Adolescents’ perceptions of differential parenting: Links with attachment style and adolescent adjustment

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Abstract
The study examines whether adolescent twins’ attachment style mediates the association between their perceptions of differential parental treatment and their reported adjustment. Data from a survey of 174 adolescent twins are used to assess the links between twins’ reports of differential parental affection and differential parental control, their attachment style, and their reported personal self-esteem, social self-esteem, and anxiety. Twins’ reports of having been disfavored in comparison with their co-twin were associated with attachment insecurity, anxiety, and lower personal self-esteem. Attachment was found to mediate the association between the twins’ reports of differential parental affection and their reported anxiety and personal self-esteem. The strongest evidence for mediation was found for twins’ reports of differential maternal affection in predicting adolescent twins’ anxiety.

The burgeoning research interest in the phenomenon of differential parental treatment and its effects on children’s social and emotional development began with the exploration of nonshared environmental influences on personality development in the early 1980s (e.g., Daniels & Plomin, 1985; Plomin & Daniels, 1987). Nonshared environment encompasses any environmental experience, whether perceived or actual, that differs for siblings growing up in the same family. Interactions with parents, friends, and siblings, along with chance events, all combine in subtle yet complex ways to create a very different environment for each child within the same family (Dunn & Plomin, 1990). These environmental differences, experienced or perceived by siblings growing up in the same family, appear to be important factors that drive a child’s normal and abnormal development (Plomin, Chipuer, Neiderhiser, 1994).

One of the key sources of nonshared family environment found to be responsible for differences between siblings in their social behavior and psychological adjustment is differential parental treatment. Young children’s and adolescents’ experiences of differential supportive and disciplinary parenting have been linked with a variety of indicators of social and emotional adjustment including children’s sense of competence and self-worth (Dunn, Stocker, & Plomin, 1990), personality (e.g., Baker & Daniels, 1990), and behavioral problems and psychopathology (e.g., Tejeronina-Allen, Wagner, & Cohen, 1994). Not surprisingly, it is the child who is disfavored in the family—that is, the one who receives less support and more discipline—who demonstrates poorer adjustment outcomes than the favored sibling.
Despite the apparent importance of differential parenting in shaping a child’s development, there is a comparative absence of theoretical and empirical research that examines the psychological mechanisms by which differential parenting may come to adversely affect the disfavored child’s notions of the self and others around him or her. The present study aims to address this gap in the research by examining whether the child’s attachment style constitutes such a mechanism. By drawing on both attachment theory and nonshared environment as the framework, the present study tests the hypothesis that attachment style mediates the association between children’s perceived experience of differential parental treatment and their reported adjustment.

The attachment-adjustment link

Bowlby’s attachment theory has been suggested as a valuable theoretical framework for guiding investigations into the nature of the parent-child relationship, as well as for understanding links between experiences in the parent-child relationship and individual differences in social and emotional adjustment—in particular, the way people regulate their inner distress and how they relate to others. The key propositions of attachment theory as defined by Bowlby (1973) are:

First, when an individual is confident that an attachment figure is available whenever he or she desires, that person is much less prone to either intense or chronic fear than an individual who, for any reason, has no such confidence. Second, confidence in the availability of attachment figures, or lack of such confidence, is built up slowly during the years of immaturity (infancy, childhood, and adolescence), and whatever expectations are developed during those early years tend to persist relatively unchanged throughout the rest of life. Third, the varied expectations of the accessibility and responsiveness of attachment figures that individuals develop during the years of immaturity are tolerably accurate reflections of the experiences those individuals have actually had. (p. 235)

Central to all three propositions are the child’s expectations or beliefs about the availability and responsiveness of the attachment figure. Over time, Bowlby argues, these expectations or beliefs are incorporated into working models of self (a model based on perceptions of the worthiness of the self to be noticed and cared for) and other (a model based on perceptions of the likelihood of the attachment figure being caring and responsive). When developed, these internalized working models constitute an interpretive system through which past parenting experiences come to influence the way future relational behavior is interpreted and understood. Parent-child relations that are warm, responsive, and stable foster the development of secure parental attachment (i.e., positive models of self and other). Parenting that is rejecting or inconsistently responsive and available gives rise to insecure parental attachment manifested by child avoidance of, or ambivalence toward, the parent (i.e., negative models of self and other) (Ainsworth, Blehar, Waters, & Wall, 1978).

Past attachment research has primarily emphasized the importance of a secure attachment for infants and young children. However, with increasing theoretical attention being given to the role of internal working models and attachment over the life course, the relevance of attachment relations for well-being in adolescence has been increasingly acknowledged (Allen & Land, 1999; Woodward, Fergusson, & Belsky, 2000). The implications of attachment insecurity for the way adolescents view themselves and those around them are strongly supported by studies of adolescents’ emotional adjustment and subjective well-being. In particular, adolescent-perceived attachment to parents has been associated with a range of indices of well-being, including self-esteem and anxiety (Armsden & Greenberg, 1987; Paterson, Pryor, & Field, 1995), mental health (Strahan, 1995), and the quality of peer relationships (Black & McCartney, 1997).

The nature of the child’s attachment orientation during adolescence may, however, differ in fundamental ways from that experienced at earlier stages of the child’s development. For example, across both the cognitive and affective dimensions of attachment, substantial changes appear to take place in the
parent-child attachment relationship in the period from early to late adolescence, as parents and adolescents negotiate issues of adolescent autonomy and independence from family members, while at the same time working to maintain close bonds (Paterson et al., 1995). Allen, Kuperminc, and Moore (1997) suggest that adolescents’ success in balancing their efforts to attain autonomy and maintain a sense of relatedness in adolescent-parent interactions may even be considered a stage specific manifestation of attachment security in adolescence. Adolescents’ developing cognitive capacities, argue Allen and Land (1999), also lead to the emergence, for the first time, of a single overarching attachment organization that arises from the multiple models held of different relationships in infancy and childhood.

Despite these possible developmental differences, there is research evidence to suggest that attachment orientation during adolescence remains linked with attachment patterns at earlier periods in the child’s life. However, the extent of continuity of attachment behavior remains controversial, and the results of studies that have tracked individuals from infancy into adolescence are mixed (Allen & Land, 1999; see also Grossmann, Grossmann, & Zimmermann, 1999, for a review of research findings on attachment stability and change during the years of immaturity). Some studies report a high degree of concordance between attachment security in late adolescence and infant strange-situation security (e.g., Waters, Merrick, Albersheim, & Treboux, 1995), but other studies have found little or no significant association (e.g., Zimmermann, Fremmer-Bombik, Spangler, & Grossmann, 1995). This inconsistency may be attributable, in part, to the fact that long-term continuities in attachment are influenced by changes in family circumstances and caretaking patterns (Feeney & Noller, 1996) and other intervening social-environmental factors as demonstrated by Waters et al. (1995).

Considered together, these findings are consistent with attachment theorists’ recognition that attachment behavior and working models cannot be regarded as fixed in infancy and unchanging throughout life. Attachment orientation can vary in stability depending on the degree of satisfaction that each person derives from the attachment pattern, the presence of major relationship events that can alter the behavior of either of the individuals in the relationship, and the degree of fit that exists between the actual social interchanges and the corresponding working models (Bowlby, 1980).

Differential parenting and attachment style
The parenting precursors of attachment insecurity are traditionally viewed as direct experiences of the primary caregiver as insensitive and unresponsive. In the present study the notion of what constitutes insensitive and unresponsive parenting is extended to include the relative deprivation of parental warmth and affection—that is, it is not only the direct level of warmth and affection you receive from a parent, but also what you receive relative to your sibling, that leads to attachment insecurity. Plomin and Daniels (1987) argued that the anxiety and distress generated by within-family differences in parenting may be more important than between-family differences in its adverse effects on children’s social and emotional adjustment—a hypothesis that has since received strong empirical support (e.g., see Anderson, Hetherington, Reiss, & Howe, 1994).

Despite the obvious utility of testing the link between children’s experience of differential parenting and their attachment style, to date the research examining the influence of attachment security on children’s social and emotional development and the research examining the effects of differential parental treatment on individual adjustment have remained largely unrelated, with the following notable exceptions. Volling and Belsky (1992) investigated the contribution of parent-child attachment and differential parenting to the quality of young children’s interactions with their younger sibling. They predicted that children who were secure in their first year, and had a supportive parent-child relationship in their third year, would be better able to cope with the experience of differential parenting in
their sixth year, which in turn would inhibit their hostility toward their younger sibling in their sixth year. Drawing on longitudinal data from 30 families, Volling and Belsky’s findings suggest that attachment security may have increased the salience of differential parenting to children because those children who demonstrated a secure parent-child relationship were more hostile in their relationship with their sibling when parents treated the children differently. Conversely, for those children who were insecurely attached, the cumulative effects of early parenting appeared to directly adversely affect the nature of the sibling interaction independently of the children’s experience of differential parental treatment. Although this study was the first to combine an examination of the effects of attachment orientation and differential parenting on the quality of family relationships, the nature of the association between differential parental treatment and attachment style was not a focus and consequently was not directly tested.

An earlier study by Minde, Corter, Goldberg, and Jeffers (1990) gives a better indication of the possible nature of the association between differential parenting and attachment. Minde and colleagues, using a sample of 24 twin dyads, examined maternal preference between premature twins from birth up to age 4 years. Among other measures of functioning, they assessed mother-child attachment for each twin at age 1 year (assessed using the Strange Situation Technique; Ainsworth et al., 1978). They found that those mothers with a stable preference for a particular twin (two-thirds of the mothers in the sample) responded to their preferred infant more sensitively than to the cotwin during the early stages of the twins’ development. In particular, these mothers monitored the preferred infant’s behavior, responded to his or her cues, and promptly attended to this twin in both the tactile and visual modalities. In contrast, these mothers generally initiated interactions with the nonpreferred twin rather than being responsive to the infant’s signals. Minde and colleagues argued that, from an attachment theory perspective, the interaction pattern between the mother and her preferred child was the more sensitive caretaking style, and was the style conducive to the development of secure attachment in these twins one year later. Although based on very small numbers, such a finding suggests that differential treatment is beneficial to the development of attachment style for the favored child as it provides that child with individualized attention. However, this appears to be at some cost to the disfavored child, who experiences less sensitive and responsive parenting relative to their favored sibling.

Though Minde et al.’s (1990) findings suggest the presence of systematic within-family differences in parent-child attachment as a result of children’s early experiences of differential parental treatment, the association between differential parenting and attachment style remains untested for older children. Investigators studying differential parental treatment of children in middle childhood and adolescence have not yet taken into consideration the parent-child attachment context in which differential parental treatment takes place.

The present study

The above discussion identifies the utility of integrating the two generative perspectives on child development (i.e., attachment theory and nonshared environment) to test the following theoretical proposition in a sample of adolescent siblings: Over time, the continued experience of differential parenting will adversely affect the disfavored child’s attachment orientation, with the disfavored child developing more negative expectations about the availability and sensitivity of others than the favored sibling. The disfavored child’s insecure attachment orientation will, in turn, predispose this sibling to anxiety and to negative misperceptions or distortions in his or her image of own self-worth and in the way he or she views relations with others.

To explore this proposition empirically, the following hypothesis was tested: Adolescent twins’ attachment style should largely mediate the association observed between twins’ perceptions of differential parental treatment
and their reports of anxiety, personal self-esteem, and social self-esteem.

Method

Participants and procedure

Subjects were identified through the National Health and Medical Research Council Twin Registry, a national registry of Australian twins who are recruited voluntarily. The twins were sent approach letters through the registry explaining the study and asking the twins to volunteer. The twins and their parents were told that the study concerned how family members got along and communicated with one another in families with adolescent twins.

A sample of same-sex adolescent twin dyads (identical and nonidentical) was drawn because a sample of this nature directly controls for differences between siblings related to age and associated developmental differences, gender, and birth order, all of which are factors that potentially confound the predicted associations. Of the 180 twins (90 dyads), aged 15 to 18 years, that were approached by the registry 174 twins participated in the study. These twins include 36 monozygotic twin dyads and 41 dizygotic twin dyads (as determined by the Nichols and Bilbro, 1966, physical similarity criteria). There were 11 twin dyads where zygosity could not be reliably determined. This small group of twins was therefore excluded from the data analyses. The final sample of 152 twins was drawn disproportionately from families of middle to high socioeconomic status as classified by the Australian occupational coding scheme (Australian Bureau of Statistics, 1986, 1990), a typical profile for twin samples drawn by the Twin Registry. The mean age of the twins in this sample was 16 years.

Twins were asked to complete a questionnaire booklet containing the self-report measures of interest, and return the completed questionnaire in the prepaid envelope provided. Twins were instructed on the importance of completing the questionnaire booklet independently of their co-twin and other family members. Separate prepaid envelopes were provided to assist the twins in keeping their responses confidential.

Materials

The questionnaire booklet consisted of general social and demographic questions, a self-report measure of twin zygosity, and measures of differential parental treatment, attachment style, social self-esteem, personal self-esteem, and anxiety.

Differential parental treatment. The four differential parental treatment subscales from the Sibling Inventory of Differential Experience (SIDE; Daniels & Plomin, 1985) were adapted for use in the present study. All four subscales (differential maternal affection, differential maternal control, differential paternal affection, and differential paternal control), comprising 18 items in total, were found to have high two-week test-retest reliabilities ranging from .77 to .85 in an adolescent sample (see Daniels & Plomin, 1985). The original scales were simplified for the mail-out format in the present study by reducing the original 5-point scale to 3 points: 1 = the respondent experienced more of the particular parental behavior (e.g., discipline or sensitivity to the child’s thoughts and feelings) than the co-twin; 3 = the co-twin has experienced more of the particular parental behavior than the respondent; and 2 = the twins were treated the same. The Cronbach alpha reliability coefficients for the four scales range from .71 for Mother’s differential control to .80 for Father’s differential affection. The mean item score for each scale was used in the data analysis.

Attachment style. Attachment style was measured using the 40-item Attachment Style Questionnaire (Feeney, Noller, & Hanrahan, 1994). This measure was developed for use with adolescents and others who have had little experience with an intimate relationship outside the family, and is theoretically based on Bartholomew’s (1990) four-type adult attachment style measure. Feeney et al.’s (1994) five-factor solution of this measure was used. This solution consists of the
following five scales. The first scale, confidence in self and others (item example: “I feel confident that people will be there for me when I need them”), represents the secure attachment factor. Each of the other four scales represents a particular aspect of insecure attachment. As specified by Feeney et al. (1994), the discomfort with closeness scale (item example: “I find it difficult to depend on others”) captures a construct that is central to Hazan and Shaver’s (1987) conceptualization of avoidant attachment. The need for approval scale (item example: “It’s important to me that others like me”) captures a characteristic of both the fearful and preoccupied groups (Bartholomew & Horowitz, 1991). The preoccupation with relationships scale (item example: “I worry a lot about my relationships”) represents a construct that is central to the original conceptualization of anxious/ambivalent attachment (Hazan & Shaver, 1987). The relationships as secondary scale (item example: “I am too busy with other activities to put much time into relationships”) is consistent with Bartholomew’s (1990) concept of the dismissing style.

Items are rated on a 6-point scale from 1 = totally disagree to 6 = totally agree. The Cronbach alpha reliability coefficients for the five scales ranged from .81 for “confidence in self and others” to .71 for “preoccupation with relationships.” The mean item score for each scale was calculated and used in the data analysis.

Self-esteem. The Coopersmith Self-Esteem Inventory (Coopersmith, 1975) was used to measure conceptions of oneself in relation to other people—or social self-esteem (item example: “I am popular with persons my own age”) and conceptions about oneself that could be described as personal self-esteem (item example: “I have a low opinion of myself”). Noller and Shum (1988), using a sample of Australian adolescents, originally derived these two scales by a factor analysis of the Coopersmith Self-Esteem Inventory. The factor analysis revealed a 20-item, three-factor structure comprising social self-esteem, family self-esteem, and personal self-esteem. The family self-esteem scale (item example: “My family usually considers my feelings”) was excluded from use in the present study because of its conceptual overlap with aspects of parenting measured in the SIDE. The 16 items from these two scales are answered as either “like me” or “unlike me,” and scores for each scale were created by summing the correct item responses. The Cronbach’ alpha reliability coefficient for the social self-esteem and personal self-esteem scales are .60 and .83 respectively.

Trait anxiety. The trait measure of the State-Trait Anxiety scale (Spielberger, Gorsuch, & Lushene, 1968) was used (item example: “I feel nervous and restless”). This measure consists of 20 items rated on a 4-point scale from 1 = almost never to 4 = almost always. The trait measure of anxiety from this inventory has high internal consistency and demonstrates high reliability and validity across a range of subject samples (Buros, 1978). The Cronbach alpha reliability coefficient for trait anxiety is .92. The mean item score for this scale was calculated and used in the data analysis.

Intercorrelations among the scales (within and between the respective measures) were examined for high correlations (a correlation of greater than .6), indicating significant overlap in the constructs measured. No correlations between the measures of different constructs exceeded this cutoff. However, not surprisingly, some measures within particular constructs were highly correlated. In particular, the need for approval scale and the preoccupation with relationships scale from the measure of attachment are highly correlated. The measure of trait anxiety and the personal self-esteem scale were also highly correlated. See Table 1 for correlation coefficients among all the measures described above. To take account of the high degree of nonindependence of twins’ reports, these correlation coefficients are calculated using a subsample of 76 twins that includes one randomly selected twin from each twin dyad. Table 2 presents the means, standard deviations, and possible range of scores for each measure.
Results

Overview of analyses

The following analyses were conducted. First, multivariate and univariate analyses of variance were conducted to test whether zygosity and gender influenced twins’ reports of differential parental treatment, attachment style, and adjustment. The results of these analyses determine whether zygosity and gender are factors that need to be taken into account when the hypothesized associations are tested. Second, intraclass correlations were used to examine the extent of agreement between twins in their reports of differential parental treatment. Third, the hypothesized associations were examined using multiple regression and hierarchical multiple regression to test for mediation. Supplementary analyses were also conducted here to further clarify the direction and cause of any mediated associations found.

The influence of zygosity and gender

The association between the core sets of measures, twin zygosity (monozygotic vs. dizygotic), and twin gender was examined. Multivariate analyses of variance were conducted for the following groups of measures: differential parental treatment (four variables), attachment style (five variables), and adjustment (three variables). Altogether, three separate analyses were conducted.

For each analysis, gender and zygosity were considered as between-group factors. In addition, each twin was randomly designated to be twin 1 or twin 2 of the twin dyad. This variable was included as a within-subjects factor in the design to take account of the nonindependence of the twins’ reports. The dependent measures in these analyses are the means for the respective scales described earlier, with the following exception: For the multivariate analysis of variance involving the twins’ reports of differential parenting, mean absolute scores for differential parental treatment were used. These mean absolute scores were created for each of the four scales by recoding item scores of 1 and 3 (preferential treatment) to equal 2, and item scores of 2 (equal treatment) to equal 1. These absolute mean scores are a measure of how much differential parenting occurred irrespective of

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Note. Decimal points have been omitted.
who was favored or disfavored. They are used specifically to test for differences between monozygotic and dizygotic twins in the extent of differential parenting reported and are relevant only to this particular analysis.

For all multivariate analyses of variance conducted, univariate analysis of variance is used to clarify significant multivariate effects. A conservative alpha criterion ($p < .012$) was applied in interpreting the significance of the univariate effects because of the inflated Type 1 error rate associated with multiple testing of univariate effects (see Tabachnick & Fidell, 1989, for further details on the Bonferroni adjustment for univariate $F$ tests when interpreting significant multivariate effects). The findings from the three analyses outlined above are now presented.

A multivariate main effect for zygosity was found for twins’ reports of differential parental treatment ($\text{Pillais criterion} = .16$, $F(4, 67) = 3.78$, $p < .01$), with monozygotic twins reporting less differential paternal affection and less differential paternal control than dizygotic twins (see Table 3 for means and standard deviations of this significant effect). This finding for father’s differential parenting is well established in the literature on nonshared environment (e.g., Baker & Daniels, 1990) and demonstrates that differential treatment is grounded, at least to some extent, in the genetic-based differences that exist between siblings.

No significant multivariate main or interaction effects were found for adjustment. However, a significant univariate main effect for zygosity was found for the measure of anxiety, with monozygotic twins reporting less anxiety ($M = 1.86; \text{SD} = .54$) than dizygotic twins ($M = 2.10; \text{SD} = .51$). A significant

### Table 2. Means, standard deviations, and possible range of scores for measures of differential parental treatment, attachment style, and adjustment

<table>
<thead>
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<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Possible range</th>
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<td>Differential parental treatment</td>
<td></td>
<td></td>
<td>1–3</td>
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<tr>
<td>Mother’s affection</td>
<td>2.07</td>
<td>.32</td>
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<tr>
<td>Father’s affection</td>
<td>2.02</td>
<td>.24</td>
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<tr>
<td>Father’s control</td>
<td>1.96</td>
<td>.27</td>
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<td>Attachment style</td>
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<td>1–6</td>
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<tr>
<td>Confidence</td>
<td>4.32</td>
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<td>Discomfort with closeness</td>
<td>3.34</td>
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<td>Relationships as secondary</td>
<td>2.37</td>
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<tr>
<td>Need for approval</td>
<td>3.38</td>
<td>.87</td>
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<tr>
<td>Preoccupation</td>
<td>3.34</td>
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<td>Adjustment</td>
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<td>Personal self-esteem</td>
<td>6.72</td>
<td>2.92</td>
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<td>Social self-esteem</td>
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<td>Anxiety</td>
<td>2.99</td>
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<th>Variable</th>
<th>Dizygotic twins ($N = 40$ dyads)</th>
<th>Monozygotic twins ($N = 36$ dyads)</th>
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<tr>
<td>Father’s affection</td>
<td>1.16 (.29)</td>
<td>1.04 (.15)</td>
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<tr>
<td>Father’s control</td>
<td>1.19 (.33)</td>
<td>1.05 (.12)</td>
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multivariate main effect for gender was found for attachment style (Pillais criterion = .22, $F(5, 69) = 4.50, p < .001$). Male twins reported emphasizing their achievements over their relationships to a greater extent than the female twins (males: $M = 2.60, SD = .85$; females: $M = 2.14; SD = .69$), replicating Feeney et al.’s (1994) earlier findings for Australian adolescents. No other significant main or interaction effects were found.

In summary, these findings indicate that dizygotic twins both experience more differential parenting and view themselves less positively than do monozygotic twins, suggesting that zygosity may confound the predicted association between twins’ perceptions of differential parental treatment and their reported adjustment. Zygosity will therefore be statistically controlled for in the hierarchical multiple regression analyses. Gender, on the other hand, will not be controlled for in the regression models because gender was found to be unrelated to the measures of differential parenting and adjustment.

**Agreement between twins**

To determine the level of agreement between twins on the respective measures of differential parenting, intraclass correlation coefficients were calculated for each of the four differential parental treatment scales for monozygotic and dizygotic twins separately. Levels of statistical significance are not reported in this table because they are irrelevant in this context (Snedecor & Cochran, 1980). When interpreting intraclass correlations, high positive correlations indicate that the variance between twin dyads is greater than the variance within twin dyads, suggesting a high level of agreement between twins. Negative values indicate the reverse (or low levels of agreement between twins). A value of zero indicates that the variances are equal, suggesting a moderate level of agreement between twins. The intraclass correlations are presented in Table 4.

The intraclass correlations are predominantly positive and range from .77 for monozygotic twins’ reports of father’s differential affection to $-.02$ for dizygotic twins’ reports of mother’s differential control, suggesting a moderate to high level of agreement between the twins across all four differential parenting scales. There appears, however, to be greater agreement between twins in their reports of father’s differential parenting than in their reports of mother’s differential parenting. The pattern of intraclass correlations also indicates greater agreement between monozygotic twins than dizygotic twins on measures of differential parenting.

A closer examination of the twins’ responses on the respective differential parental treatment items indicates that the moderate to high level of agreement evidenced is, in part, the result of the large number of dyads where both twins report equal treatment. Although such a response pattern is not surprising in a sample of twins, the truncation of variance that results prohibits testing the association between differential parental treatment and twin difference scores for the respective outcome measures (i.e., attachment style and adjustment). This is because there is less variation in the difference score than in its constituent

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**Table 4. Twin intraclass correlations for the differential parental treatment measures for monozygotic and dizygotic twin dyads**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dizygotic twins ($N = 40$ dyads)</th>
<th>Monozygotic twins ($N = 36$ dyads)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s differential affection</td>
<td>.12</td>
<td>.16</td>
</tr>
<tr>
<td>Mother’s differential control</td>
<td>$-.02$</td>
<td>.17</td>
</tr>
<tr>
<td>Father’s differential affection</td>
<td>.36</td>
<td>.77</td>
</tr>
<tr>
<td>Father’s differential affection</td>
<td>.12</td>
<td>.42</td>
</tr>
</tbody>
</table>
scores (Dunn et al., 1990). Thus, when twin differences scores are correlated with a second variable with restricted variation, such as twins’ reports of differential parenting, the resultant analysis has limited power. To improve the sensitivity of our core analyses, twins’ reports of differential parenting are regressed on individual scores for the attachment and adjustment measures.

**Testing mediation**

Multiple regression and hierarchical multiple regression analyses are used to test whether the twins’ reported attachment style mediates the association between differential parental treatment and the adolescent twins’ reports of social self-esteem, personal self-esteem, and anxiety. Regression analyses are used because the case-to-variable ratio and the exploratory (as opposed to confirmatory) nature of the mediation hypothesis prevents mediation being tested using other multivariate techniques that take into account error of measurement and method variance, such as structural equations modeling (see Godwin, 1988). To take account of the high degree of nonindependence of twins’ reports, these analyses are conducted using a subsample of 76 twins that includes one randomly selected twin from each twin dyad.

Multiple regression analyses were used to test the association between twins’ reports of relative differential parental treatment and attachment style. Five regression analyses were conducted—a separate analysis for each of the attachment style measures. The predictors in each of these multiple regression analyses comprised the four differential parental treatment measures.

Additionally, three hierarchical multiple regression analyses were conducted—a separate analysis for each of the adjustment outcome measures (i.e., personal self-esteem, social self-esteem, and anxiety were each a criterion in these respective analyses). For each hierarchical multiple regression analysis the four differential parental treatment scales were entered at Step 1. Zygosity was also entered at Step 1 as a dummy coded variable. At Step 2, the five attachment scales were entered in addition to the measures of differential parental treatment.

Together these analyses conform to the requirements for testing mediation as outlined by Baron and Kenny (1986): For mediation to be present the following must occur. First, the measures of differential parental treatment must independently account for variation in the twins’ reports of their attachment style. Second, the measures of differential parental treatment and the measures of attachment style must independently account for variation in the twins’ reports of personal self-esteem, social self-esteem, and anxiety. Third, the importance of the differential parenting measures as predictors of the three adjustment measures must decrease when the attachment measures are included in the hierarchical multiple regression model at Step 2. The extent of mediation will be reflected in the reduction in size and significance of the standardized regression weights for the differential parenting measures from Step 1 to Step 2 in the hierarchical multiple regression models.

The significant findings from the five multiple regression analyses are summarized below. The hypothesized association between twins’ reports of differential parental treatment and their reported attachment style was confirmed. A significant multiple correlation was found between twins’ reports of differential parental treatment and their reported confidence in self and others. Specifically, twins who report having received less maternal affection than their co-twin also report less confidence than those twins who report favored or equal treatment. A significant multiple correlation was also found between twins’ reports of differential parental treatment and their reports of discomfort with closeness. Specifically, twins who report having received less paternal affection than the co-twin report greater discomfort with closeness than those twins who report favored or equal treatment. No significant associations were found between twins’ reports of differential parental treatment and the remaining three attachment scales (relationships as secondary, need for approval, and preoccupation with relationships). See Table 5 for multiple correlations, adjusted multiple correlations, and standard-
ized partial regression (beta) coefficients for
the significant regression analyses.

The significant findings from the three
hierarchical multiple regression analyses are
now summarized. At Step 1 (the model
including zygosity and the differential parent-
ing measures only), the hypothesized associa-
tion between twins’ reports of differential
parental treatment and their reported adjust-
ment was confirmed. Significant multiple
correlations were found between twins’ re-
ports of differential parental treatment and
their reported anxiety and personal self-
estime. Specifically, twins’ reports of differ-
ential maternal affection predicted anxiety
such that receiving less maternal affection
than the co-twin was associated with high
anxiety. Receiving more maternal control than
the co-twin was also predictive of low
personal self-esteem and high anxiety. Twins’
reports of differential paternal affection pre-
dicted personal self-esteem, such that receiv-
ing less paternal affection than the co-twin was
associated with twins’ reports of low personal
self-esteem. Unexpectedly, receiving more
paternal control than the co-twin was asso-
ciated with high personal self-esteem. For each
of the three hierarchical multiple regression
analyses, zygosity was a nonsignificant pre-
dictor of adjustment at Step 1. See Table 6 for
the adjusted multiple $R^2$ and standardized
regression coefficients for the differential
parental treatment measures at Step 1.

At Step 2 (the full regression model
including zygosity and the differential parent-
ing and attachment measures), the addition of
the attachment style measures provided a
significant increase in explained variance for
personal self-esteem, social self-esteem, and
anxiety (see Table 6 for change in multiple
$R^2$ and the standardized regression coeffi-
cients for the respective attachment measures
at Step 2). Specifically, the twins’ reports of
confidence predicted personal self-esteem,
social self-esteem, and anxiety, such that
having less confidence in the self and others
is related to low adjustment. Discomfort with
 closeness was also related to the twins’
reports of their personal self-esteem, with
those twins who reported high levels of
discomfort also reporting lower personal
self-esteem. Preoccupation with relationships
is associated with low personal self-esteem
and high anxiety.

When the results from the multiple regres-
sion analyses discussed earlier and the findings

<table>
<thead>
<tr>
<th>Table 5. Association between twins’ reports of attachment style and twins’ reports of differential parental treatment ($N = 76$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criterion</strong></td>
</tr>
<tr>
<td><strong>Confidence</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Discomfort</strong></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Note. $R = $ multiple correlations, $adjR^2 = $ adjusted squared multiple correlations, and $\beta = $ standardized partial regression
coefficients. High scores for the differential parenting scales indicate that the co-twin (not the respondent) received more
affection (or control). Low scores indicate that the respondent received more affection (or control). High scores for the
attachment style scales indicate greater confidence and greater discomfort with closeness.

* $p < .05$. ** $p < .01$. *** $p < .001$. 
of the hierarchical multiple regression analyses are considered together, there is some support for the hypothesis that attachment style mediates the association between twins’ reports of differential parenting and their reported adjustment. Specifically, twins’ reports of their mother’s differential affection becomes a nonsignificant predictor of anxiety at Step 2 of the hierarchical multiple regression analysis. When this finding is considered in combination with the results of the regression of confidence on twins’ reports of differential parenting, it suggests that the significant association between twins’ reports of differential maternal affection and their reports of anxiety is mediated by the twins’ reported confidence in self and others.

There is also evidence of mediation for differential paternal treatment. Twins’ reports of their father’s differential affection becomes a nonsignificant predictor of personal self-esteem at Step 2 of the hierarchical multiple regression analysis. When this finding is considered in combination with the results of the regression of discomfort on twins’ reports of differential parenting, it suggests that the significant association between twins’ reports of differential paternal affection and their reports of personal self-esteem is mediated by the twins’ reported discomfort with closeness to others.

### Table 6. Results for the hierarchical multiple regression of adjustment on differential parental treatment and attachment style (N = 76)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Personal self-esteem</th>
<th>Social self-esteem</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1:</strong> adjR²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 1:</strong> β</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s affection</td>
<td>-.21</td>
<td>-.24</td>
<td>.38**</td>
</tr>
<tr>
<td>Mother’s control</td>
<td>.37**</td>
<td>-.03</td>
<td>-.27*</td>
</tr>
<tr>
<td>Father’s affection</td>
<td>-.25*</td>
<td>-.05</td>
<td>.18</td>
</tr>
<tr>
<td>Father’s control</td>
<td>-.32*</td>
<td>-.02</td>
<td>.19</td>
</tr>
<tr>
<td>**Step 2 (Full model): ΔR²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>**Step 2 (Full Model): β</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s affection</td>
<td>-.03</td>
<td>.01</td>
<td>.14</td>
</tr>
<tr>
<td>Mother’s control</td>
<td>.23</td>
<td>-.17</td>
<td>-.10</td>
</tr>
<tr>
<td>Father’s affection</td>
<td>-.10</td>
<td>.13</td>
<td>.01</td>
</tr>
<tr>
<td>Father’s control</td>
<td>-.32*</td>
<td>.05</td>
<td>.19</td>
</tr>
<tr>
<td>Attachment style</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td>.31**</td>
<td>.52***</td>
<td>-.50***</td>
</tr>
<tr>
<td>Discomfort</td>
<td>-.26*</td>
<td>-.20</td>
<td>.12</td>
</tr>
<tr>
<td>Relationships as secondary</td>
<td>.13</td>
<td>.03</td>
<td>.00</td>
</tr>
<tr>
<td>Need for approval</td>
<td>.03</td>
<td>.04</td>
<td>.15</td>
</tr>
<tr>
<td>Preoccupation</td>
<td>-.28</td>
<td>-.23</td>
<td>.32*</td>
</tr>
</tbody>
</table>

**Note.** adjR² = adjusted multiple correlations, ΔR² = change in multiple R², and β = standardized regressions coefficients. High scores for the differential parenting scales indicate that the co-twin (not the respondent) received more affection (or control). Low scores indicate that the respondent received more affection (or control). High scores for the attachment style scales indicate greater confidence, discomfort with closeness, relationships as secondary, need for approval, and preoccupation. High scores for the adjustment scales indicate greater social self-esteem, personal self-esteem, and higher anxiety.

*p < .05. **p < .01. ***p < .001.
In summary, attachment was found to mediate the association between the twins’ reports of differential parental affection and their reported anxiety and personal self-esteem. The strongest evidence for mediation was found for twins’ reports of differential maternal affection in predicting anxiety.

Supplementary analyses

Although attachment theory lends itself well to the proposition of the predicted causal pathways, alternative models of association between differential parenting, attachment style, and adolescent adjustment are plausible. For example, a twin’s insecure attachment orientation may lead him or her to reconstruct experiences of fair or justifiable differential parental treatment as favoritism, which, in turn, predicts adjustment. To test further whether the variation in adolescent adjustment (i.e., personal self-esteem and anxiety) explained by differential parental treatment was attributable largely to attachment, a final series of hierarchical regression analyses were conducted in which the order of entry of the predictor variables was reversed (i.e., attachment measures were entered at Step 1, and the differential parenting measures were entered at Step 2). This analysis tests the alternative model—that differential parenting mediates the association between attachment and adjustment.

In each of these analyses, the attachment measures accounted for a significant proportion of the variance in adjustment; $\text{adj} R^2$ at Step 1 ranged from .40 for personal self-esteem to .63 for anxiety, $p < .001$ in each case. At Step 2, the differential parental treatment scales did not provide a significant increase in explained variance for personal self-esteem or anxiety. These results provide further evidence that the variance in twins’ reports of their personal self-esteem and anxiety is attributable largely to their attachment orientation. Thus, the hypothesized mediation model appears to be the model of best fit for these data.

The mediated associations described earlier each involved the twins describing their experience of differential parenting, their attachment style, and their psychological adjustment. Hence some of the apparent associations found between these measures may be a function of having a common reporter, with responses across all three sets of measures being influenced by a twin’s general perspective on the family dynamic and the self. This issue was addressed by selecting a subsample of twins where one twin reported having been favored. The favored twin’s report of differential parenting was then correlated with the disfavored co-twin’s reports of attachment and adjustment.

If the findings are grounded in the genuine experience of differential parenting (not a response set) the following pattern of correlations would be expected. Twins who report that they are favored in the family—that is, they receive more parental affection than their co-twin—will have a co-twin who reports attachment insecurity (i.e., low confidence and high discomfort with closeness) and poor adjustment (i.e., low personal-self esteem and high anxiety). This expected pattern of correlations was largely confirmed. Twins who reported receiving more maternal affection than their co-twin indeed had a co-twin who reported low confidence ($r = .33$, $p < .01$) and high anxiety ($r = .34$, $p < .01$). Twins who reported receiving more paternal affection than their co-twin, had a co-twin who reported high discomfort ($r = .32$, $p < .01$).

Discussion

The results generally confirm the respective hypotheses. Adolescent twins’ experience of being disfavored in comparison with their co-twin is associated with attachment insecurity and low psychological adjustment for the disfavored twin. Further, the twins’ attachment style appears to mediate the association between their perceptions of differential parental affection and their personal self-esteem and anxiety. These general findings are addressed in more detail below.

Differential parenting and attachment style

The findings confirm the presence of an association between a mother’s preference for
a particular twin and the development of attachment insecurity in the disfavored twin. Adolescent twins who received less maternal affection than their co-twin reported less confidence in themselves and others. This finding is consistent with Bowlby’s (1973) theoretical proposition that if children experience their primary attachment figure as unsupportive and rejecting, they are likely to form a particular working model of themselves as unworthy that is complementary to their experience.

The literature on differential parenting to date has focused primarily on associations between child outcomes and differential maternal behavior. To address this shortcoming the present study explored the links between differential paternal treatment and attachment in adolescent twins. The findings indicate that twins who experienced less paternal affection than their co-twin reported greater discomfort with closeness than those twins who reported favored or equal treatment. This finding is consistent with the notion that children can have multiple attachments that may be independent both in quality and its influence on development (Howe, 1999; Suess, Grossman, Sroufe, 1992).

The associations found between twins’ reports of differential parenting and particular attachment style scales suggests that differential parenting may be predictive of a particular style of attachment insecurity. Adolescent twins’ reports of differential parental treatment were unrelated to the twins’ reported need for approval or their preoccupation with relationships, both of which are indicators of an anxious-ambivalent attachment orientation in adolescents (Feeney et al., 1994). However, twins’ reports of differential parenting were related to discomfort with closeness, the indicator of attachment most strongly associated with an avoidant attachment style in adolescents (see Feeney et al., 1994). The relationships as secondary scale, a second indicator of avoidance in adolescents, was not associated with differential parental treatment. This is most likely due to the age of the twins. Twins in early adolescence may not be at a stage in their lives where other activities and achievements are used as a defense mechanism to control the intensity of their personal relationships. In summary, these findings are consistent with the proposition outlined earlier that a child who is consistently disfavored by a parent while growing up will perceive that parent to be unsupportive and unavailable. Such experiences of parenting are conducive to the development of an avoidant attachment style (Ainsworth et al., 1978).

No association was found between differential parental control and the twins’ reported attachment style. However, the absence of any effect for parental control may be a function of the inability of the SIDE (Daniels & Plomin, 1985) to differentiate between different forms of parental control. Research on parenting styles and children’s well-being has identified parental control as a key resource for children (e.g., Amato & Gilbreth, 1999; Buchanan, Maccoby, & Dornbusch, 1996; Maccoby & Martin, 1983). Parental control that is reflected in rule formation, monitoring, and discipline which involves explaining to children the reasons behind the parent’s controlling behavior is associated with children’s positive development. Conversely, coercive forms of control and punishment, such as hitting, have been shown to be harmful. It follows then that receiving more of the former type of control than the co-twin could be construed as favored treatment and would be related to attachment security and adjustment. On the other hand, receiving more coercive parental control than the co-twin could be construed as being disfavored and would be related to attachment insecurity and poor adjustment. The absence of any clear association between differential parental control and attachment may be the result of the insensitivity of the measure of differential parenting that was used to these subtle differences in parental control.

Considered together, these findings support the proposition that children’s experience of their parents’ sensitivity and availability is, in part, informed by their experience of relative deprivation of parental support and affection. The relative importance of direct and differential parenting in shaping the adolescent’s attachment orientation could not be deter-
Differential parenting and adolescent attachment

Consistent with past research, there was strong support for an association between differential parental treatment and psychological adjustment. Adolescent twins who perceived their mother to have treated them with more control than their co-twin tended to report low personal self-esteem and high anxiety. Adolescent twins who perceived their mother to have treated them with less affection tended to report high anxiety. The absence of any significant association between differential maternal treatment and adolescent twins’ reports of social self-esteem is not surprising given the low level of reliability demonstrated for this particular scale.

These findings are in line with the now extensive body of research on nonshared environment and child development, which indicates that children who perceive they have been treated unfavorably by their mother demonstrate poorer psychological adjustment than their favored sibling. Specifically, past research has demonstrated that the maternally disfavored child has lower self-esteem than the favored sibling (Dunn, Stocker, & Beardsall, 1989). Mothers of disfavored adolescents report the disfavored child as more emotionally distressed than the favored sibling (Daniels, Dunn, Furstenberg, & Plomin, 1985), and maternally disfavored twins report greater affect intensity and depression during adulthood than their favored co-twin (Baker & Daniels, 1990).

Differential paternal treatment also predicted adolescent adjustment. Adolescent twins who perceived their father to have treated them with less affection than their co-twin tended to report low personal self-esteem. However, the association found between differential paternal control and personal self-esteem was in the reverse direction to that expected. Twins who reported receiving more paternal control than their co-twin also reported high personal self-esteem. This unexpected finding may be a function of the twins’ expectations that their father will provide strong guidance during adolescence—guidance characterized by disciplinary behavior and monitoring of the adolescent. Such a finding is consistent with the proposition outlined above that receiving more noncoercive control than the co-twin could be interpreted by the child as having been favored.

The different pattern of results for maternal and paternal control is consistent with Baker and Daniels’ (1990) early findings for adult twins. They found that the twin with whom the father was stricter reported better adjustment than the co-twin, and the twin with whom the mother was stricter reported poorer adjustment than the co-twin. Baker and Daniels argued that the source of this parental gender effect may be the varying expectations of mothers and fathers in regard to parental discipline, with the ideal father perceived to be a controlling authority figure and the ideal mother perceived to be understanding and warm.

Attachment style as a mediator

The proposed mediational model received some support. The strongest evidence for mediation was found for mother’s differential affection in the prediction of the twins’ anxiety. For twins’ reports of differential maternal affection, the relationship between differential maternal affection and anxiety was largely accounted for by attachment. In particular, differential maternal affection was eclipsed as a correlate of adolescent anxiety by the twins’ reports of their confidence in the self and others. Mediation was also in evidence for father’s differential affection in the prediction of personal self-esteem. For twins’ reports of differential paternal affection, the relationship between differential paternal affection and personal self-esteem was largely accounted for by attachment. In particular, differential paternal affection was
eclipsed as a correlate of personal self-esteem by the twins’ reports of their discomfort with closeness.

Considered together, these findings are consistent with the theoretical proposition outlined earlier that, over time, the continued experience of differential parenting will adversely affect the disfavored child’s attachment orientation, with the disfavored child developing more negative expectations about the availability and sensitivity of others than their favored sibling. In turn, the disfavored child’s insecure attachment orientation will predispose this sibling to anxiety and to negative misperceptions or distortions in his or her image of own self-worth.

Limitations

There are a number of methodological issues that need to be taken into account when assessing the strength and validity of these findings. First, the cross-sectional design of the study limits the ability to determine the true direction of these effects implicated by theory. The true nature of the associations examined in this mediational model is likely one of interdependence and circularity. For example, a twin’s insecure attachment orientation could both be the result of differential parenting and lead to the twin reconstructing his or her experience of the parents’ behavior as preferential treatment of the co-twin. Though this alternative model is plausible, the supplementary analysis conducted failed to provide support for differential parenting as a mediator.

Second, adolescent twins’ self-reports were relied on to test the proposed mediation model. The conclusions drawn from such a measurement approach could be explained in part by response sets. For example, twins who wish to paint a negative picture of themselves and their family life will respond to the items in a way that indicates having been disfavored, attachment insecurity, and poor adjustment. This alternative explanation for the present results is unlikely, however, as demonstrated by the associations found between favored twin’s reports of differential parenting and the disfavored co-twin’s report of attachment insecurity and poor adjustment.

Conclusions

In summary, the present study constitutes the first attempt to integrate attachment theory and nonshared environment to address the question of how children’s experiences of differential parental treatment come to shape their later functioning. The study provides empirical support for attachment style as a cognitive-affective mechanism by which children’s experiences of differential parenting come to influence the course of their emotional development. The findings also extend current understanding of parent-child attachment by highlighting the importance of relative deprivation of parental affection and support as a further precursor to the development of attachment insecurity.

Future research is needed to test the associations identified here in a population of nontwin siblings. When sibling constellation variables such as age and sex and genotypic characteristics vary within the sibling dyad, the amount of differential parental treatment experienced will increase (Baker & Daniels, 1990; Plomin & Daniels, 1987). This, in turn, may result in stronger and more complex associations between adolescents’ experiences of differential parental treatment, their attachment style, and adjustment than was demonstrated in this study. Longitudinal designs, in conjunction with larger and more diverse samples, are thus needed to further validate the pathways of influence identified here and to capture the reciprocal effects and complexity inherent in such a model. Despite the limitations of the present design, the twin paradigm adopted serves an important purpose by providing a controlled family environment where any associations that are found can be more directly attributed to the adolescent’s experience of differential parenting while growing up. Such a paradigm is well suited to the task of initially identifying a possible cognitive-affective mechanism that mediates the association between differential parental treatment and adolescent adjustment.
References


