The Relationship of Parental Overprotection, Perceived Child Vulnerability, and Parenting Stress to Uncertainty in Youth with Chronic Illness

Larry L. Mullins,[1] Cortney Wolfe-Christensen,[2] Ahna L. Hoff Pai,[3] Melissa Y. Carpentier,[2] Stephen Gillaspy,[1] Jeff Cheek,[4] and Melanie Page[2]

[1]University of Oklahoma Health Sciences Center, [2]Oklahoma State University, [3]Children's Hospital of Philadelphia, and [4]University of Oklahoma

Objective To examine the relationship of parent-reported overprotection (OP), perceived child vulnerability (PCV), and parenting stress (PS) to youth-reported illness uncertainty, and to explore potential developmental differences. **Method** Eighty-two children and 82 adolescents ($n = 164$) diagnosed with Type 1 diabetes mellitus (DM1) or asthma, completed a measure of illness uncertainty, while their parents completed measures of OP, PCV, and PS. **Results** After controlling for demographic and illness parameters, both PCV and PS significantly predicted youth illness uncertainty in the combined sample. Within the child group, only PS significantly predicted illness uncertainty, whereas only PCV significantly predicted uncertainty for adolescents. **Conclusion** Specific parenting variables are associated with youth-reported illness uncertainty; however, their relationship varies according to developmental level. Although OP has been identified as a predictor of child psychological outcomes in other studies, it does not appear to be associated with illness uncertainty in youth with DM1 or asthma.

Key words childhood chronic illness; illness uncertainty; overprotection; parenting stress; vulnerability.

Introduction

A hallmark characteristic of chronic illness in both children and adults is the cognitive experience of uncertainty (e.g., Jessop & Stein, 1985; Koocher & O'Malley, 1981; Mishel, 1984). The unpredictable, variable nature of many chronic illnesses, in conjunction with complex and often intrusive and painful treatment regimens, combine to create such an appraisal context. As a construct, illness uncertainty has been defined as a cognitive experience elicited in situations in which the meaning of illness-related events is unclear and outcomes are unpredictable due to a lack of sufficient information or cues (Mishel, 1990). Mishel's model suggests that illness uncertainty is comprised of four contributing components, including perceived ambiguity concerning the state of the illness, complexity regarding treatment, lack of information regarding the seriousness of the illness and prognosis, and perceived unpredictability of the illness course (Mishel, 1984). Perceived uncertainty is thus viewed as a person–environment interaction between objective illness events (e.g., hypoglycemic episodes) for which outcomes are unknown (e.g., retinopathy), and, an individual's cognitive appraisal of the meaning of these illness-related events (Mishel, 1990; Mast, 1995).

An extensive, growing literature now demonstrates a robust relationship between illness uncertainty and a variety of adjustment outcomes in the context of adult health conditions, including myocardial infarction (Bennett, 1993), multiple sclerosis (McNulty, Livneh, & Wilson, 2004; Mullins, Cote, & Fuemmeler, 2001), and cancer (Clayton, Mishel, & Belyea, 2006; Mast, 1995; Mishel & Sorenson, 1991), among others. Illness uncertainty has also consistently emerged as a salient predictor of adjustment outcomes among parents of children with a chronic illness (Stewart & Mishel, 2000),

All correspondence concerning this article should be addressed to Larry L. Mullins, PhD. 940 NE 13th St, Room 3B3308. Oklahoma City, UK, 73104. E-mail: larry-mullins@ouhsc.edu.

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including parents of children with Type 1 diabetes (Hoff, Mullins, Chaney, Hartman, & Domek, 2002), cancer (Grootenhuis & Last, 1997a, 1997b), and asthma (Horner, 1997). Importantly, Stewart & Mishel (2000) reported parental psychological distress to be the single most commonly reported consequence of parental uncertainty. Specifically, parental uncertainty about their child's illness has been significantly associated with symptoms of anxiety and depression (Grootenhuis & Last, 1997a, 1997b), as well as general measures of psychological distress (Fuemmeler, Mullins, & Marx, 2001) and posttraumatic stress symptoms (Fuemmeler et al., 2001) in samples of parents of children diagnosed with cancer.

Children and adolescents also experience illness uncertainty concerning the symptoms and treatments of their condition, the possibility of illness recurrence, and their ability to engage in daily activities (Greenberg & Meadows, 1991; Hasse & Rostad, 1994). Similar to the adult literature, studies demonstrate that increased child uncertainty is significantly associated with increased depressive symptoms in adolescents with Type 1 Diabetes (Hoff et al., 2002) and children with JRA (White, Chaney, & Mullins, 2005), as well as anxious symptoms (Hommel, Chaney, Wagner, White, Hoff & Mullins, 2003) and global psychological distress in adolescents and young adults with asthma (Mullins, Chaney, Pace, & Hartman, 1997). In addition, child illness uncertainty has also been found to moderate the relationship between global parent psychological distress and child-reported depressive symptoms among children with rheumatic disease (White et al., 2005). Collectively, these findings indicate that children with chronic conditions indeed experience illness uncertainty and, moreover, that perceptions of illness uncertainty may be a critical cognitive factor that can place children at increased risk for experiencing psychological distress. In light of the role that parenting variables may play in facilitating the development of illness uncertainty, the current study aimed to study these potential relations.

Although a number of studies have documented that children with a chronic health condition experience uncertainty related to their illness, few attempts have been made to identify factors that contribute to this experience, particularly as it concerns familial influences. Notably, the role of family contextual variables has received increased attention in research examining child adjustment to chronic illness in recent years (e.g., Thompson & Gustafson, 1996). From a transactional perspective, parent adjustment and child adjustment are seen as influencing each other in a reciprocal fashion. Considerable research now supports the robust nature of the parent-child adjustment outcome relationship in childhood chronic illness (Chaney et al., 1997; Eaton, Mengl, Mengel, Larson, Campbell & Montague, 1992; Livneh & Antonak, 1997; Mullins et al., 1995; Thompson & Gustafson, 1996; Thompson, Gustafson, & Bonner, 2002). Further, this relationship exists after controlling for multiple demographic and disease severity variables. However, these studies have typically focused on the relationship of global parent mood states (e.g., depression, anxiety, or measures of general psychological distress) to child behavior or mood states (e.g., externalizing symptoms, depression), and have, with rare exception, examined more specific parent behaviors or perceptions that may influence specific child behaviors or cognitive appraisal mechanisms (i.e., Davis et al., 2001; Mullins, Fuemmeler, Hoff, Chaney, Van Pelt & Ewing, 2004; Steele, Tripp, Kotchick, Summer, & Forehand, 1997). Ostensibly, parents who respond to their child's chronic illness with excessive concern or changes in their parenting practices have the potential to communicate to their child, through action and words, that they are indeed vulnerable. In turn, their children might internalize these perceptions of vulnerability, which could subsequently lead to heightened levels of perceived illness uncertainty (Steele et al., 1997).

In the current study, we examined the relationship between three specific ''parenting capacity variables'' (NIH, 2006) and illness uncertainty in youth with one of two chronic illnesses, Type 1 diabetes mellitus (DM1) or asthma. DM1 and asthma were chosen as they represent the two most common chronic illnesses of childhood. It is estimated that 6.1 million children in the U.S.A. between the ages of 0 and 17 have a diagnosis of asthma (NCHS, 2002), and 150,000 have a diagnosis of DM1 (CDC, 2005). Although each disease has a number of unique features, both illnesses are characterized by multiple potentially noncontingent, noncontrollable disease events (e.g., hypoglycemia, wheezing) (Hoff et al., 2005b).

The particular parenting capacity variables chosen for this study included the constructs of parental overprotection (OP), perceived child vulnerability (PCV), and parenting stress (PS). Parental OP has been defined as protective ''behavior'' exhibited by the parent which is excessive given the child's developmental stage (Thomasgard, Metz, & Edelbrock, 1995), whereas PCV reflects parental ''attitudes or beliefs'' that their child is particularly vulnerable or susceptible (Thomasgard & Metz, 1997). PS is conceptualized as the level of stress present in the

parent–child relationship, including stress attributable to parental distress, difficult child characteristics, and dysfunctional parent–child interactions (Abidin, 1997).

Recent studies indeed suggest that parents of children with a chronic illness report more OP than parents of children without a chronic illness, and that such OP is related to adjustment difficulties in their children (Holmbeck et al., 2002). In addition, recent research has documented that children's level of illness severity also impacts parents' overprotective or highly controlling behavior such that mothers of children with more severe chronic illness (JRA) evidence higher rates of structure and rule setting compared to mothers of healthy children (Power, Dahlquist, Thompson, & Warren, 2003). Higher levels of both parent-reported PCV and PS have also been linked to levels of child-reported depressive symptoms in a sample of children with DM1 (Mullins et al., 2004). In this study, PS also moderated the vulnerability–depression relationship, such that PS appeared to magnify the relationship between PCV and child-reported depressive symptoms.

To our knowledge, no studies to date have examined the relationship of the aforementioned parenting capacity variables to self-reported illness uncertainty in youth with a chronic illness. Identification of discrete parent behaviors or beliefs that contribute to uncertainty may be a critical first step in developing targeted interventions for parents of chronically ill children. Thus, in this preliminary investigation we sought to evaluate the unique contribution of parent-reported OP, perceptions of vulnerability, and PS to youth-reported illness uncertainty in a sample of youth with either DM1 or asthma after controlling for both demographic and illness parameters. Given previous findings of developmental differences in adjustment outcomes in the childhood chronic illness literature in general (Grey, Cameron, & Thurber, 1991; Peterson, Schmidt, & Bullinger, 2006; Zehnder, Prchal, Vollrath, & Landolt, 2005) and the OP/PCV literature more specifically (Anthony, Gil, & Schanberg, 2003), we secondarily sought to explore potential age-related developmental differences by examining these same interrelationships in subsamples of youth 8–12 years and 13–18 years of age.

Method

Participants

Eighty-two children (38 boys, 44 girls) and 82 adolescents (44 boys, 38 girls) diagnosed with DM1 (48 children, 71 adolescents) or asthma (34 children, 11 adolescents), and their parents (72 mothers, 10 fathers of children; 69 mothers, 13 fathers of adolescents) were recruited as part of a larger study examining parent and child adjustment to chronic illness. Children ranged in age from 8 to 12 years of age ($M = 10.13$, $SD = 1.42$). According to parent report, 82.9% were Caucasian, 8.5% were African-American, 4.3% were Native American, 1.8% were Hispanic, and 5.5% were ''Other''. Educational attainment for the child group ranged from 1 to 6 years of school ($M = 4.65$, $SD = 1.44$). Adolescents ranged in aged from 13 to 18 years of age ($M = 14.79$, $SD = 1.70$); 78.0% self-identified as Caucasian, 7.3% as African-American, 6.1% as Native American, 2.4% as Hispanic, and 6.1% as ''Other''. Educational attainment for the adolescent group ranged from 6 to 13 years of school ($M = 9.15$, $SD = 1.74$). Parent participants ranged in age from 28 to 64 years ($M = 39.81$, $SD = 5.79$), their education levels ranged from 6 to 21 years ($M = 14.55$, $SD = 2.44$) and the majority reported being married (75.0%). Nineteen percent of the participants reported an average annual family income of <$20,000, 45.8% reported an income between $20,000 and $60,000 and the remaining 35.7% reported a family income of >$60,000. Thus, our sample could be characterized as primarily middle to upper middle class. Notably, the demographics of the current sample were consistent with the demographic characteristics of the clinics from which participants were recruited. Duration of child illness was calculated by subtracting the date of diagnosis from the date of participation and ranged from .08 years to 16.0 years ($M = 5.52$, $SD = 4.01$). Children were excluded from participating if they evidenced cognitive deficits (e.g., mental retardation) or comorbid chronic illnesses.

Instruments

Demographic and Illness Parameters

Parents reported their age, child's age, annual family income, education, marital status, and family structure. Physicians were also asked to rate each child's overall level of illness severity using a 7-point Likert scale. Scores ranged from 0 to 7, with higher scores indicating increased physician-appraised severity. Notably, this scale has been successfully used as an overall measure of illness severity in previous research (Mullins et al., 1995).

Youth Illness Uncertainty

Illness uncertainty was measured using a revised version of the Children's Uncertainty in Illness Scale (CUIS; Mullins & Hartman, 1995). The new version of the CUIS consists of 16 items and provides a measure of

the child's perceived illness uncertainty about the course, prognosis, and treatment of their illness (Pai, Mullins, Drotar, Burant, Wagnre & Chaney, 2007). Examples of the items include, ''I don't know if my illness is getting better or worse,'' and ''They have not told me what is wrong with me.'' Respondents are asked to rate each item on a 5-point scale ranging from (1) ''very true'' to (5) ''very false.'' A CUIS total score is obtained by summing across all items, with higher scores indicting greater levels of illness uncertainty. Preliminary evidence for the validity of the CUIS has also been demonstrated by its significant association with depressive symptoms among children and adolescents with Type 1 diabetes (Hoff et al., 2002) and juvenile rheumatic disease (White et al., 2005). Internal reliability for the current sample was high, Cronbach's $\propto = .89$.

Parental OP

Parental OP behaviors were measured using the Parent Protection Scale (PPS; Thomasgard et al., 1995). The PPS is a 25-item parent self-report measure assessing several dimensions of protective parenting behaviors. Respondents are asked to rate each statement on a 4-point scale ranging from 0 (''never'') to 3 (''always'') as to the degree to which the statement is descriptive of their behavior with their child. Items include such statements as: ''I comfort my child immediately when he/she cries,'' and ''I let my child make his/her own decisions.'' Higher total scores represent greater overall levels of parental protection behaviors. Based on a clinical cut-off score of 1 *SD* above the mean (Thomasgard et al., 1995), 14.6% of parents reported evidencing clinically significant levels of overprotective behavior. Previous normative studies on the PPS have demonstrated moderate to high internal reliability (Cronbach's $\propto = .73$) and high test–retest reliability for the total score ($r = .86$, $p = .001$; Thomasgard et al., 1995). Criterion validity using criterion-referenced clinical history as the basis for comparison has also been demonstrated to be acceptable: sensitivity = 71%, specificity = 94%, and positive predictive value = 92% (Thomasgard et al., 1995). Internal reliability for the current sample was similar to that found in previous studies (Cronbach's $\propto = .77$).

PCV

Parental perceptions of child vulnerability were assessed using the Child Vulnerability Scale (CVS; Forsyth, Horwitz, Leventhal, Burger, & Leaf, 1996). The CVS is an 8-item parent self-report scale with a 4-point response scale ranging from 0 (''definitely false'') to 3 (''definitely true''); higher scores reflect greater PCV. Items include such statements as: ''In general my child seems less healthy than other children,'' and ''I get concerned about circles under my child's eyes.'' Using a clinical cut-off score of 10 (Forsyth et al., 1996) 18.3% of parents met criteria for perceiving their child as significantly vulnerable. Previous studies have demonstrated adequate internal reliability (Cronbach's $\propto = .74$; Forsyth et al., 1996) and an aggregate correlation of $r = .84$ for test–retest reliability (Thomasgard & Metz, 1993). Validity of the CVS has been supported in research comparing CVS scores to scores on the Child Behavior Checklist (CBCL; Achenbach, 1991) (Forsyth et al., 1996). Cronbach's alpha coefficient for the current sample was slightly higher than that reported in previous studies ($\propto = .82$).

PS

The relative magnitude of PS in the parent–child system was measured using the Parenting Stress Index/Short Form (PSI/SF; Abidin, 1990). The PSI/SF is a 36-item parent self-report instrument with a 5-point response scale ranging from 1 (''strongly agree'') to 5 (''strongly disagree''). Items include statements such as: ''I feel trapped by my responsibilities as a parent,'' and ''My child makes more demands on me than most children.'' The PSI/SF yields a total summary score, which was used in the current study as the measure of PS. Based on Abidin's (1990) recommendation of 90 as the clinical cut-off, 23.2% of parents reported clinically significant levels of PS. The PSI/SF is highly correlated with the full-length PSI instrument ($r = .94$) and two-week test–retest reliability of the full-length PSI with the PSI/SF is .95 (Abidin, 1990). Although the validity of the PSI/SF has yet to be formally assessed, Abidin (1990) suggests that the validity is similar to that of the full-length PSI given their relationship. The validity of the full-length PSI has been established in a range of populations, including parents of children with asthma (Carson & Schauer, 1992) and DM1 (Wysocki, Huxtable, Linscheid, & Wayne, 1989). Cronbach's alpha coefficient for the current sample was .94.

Procedure

Participants with asthma were recruited from two outpatient pulmonology clinics and participants with diabetes were recruited from three outpatient endocrinology clinics in the southwestern U.S. Clinic rosters were used to generate the list of families who were eligible for the study. Parents were sent a solicitation letter describing the purpose of the study, as well as a return postcard on which they could indicate their decision to

participate. The parent participants who expressed interest were then mailed consent forms, questionnaire packets, and self-addressed, stamped return envelopes. Those who returned completed questionnaires were sent thank-you letters and $10.00 gift certificates. Approximately 310 families were contacted for participation within the context of the larger study, although 259 initially consented to participate, only 179 returned their measures. Thus, the overall consent rate was 83.5%, with an actual completion rate of 69.1%. All procedures were approved by the university Institutional Review Board and were in compliance with the ethical standards of the American Psychological Association.

Results

Preliminary Analyses

Data screening revealed that the pulmonologist selected to complete ratings of disease severity for the asthma participants failed to accurately complete this information. Therefore, physician-ratings of illness severity were omitted from the analyses. Descriptive statistics were then calculated for all the variables of interest [i.e., parental overprotection (OP), perceived child vulnerability (PCV), parenting stress (PS), and youth illness uncertainty (CUIS); Table I]. Next, bivariate correlations were conducted to examine potential interrelationships between demographic (i.e., child's current age, child's gender, annual family income) and illness (i.e., duration of illness, disease group) parameters and predictor (i.e., OP, PCV, PS) and criterion variables (i.e., youth illness uncertainty; Table II). Results indicated that child's age, annual family income, duration of illness, and disease group were significantly correlated with at least one of the variables of interest. Thus, each of these variables was subsequently utilized as covariates in all regression analyses.

To determine whether differences existed between the two illness groups (i.e., asthma vs. DM1) on demographic variables, illness parameters, or predictor or criterion variables, independent samples *t*-tests were conducted for child's current age, duration of illness, OP, PCV, PS, and youth illness uncertainty. In addition, chi-square tests were conducted to determine if the illness groups differed with respect to gender or annual family income. Results indicated that the illness groups significantly differed on child's current age, and duration of illness [$t(162) = 3.41$; $p < .01$; $t(162) = 8.27$, $p < .01$, respectively], such that participants with diabetes were older, while participants with asthma had greater illness duration. Contrary to expectations, the illness groups also differed on PCV [$t(162) = -4.01$, $p < .01$], such that parents of youths with asthma perceived their children to be significantly more vulnerable than parents of youths with diabetes. Finally, to determine whether differences existed between mothers and fathers on any of the predictor or criterion variables, independent *t*-tests were conducted for OP, PCV, PS and youth illness uncertainty. Results revealed that mothers and fathers differed only on PS [$t(162) = 2.60$, $p = .01$], such that mothers reported significantly higher levels of PS than fathers. Given this difference between mothers and fathers, parent

Table I. Descriptive Statistics for Predictor and Criterion Variables

Variable	Range	M(SD)
PPS	10–42	26.10 (6.16)
CVS	0–20	6.20 (4.06)
PSI	38–146	75.96 (20.64)
CUIS	16–76	41.70 (10.17)

Note. PPS = Parent Protection Scale; CVS = Child Vulnerability Scale; PSI/SF = Parenting Stress Index/Short Form; CUIS = Children's Uncertainty in Illness Scale.

Table II. Zero-Order Correlations for Study Variables

	1	2	3	4	5	6	7	8	9	10
1. Child's Age		.10	.01	−.07	.22**	−.26**	. 44**	−.13	.04	−.17*
2. Child's Gender			.01	−.09	.16*	.12	−.14	−.11	.05	−.15
3. Family Income				−.09	−.04	−.09	−.28**	−.26	−22**	−.18*
4. Parent Respondent					−.07	.05	.09	.14	.20*	.10
5. Duration of Illness						.44**	−.05	.16*	.09	.03
6. Disease Group							.08	.30**	.09	.03
7. PPS								.34**	.23**	.17*
8. CVS									.35**	.32**
9. PSI/SF										.29**
10. CUIS										

Note. Duration of Illness = Date of Participation - Date of Diagnosis; PPS = Parent Protection Scale; CVS = Child Vulnerability Scale; PSI/SF = Parenting Stress Index/Short Form; CUIS = Children's Uncertainty in Illness Scale; *$p < .05$, **$p < .01$.

respondent was also utilized as a covariate in all subsequent analyses.

Primary Analyses

Hierarchical regression analysis was utilized to determine the relationship of OP, PCV, and PS to youth illness uncertainty in the combined sample. Guided by the transactional stress and coping model (Thompson & Gustafson, 1996), demographic variables, including child current age, child gender, annual family income, and parent respondent, were entered on Step 1; illness parameters, including duration of the child's illness, and illness group were entered on Step 2; and OP, PCV, and PS were simultaneously entered as the predictor variables on Step 3. Youth illness uncertainty served as the outcome variable. Examination of Tolerance and VIF for all of the regression equations revealed that multicollinearity was not a concern in any of the analyses. Results indicated that, after controlling for demographic and illness parameters, both PS and PCV significantly predicted youth illness uncertainty [$t(163) = 2.83$, $p < .01$; $t(163) = 2.67$, $p < .01$, respectively]. OP did not significantly predict youth illness uncertainty, ($p > .05$). Notably, OP, PCV, and PS accounted for 10.6% of the variance in youth illness uncertainty, above and beyond the variation accounted for by demographic and illness parameters (Table III).

Analyses Examining Age-Related Developmental Differences

Next, analyses were conducted to determine whether the parenting variables had different effects based on the age-related developmental level of the youth. The sample was divided into child (ages 8 to 12 years) and adolescent (ages 13 to 18 years) groups, and identical regression analyses were conducted for each. Child gender, annual family income, and parent respondent were entered on Step 1, duration of the child's illness, and illness group were entered on Step 2, and OP, PCV, and PS were entered on Step 3. For both regression equations, youth illness uncertainty was entered as the dependent variable.

Results for the child group indicated that, after controlling for demographic and illness parameters, PS significantly predicted illness uncertainty [$t(81) = 2.63$, $p = .01$], while OP and PCV did not (both p's $> .05$). Among the adolescent group, PCV significantly predicted illness uncertainty [$t(81) = 2.49$, $p = .02$] while OP and PS did not (both p's $> .05$).

Discussion

The current study examined the relationship of three parenting capacity variables to the experience of illness uncertainty in a sample of youth diagnosed with either Type 1 diabetes or asthma. Using independent reports from parents and youth, our results indicate that both increased PS and higher levels of PCV predicted higher levels of youth illness uncertainty after controlling for demographic variables, illness duration, and type of disease. Importantly, these results are qualified by results indicating different interrelationships depending on the age-related developmental level of the child. Illness uncertainty in younger children appears to be more closely associated with the parent's level of PS, whereas adolescent uncertainty is related to their parent's attitudes or beliefs about their vulnerability. It would indeed appear that combination of the two age groups obscured the more precise interrelationships that existed within each developmental level. Although speculative, it may be that adolescents are in a stage of their life in which they are seeking independence and autonomy, and parents are less likely to engage in overt overprotective behaviors yet still perceive their child as vulnerable.

Table III. Hierarchical Regression Analyses of Parental Overprotection, Perceived Child Vulnerability, and Parenting Stress on Youth Illness Uncertainty for Total Sample

Step	Variable	Standardized β	*t* for wi thin-step predictors	R^2 Change for step	Cumulative R^2	*F* Change for Step
1	Child Age	−0.15	−2.01*	0.08	0.08	3.61**
	Child Gender	−0.12	−1.62			
	Family Income Parent	−0.17	−2.27*			
	Respondent	0.06	0.90			
2	Duration of Illness	0.14	1.48	0.01	0.10	1.11
	Disease Group	−0.09	−0.09			
3	PPS	−0.09	−1.02	0.11	0.20	6.81**
	PSI/SF	0.23	2.83**			
	CVS	0.23	2.67*			

Note. Duration of Illness = Date of Participation - Date of Diagnosis; PPS = Parent Protection Scale;PSI/SF = Parenting Stress Index/Short Form; CVS = Child Vulnerability Scale; *$p < .05$, **$p < .01$.

Such perceptions of vulnerability may well be implicitly or explicitly communicated to the adolescent, and being perceived by their parent as vulnerable leads to uncertainty regarding their health status. Further, it is suggested that younger children may be more sensitive to communication of PS, but less attuned or sensitive to subtle communications of OP or vulnerability.

Notably, the current results indicate that parental OP was not associated with children's illness uncertainty for youths with either asthma or Type I diabetes. These findings are consistent with results from Mullins et al. (2004), who found that OP was unrelated to child outcomes (i.e., depressive symptoms) in a sample of children with Type 1 diabetes. In contrast, Holmbeck et al. (2002) documented a relationship between parental OP and both internalizing and externalizing problems in children with spina bifida. Although an explanation for this discrepancy in findings is not clear, it is possible that illness-specific factors may play a role. For example, children with spina bifida often face a host of both physical and cognitive deficits, which may put them at increased risk for overprotective parenting. In contrast, youth with DM1 and asthma, while at risk for a variety of negative health outcomes (e.g., ketoacidosis, wheezing) typically do not evidence significant physical limitations or cognitive compromise. It stands to reason that the functional limitations related to specific illnesses would have an impact on subsequent parenting behaviors. At the same time, it is also possible that parents of youth with Type 1 diabetes and asthma are under-reporting actual overprotective behaviors. Further research is certainly warranted that examines not only disease-specific differences in parent behavior, but utilizes multiple informants and methods.

These findings should be considered preliminary in light of several limitations. First, the current study is cross-sectional in nature, and longitudinal research is needed to better determine the causal relationships between these variables. Second, we relied exclusively on self-report of parent behaviors, attitudes, and beliefs. Future research would benefit from utilization of behavioral observation measures of both parent behavior and parent–child interactions to assess OP and the possible usurping of independent, autonomous behavior (Holmbeck et al., 2002; Power et al., 2003). Third, although the majority of families who consented to participate completed the study, 31% of families failed to complete and return the measures. Thus, response bias may have affected the results. Further, it is possible that the participants included in the sample may differ from those that chose not to participate in the study, a sampling problem previously identified by other pediatric researchers (e.g., Riekert & Drotar, 1999). However, no information was collected on families who did not complete the study, therefore we were unable to examine the groups for such differences. Fourth, although asthma and diabetes are two of the most common chronic illness in childhood and adolescence, the results of the current study may not generalize to other illness groups. Future studies could build upon these findings by examining the relationship of parenting variables to youth's illness uncertainty among other chronic childhood diseases, as well as including other parent capacity variables (e.g., parent support, marital conflict) that have demonstrated relationships to adjustment outcomes. Fifth, although attempts were made to collect data on level of illness severity, this data was missing for the children with asthma, although it had been collected on the majority of participants with diabetes. Examination of our data revealed a nonsignificant relationship between physician-rated illness severity and level of youth's illness uncertainty for the diabetes group. Although this lack of data for the entire sample is clearly a limitation of the study, our findings are consistent with previous research which has documented that objective measures of illness severity are often unreliable predictors of adjustment outcomes, especially when the outcomes involve cognitive appraisals (e.g., Stein et al., 1987). Certainly, it can be argued that illness severity could have a direct effect on youth's experience of uncertainty. As such, measures of disease status should be included in future research. Finally, given that the majority of the current sample self-identified as Caucasian, it is possible that these findings may not generalize to minority populations.

The current results support a growing body of research documenting that specific parenting behaviors may influence a variety of adjustment outcomes in the chronically ill child. Recently, Hoff et al., (2005a) developed a coping skills-based intervention targeting illness uncertainty in parents of children newly diagnosed with Type 1 diabetes. In this randomized clinical trial, mothers who received the intervention reported significant reductions in psychological distress at both one-month and six-month follow-up periods compared to mothers who received treatment as usual. Importantly, mothers in the intervention group reported significantly fewer internalizing behavior problems in their children compared to the treatment as usual group at those same time points. Although preliminary, these findings emphasize the need to develop family-based interventions that target parent

behavior in chronically ill populations. In this manner, it may be feasible to not only influence parent adjustment to their child's chronic health condition, but distal child adjustment outcomes as well. Finally, these findings also underscore the continued need to examine developmental differences in investigations of parent behavior and adjustment outcome research in pediatric psychology.
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