescent scores or adolescent scores to predict mother scores – which we did not do in our study. It should be noted that also in other studies using the autonomy-relatedness coding system coders assigned scores to both members of the dyad (e.g., Allen et al., 2003).

Because the AAI is administered with adolescents in many studies, a psychometric study on this issue was necessary. The present study shows that the AAI is not only a valid instrument to measure attachment representations in adults, but also in adolescents.

Physiological reactivity during the AAI and during a conflict interaction task: summary and limitations

Attachment theory suggests that internal working models of attachment influence emotion regulation in childhood as well as in adolescence and adulthood (Cassidy, 1994; Main, Kaplan, & Cassidy, 1985). We revealed that dismissing participants were less stressed during the AAI than secure adolescents, whereas during a mother-adolescent conflict interaction task (FIT; Allen et al., 2003; Kobak, Sudler, & Gamble, 1991; Strodtbeck, 1951) they were more stressed than their secure counterparts, at least as indicated by IBI reactivity. These contrasting findings may be explained by the rather different demands these tasks place on the participants. During the AAI adolescents were asked to produce childhood memories and evaluate them. It seems that dismissing adolescents are less open to this task than secure adolescents, and are able to cope with it in a somewhat superficial manner. However, during the FIT the stakes may felt to be higher because real-life issues are discussed and their mothers may also be more demanding and provocative than an unknown interviewer. Therefore, dismissing adolescents may have less opportunity to use defensive processes effectively during the FIT and feel more stressed than secure individuals.

Our findings concerning physiological reactivity during the AAI differ from what has been found by Dozier and Kobak (1992) and Roisman, Tsai, and Chiang (2004). While these researchers included adults in their studies we administered the AAI with adolescents. The results we found may be a consequence of the transitional life stage (becoming less dependent on their parents) of the adolescents and of their developing cognitive functioning (less mature frontal cortex).

We have found no differences in physiological reactivity during the AAI for the resolved and unresolved adolescents possibly as a result of how we measured physiological reactivity concerning loss and abuse experiences. Rather than examining stress reactivity during the loss, abuse, and other trauma questions of the AAI, researchers should to try and connect the moment of breakdown in speech during the AAI with the recordings of physiological reactivity in further studies. A second limitation is that during the baseline periods adolescents completed a questionnaire, whereas they answered interview questions or were involved in a

discussion during the two target tasks. Further research should use tasks that are more similar in activity during baseline and experiment, because speaking versus completing a questionnaire may differentially influence physiological activity (e.g., Berntson et al., 1997). Finally, the various ethnicities represented in the current sample may have interfered with detecting potential differences in SCL reactivity as opposed to IBI reactivity. Although we controlled for possible associations between SCL and country of origin, a more specific measure for ethnicity may be needed as even adolescents from the same country vary widely in skin color.

Attachment research using physiological measures provides an excellent opportunity to test hypotheses concerning emotion regulation. The present results indicate that the AAI has the potential of differentiating between persons with divergent emotion regulation patterns during the AAI and during the FIT.

Applications of the AAI

Adoption and Twin samples

It is important to note that the sample of adolescents in our studies is special because of their adoptive status. This may have influenced the distribution of attachment classifications in the current sample. However, in several respects the adolescents were not too different from other adolescent samples. The participants were adopted at a very early age (before 6 months, at 10 weeks on average) and were not selected for special needs. Their IQ scores did not differ from that of the norm for 14-15 year olds. Moreover, although they had less optimal scores for inhibiting autonomy-relatedness compared to a high school sample (Allen & Hauser, 1996), they exhibited more optimal autonomy behaviors compared to an academic low risk group (Boykin-McElhaney & Allen, 2001).

The use of adoption samples provides an excellent chance to draw conclusions regarding the influence of genes and environment on attachment representations. Our study on the validity of the AAI shows that the environment may be an important factor in the development of attachment representations: even though there was no genetic bond between the adoptive mothers and their adolescent children, adolescents' AAI classifications were associated with mothers' relatedness during conflict situations. A substantive next step in studies using the AAI would be to administer this interview with adoptive parents. This would provide a unique opportunity to relate adopted children's attachment representation with their parents' attachment representation, and to test the intergenerational transmission hypothesis in a biologically unrelated sample of parent-adolescent dyads. When siblings of the adoptive children would also

be included in such a study, a more complete picture may be derived of the influences of genes, shared, and unshared environment on attachment representations.

In a similar vein, a study of Caspers et al. (Caspers, Yucuis, Troutman, Arndt, & Langbehn, 2007) points to the importance of shared environment: Genetically unrelated siblings (one of them the biological child, the other the adopted child of the same parents) showed 61% concordance in attachment representations when the autonomous non-autonomous distinction was used. The influences of genes and environment may also be examined in twin studies (Rutter, 2006). If monozygotic twins are more similar than dizygotic twins or non-twin siblings, the influence of genes is highlighted. A study of Bokhorst and colleagues (2003) on infant attachment security revealed that 52% of the variance in security versus insecurity was explained by shared environment and 48% was explained by unique environment and measurement error. This is in line with what has been found by others (e.g., Ricciuti, 1992), with the exception of research by Finkel and Matheny (2000). However, they used a procedure to measure attachment which was only moderately associated with the Strange Situation Procedure (SSP; Ainsworth, Blehar, Waters, & Wall, 1978). It should be noted that the influence of genetics and the (shared and non-shared) environment may change over time (e.g., Plomin, 1999; Rutter, 2006). A first study by Constantino et al. (2006) showed that for non-twin siblings the concordance in attachment representation was as strong as that for monozygotic twins. In contrast, Torgersen, Grova, and Sommerstad (2007) reported a tendency for monozygotic twins to be more similar than dizygotic twins. With one exception, the first studies on the AAI in adoptive and twin samples thus point to the importance of (shared) environment for the development of attachment representations. More carefully designed behavioral genetic studies on the AAI are necessary to get more insight in the strength of shared environmental, non-shared environmental and genetical influences on attachment representation in adolescence.

Gene-environment interaction

To date, no studies with the AAI explored the possible differential susceptibility of individuals to their environments as a result of their genetic make-up. Van IJzendoorn and Bakermans-Kranenburg (2006) reported that maternal unresolved loss or trauma was associated with infant disorganization, but only in the presence of the DRD4 7-repeat polymorphism. It would be interesting to examine gene-environment interaction effects on unresolved attachment in adolescents and adults. Caspi et al. (2003) showed that 5-HTT (a functional serotonin transporter polymorphism) moderates the influence of stressful life experiences on depression: Only subjects with one or two short alleles of 5-HTT showed more depressive symptoms when they experienced

stressful life events. In search for a possible gene-interaction effect on unresolved loss or trauma, DRD4 and 5-HTT are important genes to investigate: participants with the DRD4 7-repeat allele or with one or two short alleles of 5-HTT may be more vulnerable to develop unresolved attachment as a consequence of loss or trauma. Since DNA is now being collected from the current adoption sample, we will be able to test this hypothesis in the future.

Physiological reactivity during conflict interaction

In our study on physiological responses during attachment relevant situations, we examined reactivity of the adolescents during conflict interaction with their mothers. Future research may focus on the concordance of physiological responses of mothers and adolescence during a conflict interaction task in relation to attachment representation. Zelenko and colleagues (2005) reported that heart rate changes during the SSP were more consistent in secure mother-infant dyads than in insecure-resistant dyads. This focus would give more insight into the importance of attachment representations for psychophysiological attunement of the mother-adolescent dyad.

During adolescence peers become especially important. Even though parents will remain attachment figures in the life of the adolescents, close friends and romantic partners may also become attachment figures (Allen & Land, 1999). The question is whether adolescents will show the same physiological patterns during conflict interactions with close friends as with their mothers. It may be that because of their attachment representation adolescents will indeed react in a similar way to friends and romantic partners as to their mothers. On the other hand, the physiological responses may depend more on the quality of the specific friendship/romantic relationship and the interactive behaviors shown by the friend/romantic partner than on the adolescent's overall mental representation of attachment. Adults with insecure representations of their childhood experiences showed more physiological reactivity during interactions with romantic partners than secure adults (Roisman, 2007). Future research should address this issue in adolescents.

The role of fathers

The study on the validity of the AAI did not assess sensitive responsiveness shown by fathers or father-adolescent conflict interactions. Findings concerning infants suggest that fathers' sensitivity is related to father-infant attachment although the strength of the association is weaker than for mothers (see for a meta-analysis Van IJzendoorn & De Wolff, 1997). It would be interesting to test whether fathers' sensitivity and autonomy-relatedness behaviors to their adolescent children are related to adolescent attachment. A first study in this area (Allen, Porter, McFarland, Boykin-McElhaney, &

Marsh, 2007) showed that paternal relatedness was moderately (r = .38) associated with adolescent attachment security. Since many family interactions involve father-adolescent contacts a stronger focus on this issue seems warranted.

Attachment and altruism

Finally, we found that secure and preoccupied adolescents emotionally invested more in others than dismissing individuals, which may be seen as an altruistic tendency. A next step would be to investigate whether secure individuals show more empathy, compassion, and altruistic helping behaviors toward strangers. For example, would they be more willingly to participate in voluntary activities or help a stranger who is in need? It would be expected that secure individuals are more open to other persons' needs and are more comfortable and better able to provide help, also in contacts with strangers (Bowlby, 1982; Gillath, Shaver, & Mikulincer, 2005). Van der Mark, Van IJzendoorn, and Bakermans-Kranenburg (2002) showed that secure children were more empathic to strangers than insecure children. Studies using self-report measures to assess adult attachment revealed that secure adults had greater compassion, were more willing to help, and participated more in altruistic activities (e.g., volunteering; Erez, 2007) (see Mikulincer & Shaver, 2007 for an overview). However as self-reported attachment and AAI classifications do not converge (for an overview see Crowell, Fraley, & Shaver, 1999), research using the AAI is needed.

Conclusion

Since its development in the early 1980s the AAI as coded with Main et al.'s coding system has been applied in more than 100 studies. Still, important questions remain concerning the potential and limitations of this instrument. The current thesis showed that although the AAI is not an easily accessible research tool, it appears to be a valid measure for assessing adolescents' attachment representations, and differentiates between adolescents with divergent physiological responses to attachment relevant situations.

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Samenvatting

(Summary in Dutch)

Introductie

In de gehechtheidstheorie is altijd veel aandacht geweest voor de relatie tussen jonge kinderen en hun moeders. Gehechtheidsrelaties zijn echter nog steeds belangrijk tijdens de adolescentie en volwassenheid. Zoals Bowlby (1973) het verwoordde: gehechtheid is van belang "from the cradle to the grave" ("van de wieg tot het graf"). Tot 1985 bestond er echter geen meetinstrument om gehechtheidsrepresentaties van volwassenen te meten. Individuele verschillen in gehechtheidsrelaties van jonge kinderen met hun moeders werden gebaseerd op de observatie van het non-verbale gedrag van het kind tijdens de stressvolle Vreemde Situatie Procedure (Ainsworth, Blehar, Waters, & Wall, 1978). Op basis van Bowlby's (1973, 1980, 1982) beschrijving van gehechtheid als een interne representatie suggereerden Main, Kaplan en Cassidy (1985) dat met verbaal gedrag de gehechtheidsrepresentaties van oudere kinderen en volwassenen kunnen worden gemeten. Het Gehechtheidsbiografisch Interview (GBI; George, Kaplan, & Main, 1996; Hesse, 1999; Main, Goldwyn, & Hesse, 2003) werd ontwikkeld om, aan de hand van de coherentie van iemands antwoorden op een set gestructureerde vragen over vroegere gehechtheidservaringen, de gehechtheids-representaties van volwassenen te meten.

Doel en vragen

Sinds de ontwikkeling van het GBI is dit instrument in meer dan 100 studies[1] (Van IJzendoorn & Bakermans-Kranenburg, in press) gebruikt. Het doel van deze dissertatie is inzicht te krijgen in een aantal mogelijkheden (of onmogelijkheden) van het GBI. We proberen een antwoord te vinden op de volgende onderzoeksvragen:

a) Definiëren gehechtheidsexperts, taalkundigen en niet-experts coherentie in gehechtheidsinterviews verschillend? *(Hoofdstuk 2)*

b) Is het GBI een valide instrument voor het meten van gehechtheidsrepresen-taties van jongeren? *(Hoofdstuk 3)*

c) Laten adolescenten met verschillende gehechtheidsrepresentaties verschillende fysiologische reacties zien tijdens het GBI en tijdens een moeder-adolescent interactietaak waarbij ze een conflict moeten bespreken (construct validiteit)? *(Hoofdstuk 4)*

[1] Dit aantal is gebaseerd op studies die het classificatiesysteem van Main et al. (2003) gebruikten voor het coderen van het GBI.

Allereerst wordt uitleg gegeven over het GBI: welke vragen worden in dit interview gesteld en welke typen gehechtheidsrepresentaties kunnen worden onderscheiden? Vervolgens worden de studies waarin een antwoord is gezocht op de genoemde onderzoeksvragen beschreven. Ten slotte rapporteren we de beperkingen van het onderzoek en presenteren we de uiteindelijke conclusie.

Het Gehechtheidsbiografisch Interview

Het Gehechtheidsbiografisch Interview is een semi-gestructureerd interview dat ongeveer een uur duurt (George et al., 1996; Hesse, 1999). Na een “opwarm”-vraag over de vroegere gezinssituatie wordt de respondent gevraagd om de relatie die hij als klein kind met zijn ouders had te beschrijven. Vervolgens vraagt de interviewer vijf kenmerken voor de relatie die de respondent als kind met elke ouder had. Voor elk kenmerk wordt een herinnering gevraagd die het kenmerk ondersteunt. Andere vragen gaan over momenten waarop de respondent als kind overstuur was, pijn had of ziek was. Er zijn ook vragen over de eerste keer dat de respondent niet bij zijn of haar ouders was (bijvoorbeeld tijdens logeren) en of hij zich ooit afgewezen heeft gevoeld door zijn ouders. Vervolgens wordt gevraagd hoe hij denkt dat zijn ervaringen uit zijn kindertijd hem hebben beïnvloed en of er bepaalde ervaringen zijn die hij als een belemmering heeft ervaren. Ook wordt de respondent gevraagd waarom hij denkt dat zijn ouders zich gedroegen zoals ze deden tijdens zijn kindertijd. Een aantal vragen gaat over verlieservaringen en mishandeling/misbruik. De interviewer vraagt ook naar de veranderingen in de relatie met de ouders sinds de kindertijd en naar hoe de huidige relatie met de ouders is. Ten slotte wordt gevraagd naar drie wensen voor het eigen kind voor over 20 jaar en wat hij hoopt dat zijn kind leert van de opvoeding die hij geeft.

De transcripten van het Gehechtheidsbiografisch Interview worden geclassificeerd als veilig, onveilig-gereserveerd of onveilig-gepreoccupeerd. Personen met een veilige gehechtheidsrepresentatie zijn in staat om op een coherente manier over hun ervaringen uit hun kindertijd te praten. Als zij hun ouders omschrijven als warm en liefdevol, kunnen zij hier ook voorbeelden bij geven. Als hun herinneringen niet fijn waren, kunnen zij hier op reflecteren en zijn zij vaak impliciet vergevend.

Gereserveerde volwassenen beschrijven hun ouders meestal in erg positieve termen maar hebben hier geen bewijs voor of spreken zichzelf zelfs tegen. Ouders worden bijvoorbeeld beschreven als verzorgend, maar later in het interview wordt verteld dat als de respondent ziek was, ouders zeiden dat hij zich niet moest aanstellen. Als er negatieve ervaringen worden verteld dan claimt de respondent vaak

dat hij hier alleen maar in positieve zin van heeft geleerd. Daarnaast hebben gereserveerde volwassenen de neiging om hun onafhankelijkheid te benadrukken.

De transcripten van gepreoccupeerde respondenten worden gekenmerkt door lange antwoorden. Ze dwalen vaak af, gebruiken verwarde zinnen en boze of vage taal. Zij zijn nog overweldigd door hun vroege gehechtheidservaringen en relaties. Een respondent kan bijvoorbeeld heel uitgebreid vertellen over een kleine fout die zijn moeder heeft gemaakt en vervolgens aan de interviewer vragen: *"Vind jij het ook niet belachelijk dat mijn moeder zo deed?"*

Bovenop de hiervoor beschreven gehechtheidsclassificaties kan een transcript gecodeerd worden als onverwerkt. Dit betekent dat de respondent overtredingen laat zien van het controleren van redeneren of spreken als hij het heeft over verlieservaringen of andere traumatische gebeurtenissen. Een voorbeeld van een overtreding van redeneren is als een respondent aangeeft dat hij eigenlijk niet gelooft dat de overleden persoon dood is door bijvoorbeeld te zeggen: *"Mijn vader vindt dat ik een goede vader ben",* terwijl zijn vader is overleden zelfs voordat zijn kleinkind was geboren. Ongebruikelijk aandacht hebben voor details van een begrafenis is een voorbeeld van een overtreding van het controleren van spreken.

Coherentie in gehechtheidsinterviews

Coherentie is een belangrijk construct voor gehechtheidsinterviews. In deze interviews worden respondenten gevraagd om zowel algemene evaluaties te geven van relaties en/of gebeurtenissen, als bewijs te geven voor deze evaluaties. Aan de hand van de vier criteria van de taalkundige filosoof Grice (1975) wordt een interview beoordeeld op coherentie. De criteria zijn:

Kwaliteit:	wees eerlijk en heb bewijs voor wat je zegt
Kwantiteit:	wees bondig maar compleet
Relevantie:	wees relevant
Manier:	wees duidelijk, beknopt en ordelijk

De interviewtranscripten van participanten die zich aan deze criteria houden zijn coherent. In gehechtheidsinterviews maken respondenten met een veilige gehechtheidsrepresentatie alleen marginale overtredingen van deze criteria. Onveilig-gereserveerde respondenten schenden de criteria kwaliteit en kwantiteit. Zij zijn niet in staat bewijs te geven voor de positieve evaluaties die ze geven of ze spreken zichzelf tegen. Daarnaast hebben ze de neiging te claimen dat ze zich geen gebeurtenissen

meer kunnen herinneren. Gepreoccupeerde respondenten schenden de criteria kwantiteit, relevantie en manier. Ze vertellen lange verhalen, dwalen af van de vraag en gebruiken boze of vage taal.

Ondanks het belang van het begrip coherentie voor gehechtheidsinterviews is het nooit het hoofdonderwerp geweest van een onderzoek naar gehechtheid. Wij hebben onderzocht of gehechtheidsexperts, taalkundigen en niet-experts dit begrip verschillend definiëren in gehechtheidsinterviews (zie hoofdstuk 2). Als dit niet het geval is dan zouden gehechtheidsinterviews met een meetinstrument voor coherentie gecodeerd kunnen worden door niet-gehechtheidsexperts of zelfs met behulp van geavanceerde computerprogramma's.

De participanten werden gevraagd om de Coherence Q-sort (dit is een maat voor coherentie) te sorteren voor het denkbeeldige ideale coherente gehechtheids-interview. Ze werden geïnformeerd dat tijdens deze interviews respondenten worden gevraagd algemene evaluaties van relaties en/of gebeurtenissen te geven, alsmede concreet bewijs ter ondersteuning van de evaluaties. Daarnaast werden instructies gegeven over Grices criteria.

Uit onze studie bleek dat gehechtheidsexperts zich onderscheiden van taalkundigen en niet-experts in het definiëren van coherentie in gehechtheids-interviews. Gehechtheidsexperts benadrukken de criteria kwaliteit en manier meer dan de andere groepen, terwijl taalkundigen kwantiteit en relevantie meer benadrukken en hoger opgeleide niet-experts relevantie meer benadrukken. Dat gehechtheidsexperts meer waarde hechten aan kwaliteit kan het gevolg zijn van het gewicht dat Main et al. (2003) aan dit criterium geven. In de taalkunde hebben kwantiteit en vooral ook relevantie juist de meeste aandacht gekregen (Haberland & Mey, 2002). Een tweede verklaring voor het verschil tussen gehechtheidsexperts en taalkundigen kan zijn dat coherentie voor gehechtheidsexperts refereert aan een onderliggende psychologische component terwijl dit niet het geval is voor taalkundigen. Niet-experts kunnen kwaliteit en manier minder benadrukt hebben omdat deze constructen mogelijk het lastigst te begrijpen zijn voor buitenstaanders.

Een beperking van dit onderzoek is dat de participanten coherentie hebben gedefinieerd voor het denkbeeldige ideale coherente interview en niet voor een echt interviewtranscript. Het is niet uit te sluiten dat de participanten van andere criteria uitgaan wanneer ze de coherentie van een echt interviewtranscript zouden scoren. Verschillen tussen codeurs bij het interpreteren van (delen van) een echt interviewtranscript zouden dan echter vermengd raken met hun scores voor wat essentieel is voor coherentie. Het is belangrijk te benadrukken dat deze studie een exploratieve conceptuele studie is met een relatief kleine steekproefgrootte. Toekomstig onderzoek is nodig om meer definitieve conclusies te kunnen trekken. In elk geval wijzen de verschillende analysetechnieken erop dat het definiëren van

coherentie in gehechtheidsinterviews meer is dan het toepassen van Grices criteria: expertise in de gehechtheidstheorie bepaalt de manier waarop coherentie wordt gedefinieerd.

De uitkomsten van de studie impliceren dat de maat voor coherentie zoals door ons gebruikt (de Coherence Q-sort) niet toegepast kan worden in gehechtheids-interviews zonder training in de gehechtheidstheorie. Voorlopig lijkt het coderen van gehechtheidsinterviews dus nog niet toegankelijker te worden voor niet-gehechtheidsexperts. Op dit moment kunnen computerprogramma's woorden tellen die indicatief zijn voor getoonde emotie en emotionie-abstractie patronen meten (zie bijvoorbeeld Appelman, 2000; Buchheim & Mergenthaler, 2000). Dit overlapt echter slechts gedeeltelijk met het analyseren van verhaalkenmerken en hun psychologische betekenis. Het coderen van Gehechtheidsbiografische Interviews door computer-programma's lijkt dus nog ver weg.

Het Leidse Longitudinale Adoptieonderzoek

Voor de studies zoals beschreven in hoofdstuk 3 en 4 van dit proefschrift, is gebruik gemaakt van gegevens van het Leidse Longitudinale Adoptieonderzoek dat startte in de babytijd. Op 14-jarige leeftijd hebben 156 jongeren en hun moeders meegedaan aan 3,5 uur durende huisbezoeken. Tijdens deze bezoeken is het GBI bij de jongeren afgenomen, hebben ze meegedaan aan een intelligentietest en een test voor emotionele investering. Daarnaast hebben de jongeren en hun moeders vragenlijsten ingevuld en meegewerkt aan een probleemoplossingstaak (Tangram) en een conflict-interactietaak (Family Interaction Task; FIT). In deze dissertatie is gebruik gemaakt van de data die zijn verzameld toen de kinderen 14 jaar waren.

We rapporteren in hoofdstuk 3 en 4 over 152 jongeren aangezien GBI's van twee jongeren niet gecodeerd konden worden als gevolg van technische problemen en GBI's van twee andere jongeren niet gecodeerd konden worden omdat zij de vragen niet begrepen als gevolg van (zeer) laag IQ. De verdeling van gehechtheids-representaties was als volgt: 57 (37.5%) veilig, 62 (40.8%) gereserveerd, 33 (21.7%) gepreoccupeerd. Als de onverwerkte categorie meegenomen wordt, is de verdeling: 50 (32.9%) veilig, 57 (37.5%) gereserveerd, 19 (12.5%) gepreoccupeerd en 26 (17.5%) onverwerkt. Deze verdelingen wijken af van de normatieve verdeling voor (niet-klinische) jongeren (Van IJzendoorn & Bakermans-Kranenburg, in press): de geadopteerde jongeren hebben vaker een onveilige gehechtheidsrepresentatie.

Validiteit van het Gehechtheidsbiografisch Interview bij jongeren

De validiteit en betrouwbaarheid van het GBI is uitgebreid aangetoond voor volwassenen. Dit is echter niet het geval voor jongeren, terwijl het GBI ook vaak bij deze groep wordt afgenomen. Doordat de meeste adolescenten bij hun ouders wonen en bijvoorbeeld ook financieel van hen afhankelijk zijn, zijn adolescenten mogelijk emotioneel minder onafhankelijk, en hebben ze ook nog niet de kans gehad om objectief hun relatie met hun ouders door te werken. Als gevolg hiervan kunnen adolescenten anders reageren op het GBI dan volwassenen. Validatie-onderzoek is voor deze groep dus noodzakelijk.

In hoofdstuk 3 tonen we aan dat het GBI ook een valide meetinstrument is wanneer het wordt afgenomen bij (geadopteerde) jongeren: (1) gedurende een conflict-interactietaak laten veilige jongeren meer autonomie zien dan onveilige jongeren en moeders van veilige jongeren laten meer verbondenheid zien dan moeders van onveilige leeftijdsgenoten, (2) gereserveerde jongeren investeren in emotioneel opzicht minder in anderen dan veilige en gepreoccupeerde jongeren, (3) veilige jongeren rapporteren meer steun vanuit hun omgeving dan onveilige jongeren en (4) temperament en intelligentie zijn onafhankelijk van gehechtheidsclassificatie.

Dat we, in tegenstelling tot onze verwachting, geen verband vonden tussen sensitiviteit van de moeders en de gehechtheidsrepresentaties van de adolescenten kan komen door de taak die we hebben gebruikt voor het meten van sensitiviteit. De jongeren werden gevraagd om moeilijke puzzels op te lossen. De moeders kregen de oplossingen van de puzzels en mochten hun kinderen helpen om de puzzel op te lossen. Deze situatie zal in het dagelijkse leven niet vaak voorkomen en is dus mogelijk niet voldoende ecologisch valide voor deze leeftijdsgroep. Toekomstig onderzoek zou sensitiviteit moeten meten in probleemoplossingsituaties die vaak voorkomen zoals helpen bij een moeilijke huiswerkopdracht.

Ondanks dat de jongeren geen genetische band hebben met hun moeders, toont deze studie aan dat de gehechtheidsrepresentatie van jongeren samenhangt met de door moeders vertoonde verbondenheid gedurende conflictsituaties. Dit duidt dus op het belang van de omgeving voor het ontwikkelen van de gehechtheidsrepresentatie. Dit sluit aan bij de studie van Caspers en collega's (in press) die vonden dat er 61% overeenkomst was in gehechtheidsrepresentatie bij niet-gerelateerde broers en zussen. Ook Constantino et al. (2006) rapporteerde dat niet-tweeling zussen net zoveel overeenkomst vertoonden in gehechtheidsrepresentatie als eeneiige tweelingzussen. Een substantiële volgende stap in gehechtheidsonderzoek kan gemaakt worden door het GBI af te nemen bij adoptieouders. Dit geeft de unieke kans om de gehechtheidsrepresentatie van adoptiekinderen te koppelen aan die van hun

ouders, om zo de intergenerationele overdrachtshypothese te testen in een steekproef van niet-gerelateerde ouder-adolescent paren.

Fysiologische reacties tijdens gehechtheidsrelevante situaties

In de gehechtheidstheorie wordt gesuggereerd dat interne werkmodellen van gehechtheid de emotieregulatie van personen beïnvloeden in de kindertijd, adolescentie en volwassenheid (Cassidy, 1994; Main, Kaplan, & Cassidy, 1985). Fysiologische maten bieden een uitstekende mogelijkheid om deze verwachte link te testen (Spangler & Zimmermann, 1999). In hoofdstuk 4 is onderzocht of jongeren met verschillende gehechtheidsrepresentaties ook verschillende fysiologische (stress) reacties laten zien tijdens het GBI en tijdens een conflict-interactietaak met hun moeders (FIT). In deze studie hebben we drie fysiologische maten meegenomen: interbeat interval (tijd tussen twee hartslagen), hartslagvariabiliteit en huidgeleiding. Door de baselinewaardes voor deze maten af te trekken van de waardes tijdens het GBI of de FIT kan de reactiviteit van een persoon worden bepaald.

Uit ons onderzoek bleek dat (wanneer gekeken wordt naar interbeat interval reactiviteit) gereserveerde jongeren tijdens het GBI minder stress ervaren dan jongeren met een veilige gehechtheidsrepresentatie, terwijl zij tijdens de FIT meer gestresst zijn dan veilig gehechte jongeren. Deze resultaten kunnen verklaard worden door de verschillende eisen die de twee taken aan de jongeren stellen. Tijdens het GBI wordt adolescenten gevraagd herinneringen op te halen uit hun kindertijd en deze te evalueren. Het lijkt erop dat gereserveerd jongeren minder open staan voor deze taak dan jongeren met een veilige gehechtheidsrepresentatie. Tijdens de FIT kan de inzet van de taak echter als hoger worden ervaren omdat het over zaken gaat in het huidige leven van de jongere. Daarnaast zijn moeders mogelijk veeleisender en meer uitlokkend dan een onbekende interviewer. Gereserveerde jongeren zouden daardoor minder kans kunnen hebben om defensieve strategieën effectief te gebruiken tijdens de FIT en daardoor meer stress ervaren dan veilige jongeren.

Onze resultaten voor het GBI verschillen van de twee eerder uitgevoerde studies door Dozier en Kobak (1992) en Roisman, Tsai en Chang (2004) die toonden dat deactivatie (een strategie die wordt gebruikt door personen met een meer gereserveerde gehechtheidsrepresentatie) samenhangt met meer stress tijdens het GBI. In de genoemde studies waren de participanten echter volwassenen terwijl onze steekproef bestond uit jongeren. Onze resultaten met betrekking tot het GBI kunnen de consequentie zijn van de transitionele levensfase van de jongeren (minder

afhankelijk worden van hun ouders) en van hun in ontwikkeling zijnde cognitieve functies (minder volwassen frontale cortex).

Een beperking van deze studie is dat tijdens de baselineperiode adolescenten is gevraagd een vragenlijst in te vullen terwijl zij gedurende de beoogde taken vragen beantwoorden of discussieerden met hun moeders. We waren echter niet zozeer geïnteresseerd in de verandering in fysiologische reactie van baseline naar beoogde taak als wel in mogelijke verschillen tussen jongeren met verschillende gehechtheids-representaties. Als we tijdens het GBI controleerden voor het aantal gebruikte woorden door de respondent, bleven de resultaten hetzelfde.

Samenvattend is de in hoofdstuk 4 beschreven studie de eerste waarin onderzoek is gedaan naar fysiologische reactiviteit bij (geadopteerde) jongeren tijdens het GBI en tijdens een moeder-adolescent interactietaak. Uit de resultaten blijkt dat gehechtheidsrepresentatie een belangrijke rol speelt bij emotieregulatie in gehechtheidsgerelateerde situaties, ook tijdens de adolescentiefase.

Geadopteerde versus niet-geadopteerde jongeren

In de twee hiervoor beschreven onderzoeken is het GBI afgenomen bij geadopteerde jongeren. Dat wij een ander verdeling van gehechtheidsreprepresentaties hebben gevonden dan in de normatieve verdeling voor jongeren kan (gedeeltelijk) het gevolg zijn van de adoptiestatus van de adolescenten. De geadopteerde jongeren zijn echter om verschillende redenen niet zo verschillend van niet-geadopteerde jongeren. Ze zijn op heel jonge leeftijd geadopteerd (gemiddeld waren ze 10 weken) en hadden geen medische problemen. Daarnaast hadden ze een IQ-score die niet significant verschilde van andere 14-15 jarige jongeren. Ook al hadden ze minder optimale scores voor inhibitie van autonomie-verbondenheid in vergelijking met een middelbare school steekproef (Allen & Hauser, 1996), ze vertoonden meer optimale autonomie gedragingen in vergelijking met een academische laag-risicogroep (Boykin-McElhaney & Allen, 2001).

Conclusie

Sinds de ontwikkeling van het GBI in de jaren tachtig is dit meetinstrument in meer dan 100 studies gebruikt. Toch waren er nog belangrijke vragen wat betreft de mogelijkheden (en onmogelijkheden) van het GBI onbeantwoord. In deze dissertatie hebben we aangetoond dat, hoewel het GBI een niet gemakkelijk toegankelijk meetinstrument is, het wel valide is om gehechtheidsrepresentaties van jongeren te meten, en dat het differentieert tussen jongeren met uiteenlopende fysiologische reacties tijdens gehechtheidsgerelateerde situaties.

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Curriculum Vitae

Mariëlle Beijersbergen werd op 25 augustus 1980 geboren te Delft. In deze stad behaalde zij in 1998 haar VWO diploma aan het Grotius College. Aansluitend hierop volgde zij de studie Pedagogische Wetenschappen aan de Universiteit van Leiden. In 2002 studeerde ze cum laude af in de gezinspedagogiek. In haar scriptie beschreef ze het adoptie-nazorgaanbod in Nederland vanuit Europees perspectief. Van 2002 tot en met 2007 werkte Mariëlle als promovenda op de afdeling Algemene en Gezinspedagogiek-Datatheorie. Zij deed hier onderzoek naar de validiteit van het Gehechtheidsbiografisch Interview. De resultaten van dit onderzoek zijn in deze dissertatie beschreven. Tevens werkte ze van 2004 tot en met 2007 één dag in de week als docent aan dezelfde afdeling. Sinds 1 november 2007 is Mariëlle werkzaam als wetenschappelijk onderzoeker bij het Onderzoekscentrum maatschappelijke zorg van het UMC St Radboud te Nijmegen.

Mariëlle Beijersbergen was born at 25 August 1980 in Delft, the Netherlands. In this city, she completed her secondary education in 1998 at the Grotius College. She then started her study at the Department of Education and Child Studies at Leiden University. In 2002 she received her M.A. degree (cum laude) in Child and Family Studies. In her thesis she described adoption aftercare in the Netherlands from a European perspective. From 2002 to 2007, Mariëlle was a PhD-student at the Centre for Child and Family Studies. At this Centre she conducted research on the validity of the Adult Attachment Interview. The results of this study are described in the present thesis. From 2004 to 2007, she also worked one day a week as a teaching assistant at the Centre for Child and Family Studies. Since November 2007 Mariëlle is working as a researcher at the Radboud University Nijmegen Medical Centre, the Netherlands.