The Influence of Parent-Child Relatedness on Depressive Symptoms in Children With Asthma: Tests of Moderator and Mediator Models

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Objective: To examine the influence of parent-child relationship quality on the association between illness-related functional status and depressive symptoms in children with asthma.

Methods: Questionnaire data were collected from the child, caregiver, and physician. Fifty-five children with asthma (8–17 years of age), their caregivers, and physicians participated.

Results: Regression analyses suggest that patterns of mother-child relatedness (secure vs. insecure) mediate the relationship between functional status and depressive symptoms.

Conclusions: The parent-child relationship may be an important pathway by which illness influences symptoms of depression in children with asthma. This study suggests that impaired functional status does not directly contribute to symptoms of depression, but rather influences the parent-child relationship in ways that may promote the development of depressive symptoms in the child.

Key words: asthma; asthma severity; depression; functional status; relatedness; attachment; parent-child relationship; family, mediator, moderator.

Asthma is the most prevalent chronic illness in childhood (Halfon & Newacheck, 1993), affecting approximately 4.8 million children (Adams & Marano, 1995; Centers for Disease Control and Prevention [CDC], 1995). Pediatric asthma is a growing phenomenon, as its morbidity and mortality continue to escalate (Weitzman, Gortmaker, Sobel, & Perrin, 1992). The National Heart, Lung, and Blood Institute (NHLBI, 1997, p. xiv) defines asthma as “a chronic inflammatory disorder of the airways in which inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough. These episodes may be associated with airflow obstruction that is reversible either spontaneously or with treatment.”

Children with asthma are more likely to experience psychological difficulties than are healthy children (Kashani, Konig, & Shepperd, 1988; MacLean, Perrin, & Gortmaker, 1992) with estimates of psychopathology among these children ranging from 25% to 42% (Mrazek, 1992). The psychological difficulties of these children most commonly include symptoms of depression (Gizynski & Shapiro, 1990; Nelms, 1989). Bennett (1994), in a meta-analytic review of 60 studies, found that children with asthma were at greater risk for developing depressive symptoms even when compared to children with other
chronic illnesses such as cancer, cystic fibrosis, and diabetes mellitus. Moreover, depressive symptoms may be particularly problematic for children with asthma because of a possible psychophysiological link between depressive symptoms and asthma morbidity and mortality (Miller, 1987; Miller & Strunk, 1989; Miller & Wood, 1997).

Despite numerous studies examining the association between asthma and depression, pathways by which depressive symptoms arise in children with asthma have not been identified. Current research has focused mainly on the medically related aspects of asthma, investigating asthma severity as a primary risk factor. Although some evidence suggests that asthma severity is associated with depressive symptoms, overall, the findings have been inconsistent and sometimes contradictory (Kashani et al., 1988; MacLean et al., 1992; Padur et al., 1995). This suggests that factors beyond the biological parameters of the illness may be operating as well.

Family functioning has been implicated in the psychosocial outcomes of children, including those children experiencing chronic illness (Eiser, 1990), with 20%-25% of children exhibiting a psychiatric disorder in poorly functioning families, compared to 7% of children exhibiting a psychiatric disorder in well functioning families (Rutter, 1981). Furthermore, Jessop and Stein (1985), investigating the familial environments of children with chronic illness, found that children with high illness-related functional status came from higher functioning families and exhibited fewer emotional problems. Functional status is defined as the degree to which a child can function in his or her normal activities despite current symptoms of asthma. Although functional status is inversely related to disease severity, which refers to the intensity and frequency of symptoms, other factors likely influence the degree to which a child actually is impaired by the illness. Depression, for example, may lead a child to be less motivated, or more pessimistic, about coping effectively with the disease, even if it is not very severe. Conclusions from these studies underscore the importance of family factors and suggest that the functional impact of an illness may be more predictive than illness severity alone in the psychological adjustment of children with chronic illness.

The developmental literature indicates that, within the family context, parent-child relationships specifically may influence the emotional well-being of children. Positive parent-child relationships may be particularly important for children facing adversities related to chronic illness, potentially lessening the risk of depression in these children (Gizynski & Shapiro, 1990). Attachment theory has guided the conceptualization of parent-child relationships in this regard (Huebner & Thomas, 1995; Masten, Best, & Garmezy, 1990). Secure attachment relationships allow the child to regulate his or her emotions in response to environmental challenges (Cassidy, 1994), with the disruption of attachment relationships leaving the child ill prepared to negotiate such adversities (Cicchetti, Ganiban, & Barnett, 1991). We propose that the quality of children’s attachment relationships with their caregivers will be implicated in the extent to which asthma-related functional impairment evokes depressive symptoms.

Although few well-validated and widely accepted instruments for assessing attachment in school-age children exist, Lynch and Cicchetti (1991, 1997) have approached the role of attachment in studies of emotional well-being in children by using an adapted version of Connell’s (1990) concept and measure of “relatedness.” Relatedness describes the quality of the child’s self-reported relationship patterns with his or her caregivers (Connell, 1990). It encompasses dimensions of emotional proximity seeking and emotional quality, which together yield five categories of relatedness (two secure and three insecure) (Lynch & Cicchetti, 1991, 1997). These relatedness patterns parallel attachment patterns (Cicchetti, Toth, & Lynch, 1995), representing a profile of parent-child interactions that typify qualitatively distinct positive and negative relationship types.

This study investigates the possible association and specific pathways by which parent-child relatedness may influence the relationship between illness-related functional status and depressive symptoms in children with asthma. We conceptualize two possible ways in which this influence may take place: (1) secure relatedness will buffer, and insecure relatedness exacerbate, the impact of poor functional status on depressive symptoms (relatedness moderates the relationship between functional status and depressive symptoms); (2) functional status will influence parent-child relatedness in ways that influence the child’s level of depression (relatedness mediates the relationship between functional status and depressive symptoms).

In the first case, the conceptualization of relatedness as a moderator is consistent with the Biobehavioral Family Model (Wood, 1993), proposing that family process and biological factors interact in
States and from an allergist’s private practice. Recruitment criteria included (1) diagnosis of asthma prior to the clinic visit; (2) age between 8 and 17 years; (3) accompaniment to the clinic by a parent/legal guardian; and (4) absence of other major medical illnesses.

Fifty-five (93%) of 59 families agreed to participate. Two families declined because of time constraints, one declined for the protection of the child, and one declined because they do not participate in formal research projects. Families who participated were not compensated.

**Measures**

The **Asthma Severity Rating Form.** This form, completed by the physician, identifies the child’s asthma severity according to criteria established by the NHLBI (1997). Severity classifications include mild intermittent, mild persistent, moderate persistent, and severe persistent. Reliability and validity data are not available for these criteria as they are considered the guidelines by which other measures are constructed and validated. Asthma severity is included to inform the functional status measure, investigating whether the child’s functional status is, in fact, associated with illness severity.

The **Asthma Symptom Questionnaire.** The ASQ, an 8-item questionnaire completed by the parent, measures the frequency and intensity of the child’s current asthma symptoms. This questionnaire was constructed by the investigators according to the NHLBI (1997) criteria for the classification of asthma severity. Higher scores reflect more severe asthma symptoms. Cronbach’s alpha coefficient for the ASQ in the current sample of children is .83. The ASQ was correlated with the physician’s asthma severity rating ($r = .522$, $p < .001$), providing evidence of convergent validity for the two ratings (see Table I).

The **Play Performance Scale for Children.** The PPSC (Lansky, List, Lansky, 1987) indexes functional status by measuring how restricted the child is in his or her activities as the result of asthma. The parent chooses the one description (from a continuum of 11 possibilities) that best describes the child’s ability to function in the past week. The range of descriptions include 0 = unresponsive; 10 = no play, does not get out of bed; 90 = minor restrictions in physically strenuous activity; 100 = fully active, normal. Although this instrument has been administered in samples of children with asthma (Padur et al.,

![Diagram of relatedness as a moderator](image)

Figure 1. (A) Diagram of relatedness as a moderator. (B) Diagram of relatedness as a mediator.

their influence on the well-being of children with chronic illness. In the second case, the conceptualization of relatedness as a mediator is consistent with Nelms’s (1989) suggestion that the presence of a chronic illness may negatively alter the parent-child relationship so as to render the child more vulnerable to psychological problems. Thus, the study reported herein tests two competing models: hypothesis 1 (relatedness as a moderator) and hypothesis 2 (relatedness as a mediator), each proposing different pathways by which relatedness may influence the impact of functional status on depressive symptoms in children with asthma (see figure 1).

**Method**

**Participants**

Fifty-five children with asthma (ages 8–17, $M = 11.8$) participated in this study. Twenty-three (41.8%) participants were girls and 32 (58.2%) were boys. Thirty-eight (69.1%) were Caucasian, 10 (18.2%) African American, 1 (1.8%) Hispanic, 1 (1.8%) Native American, and 5 (9.1%) other. Six (10.9%) mothers attended some high school, 16 (29.1%) graduated from high school, 16 (29.1%) attended some college, 12 (21.8%) graduated from college, and 5 (9.1%) attended graduate school.

Children were serially recruited over a 3-month period from the allergy and immunology clinic of a children’s hospital located in the northeast United States and from an allergist’s private practice. Recruitment criteria included (1) diagnosis of asthma prior to the clinic visit; (2) age between 8 and 17 years; (3) accompaniment to the clinic by a parent/legal guardian; and (4) absence of other major medical illnesses.

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1995), reliability and validity data have only been reported in samples of children with cancer with the interrater reliability between mother and father reports ($r = .71$, $p < .0001$) (Lansky et al., 1987). The validity of the PPSC is demonstrated by its ability to discriminate between inpatient and outpatient samples of children (Lansky et al., 1987).

We selected the PPSC over other measures of quality of life and asthma functional status because it was the most behaviorally oriented, thus minimizing subjective judgment on the part of the parent. Furthermore, unlike most quality of life measures, the PPSC clearly differentiates functional status from asthma severity, excluding items that more properly reflect asthma severity. (Similarly, the asthma severity measures used in this study included no items of functional status.)

**Relatedness Questionnaire.** The Relatedness Questionnaire (Lynch & Cicchetti, 1991, 1997), a 17-item questionnaire completed by the child, measures the child’s relationship patterns with an adult caregiver. The questionnaire is completed once for each target caregiver. The instrument has two subscales: Psychological Proximity Seeking and Emotional Quality. Psychological Proximity Seeking refers to the child’s desire to be “closer” to the person about whom the child is answering the questionnaire. For example, the child may endorse items stating that he or she wishes to be better understood by the caregiver or spend more time with the caregiver. It is assumed that endorsing proximity-seeking items reflects insufficiency of attachment connection. Emotional Quality refers to the positive and negative emotions that the child feels in the presence of the caregiver.

The configurational combination of scores on each dimension yields five qualitatively distinct patterns of relatedness (two secure and three insecure). Children with *optimal* patterns of relatedness report higher than average levels of positive emotions and lower than average amounts of psychological proximity-seeking. *Average* children report levels of emotional quality and psychological proximity-seeking within one standard deviation of the mean for each dimension. These children feel positive and secure in their relationships, and they are satisfied with existing degrees of closeness. Children with *deprived* (ambivalent) patterns of relatedness report lower than average levels of emotional quality, but higher than average amounts of psychological proximity seeking. These children desire to feel closer to others, but their relationships are characterized by feelings of negativity and insecurity. Children with *disengaged* (avoidant) patterns of relatedness report lower than average levels of emotional quality and lower than average amounts of psychological proximity-seeking. These children have predominantly negative feelings about others and do not want to be any closer to them. *Confused* children report high levels of emotional quality as well as extremely high amounts of psychological proximity-seeking. In order to increase power, and consistent with the way in which relatedness has been treated in past research (Cicchetti et al., 1995), we combined these categories into a secure relatedness group and an insecure relatedness group for the purposes of this study.

This questionnaire has been used with children ages 8 to 13. Cronbach’s alpha coefficient for psychological proximity seeking ranges from .83 to .93 and for emotional quality from .67 to .83. In the current sample of children, Cronbach’s alpha for

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Social desirability controlled for in the relatedness and depression (child version) measures.

* $p < .05. 
** $p < .01. 
*** $p < .001.
psychological proximity seeking is .89 and for emotional quality is .87. The validity of the Relatedness Questionnaire is supported by its ability to differentiate maltreated from nonmaltreated children and to predict psychosocial outcomes in these children (Toth & Cicchetti, 1996).

*Childhood Depression Inventory.* The CDI (Kovacs, 1985), a 27-item questionnaire completed by the child, measures the child’s symptoms of depression. Scores range from 0 to 54, with higher scores indicating more depressive symptoms. The CDI is appropriate for children ages 8 to 17. The reported Cronbach’s alpha coefficients for this instrument range from .83 to .89 (Smucker, Craighead, Craighead, & Green, 1986). Cronbach’s alpha coefficient for the current sample of children is .90.

*Childhood Depression Inventory-Parent Version.* The CDI-P (Kovacs, 1985), a 27-item questionnaire completed by the parent, measures the child’s symptoms of depression as perceived by the parent. Scores range from 0 to 54, with higher scores indicating more depressive symptoms. Cronbach’s alpha coefficient reported for this instrument is .85 (Wierzbicki, 1987), and for the current sample of children is .82. In this study, the CDI-P was correlated with the child’s report of depressive symptoms (CDI) \((r = .376, p < .01)\), providing evidence of convergent validity for both measures (see Table I).

*Childhood Social Desirability Scale.* Experience in the pilot phase of the study indicated that the questions posed to the child in the Relatedness Questionnaire and the CDI tended to elicit socially desirable answers in some children. Therefore, the modified CSD was included in this study. The CSD (Crandall, Crandell, & Katkovsky, 1965), a 16-item questionnaire completed by the child, measures the child’s tendency to report socially desirable answers. Socially desirable answers are those responses the child provides that are not true, but that the child thinks reflect the “right” way to behave and think (e.g., a child’s assertion that he or she “always washes his or her hands before meals”). Higher scores on the CSD indicate a greater tendency to report socially desirable answers. Test-retest reliability for this instrument ranges from .82 to .95. Cronbach’s alpha coefficient in the current sample of children is .72.

**Procedure**

Children meeting recruitment criteria were invited to participate in the study at the time of their regularly scheduled clinic appointments. Informed written consent was obtained from the parent and informed written assent was obtained from the child. If the child was 12 years old or younger, the assent form was read aloud by the investigator. Copies of the consent forms were provided to the families. The Institutional Review Boards of the hospital and the affiliated university granted approval for the study.

The parent completed three questionnaires in reference to his or her child. Instructions for each questionnaire were explained to the parent by the investigator. The questionnaires were administered in a consistent order: (1) ASQ; (2) PPSC (Lansky et al., 1987); and (3) CDI-P (Kovacs, 1985). Experience in the pilot phase of the study demonstrated that this order made the most sense to the research participants in completing the questionnaires.

The child completed three questionnaires. Instructions for each questionnaire were explained to the child by the investigator. The investigator asked each child to read aloud sample questions from the questionnaires to ensure that the child’s reading ability was adequate. The questionnaires were administered in a consistent order: (1) The Relatedness Questionnaire (Lynch & Cicchetti, 1991, 1997), completed in reference to the child’s mother and father (if the child did not have a mother or father, the investigator prompted the child to identify a primary caregiver and a secondary caregiver); (2) CDI (Kovacs, 1985); and (3) CSD (Crandall et al., 1965).

The physician was asked to complete a form identifying the child’s asthma severity according to the NHLBI (1997) classifications for asthma severity.

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While the child and parent were completing the questionnaires, the investigator remained in the room to answer questions that arose and to ensure that the child and parent completed their questionnaires independently.

**Data Analysis**

*Relatedness as a Moderator (Hypothesis 1).* When a variable acts as a moderator, it specifies the conditions under which one variable is related to another variable. Specifically, a moderator variable can “affect the relationship between two variables, so that the nature of the impact of the predictor variable on the dependent variable varies according the level or value of the moderator” (Holmbeck, 1997, p. 599). That is, the moderator variable interacts with
the predictor variable in determining the dependent variable. In our model, the child’s pattern of relatedness (secure vs. insecure) with his or her caregiver is predicted to moderate (buffer or exacerbate) the relationship between functional status and depressive symptoms.

Regression analyses were conducted to test this hypothesis. All variables were centered, a procedure recommended to reduce the problem of multicollinearity (Aiken & West, 1991). The interaction term was computed by multiplying functional status and relatedness. On the first step of the regression equation, functional status and relatedness were entered simultaneously. On the second step, the interaction term was entered. Moderation is demonstrated if the interaction term is significant. Moderation analyses for mother and father relatedness were conducted separately.

**Relatedness as a Mediator (Hypothesis 2).** A mediator can be described as the mechanism by which one variable influences another variable (Baron & Kenny, 1986). In our model, relatedness is predicted to mediate the relationship between functional status and depressive symptoms, transmitting the effect of functional status on depressive symptoms. In other words, functional status influences relatedness, and relatedness, in turn, influences depressive symptoms. According to Baron and Kenny (1986), several statistical conditions must be met to infer support for a mediating model. First, the predictor variable (functional status) must be significantly associated with the mediator variable (relatedness). Second, the predictor variable (functional status) must be significantly associated with the criterion variable (depressive symptoms). Third, the mediator variable (relatedness) must be significantly associated with the criterion variable (depressive symptoms). Mediation is demonstrated if, after controlling for the effects of the mediator variable (relatedness) on the criterion variable (depressive symptoms), the relationship between the predictor variable (functional status) and the criterion variable (depressive symptoms) is significantly reduced (Baron & Kenny, 1986).

**Results**

**Descriptive Statistics**

**Demographics.** Although demographic information (age, gender, race, and educational level) was collected, no a priori predictions were made regarding the impact that demographic variables may have on any of the variables of interest (asthma severity, functional status, relatedness, and depressive symptoms). Past research has found that demographic variables were not correlated with depression in children with chronic illnesses (Bennett, 1994). Furthermore, post hoc analyses found no significant patterns of associations between age, race, and educational level and the variables of interest. For these reasons, these demographic variables were not controlled for in any further analyses. Gender, however, was associated with functional status ($r = .468, p < .001$). See the exploratory analyses section for post hoc analyses including age and gender.

**Social Desirability.** Scores on the CSD revealed a mean of 6.51 ($SD = 3.23$). Prior to all statistical analyses, social desirability was partialed out of the Relatedness Questionnaire and the CDI. All relationships reported in this article that include either of these two measures reflect adjusted scores. The CSD was not significantly correlated with relatedness, but was correlated with the CDI ($r = -.464, p < .001$).

**Asthma Severity.** Physician report indicated the following distribution of asthma severity: $21 (38.2\%)$ mild intermittent, $23 (41.8\%)$ mild persistent, $10 (18.2\%)$ moderate persistent, and $1 (1.8\%)$ severe. The physician report was correlated with the parent report of asthma severity (ASQ) ($r = .522, p < .001$). Neither rating of asthma severity was associated with the relatedness or depressive symptom measures (see Table I).

**Functional Status.** Scores on the PPSC (Lansky et al., 1987) revealed a mean of 88.18 ($SD = 14.15$) and a range of 50–100. This instrument was designed to measure a wide array of functioning, including being bed-ridden (scores below 50). Because children in this outpatient sample would not be bed-ridden, scores between 50 and 100 were expected and provided an adequate range for this sample. Functional status was correlated ($r = -.426, p < .05$), with asthma severity confirming that at least some portion of functional status was associated with asthma severity (see Table I).

**Relatedness.** Fifty-three (96.4\%) children answered the mother relatedness questionnaire (Lynch & Cicchetti, 1991, 1997) for their mothers, $1 (1.8\%)$ for their grandmother, and $1 (1.8\%)$ for their stepmother. All caregivers referred to in the mother relatedness questionnaire were considered primary caregivers and 100% lived in the same home with
their children. Thirty-seven (67.3%) children reported secure relatedness patterns with their mothers and 18 (32.7%) children reported insecure relatedness patterns with their mothers. This distribution is comparable to normative samples of children, with 67.5% reporting secure and 32.5% insecure relatedness with their mothers.

Thirty-seven (67.3%) children answered the father relatedness questionnaire (Lynch & Cicchetti, 1991, 1997) for their fathers or stepfathers with whom they lived, 11 (20%) for fathers or secondary caregivers with whom they have regular contact, and 7 (12.7%) reported having no contact with their fathers or other secondary caregivers. Twenty-seven (56.3%) children reported secure relatedness patterns with their fathers or secondary caregivers, whereas 21 (43.7%) reported insecure relatedness patterns their fathers or secondary caregivers.

Children reporting insecure relatedness with their mothers, also reported more depressive symptoms than children reporting secure relatedness ($t [2] = 4.75, p < .001$). Similarly, children reporting insecure relatedness with their fathers or secondary caregivers also reported more depressive symptoms than children reporting secure relatedness patterns ($t [2] = 2.42, p < .05$).

Depression. On average, the children included in this study sample were within nonclinical ranges on the CDI ($M = 6.51, SD = 5.79$, range: 0–20) (Kovacs, 1992). However, 10 (18%) children scored above the clinical cut-off score (12) on the CDI (Smucker et al., 1986). This finding demonstrates that a modest, but reasonable range of depressive symptoms was captured in the sample. One child’s score on the CDI, in excess of 4 standard deviations from the mean, was identified as a univariate outlier. As recommended by Tabachnick and Fidell (1996), this score was conservatively transformed to reduce undue influence on the sample statistics. Scores on the CDI-P revealed comparable levels of depressive symptoms ($M = 6.02, SD = 5.07$). The CDI-P correlated with the child’s report of depressive symptoms (CDI) ($r = .376, p < .01$). The CDI child version was selected for further analyses, addressing the study’s specific interest in the child’s perceived experience of depressive symptoms.

**Results of Tests of Moderation and Mediation**

Regression analyses testing the moderating role of maternal relatedness indicated that the interaction term (functional status $\times$ maternal relatedness) did not account for a significant portion of the variance of depressive symptoms, beyond that accounted for by functional status and maternal relatedness, $R^2_{\text{change}} = .012, F_{\text{change}} (1, 51) = .914, \text{n.s.}$ Similarly, for paternal relatedness, the interaction term (functional status $\times$ paternal relatedness) did not achieve significance, $R^2_{\text{change}} = .030, F_{\text{change}} (1, 44) = 1.649, \text{n.s.}$

The steps for testing for mediation were followed (Baron & Kenny, 1986). First, partial correlations revealed a significant association between functional status and maternal relatedness ($r = .334, p < .05$); second, between functional status and depressive symptoms ($r = -.298, p < .05$); third, between maternal relatedness and depressive symptoms ($r = -.546, p < .001$). The association between functional status and depressive symptoms ($\beta = -.298, p < .05$) was reduced to a nonsignificant level ($\beta = -.130, p = .293$) after controlling for maternal relatedness. Goodness of fit (Tabachnick & Fidell, 1996) of the mediation model to the collected data was $.967$ (see Table II).

Father relatedness did not meet criteria for testing mediation and, therefore, was not examined.

**Exploratory Analyses**

Previous empirical and clinical findings did not suggest specific hypotheses regarding the interaction of

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**Table II. Regression of Depression on Functional Status and Relatedness**

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<td>$p &lt; .05$</td>
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<td>Outcome</td>
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<td>(3) Predictors</td>
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<tr>
<td>Relatedness</td>
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Test of overidentified model (mediated): goodness of fit = .967.
age and gender with the other variables of interest. Furthermore, there were no significant zero order correlations between the developmental variables and depressive symptoms in this study. Nevertheless, post hoc exploratory analyses found that age and gender may, in fact, play an important role. A significant three-way interaction was found between functional status, relatedness, and age ($\beta = .383, p < .01$). Examination of the plotted slopes suggests that maternal relatedness in older children (ages 13–17) may buffer the influence of poor functional status on depressive symptoms. A significant three-way interaction was also found between functional status, relatedness, and gender ($\beta = .463, p < .05$). Examination of the plotted slopes suggests that girls who are very functionally impaired (scores 60 and below) may not benefit from positive mother-child relatedness in preventing symptoms of depression. Extreme caution must be taken in the interpretation of these results as they were not theoretically predicted and are based on 19 teenagers and on 6 children scoring 60 or below on the functional status measure.

**Discussion**

The purpose of this study was to investigate parent-child relationship quality as a potential risk or protective factor for children with asthma who are at increased risk for depression because of the functional impairment they may experience as the result of their illness. We identified two specific pathways by which the parent-child relationship may be influential in the association between illness-related functional status and depressive symptoms. The first pathway suggested that parent-child relationship quality would have a moderating effect. This hypothesis, however, was not supported. Overall, secure patterns of parent-child relationship did not buffer nor did insecure patterns exacerbate the impact of poor functional status on depressive symptoms. Instead, the second pathway in which parent-child relationship quality (secure or insecure) was predicted to mediate the relationship between functional status and depressive symptoms was supported. Illness-related functional impairment may influence the child’s relationship with his or her primary caregiver, which, in turn, influences the development of depressive symptoms in the child. Overall, findings in this study underscore the importance of investigating parent-child relationships among children with asthma, emphasizing that disease factors alone may not fully explain the development of emotional disturbances in these children.

Although the child’s relationship quality with his or her father did not mediate the impact of functional status on depressive symptoms, the influence of fathers in the lives of their children should not be discounted. A nonsignificant trend was detected in an exploratory analysis assessing the relationship between positive mother-child relationships and the presence of a father figure in the household: 73.0% of children with fathers present versus 55.6% with fathers not present reported secure relatedness with their mothers, $\chi^2(1,55) = 1.669, p = .196$. Although this trend must be interpreted with extreme caution, it nonetheless suggests that fathers may play a role in supporting the mother-child relationship. Current literature supports the notion that fathers do play an important role in the lives of their children and that positive father-child relationships are in general associated with better psychosocial outcomes (Akande, 1997). However, future research is necessary to identify the pathways by which the presence of a father or father figure may affect the emotional well-being of children with asthma.

Results of the exploratory analyses suggest that within the proposed mediational model, relatedness may also play a moderating role for certain subgroups of children. Post hoc analyses revealed that the developmental variables (age and gender) may interact with functional status and relatedness in predicting depressive symptoms in children with asthma. Specifically, positive maternal relatedness may buffer older children (ages 13–17) from depressive symptoms, but girls who are very functionally impaired (scores 60 and below on the functional status measure) may not be similarly protected. Firm conclusions, however, cannot be drawn because of the small sample size on which these analyses were based, with only 19 children in the 13 to 17 age range and 6 children scoring 60 or below on the functional status measure. These findings suggest areas of future research in which larger sample sizes are provided in the investigation of complex interactions between developmental and relationship variables, as well as the exploration of models of relationships including both mediating and moderating pathways.

Although this study supports a model that implies a linear direction of effect from functional status through relatedness to depressive states in
children, the model does not exclude the possibility that some of the factors may mutually influence one another. For example, Miller (Miller, 1987; Miller & Wood, 1997) suggests that depressive symptoms may actually exacerbate airways dysfunction in asthma via a psychophysiological (autonomic nervous system) pathway. Furthermore, depressive symptoms may have a mediating influence on the relationship between functional status and relationship quality. Functional impairment may influence feelings of depression, and depressive symptoms may, in turn, hamper the child’s ability to experience or maintain positive parent-child relationships. Clearly various possible interpretations of the current data exist, and alternative models must be investigated before the proposed mediational model can be fully accepted.

Future research must test causal direction, eliminate shared method variance, and more clearly define parent-child interactions relevant to the emotional well-being of children with asthma. A longitudinal study measuring parent-child relationship patterns and symptoms of depression, both before and after the onset of asthma, would help to confirm causal direction as would testing the impact of each variable on each other through controlled clinical intervention trials. Implementing observation and interview measures would prevent a limitation of this study in which the child’s self-report was used for both relatedness and depressive symptoms. Shared method variance in this study may have accounted for the association between relatedness and depression, as the parental report of depression was not very highly correlated with the child’s report and did not meet criteria for testing for mediation. Finally, distinguishing between the child’s perception and more objective measures of relationship quality, as well as identifying coping strategies and communication patterns of the child, would provide useful information about the kinds of behaviors that support or undermine parent-child relationships.

This study suggests that the parent-child relationship between children with asthma and their primary caregivers may be an important point of intervention for the treatment and prevention of depressive symptoms. Crittenden (1992) suggests that parent-child attachment relationships may be improved by intervening with the parent or the child directly. Furthermore, Campbell and Patterson (1995), in a review of family-centered intervention studies, suggest that family therapy approaches in treating children with chronic illness may be the most efficacious. More research is needed, however, to investigate the impact of these treatments and ways in which traditional approaches to therapy may or may not apply to groups of depressed children with different chronic illnesses.

Acknowledgments

Support for this work was provided by a Research Scientist Development Award from NIMH awarded to Beatrice L. Wood (K01 MH01291). We thank John Parker and Chris Cox for their assistance with the data analyses, Jutta Helm and Jeffrey Rockoff for their help with participant recruitment, as well as all the families who participated in the study. In addition, we thank the members of David Reiss’s Research Seminar and the anonymous reviewers for their critical reviews of this manuscript.

Received September 15, 1998; revisions received February 17, 1999, and July 26, 1999; accepted October 29, 1999

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