Attachment in Adolescence:
A Social Relations Model Analysis

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A fundamental question in the study of attachment is the explanation for differences in quality of attachment. In the present study, the Social Relations Model (SRM) was used to examine whether these differences in quality of attachment could be explained by (a) characteristics of the person (actor effect), (b) characteristics of the attachment figure (partner effect), (c) characteristics of the specific attachment relationship (relationship effect), or (d) characteristics of the family (family effect). In 288 families, two adolescent children and their parents reported on their attachment relationships with other family members. Results of SRM analyses showed that, in general, characteristics of the person reporting the attachment relationship and characteristics of the attachment relationship are the most important explanations for differences in quality of attachment, but the magnitude of these effects tends to vary depending on which family relationship is considered.

Keywords: *attachment; adolescence; family relations*

Attachment bonds are assumed to be a positive influence on development throughout the life span by providing a sense of emotional support and of closeness and continuity, especially during times of important life transitions (Bowlby, 1982; Lopez & Gover, 1993). Adolescence is such a time of important life transitions. During this time frame, children confront the task of

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developing their identity and learning how to become autonomous, independent individuals while remaining involved in close relationships with parents, siblings, and peers. Because most of the studies on attachment focus on infancy and early childhood, it is relatively less known how attachment relationships change during adolescence. (Ainsworth, 1989; Paterson, Field, & Pryor, 1994).

There has been much discussion about the conceptualization of attachment. Traditionally, the term *attachment* was almost exclusively used for the affectional bond between infants and their mothers. Some researchers still favor a narrow definition of attachment, with protection as a main decisive factor concerning whether or not a relationship is to be viewed as an attachment relationship (Goldberg, Grusec, & Jenkins, 1999). Over the years, however, the scope of attachment research has broadened considerably, a development that some researchers feel is more true to Bowlby's theoretical concept of attachment and more promising as a line of research (Isabella, 1999; Pederson & Moran, 1999).

The first broadening of the traditional scope of attachment research concerns the developmental period during which attachment is studied. In addition to traditional infant attachment research, over the years, more and more researchers have studied attachment from a life-span perspective (Bartholomew, 1993; Rice, 1990). This broadening, naturally, has consequences for the type of instruments used to measure attachment and the dimensions of attachment that are studied (Lerner & Ryff, 1978, as in Rice, 1990). In infant attachment research, observational measures have been used that tap the behavioral dimension of attachment (Hinde, 1982; Parkes & Stevenson-Hinde, 1982). This dimension reflects the use of attachment figures for support and proximity. The second dimension of attachment is known as the affective-cognitive dimension, which reflects the affectively toned cognitive expectancies that are part of an individual's internal working model of attachment (Armsden & Greenberg, 1987; Bretherton, 1985). An individual's working model of attachment is a mental representation of that individual's self, of attachment figures, and of their relationships (Colin, 1996). A working model of attachment takes shape through experiences with several attachment figures over time. These past experiences are the basis on which an individual forms expectations about responsivity of attachment figures to that individual's needs (Bowlby, 1982). An individual's general working model of attachment (i.e., the affective-cognitive dimension of attachment) can be seen as guiding expectations about new relationships (Colin, 1996; McCormick & Kennedy, 1994) and is generally seen as more or less stable throughout adolescence (Bretherton, 1985; Weiss, 1982). The behavioral dimension of attachment, on the other hand, is more subject to develop-

mental changes due to (cognitive) maturation of the individual. Perhaps because of its stability, the affective-cognitive dimension is more predictive of adolescent functioning than the behavioral dimension (Paterson, Pryor, & Field, 1995). The affective-cognitive dimension of attachment continues to be important as an influence on adolescents as they move from childhood and adolescence into early adulthood (Ainsworth, 1989; Grotevant & Cooper, 1985; Paterson et al., 1995; Youniss, 1983). In research concerning attachment in adolescence and adulthood, the affective-cognitive aspect of attachment can be directly tapped by using self-report measures (Armsden & Greenberg, 1987).

In sum, in infant attachment research, attention has centered on the behavioral aspects of attachment, assessed through observations, because it is not possible to acquire direct information about an infant's affective-cognitive dimension of attachment. Adolescent and adult attachment research primarily taps the affective-cognitive aspect of attachment, assessed with questionnaires or interviews, because it is hard to think of experiments triggering the behavioral dimension of attachment in adolescents and adults, although some naturalistic observational studies have been conducted (Fraley & Shaver, 1998; Simpson, Rholes, & Nelligan, 1992).

A second broadening of the traditional scope of attachment research concerns the attachment figures studied. Several studies found that infant quality of attachment was relationship specific (e.g., Main & Weston, 1981). That is, infants could show high quality of attachment to theirs mothers and low quality of attachment to their fathers (or vice versa). So fathers were included as possible attachment figures. Following a life-span perspective of attachment, the diversity of possible attachment figures broadened even further. As children mature into adolescence and, after that, adulthood, other attachment figures besides their parents become important, such as friends and romantic partners (Ainsworth, 1989).

Despite the discussion regarding what constitutes the core of attachment, theorists generally agree that attachment can be defined as an enduring affectional bond of substantial intensity (Ainsworth, 1989; Armsden & Greenberg, 1987). For example, Ainsworth (1989) defined affectional bonds as "relatively long-enduring ties in which the partner is important as a unique individual and is interchangeable with none other" (p. 711). Not only the relationships of children with their parents but also relationships of children with their siblings and friends, relationships between romantic partners, and relationships of parents to their children can be considered affectional bonds (Ainsworth, 1989). In the present study, we adopt this approach and examine attachment relationships within the family in the period of adolescence.

An important theoretical issue in attachment studies is the explanation for differences in quality of attachment. Literature provides three possible explanations. First, differences in quality of attachment can be explained by characteristics of the person reporting attachment. In most research concerning adolescent and adult attachment, attachment is studied as a general working model, which is thought to be stable throughout the life span (McCormick & Kennedy, 1994), although some changes may occur as the person experiences new attachment relationships (Bartholomew, 1993). According to this theoretical premise, quality of attachment is a characteristic of the individual. Second, differences in quality of attachment can be explained by characteristics of the attachment figure. Some features of attachment figures (e.g. sensitivity and responsivity) are thought to be strongly related to differences in infant quality of attachment (Ainsworth, 1982; Ainsworth, Blehar, Waters, & Wall, 1978). Third, differences in quality of attachment can be explained by characteristics of the specific attachment relationship. Studies concerning infants' attachment to their mothers and fathers show that these attachments are relationship specific (Ainsworth, 1982; Main & Weston, 1981). Research studying attachment in adults also found that these attachments were relationship specific (Asendorpf, Banse, Wilpers, & Neyer, 1997). This suggests that quality of attachment is a characteristic of the relationship itself rather than of either of the individuals in the relationship, a view that is also shared by some attachment theorists (Hinde, 1982).

The question regarding the relative importance of characteristics of the adolescent, of the attachment figure, and of the specific attachment relationship in explaining differences in quality of attachment cannot be answered using conventional data analysis. To shed more light on this issue, in the present study, we used the Social Relations Model (SRM; Kenny & La Voie, 1984).

The SRM (Kenny & La Voie, 1984) was designed to methodically deal with the complexities of social interaction data, in particular the possible dependency in behavior and perceptions between two partners in a dyadic interaction (Cook, Kenny, & Goldstein, 1991; Stevenson, Leavitt, Thompson, & Roach, 1988). The SRM is a statistical model that can help determine whether variance in a particular construct can be explained by individual, dyadic, or group characteristics. Individual characteristics can have an impact on differences in behavior or perceptions in two ways. First, individuals may have characteristic behavior or perceptions that are carried into many relationships. In the SRM, the *actor effect* represents a person's average tendency to behave or report in a particular fashion while interacting with multiple partners, reflecting individual differences in the way one person acts toward others. Second, individuals can elicit behavior and perceptions from

others that are common across several relationships; these are called *partner effects* in the SRM. The partner effect is the extent to which a specific individual tends to elicit certain responses from others. The relationship itself can also have an impact that goes beyond the characteristic influences of either member. In the SRM, *relationship effects* reflect the special adjustment of an actor to a particular partner, the uniqueness of the interaction between two persons on a particular behavioral or perceptional dimension while controlling for actor and partner effects. Finally, differences can exist between groups in the way group members tend to behave or perceive, differences that rise above all individual and dyadic behavioral and perceptional tendencies. This is called the *group effect* in the SRM. The group effect (or *family effect*, as it is called in family research) is a measure of differences between groups (or, in this case, families) that cannot be attributed to individual group members, or to their dyadic relationships, because all actor, partner, and relationship effects have been partialled out.

Besides estimating these four kinds of effects, the SRM has the advantage that it can also provide information about reciprocal effects within groups (Cook et al., 1991). At the individual level, reciprocity can be estimated by correlating an individual's actor and partner effect. A significant actor-partner correlation indicates that persons who exhibit more of a particular behavior also elicit more of this behavior from their partners (Stevenson et al., 1988). At the dyadic level, reciprocity can be estimated by correlating the two relationship effects for a particular dyad (Cook & Dreyer, 1984). A significant dyadic correlation indicates that the unique relationship that one individual has with another individual is reciprocated by that other individual (Stevenson et al., 1988).

Much research applying the SRM has focused on interpersonal perception (Kenny & Malloy, 1988; Levesque & Kenny, 1993; Marcus & Holahan, 1994; Marcus & Kashy, 1995). Another fruitful area of research has been social behavior and relationships, especially within the family system. Different aspects of family relationships have been studied: play behavior (Stevenson et al., 1988), affective style (Cook et al., 1991), sense of control (Cook, 1993), coerciveness (Cook, 1994), and attachment (Cook, 2000). These studies have generally found that differences in social behavior are not only caused by characteristics of the person reporting on the relationship but also by characteristics of the partner in the relationship and unique features of that particular relationship. Family characteristics have not been found to explain a lot of variance up to now. Reciprocities were found to be significant on the individual level for fathers (Cook et al., 1991) and adolescents (Cook, 2000; Cook et al., 1991) and on the dyadic level between parents (Cook, 2000; Cook et al., 1991) and between siblings (Cook, 2000). Cook's (2000)

study of attachment within family relationships indicated that differences in quality of attachment are, in part, caused by characteristics of the person reporting the attachment. In his study, actor effects were much more important in explaining variance in attachment than were partner effects. This would mean that characteristics of the person reporting the attachment (e.g., attachment style) influence differences in quality of attachment more strongly than characteristics of attachment figures (e.g., responsivity or sensitivity). Relationship effects were found to be important in explaining differences in quality of attachment, even more so concerning attachment relationships within the same generation (adolescent-sibling and parent-spouse). Individual reciprocities of adolescents and dyadic reciprocity between within-generational pairs (mother-father and youngest-oldest) were also found to be significant (Cook, 2000).

However, the above-mentioned studies represent a major limitation that is fairly common in adolescent attachment research. Most of these studies concern college students and their families, a focus that causes a generalizability problem. Samples such as these generally include only late adolescents who possess enough intelligence to attend college, many of whom live away from home and whose families have sufficient income to pay at least part of the cost of college (Colin, 1996). Because of the availability of college populations, relatively little research has been conducted concerning general early and middle adolescent populations, which is why the present study focuses on attachment in this particular population.

In conclusion, in this study, by applying the SRM, we can examine whether differences in quality of attachment during early and middle adolescence can be explained by (a) characteristics of the person reporting attachment, (b) characteristics of the attachment figure, (c) characteristics of the specific attachment relationship, or (d) characteristics of the family as a whole. We will also examine whether quality of attachment is reciprocated at the individual, at the dyadic level, or both.

Based on the premises of attachment theory and results of previous studies (e.g., Cook, 2000; Cook et al., 1991), a number of hypotheses can be formed.

Especially during infancy and early childhood, characteristics of the attachment figure are important in the child's formation of a general working model of attachment (Ainsworth, 1982). By adolescence, these working models of attachment are thought to be a quite stable characteristic of an individual (McCormick & Kennedy, 1994). We would, therefore, expect actor effects, which reflect characteristics of the individual, to be significant and relatively more important in explaining variance in quality of attachment in adolescence than partner effects, which reflect characteristics of the attachment figure.

In infancy as well as in adulthood, attachments have been found to be relationship specific, indicating that quality of attachment is a characteristic of the relationship (Ainsworth, 1982; Asendorpf et al., 1997; Main & Weston, 1981). We would, therefore, expect relationship effects, which reflect characteristics of the specific attachment relationship, to be significant and important in explaining differences in quality of attachment, a hypothesis supported by empirical results (Cook, 2000).

Based on the results of previous research, we would expect the family effect to be relatively small and not very important in explaining differences in quality of attachment.

Finally, we expect quality of attachment to be reciprocated at both the individual level (i.e., individuals who report high quality of attachment also elicit these reports from other family members) and at the dyadic level (i.e., if a family member has a specifically high quality of attachment to another family member, this high quality of attachment is reciprocated by that other family member). Significant dyadic reciprocities are expected to be particularly evident concerning the relationships between parents and between siblings.

METHOD

Participants and Procedures

The sampling procedure consisted of two stages. In the first stage, 23 representative Dutch municipalities were asked to supply a list of families consisting of at least two children between 11 and 15 years of age and their two parents, all living at the same address. The required number of families per municipality depended on the size of the municipality: The greater the municipality, the larger the number of families. In the second stage of the sampling procedure, the candidate families were sent an invitation letter informing them about the project. After a few days, a candidate family was contacted by phone. It was checked to see whether the family fit all the requirements, after which they were asked to take part in this study. Of the 649 candidate families, 288 (44.4%) agreed to participate. After informed consent was obtained, an appointment for a home visit was made, and the data collection took place. All participating families were of Dutch origin and predominantly middle class.

All participants of the study (members of 288 intact families, consisting of at least two adolescent children and their biological parents) filled out a questionnaire concerning their affectional bonds with all other participating family members (a round-robin design).

The adolescents were 11 to 16 years old; the mean age of Child 1 (the elder of the two adolescents) was 14.5 years and that of Child 2 (the younger of the two adolescents) was 12.4 years. Of the total sample, 48.6% were boys and 51.4% were girls, both for Child 1 and Child 2. Mean age of mothers was 41.6 years, and mean age of fathers was 43.9 years.

Measures

The Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) was used to determine the quality of affectional bonds between all family members. The IPPA was designed to tap specific working models of attachment by assessing the positive affective-cognitive experiences of good communication and trust in the accessibility and responsiveness of attachment figures and the negative affective-cognitive experiences of anger and/or hopelessness resulting from unresponsive or inconsistently responsive attachment figure (Armsden & Greenberg, 1987).

The IPPA is a self-report questionnaire using a 5-point Likert-type scale (1 = *very untrue* to 5 = *very true*). Originally, the IPPA was only used for measuring adolescents' quality of attachment to parents (as a unit) and peers. Because SRM analyses require that the same instrument be used for all family members, we extended the use of this particular instrument for measuring quality of affectional bonds among all family members. Items were specifically screened for their application to all affectional bonds within the family, and some items were deleted from the modified IPPA (Raja, McGee, & Stanton, 1992) for this reason, resulting in a 10-item scale (see appendix for a final version of the IPPA used in the present study).

The IPPA contains three subscales. The communication scale, containing 3 items, measures to what extent a family member experiences having a high quality of communication with other family members. An example is as follows: "If my partner/Child 1/Child 2 knows something is bothering me, he/she asks me" (parent version), or "If my father/mother/sibling knows something is bothering me, he/she asks me" (adolescent version). The trust scale, also containing 3 items, measures the extent to which a family members trusts other family members to respect and accept his or her feelings and wishes. An example is as follows: "My partner/Child 1/Child 2 respects my feelings" (parent version), and "My father/mother/sibling respects my feelings" (adolescent version). The alienation scale consists of 4 items and measures the degree to which a family member experiences negative feelings toward other family members. An example is as follows: "I don't get much attention from my partner/Child 1/Child 2" (parent version), and "I don't get

much attention from my father/mother/sibling" (adolescent version). For each of the mother, father, and sibling relationships, identical items were used. Given the interrelationship between these scales (correlations for the whole group varied between .37 and .53), they are combined for each family member in an overall attachment score by computing the mean of the three scales. A high score on the overall attachment scale indicates high quality of attachment.

Though this instrument proved to be reliable and valid in previous studies (Armsden & Greenberg, 1987; Raja et al. 1992; Deković & Meeus, 1997), it should be noted that, until now, it has been used only for the assessment of attachment of adolescents and young adults to their parents (as a unit or to their mothers and father separately) and friends. Because it should not be assumed that the psychometric properties of scales developed for certain relationships and samples would generalize to other samples and relationships, we assessed both the reliability of the IPPA for each dyad within the family and the construct validity of the IPPA for use with adults. Reliabilities (Cronbach's alpha) of the adjusted IPPA ranged from .69 (father-Child 1) to .83 (Child 1-father). Mean reliability was .78, which is satisfactory. All of the alpha coefficients were moderate to high, and no differences were observed between the reliabilities of adolescents' affectional bonds with parents and siblings on one hand and those of parent-adolescent and parent-spouse affectional bonds on the other. Additionally, we checked the construct validity of the IPPA for use with adults by correlating parent scores with measures concerning perceived warmth, hostility, acceptance, and emotional support, scales taken from the Relational Support Inventory (RSI; Scholte, van Lieshout, & van Aken, 2001). These data were also collected following a round-robin design, meaning that data were available regarding the perceived warmth, hostility, acceptance, and emotional support of all participating family members concerning all other family members. The connections between attachment and RSI scales were significant and in the expected direction: significant positive correlations between parents' attachment to their children and parents' perceived warmth (range = .52 to .60), acceptance (range = .45 to .50), and emotional support (range = .57 to .60) from children and a significant negative correlation for parents' perceived hostility (range = –.36 to –.46) from children. Additionally, we calculated correlations between parental reports concerning the quality of attachment to their children and children's reports concerning the warmth, hostility, acceptance, and emotional support that they perceived from parents. Again, correlations were significant and in the expected direction: a positive correlation for perceived warmth (range = .21 to .25), acceptance (range = .13 to .24), and emotional

TABLE 1:
Attachment Scores: Means and Standard Deviations

	Attachment to							
	Child 1		*Child 2*		*Mother*		*Father*	
Attachment From	M	SD	M	SD	M	SD	M	SD
Child 1	—		3.25	.62	4.06	.55	3.74	.62
Child 2	3.34	.61	—		4.18	.51	3.91	.56
Mother	3.71	.45	3.76	.42	—		4.03	.53
Father	3.63	.41	3.67	.43	4.12	.49	—	

support (range = .21 to .27) and a negative correlation for perceived hostility (– .11 to – .21). Parents who report high quality of affectional bonds with their children not only report much warmth, acceptance, and emotional support and little hostility toward their children but also are perceived by their children as showing much warmth, acceptance, and emotional support and little hostility. This represents an indication for construct validity of the IPPA for use with adults.

RESULTS

Descriptive Statistics

Table 1 shows the means and standard deviations in attachment scores of all family members. All family members report highest quality of attachment to the mother. The highest quality of attachment reported is that of Child 2 to his or her mother, and the lowest reported are those of Child 1 to Child 2 and vice versa.

Table 2 presents the intercorrelations among attachment scores of all family members. A number of correlations are worth noting.

Correlations concerning the same actor with different partners (italic in Table 2) are larger, sometimes even twice as large, than those of different actors concerning the same partner (bold in Table 2). More specifically, correlations between both adolescents' attachment scores concerning the same parent are lower (Child 1-mother and Child 2-mother = .25; Child 1-father and Child 2-father = .28) than those between one adolescent's attachment scores concerning both parents (Child 1-mother and Child 1-father = .67; Child 2-mother and Child 2-father = .73).

TABLE 2: Correlations Among Attachment Scores

	C1-M	*C1-F*	*C1-C2*	*C2-M*	*C2-F*	*C2-C1*	*M-C1*	*M-C2*	*M-F*	*F-C1*	*F-C2*	*F-M*
C1-M	1.00											
C1-F	*.67***	1.00										
C1-C2	*.47***	*.52***	1.00									
C2-M	**.25****	.24**	.22**	1.00								
C2-F	.18**	**.28****	.25**	*.73***	1.00							
C2-C1	.25**	.23**	.41**	*.42***	*.53***	1.00						
M-C1	.22**	.19**	.15*	.12*	–.07	**.13***	1.00					
M-C2	.08	.14*	**.20****	.32**	.22**	.22**	*.54***	1.00				
M-F	.00	**.20****	.10	.11	**.03**	.12	*.33***	*.31***	*1.00*			
F-C1	.20**	.28**	.13*	.07	.08	**.19****	**.32****	.20**	.24**	1.00		
F-C2	.14*	.09	**.17****	.22**	.30**	.25**	.11	**.36****	.08	*.56***	1.00	
F-M	**.03**	.08	.04	**.06**	.11	.05	.12*	.17*	.44**	*.46***	*.39***	1.00

NOTE: C1 = Child 1 (elder adolescent); C2 = Child 2 (younger adolescent); F = father; M = mother; italic correlations indicate correlations between the same actor concerning different partners; bold correlations indicate correlations between pairs of actors concerning the same partner; underlined correlations indicate correlations between dyads.
*$p < .05$. **$p < .01$.

Attachment scores of one person (actor) are highly intercorrelated but are even more so when partners belong to one family subsystem (e.g., both are parents or both are children). Highest correlations for fathers as well as for mothers are those between their affectional-bond scores concerning Child 1 and Child 2 (.56 and .54, respectively). Highest correlations for Child 1 as well as Child 2 are those between their attachment scores concerning their mothers and fathers (.67 and .73, respectively). Within families, results seem to point at two subsystems: the parental subsystem (father, mother) and the child subsystem (Children 1 and 2).

Social Relations Analysis

The current study applied the SRM to identify the relative importance of actor, partner, relationship, and family effects concerning quality of attachment between family members. As stated earlier, the actor effect indicates a person's general tendency to report systematically high (or low) quality of attachment to other family members. The partner effect means that a person systematically elicits high (or low) quality of attachment relationships from other family members. The relationship effect is the unique quality of attachment that one family member reports to another family member, controlling for their actor and partner effects. The family effect indicates that there are systematic differences between families in the degree to which quality of attachment relationships within the family is high (or low).

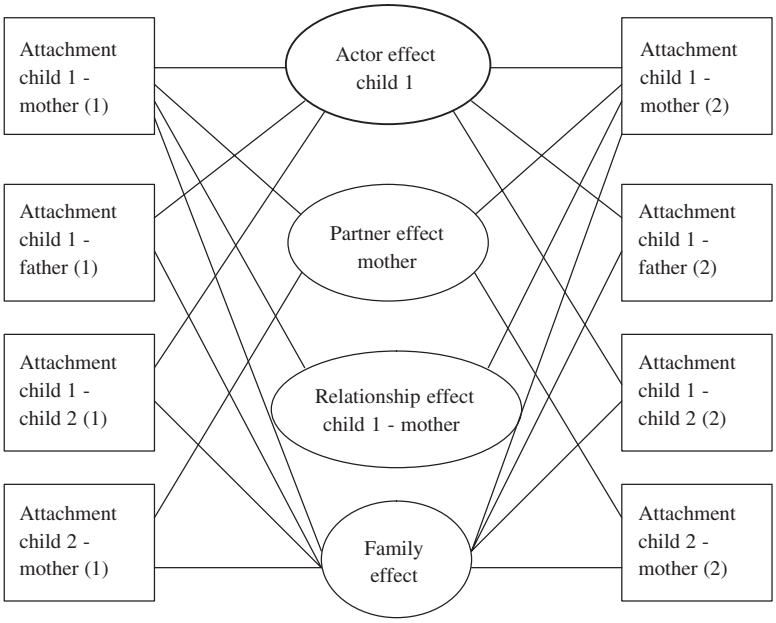

Figure 1. Example of the Social Relations Model: two parallel measures of youngest-child-mother attachment (all factor loadings were fixed at 1.0).

The SRM effects are specified as latent variables in a confirmatory factor analysis, using a structural equation modeling approach (e.g., LISREL). Forcing the observed variables (attachment scores) to load on these latent variables provides information regarding the amount of variance in the observed variables accounted for by each of the effects. For example, the IPPA score of Child 1's quality of attachment to his or her mother was forced to load on (a) Child 1's actor effect, (b) mother's partner effect, (c) Child 1-mother relationship effect, and (d) family effect (see Figure 1). Factor loadings are fixed at 1.0. A SRM effect is significant if the amount of variance it explains reliably differs from zero (Cook et al., 1991). All effects are estimated simultaneously, so every effect is controlled for by every other effect.

Because estimations of relationship effects on the basis of a single indicator contain random error as well, relationship effects cannot be reliably estimated from a single indicator. To separate the true relationship effects from random error, either replications or multiple measures of the same construct

must be used (Kashy & Kenny, 1990; Kenny & La Voie, 1984). This can be achieved in a number of ways. First, the same measurement can be used at two or more points in time. Second, two similar measures can be used to measure the same construct. Third, a particular measure can be split into two random, parallel halves (Cook, 1993; Cook, 2000). This third way of creating multiple indicators to estimate true relationship effects was used in this study. Instead of using the overall attachment score for SRM analyses, we split the attachment scale into two random halves, each containing five items. Attachment Parallel Scale 1 consists of two alienation items, two communication items, and one trust item. Attachment Parallel Scale 2 consists of two alienation items, one communication item, and two trust items (see appendix).

In addition to actor, partner, relationship, and family effects, it is possible to estimate two kinds of reciprocity. First, individual reciprocity can be estimated by correlating actor and partner effects of one individual. A significant individual reciprocity indicates that persons who have a tendency to report high quality of affectional bonds also elicit reports of high quality of affectional bonds from others. Second, dyadic reciprocity can be estimated by correlating the two relationship effects of one dyad (e.g., Child 1-mother relationship effect with mother-Child 1 relationship effect). A significant dyadic reciprocity indicates that the uniquely high quality of attachment Person A reports to Person B is reciprocated by Person B (i.e., Person B also has a uniquely high quality of attachment to Person A).

Using structural equation modeling (LISREL 8; Jöreskog & Sörbom, 1993), the basic SRM was estimated containing 4 actor effects (Child 1, Child 2, mother, and father), 4 partner effects, 12 relationship effects, 1 family effect, four individual reciprocities, and six dyadic reciprocities. As a general rule for a good fit of the model, the chi-square value should be nonsignificant. However, this measure is sensitive to sample size, meaning that if the sample size increases, the chi-square value has a tendency to indicate a significant probability level (Schumacker & Lomax, 1996). Instead of relying on significance of the chi-square value, we used the RMSEA and the NNFI for indicators of fit. These two fit indices are among the ones least sensitive to sample size (Fan, Thompson, & Wang, 1999). Values of the RMSEA between .5 and .8 indicate an acceptable fit, and values below 0.5 a good fit of the model (Browne & Cudeck, 1993). A value of .90 or higher of the NNFI indicates a good fit of the model with the data (Bartle-Haring & Gavazzi, 1996; Marsh & Hocevar, 1988).

Our basic model showed a moderate fit. Modification indices were checked to see how model fit could be improved. These indicated that allowing measurement errors to covary would drastically improve the fit of the original model. This adjustment did not alter the significance of effects and

TABLE 3: Variance Estimates of the Social Relations Model Effects

Effects	*Variance Estimate*
Actor	
Child 1	.35*
Child 2	.41*
Mother	.21*
Father	.31*
Partner	
Child 1	.11*
Child 2	.14*
Mother	*ns*
Father	.08*
Relationship	
Child 1 and mother	.31*
Child 1 and father	.18*
Child 1 and Child 2	.27*
Child 2 and mother	.21*
Child 2 and father	.*ns*
Child 2 and Child 1	.30*
Mother and Child 1	.28*
Mother and Child 2	.22*
Mother and father	.39*
Father and Child 1	*ns*
Father and Child 2	*ns*
Father and mother	.38*
Family	.10*

*$p < .05$.

only slightly changed their variance. After the adjusted SRM was fitted, nonsignificant effects were dropped from the model, after which it was tested again. This resulted in the following: $\chi^2(233, N = 253) = 417.14, p < .01$. The RMSEA was .05 and the NNFI was .94, which indicates that the model fits the data well. Table 3 shows the effects according to this last model. The entries in Table 3 are the construct variances for each of the SRM effects.

As can be seen in Table 3, all of the actor effects are significant. This means that differences in quality of attachment relationships are, in part, caused by a family member's tendency to report high quality of attachment relationships with all other family members. Except for mothers, all partner effects are significant, too, but their variances are smaller than the actor variances. This indicates that a person's tendency to elicit a high quality of attachment relationships also influences the quality of attachment of all family members with that person.

Nine out of 12 possible relationship effects are significant. It is interesting to note that all three nonsignificant relationship effects concern attachment between the adolescents and their fathers: father-Child 1, father-Child 2, and Child 2-father. A few other differences are worth noting. Within-generational relationship effects account for more variance in quality of attachment than between-generational relationship effects. The relationship effects between spouses are especially large. Relationship effects of Child 1 with his or her parents are larger than those of Child 2 with his or her parents. This means that characteristics of the specific relationship are more important for Child 1 (the older adolescent) than for Child 2 (the younger adolescent). Another difference is that for both adolescents, relationship effects concerning quality of attachment to their mother account for more variance than relationship effects concerning quality of attachment to their father. This indicates that adolescents show more unique adjustment in their attachment relationship to their mother than they do to their father.

The family effect was found significant. This means that there are systematic differences between families in quality of attachment among family members, even after controlling for all actor, partner, and relationship effects within that family.

Apart from these effects, two kinds of reciprocities were estimated. Because reciprocities are estimated by correlating actor and partner effects (in case of individual reciprocity) and both relationship effects concerning one particular dyad (in case of dyadic reciprocity), only those reciprocities were estimated in which the effects correlated are both significant.

Individual reciprocities (the correlation between one family member's actor and partner effects) indicate whether persons who report high quality of attachment to other family members also elicit reports of high quality of attachment from other family members. The individual reciprocity correlations were significant for the adolescents only: Child 1 = .43 and Child 2 = .56. Dyadic reciprocities are estimated by correlating both relationship effects of a particular dyad. Four dyadic reciprocities could be estimated (mother-father, mother-Child 1, mother-Child 2, and Child 2-Child 1). Two of these reciprocities were found significant; the dyadic reciprocity correlation between parents was .67, and between siblings it was .47. Therefore, it seems that only in within-generational relationships are unique adjustments reciprocated.

The preceding analyses provide the answer to the question of which effects significantly contribute to the variance in quality of attachment, but they do not convey information about the relative importance of these effects. This information can be obtained by comparing the effects as sources of variance in quality of attachment. This was done separately for each of the 12

TABLE 4: Proportions of the Explained Variance in Attachment Explained by SRM Effects

	Effects			
Attachment Relationship	*Actor*	*Partner*	*Relationship*	*Family*
Child 1 and mother	46	0	41	13
Child 1 and father	49	11	25	14
Child 1 and Child 2	41	16	31	12
Child 2 and mother	57	0	29	14
Child 2 and father	69	14	0	17
Child 2 and Child 1	45	12	33	11
Mother and Child 1	30	16	40	14
Mother and Child 2	31	21	33	15
Mother and father	27	10	50	13
Father and Child 1	60	21	0	19
Father and Child 2	56	25	0	18
Father and mother	39	0	48	13

NOTE: SRM = Social Relations Model.

attachment relationships by adding up all the variances caused by actor, partner, relationship, and family effects for that particular dyad, as well as the error variance. For example, the total variance in quality of attachment of Child 1 to his or her mother is computed by summing the following SRM variance estimates: Child 1's actor effect, mother's partner effect, Child 1-mother relationship effect, the family effect, and error. Across all attachment relationships, the SRM effects can explain a mean of 54% of the variance in quality of attachment. About 46% of the variance in quality of attachment of all family members to all other family members can be accounted for only by unmeasured variables or measurement error. The percentages in Table 4 indicate the proportion of the explained variance (without error variance) accounted for by each of the SRM effects.

The results as presented in Table 4 show that the relative importance of the effects is different for the four different kinds of relationships within the family. Regarding explained variance in quality of attachment of adolescents to their parents, it is clear that actor effects account for a large portion of the explained variance (between 46% and 69%). These percentages are slightly higher for Child 2 than for Child 1. In addition to actor effects, another significant source of variance in quality of attachment is the relationship effects, which account for between 29% and 41% of the explained variance.

Similarly, variance in quality of attachment between siblings is best explained by actor effects (41% and 45%) and relationship effects (31% and 33%).

Concerning quality of affectional bonds of parents with their adolescents, there seems to be a difference in results between quality of affectional bonds of the mother with her children on one hand and quality of affectional bonds of the father with his children on the other hand. Father's actor effect is much more important in explaining variance in quality of affectional bonds with the children (60% and 56% for Child 1 and Child 2, respectively) than is mother's actor effect (30% and 31%). Mother's relationship effects regarding her children (44% and 33% for Child 1 and Child 2, respectively) are as important as are her actor effect, whereas father's relationship effects concerning his children are not significant. In other words, mothers adjusts themselves to each of the children separately, whereas fathers show no unique adjustment to their children at all.

Differences in quality of attachment between spouses are best explained by their unique adjustment toward each other (50% and 48% for mother-father and father-mother, respectively) and, to a lesser degree, by their actor effect (27% and 39%). In no other relationship within the family is this unique adjustment as important as it is here, which is not surprising considering the fact that the relationship between marital partners is unique within the family.

Taken together, these findings suggest that there is no straightforward answer to the question of which effects are the most important ones. It obviously depends on the kind of relationship in focus.

DISCUSSION

In the present study, by applying the SRM, four explanations for differences in quality of attachment were examined: characteristics of the person reporting the attachment (actor effect [e.g., attachment style]), characteristics of the attachment figure (partner effect [e.g., responsivity or sensitivity]), characteristics of the unique attachment relationship (relationship effect), and characteristics of the family as a whole (family effect [e.g., religion or economic status]). Results show that characteristics of the person reporting attachment appear to be more important in explaining differences in quality of attachment than characteristics of the partner in the relationship (i.e., actor effects were much larger than partner effects). This is especially the case for adolescents; their reports of family relationships seem to be more influenced by their own characteristics than are reports of parents. These findings are similar to findings of SRM family studies regarding affection (van Aken & Oud, 1997), restrictiveness (van Aken, Oud, Mathijssen, & Koot, 2001), negativity (Cook et al., 1991), and attachment (Cook, 2000).

Partner effects. These reflect a person's tendency to systematically elicit high quality of attachment, and though lower in magnitude, they were still significant, except for mother's. There are two possible explanations for the absence of this partner effect. The first explanation is that mothers do not systematically elicit reports of high quality of attachment relationships from other family members. In other words, there is too little within-family consensus. The second explanation is that there is not much variance in the way other family members experience their attachment relationship with the mother in the family. That is, there is too little between-family variance. If all family members in all families report a high quality of attachment to the mother, variance in this measure is small, causing a nonsignificant mother partner effect. Given the generally high means of attachment to the mother, the second explanation seems the more plausible one.

All but three of the relationship effects are found to be significant. The nonsignificant relationship effects concern the relationship between adolescents and their fathers (or vice versa). It seems that fathers do not adjust themselves in their relationships to both adolescents. Another interesting result is that especially the relationship effects between spouses are very important in explaining variance in quality of attachment between spouses, more important than their individual characteristics. This leads to the not-very-surprising conclusion that the marital relationship is truly unique within the family setting. These findings are similar to those of Cook (2000), who also found that variance estimates of father-mother and mother-father relationship effects were higher than those of any other relationship effects and that these relationship effects between father and mother had the highest contribution to the explained variance in these attachments.

The family effect proved to be a significant yet modest source of variance. This finding is dissimilar to most family studies using the SRM, which usually show less important or nonsignificant family effects (Cook, 2000; Cook et al., 1991; van Aken et al., 2001). Our significant family effect indicates that there are small but systematic differences between families (e.g., religion, urbanity, socioeconomic status) in the degree to which quality of attachment within the family is high or low. The fact that the family effect is more important in our study than in other studies indicates that families in our study show greater within-family similarities and/or greater between-family variance than the families in other studies. This could be caused by the fact that compared to the other studies, ours is a more general population of families, randomly selected from a number of Dutch municipalities, containing families that are heterogeneous concerning education level, family income, and urbanity. Cook (2000), for example, used a sample of American college students and their families, whereas our sample consisted of Dutch high school

students and their families. The difference in the sample causes differences in cultural background, differences in age between the adolescent subjects of the two studies (our adolescents were younger), and differences in the level of education of the adolescents (none of our adolescents attended college at the time of the study).

Concerning the individual reciprocities, only the correlation between adolescents' actor and partner effects were significant. This means that adolescents who have a tendency to report high quality of attachment to all other family members also have a tendency to elicit such reports from those family members. Two dyadic reciprocities were found to be significant, both concerning within-generational pairs: dyadic reciprocity between siblings and between parents. It seems that these pairs have unique attachment relationships with each other that are strongly reciprocated. This is probably the case because these relationships are the relationships within the family that are characterized most by equality.

Comparing these results to the only other known study using the SRM on attachment data—that of Cook (2000)—there are a lot of similarities. Cook also found significant actor effects that were more important in explaining differences in quality of attachment than partner effects and significant relationship effects, especially those in within-generational dyads. An interesting similarity between the two studies is that different results were found for the four types of affectional bonds within the family (i.e., adolescent-parent, adolescent-sibling, parent-adolescent, and parent-spouse). Each attachment relationship showed a different pattern concerning the relative importance of characteristics of the person reporting the attachment, the attachment figure, the specific relationship, and the family in explaining differences in quality of attachment (see Table 4).

Besides similarities in results, there are also some interesting differences. The actor effects (i.e., characteristics of) adolescents in our study were more important in explaining differences in quality of attachment than in Cook's (2000) study. This difference could be caused by the age difference between the adolescents in both studies. In Cook's study, mean age of the older adolescent was 19.1 years and that of the younger adolescent was 16 years. In our study, mean age of the older adolescent was 14.5 years and of the younger adolescent was 12.4 years—a substantial difference. It could be that younger adolescents are more influenced by their own characteristics in reporting about attachment relationships than by characteristics of the attachment figure or unique characteristics of the relationship itself. This idea is confirmed by several findings. First, actor effects within our study were larger for younger adolescents than for older adolescents. Second, partner and relationship effects were more important in explaining differences in attachment of ado-

lescents with their family members in Cook's study (with the older sample) than in our sample (with the younger sample). Third, in our study, relationship effects of the older adolescents were generally more important than relationship effects of the younger adolescents in explaining differences in quality of attachment of the adolescents to other family members. Fourth, partner effects of the parents were much less important in explaining differences in quality of attachment of adolescents with their parents in our study (with the younger sample) as compared to Cook's (with the older sample). All these findings, taken together, seem to indicate that younger adolescents' differences in quality of attachment are more influenced by their own characteristics than by characteristics of the attachment figure or of the specific attachment relationship, a hypothesis that warrants further investigation.

Using the SRM on attachment relationships within the family, one can distinguish four causes of differences in quality of attachment: properties of the person reporting the attachment (actor effect [e.g., attachment style]), properties of the attachment figure (partner effect [e.g., responsivity or sensitivity]), properties of the unique attachment relationship (relationship effect), and properties of the family as a whole (family effect [e.g., religion or economic status]). The ability to distinguish between these four causes of differences in quality of attachment is very important from a practical point of view. Low quality of attachment relationships is associated with psychopathology (Main, 1996; Rosenstein & Horowitz, 1996) and low self-esteem (McCormick & Kennedy, 1994). To improve the quality of an attachment relationship effectively, one must know whether interventions should focus on the person, on the attachment figure, on the specific attachment relationship, or even on the family as a whole. Focusing on the person reporting the low quality of attachment is not very effective if quality of the attachment relationship is influenced only by characteristics of the attachment figure. The results of our study suggest that it is important to look at the type of attachment relationship first. At what level intervention should take place could be different for each of the four attachment relationships in the family. The results shown in Table 4 could be translated into an answer to the question on what level intervention should take place. For example, if an adolescent reports a low quality of attachment to his or her parents, it might be important that intervention focus not only on the adolescent but also on the specific relationship. Characteristics of the attachment figure do not seem to be very important in causing differences between adolescents in quality of attachment to their parents, so, considering our results, it might not be very effective for the attachment figure to be the focus of the intervention.

There are some limitations to the present study. The IPPA was designed for use with adolescents. One cannot automatically assume the appropriate-

ness of such an instrument for a much older group of participants, such as adult parents. However, we checked both reliability and validity of the instrument with this new group and, on the basis of which, we concluded that the IPPA could be used for measuring attachment in adults as well as in adolescents.

Studies examining attachment in family relationships by using sophisticated analytic strategies are still relatively rare. Further studies are needed to validate present findings. Furthermore, future studies should examine whether results of SRM analyses of family attachment data are different for different types of families. In a study by Cook and Dreyer (1984), different SRM results were found for four separate groups of families. These four groups of families were formed on the basis of gender of the adolescent and on the adolescent's cognitive style. Likewise, one could form groups of families on the basis of, for example, general level of conflict within the family and could study differences in results of SRM analyses between these groups. This would give us even more information about the complex ways that attachment relationships within the family are formed and maintained or how they can change or be changed. As attachment relationships have been shown to change during adolescence (Buist, Deković, Meeus, & van Aken, 2002), using a longitudinal design, combined with SRM analyses, could prove to be very insightful.

Appendix
Modification of the
Inventory of Parent and Peer Attachment

Respondents indicate whether the following items are (1) *very untrue*, (2) *untrue*, (3) *sometimes true*, *sometimes untrue*, (4) *true*, or (5) *very true*.

In the adolescent version, the blanks were filled in with *mother*, *father*, or *sibling*. In the parent version of the questionnaire, the blanks were filled in with *Child 1* (elder adolescent), *Child 2* (younger adolescent), or *spouse*.

Communication Scale:

1. I tell _____ about my problems and troubles.
2. If _____ knows something is bothering me, _____ asks me about it.
3. _____ helps me to understand myself better.

Trust Scale:

4. _____ accepts me as I am.
5. _____ respects my feelings.
6. When I am angry about something, _____ tries to be understanding.

Alienation Scale:

7. Talking over my problems with _____ makes me feel ashamed or foolish.
8. I do not get much attention from _____ .
9. I feel angry with _____ .
10. I get upset easily at _____ .

Alienation scale item scores were recoded.

Parallel Attachment Scales (for Social Relations Model purposes):

Scale 1: Items 1, 3, 5, 8, and 10
Scale 2: Items 2, 4, 6, 7, and 9

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