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Asthma Severity, Child Security, and Child Internalizing: Using Story Stem Techniques to Assess the Meaning Children Give to Family and Disease-Specific Events

Marcia A. Winter,

University of Rochester

Barbara H. Fiese,

University of Illinois at Urbana-Champaign

Mary Spagnola, and

University of Rochester

Ran D. Anbar

SUNY Upstate Medical University

Abstract

Children with persistent asthma are at increased risk for mental health problems. Although mechanisms of effect are not yet known, it may be that children are less trusting of the family as a source of support and security when they have more severe asthma. This study tested whether asthma severity is related to children's perceptions of insecurity in the family, and whether insecurity is in turn associated with child adjustment. Children ($N = 168$; mean age = 8 years) completed story stems pertaining to routine family events (e.g., mealtimes) and ambiguous but potentially threatening asthma events such as tightness in the chest. Responses were evaluated for the extent to which appraisals portrayed the family as responding in cohesive, security-provoking ways. Asthma severity was assessed by both objective lung function testing and primary caregiver report. Caregivers reported child symptomatology. Beyond medication adherence, caregiver education, and child age and gender, greater asthma severity predicted more internalizing and externalizing symptoms. Greater asthma severity, assessed using spirometry (but not parent report), was related to less secure child narratives of the family, which in turn related to more child internalizing symptoms. Results suggest that asthma can take a considerable toll on children's feelings of security and mental health. Furthermore, given the difficulty in assessing young children's perceptions, this study helps demonstrate the potential of story stem techniques in assessing children's appraisals of illness threat and management in the family.

Keywords

pediatric asthma; family relationships; emotional security; child behavior; narratives

Correspondence concerning this article should be addressed to Marcia A. Winter, PhD, University of Rochester, Department of Psychiatry, Box Psych 1-9010, 300 Crittenden Boulevard, Rochester, NY 14642. marcia_winter@urmc.rochester.edu.
Marcia A. Winter and Mary Spagnola, Department of Psychiatry, University of Rochester; Barbara H. Fiese, Department of Human and Community Development, University of Illinois at Urbana-Champaign; and Ran D. Anbar, Pediatric Pulmonary Medicine, SUNY Upstate Medical University.

The family plays a central role in processes and outcomes associated with child chronic illnesses such as asthma (Drotar, 1997; Kaugars, Klinnert, & Bender, 2004). Most studies to date have tended to rely on parent report of family functioning despite evidence that parent report, particularly when it comes to asthma care, may be biased. For example, parents have been found to overestimate their children's adherence to medications and asthma control (Dozier, Aligne, & Schlabacher, 2006). Thus, gaining perspectives from multiple family members is crucial to obtaining a full understanding of family functioning as it relates to pediatric asthma (McQuaid, Walders, Kopel, Fritz, & Klinnert, 2005).

Reports from multiple family members provide a richer understanding of family context, and children may be a particularly valuable source of information about their own perceptions of illness and its management within the family. However, children younger than 10 years of age are often neglected as sources of information for asthma-related family characteristics because of limitations in self-report measures for young children. Although it may be challenging to elicit child reports of complex family interaction and illness-response patterns through standard self-report measures, we propose that child narrative story stem completion tasks are an important way of assessing children's perceptions of the meaning that asthma has for them. Indeed, story stems have been used to elicit self-reports of psychopathology that might not otherwise be accessible from children (Oppenheim, 2006). Story stems evoke open narrative responses that allow a deeper understanding of the meaning a child gives to events and relationships (Fiese & Spagnola, 2005; Yoshikawa, Weisner, Kalil, & Way, 2008). Narrative techniques offer an especially rich opportunity to assess child perceptions of various threats, and the availability of security and safety from the family in times of threat (Oppenheim, 2006).

There were three primary aims of this study. First, we conceptualized asthma as a salient threat to children's emotional security and examined children's narrative responses to both general and asthma-specific story stems. Second, we tested the direct links between asthma severity (as tested by objective pulmonary function test and by parent report) and children's (a) internalizing and externalizing symptoms, (b) depictions of family involvement and relationship expectations in their responses to story stems pertaining to general family routine events, and (c) emotional security portrayed in their narrative completions of asthma-specific story stems. Based on previous research, we expected greater asthma severity to be related to greater internalizing (but not necessarily externalizing) symptoms, and children's representations reflecting less security and trust in the family. Third, we tested a hypothesized indirect path by which greater asthma severity would be associated with greater internalizing symptoms through child representations of family relationships and involvement and their own emotional security.

The Utility of Story Stem Techniques

Children's story stem tasks are a rich narrative technique that can offer insight into the meaning children derive from experiences and their expectations of what will occur in similar future situations (Fiese & Spagnola, 2005). Theoretically, with ongoing experience, children form working models of themselves and others in relationships that then act as

lenses through which they interpret events across various relationships and situations (Bowlby, 1982; Bretherton, 1985). Over time, these working models cohere into internal representations that guide children's appraisals in subsequent situations. Story stem procedures allow us to tap into these representations to assess children's appraisals.

Children have been found to reliably depict family interactions in response to story stem procedures, and story content tends to be consistent with parent interviews and observations. For example, McHale, Neugebauer, Radin Asch, and Schwartz (1999) found that children's depictions of affection and aggression in stories about families were related to mothers' reports of family climate and were stable over a one-month period. Likewise, Bretherton, Prentiss, and Ridgeway (1990) found that children's responses to story stems pertaining to parent-child attachment correlated with family cohesion as reported by mothers.

In story stem techniques, standardized stories with specific dilemmas are presented to a child using props and dolls, and then the child is prompted to finish the story. Narrative storytelling techniques are postulated to be especially appropriate for assessing young children's inner thoughts and feelings because children have a natural interest in storytelling (Bretherton, Ridgeway, & Cassidy, 1990). Although they can be time consuming, these techniques allow the child to actively participate in storytelling and therefore are likely to result in less participant burden as compared to question-and-answer formats, for example (Yoshikawa, Weisner, Kalil, & Way, 2008). In addition, from a methodological standpoint, they maintain standardization (in the stems) while also allowing free, open-ended responses. They can be individualized so that the child more closely identifies with the stories, for example, by using dolls matched to the child in sex and race, allowing different family compositions, and so forth. Last, story stems can be tailored to address specific questions via development of precise story stems.

Story stems often contain situations that are threatening and potentially distressing to children and families. The intention is to elicit responses that indicate children's underlying expectations about their safety and emotional security in the face of disruption (Davies & Cummings, 1994). Research has examined a range of threatening circumstances, including maltreatment (Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002), parental divorce (Page & Bretherton, 2001), maternal depression (Trapolini, Ungerer, & McMahan, 2007), interparental discord (Davies, Sturge-Apple, Winter, Cummings, & Farrell, 2006; Winter, Davies, Hightower, & Meyer, 2006), and family instability (Winter, Davies, & Cummings, 2010). A common theme across studies is the focus on relationship processes, and together results imply that children in environments of greatest threat and least family protection tend to have the most negative representations of the family.

A frequently overlooked context that potentially presents feelings of insecurity and threat is exposure to a chronic health condition. In an exception, Spagnola and Fiese (2010) examined narratives in a sample of children with asthma enrolled in Head Start. Children who portrayed more positive family functioning in the face of routine family events (e.g., mealtime, vacation) had fewer parent-reported behavior problems, but correlations were not found with asthma severity as reported by parents. However, their study was limited by a relatively small sample size and parent report of asthma severity. In addition, their study

focused on three- to five-year-old children, which may have limited findings in that children's representations are still developing and may not yet be fully cohered (e.g., Cicchetti, Cummings, Greenberg, & Marvin, 1990). Finally, using parent-reported asthma severity did not allow for a more objective analysis of physiological stress as experienced by the child.

Using a mixed-method approach, the integration of objective physiological data with children's narratives might provide converging evidence that threat appraisal is consistent across two domains (Creswell, Klassen, Plano-Clark, & Clegg Smith, 2011). The narratives drawn from story stem procedures provide individual expressions of family relationships and responses to threatening situations. Physiological responses to threat may include compromised respiratory functioning, such as tightness in the chest, shallow breathing, and coughing (Wamboldt & Wamboldt, 2008). If the physiological index of threat coincides with the child's representations of family life as garnered through the narrative analysis, then there would be converging evidence that emotional security is potentially an explanatory mechanism accounting for adjustment in children with a chronic health condition.

We extend previous research, including the study by Spagnola and Fiese (2010), in several important ways. First, we focus on school-age children who can employ self-understanding, cognitive functions, affective perspective taking, memory, and language abilities (see Cicchetti et al., 1990; Ontai & Thompson, 2002) to meaning-making and storytelling. Second, we strengthen the methodological design by using an objective measure of children's lung function that is more likely to represent the asthma symptoms that children actually feel (and therefore their level of threat). Third, given children's capacity to recognize relationships as sources of weakness, strength, threat, or support at this age, we theorize that threat might be particularly significant in shaping children's security by fostering representations of the self and others as vulnerable in challenging contexts (Davies & Cummings, 1994) such as asthma.

Children's Appraisals in the Face of Physiological Threat

For young children, the family is the primary source of protection, security, and stability (Bowlby, 1982). When threatened, children look to the family to help them understand the nature of the challenge and the strategies needed to regulate the threat and resulting emotions (Gottman, Katz, & Hooven, 1996) and maintain a sense of security (Davies & Cummings, 1994). Theoretically, children with asthma are experiencing the chronic threat of asthma attack and are, therefore, consistently seeking caregiver guidance and protection. For example, our research indicates that children feel more separation anxiety when they experience poorer pulmonary function and greater wheezing, coughing, chest tightness, urgent care, and emergency room use (Fiese, Winter, Wamboldt, Anbar, & Wamboldt, 2010). These results support the notion that children most threatened by asthma may feel more threatened and less secure in the family system.

Elevated levels of internalizing disorders in children are commonly evidenced in research studying pediatric asthma (e.g., Katon et al., 2007), and internalizing symptoms have been associated with disease activity (McQuaid, Kopel, & Nassau, 2001). Thus, we expect poorer

lung function and greater parent-reported asthma severity to be associated with increased internalizing symptoms. Children with asthma are especially at risk for internalizing symptoms such as feelings of anxiety (Richardson et al., 2006). The physiological sensation of asthma symptoms includes tightness of the chest, an inability to catch your breath, and in its extreme form, feelings of panic. Over time, these sensations can lead to heightened feelings of insecurity (Preter & Klein, 2008). Repeated experience with the physiological threat of poorer lung function may influence children's working models of security and family cohesion, and also be likely to lead to the anxiety and internalizing outcomes associated with children's understanding of the implications of threat for their well-being.

Family processes models postulate that children's evaluations of the meaning that events and situations hold for their well-being is a mechanism by which threat can impact child adjustment (e.g., Bowlby, 1982; Davies & Cummings, 1994). Existing research demonstrates that child representations, characterized by negative feelings such as worry and fear, can be carried into future emotional and relational situations, and therefore may impact children's ability to regulate their arousal and affect (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999) and be exhibited in children's psychological and behavioral maladjustment (Bascoe, Davies, Sturge-Apple, & Cummings, 2009; Davies, Woitach, Winter, & Cummings, 2008; Forman & Davies, 2003; Warren, Oppenheim, & Emde, 1996). If children expect that family members will not be responsive, cohesive, and protective, and are unlikely to help them maintain security in times of stress, then that insecurity may be a mechanism by which the threat of asthma is transmitted to adjustment problems, particularly internalizing symptoms that are characterized by worry and fear. Therefore, we hypothesized that more severe, threatening asthma would be associated with representations of caregivers as less positive, secure, and trustworthy, which in turn would be associated with more internalizing problems.

Method

Procedure

Families who responded to flyers distributed at ambulatory clinic, pediatric pulmonary clinic, or area group pediatric practice sites were recruited. Families were enrolled if the child: (1) was between the ages of 5 and 12; (2) had physician notes indicating an asthma diagnosis of at least one year (the diagnosis was then verified using a spirometric test conducted by a licensed respiratory therapist and analyzed by a pediatric pulmonologist); (3) was prescribed daily asthma controller medication for at least six months; and (4) was not diagnosed with any other chronic medical condition. Of the families that expressed interest, 14% were ineligible for the study. Of those who were eligible, 94% completed the laboratory visit during which caregivers and children first consented and assented, respectively, and then completed questionnaires and the story stem completion task.

We measured asthma severity in two ways in this report. First, we assessed parent report of asthma symptoms, which allowed for an examination of symptoms that parents observed in the home and also allowed us to examine our results in light of the findings of Spagnola and Fiese (2010). While Spagnola and Fiese found associations between child representations and behavior problems, they did not find an association between parent-reported asthma

severity and child representations. We reasoned that this null finding may be because parent-reported asthma severity does not assess the physiological sensations experienced by the child and therefore may be less likely to capture the sense of threat that is likely to lead to heightened feelings of insecurity over time (Preter & Klein, 2008). Thus, we also directly measured asthma severity using spirometry tests of pulmonary function administered by a licensed respiratory therapist and interpreted by a board-certified pulmonologist.

Participants

Participants were drawn from a study of 215 children diagnosed with asthma and their families. For this study, we included 168 children from whom we had complete data (37% girls and 63% boys; ages 5–12 years, $M = 7.84$ years; $SD = 2.12$ years) and their primary caregivers (95% mothers, 3% grandmothers, 2% fathers). Caregiver-reported child race was 29% African American, 58% White, 12% mixed race, and 1% Asian American. Three percent of families indicated that they were of Hispanic or Latino ethnicity. Forty-nine percent of primary caregivers reported being in their first marriage, 4% lived with a partner, 9% remarried, 16% were single or widowed, and 22% were separated or divorced.

Measures

Demographics—Primary caregivers reported child age and race, caregiver education, and caregiver marital status.

Medication adherence—Adherence was tracked for six weeks. Electronic recording devices (MDILog-II) were used except for oral controller medication (for which electronic devices were not available at the time of the study), which were tracked with telephone diaries. Adherence was calculated by dividing the number of doses taken by doses prescribed for each day, averaged over the 6-week period. While the MDILog ratings provide a more objective measure of adherence (Bender et al., 2000), telephone diaries also provide acceptable estimates of medication adherence (Rapoff, 1999).

Asthma severity (spirometry testing of pulmonary function)—Consistent with common practice, a licensed respiratory therapist conducted spirometry testing on a PDS 313100-WSU KOKO Spirometer, yielding measurements of forced vital capacity (FVC), forced expiratory flow in 1 second (FEV1), and forced expiratory flow, 25% to 75% of vital capacity (FEV25–75.). Each child performed three maneuvers while at rest, and the test with the largest sum of FVC and FEV1 was used for analysis. The testing was repeated 10 minutes after albuterol was administered by Aerochamberaided MDI. A pediatric pulmonologist classified asthma severity as: FEV1 < 40% of predicted = severe; FEV1 > 40% and < 60% = moderate; FEV1 > 60% and < 80% = mild; and FEV1 80% or greater = slight, or normal, ultimately yielding a 1-to-4 rating in which higher scores indicate more compromised lung function.

Asthma severity (parent report)—Primary caregivers completed the Functional Severity of Asthma Scale (Rosier et al., 1994). Validity of this six-item measure has been demonstrated via its correlations with school days missed, functional impairment, and medical care visit frequency (Rosier et al., 1994). Consistent with traditional use of this

scale, responses were summed across items to yield a continuous score; internal consistency was $\alpha = .71$.

Child narratives—Five story stems were designed to assess children’s representations of their families’ responses to both a routine family event and a challenging asthma event. After a warm-up stem, each standardized routine event stem was presented to children using family dolls (matched to the race of the family members and the sex of the child) and various props (e.g., a table and chairs for the dinner stories). Coordinating story boards depicted each story setting. Following each routine event stem, the experimenter asked the child to finish the story. Routine stems included dinnertime in a clean kitchen, dinnertime in a messier kitchen, a family vacation, a special celebration, and bedtime. Following each routine story, the experimenter presented an asthma challenge (i.e., asthma attack, tightness in the chest, forgotten medication, or coughing) and asked the child to complete the story. All responses were videotaped for later coding.

Coding development and refinement proceeded along several steps. First, a theoretically guided coding system was compiled. To children’s responses to the five routine family events, we applied two global ratings inspired by the Family Narrative Consortium scales (Fiese & Sameroff, 1999): family involvement and relationship expectations. To children’s completions of the threatening asthma events that were presented at the end of each routine event, we used one global rating in this study—emotional security (see Davies & Cummings, 1994; Winter et al., 2006). Second, we met as a group for several months of weekly meetings to observe videotapes of children’s story stem responses. Our goal at this stage was to revise the coding manual in an iterative process that allowed us (1) to maintain the theoretical integrity of the rating systems, while (2) highlighting the response patterns that were exhibited across the broad range of children in this sample. Once we had the refined coding manual, two extensively trained coders independently rated children’s videotaped stories, including a 25% overlap for tests of reliability. The rating scales, reliabilities, and exemplars from this sample are described in Tables 1 and 2.

Child internalizing and externalizing—Primary caregivers completed the symptoms subscales from the Child Behavior Checklist (CBCL; Achenbach, 1991). Following standard CBCL procedures, caregiver responses on the Somatic, Anxious/Depressed, and Withdrawn subscales were summed to form a report of child internalizing symptoms, while reports on the Delinquent Behavior and Aggressive Behavior subscales were summed to form an assessment of a child’s externalizing symptoms. The CBCL is a psychometrically established measure with demonstrated reliability and validity (Achenbach, 1991); for this sample, internal consistency for the internalizing and externalizing subscales, indexed by intraclass correlation coefficients, was .75 and .86, respectively.

Results

Given the potential impact of medication adherence and caregiver education on study hypotheses, and also the broad age range of children in this study, we statistically controlled for them in all models. Furthermore, past narrative research indicates potential effects of

child sex (e.g., Buckner & Fivush, 1998; Bohanek & Fivush, 2010) so we also included child sex as a covariate.

We began by examining children's responses to story stems in more detail. The stems for the routine family events included common, innocuous scenarios such as a family at dinnertime, bedtime, and family celebrations. Children's responses were meaningful in terms of how they portrayed family cohesion, boundaries, and roles. Some family relationships were portrayed as simply positive: *"She is reading her a story while she falls asleep."* Boundaries were often clear: *"Okay everybody, as you know it is Kate's birthday and you know what we do on birthdays. We eat this nice yummy cake. And Kate gets to cut it as soon as we teach her how to use a knife."* *"But mommy, I already know how to use a knife."* *"Dear, listen to your mother. You know we have to make sure you are safe."* *"Okay."* Others were more complex, with a range of emotions revealed. *"Mmm mom, this pizza is good."* *"Thank you Tina."* *"Dad, me and my friends want to go skate boarding tomorrow. Can I go?"* *"Yeah I guess as long as an adult is with you. Honey I have to go out of town today on a business trip so I'll be gone for about a week or two."* *"Dad, why do you have to leave? This is like the fifth time you've left this month?"* *"It's just that, this, the business time and it's on, you know, it's very difficult and you have to travel a lot to make money and that's basically what I do" . . . so everybody at the dinner table is quiet for another two minutes or so until Tina and Daniel start having a little bit of a quarrel."* Still other stories indicated more negative appraisals of family interactions during a routine event: *"Bobby hid from his mom during dinner, then she found him. 'Oh mommy I'm sorry.' 'No sorrys Bobby. Now after dinner I'm gonna whoop your butt.' Uh oh. They all get a piece (of pizza). They gobbled all of it up . . . He goes up, all of them go up to their rooms. The mom gets up. Gets a belt. Walks upstairs. Bobby runs out of his room . . . 'Haha suckah I found you.' (Has mom doll hit the boy doll). 'Now don't you ever ever hide from me again.' 'Ok ok' (said in a crying voice)."*

Children's responses also revealed expectations pertaining to the family's ability to stay organized and cohesive during routine events. Some children expected relatively high organization: *"Here we are on our vacation. 'Wow mom you picked the best place ever.' And she's walking, she's walking, and she looks around. 'Oh volleyball, I'm just going to look at the cabin.' And they look at the cabin. It has two beds, a TV, a flat screen TV, and they go outside and they play volleyball and they have a nice picnic. They sit down and they eat sandwiches, apples, watermelon, and peanuts."* Other children depicted an innocuous event turning chaotic: *"So they are having dinner, eating away, gobble, gobble . . . and all of a sudden, 'Whoa, Whoa' 'Oh, what the heck is going on?' 'Earthquake' (making banging sounds). 'Help, aaagh, my leg. Aggh, the pain. I think it is broken. Aaaaghh!'"*

In response to story stems presenting asthma-related events, which included threatening scenarios such as tightness in the chest or wheezing, children's responses were meaningful in terms of how they depicted the family's (particularly the caregivers') responses to the physical and emotional threat (chaotic versus organized, threatening versus protective and comforting). A range of responses were depicted. Some responses showed proliferation of threat; for example, this response to the asthma attack stem: *".. (making coughing sounds) 'Achoo! Achoo! Achoo! Achoo! I am going to rough you up.' 'Agh!' (Parent doll choking child doll.) Ah, sitting in the house. He is in the graveyard."* Others showed recognition of

serious threat, but also trust in caregivers as protectors: *“The mom and dad had to go get the puffer for Jamal and when they came back, he was sitting—like he had his head on the table, coughing, and wheezing, and they asked him to pick his head up please, so they could give him his puffer. And they gave it to him and he wasn’t, still didn’t feel good after a while, so they took him to the hospital and then he had to have a breathing treatment and he got all better and went home and they had some more cake.”*

Within children’s narrative responses, we recognized themes of warmth, aggression, cohesion, chaos, threat, and protection. While younger children’s stories were often shorter and less detailed, they still contained the patterns that we found in older children’s stories. For example, a key component of responses to asthma events was the extent to which the family was portrayed as able to competently resolve challenges (e.g., give medicine to the child) while supporting the physical and emotional welfare of the child. An older child’s story might contain a detailed verbal account of how the family tried and tried to find the asthma medication but was unable to and the child was fearful and ultimately died. A younger child’s story might be less detailed, showing (as opposed to verbally describing) the dolls running and yelling and not retrieving the medication, then an ambulance coming (but it was too late because a monster already ate the child). The stories differ, but the pattern that emerges is still one of unresolved challenges, proliferation of stress, and child insecurity.

Next, to test the remaining study aims, we applied rating systems to quantify children’s responses along scales of family involvement and relationship expectations (within responses to routine event stems) and emotional security (within responses to asthma event stems). Our second aim was to explore relations between asthma severity (both objective pulmonary function and parent-reported functional severity) and children’s internalizing, externalizing, and general and asthma-specific representations. Over and above effects of mother education, child sex and age, and medication adherence, greater asthma severity as reported by primary caregivers was related to greater child internalizing ($\beta = .15, p = .05$) and externalizing ($\beta = .13, p = .08$) symptoms, but was not related to children’s depictions of family involvement ($\beta = -.02, ns$), relationship expectations ($\beta = -.01, ns$), and security ($\beta = .01, ns$). Poorer lung function assessed with objective spirometry testing was related to greater child internalizing ($\beta = .27, p = .001$) as well as poorer family involvement ($\beta = -.15, p = .06$), less positive relationship expectations ($\beta = -.15, p = .06$), and less security ($\beta = -.18, p = .02$) over and above the effects of medication adherence, mother education, and child sex and age. The relationship between lung function and externalizing symptoms was not statistically significant ($\beta = .11, ns$).

Our third aim was to examine whether there were indirect pathways from asthma severity to child symptomatology through child representations. We followed the steps outlined by Baron and Kenny (1986) and then tested the significance of potential indirect pathways using frequency distributions likely to be less dependent on large sample sizes (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Only the indirect paths from lung functioning to internalizing met the Baron & Kenny criteria for potential mediation and were subjected to tests of significance. Statistically significant indirect paths were evidenced through security ($z = 1.45, p < .05$), family involvement ($z = 1.36, p < .05$), and relationship expectations ($z = 1.43, p < .05$).

Discussion

In 2010, nearly 10% of children (7.1 million) in the United States received a diagnosis of asthma (Centers for Disease Control and Prevention, 2010). This is a very large group of children whose emotional security is of importance both individually and to the public interest. Because children are most likely to develop their first asthma symptoms before five years of age (National Heart Lung and Blood Institute, 2011), it is important to understand how early experiences in the family may portend for adjustment and health outcomes. Increasingly, research is concerned with mechanisms of effect in links between asthma and child adjustment outcomes as targets of prevention and early intervention programs.

Of particular interest in this study was the link between asthma severity and children's emotional security. Results suggest that asthma severity influences children's emotional outcomes, both at the level of representations and at the level of symptomatology. These findings are in accord with previous research. For example, Fiese, Winter, Wamoldt, Anbar, and Wamboldt (2010) found a relation between poorer lung function and separation anxiety symptoms in children, suggesting that the shortness of breath, wheezing, and coughing symptoms might translate to feelings of threat and worry.

Interestingly, while both parent-report and objective measures of asthma severity were associated with child internalizing (and, to some extent, externalizing) outcomes, only lung function tests of asthma severity related to child representations. Specifically, greater asthma physiological threat (i.e., poorer lung function) was associated with perceptions of the family as less involved and less cohesive during routine family events as well as less child emotional security in the context of ambiguous, but potentially threatening, asthma events. These findings expand on the findings of Spagnola and Fiese (2010), who also did not find associations between parent-reported asthma severity and child representations. One interpretation of this finding is that the physiological measure more closely captured the threat experienced by the child and is therefore more likely to relate to heightened feelings of insecurity (Preter & Klein, 2008). Results attest to the informative nature of including multiple, diverse methods of assessing disease severity and threat as well as looking more closely at children's own perception give to the physiological threat they experience.

A deeper understanding may be gained through an examination of the narratives themselves, which demonstrate how meaningful children's responses to story stems can be. We examined them with a focus on children's portrayals of relationship quality, family involvement and cohesion in routine events, and family response to asthma-related threats. We were impressed by the diversity and richness of the responses at all ages, and the clear, theoretically relevant patterns that emerged. In particular, we found the responses to the threatening stems to be telling with regard to children's expectations of the families' reaction to asthma threat and distress. These results suggest the utility of tailoring story stems to threats that may be particularly salient to a given group of children.

Results also highlight children's perceptions of the threat that asthma conveys as a mechanism that may carry asthma risk to adjustment outcomes. Specifically, greater asthma physiological threat was associated with more negative appraisals, which in turn were

associated with more internalizing symptoms. These paths are in agreement with previous research showing that child appraisals of threat mediate paths between adversity (e.g., interparental conflict) and child internalizing symptoms (Davies & Cummings, 1998; Grych, Harold, & Miles, 2003) and that children's positive depictions of family functioning in the face of routine family events relate to fewer parent-reported behavior problems (Spagnola & Fiese, 2010).

Because the family is the main source of protection for children (Bowlby, 1982), and given the central role that the family plays in processes and outcomes associated with child chronic illnesses such as asthma (Drotar, 1997; Kaugars, Klinnert, & Bender, 2004), child emotional security will necessarily be based not only on physiological threat but also on the extent to which the family is cohesive, involved, and protective, particularly in the face of health-related challenges. However, greater asthma severity is also known to undermine parenting for some families. By assessing children's representations, we were able to look more closely at the meaning children give to asthma threat, including not only the degree of threat (i.e., the severity of disease), but also the extent of family involvement, relationship cohesion, and protection in the face of asthma threat. Young children, when threatened, look to the family for support, guidance, and protection. Particularly within a consistently salient threat such as an asthma attack, children are reliant on others for protection. Thus, it is not surprising that children's sense of confidence in family involvement and relationship quality, as well as their own sense of safety and security within the family during times of asthma challenge, were related to their internalizing symptoms. Being able to elicit each individual child's perception of asthma threat and appraisal of the families' capacity to protect him or her was possible using a narrative story stem task, but would be much less obtainable in questionnaire and even interview formats.

However, findings should be interpreted with regard to the limitations of this study. Perhaps most notably, this study was cross-sectional, and thus we could not test causality and direction of effects. The models we proposed imply one possible direction of effects, but another plausible interpretation of our findings is that children's negative representations and internalizing symptoms are manifestations of emotion dysregulation that might foster airway constriction and exacerbate asthma (e.g., Miller & Wood, 2003; see also Wood et al., 2008). Indeed, we imagine that both interpretations are true: more profound, threatening asthma symptoms lead to increased emotional insecurity, dysregulation, and internalizing, which in turn exacerbate asthma. Longitudinal work is needed to demonstrate a clear pathway, but it is likely that there is a transactional loop. In any event, it is crucial to identify the various relations among stress, family relationships, and child physical and socioemotional functioning.

This study, interpreted alongside other extant research, suggests several avenues of intervention tailored to children with asthma and their families. First, if the risk of asthma is conveyed in part through more negative child representations, child perceptions could be a target of intervention both directly and through the family. For example, previous research has indicated caregiver explanations of stressful events as moderators of the impact of family instability and discord on child representations (Winter et al., 2006; Winter et al., 2010). Thus, interventions could focus on how caregivers frame events to help children make more

positive meaning of them. Second, given the important role of the family in asthma management, families could be guided in responding to asthma in ways specifically designed to diminish the salience and threat to child emotional security that asthma poses to children (e.g., with emphasis on the family in responding effectively to asthma challenges). Third, although we are only beginning to understand child representations in the face of asthma threats, evidence suggests that stories in general can aid health professionals in understanding a patient's experience with their illness. For example, Coles (1989) found that stories can reveal patients' understanding of their illnesses. Such stories have also been implicated in helping patients cope with chronic pain associated with illness (Brody, 1987; see Fiese, 1997). Applying these findings to child stories, one can imagine that perhaps stories can be rewritten.

Conclusion

Fiese and Spagnola (2005), in their review of family narrative techniques, described asking research participants to tell a story, and how participants seem to understand that it is in reference to the meaning of the story *to them* as opposed to a factual account of events. Those of us who use these techniques see how caregivers and children seem to relax and begin to enjoy sharing their experiences; it seems less about what we want to ask and more about what they want to tell. Narrative story stem completion tasks are rich meaning-making processes. By specifically tailoring the story stems, we are able to view the salience of a specific stressor like asthma and interpret its meaning within each child's unique context.

The integration of physiological measures with narrative analysis provides an especially rich opportunity to explore converging evidence across different domains. Future efforts are warranted to further understand how the felt experience of stress and threat are translated into narratives about family life as either supportive or rejecting, and how these representations influence mental health outcomes. Digging deeper into the narratives of family life may afford one avenue into understanding and improving health and well-being.

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Table 1

Rating Codes of Children's Responses to Story Stems

Construct/Code	Type and Scale	Description	Interrater Reliability Range (Mean)
<i>Routine Story Stems</i>			
Family Involvement	Scores range from 1 (very low involvement) to 5 (very high involvement)	Degree to which family interactions are portrayed as loving, cohesive, and meaningful	$\alpha = .71-.84 (.78)$
Relationship Expectations	Scores range from 1 (very low expectations) to 5 (very high expectations)	Degree to which relationships are portrayed as satisfying, reliable, rewarding, and predictable	$\alpha = .81-.90 (.83)$
<i>Asthma Story Stems</i>			
Security	Scores range from 1 (strong insecurity) to 5 (strong security)	Degree to which the family is portrayed as able to maintain children's well-being in the face of threat	$\alpha = .63-.77 (.71)$

Exemplars From Dinnertime Story Stems of Children's Responses

Table 2

Family Involvement (in response to general family meal stem)	
<p>Exemplar of Response Rated 1 (Very Low) (Age 8)</p>	<p>"Mom, mom called everybody down because she says we're having pizza tonight. And Michelle gets mad because she don't like pizza so she leaves. She goes to her room. Susie start calling Michelle names because she, Susie got mad because her sister's not going to have nothing to eat. So mom says, since you aren't going to eat, you can go to bed. So then Susie leaves. And then mom and dad starts talking and then they get into a big argument and dad leaves outside. Then mom said, 'They don't have no respect ... so I think I should go on a vacation.'"</p>
<p>Explanation of Exemplar</p>	<p>Involvement is portrayed as solely negative, escalating, and resulting in dissolution of the family group at the meal and even beyond.</p>
<p>Exemplar of Response Rated 3 (Medium) (Age 7)</p>	<p>"Once upon a time there were three little girls and three little boys and they had a mom and a dad. It was dinnertime. It was such a big family that they couldn't eat all together. There were only four chairs so they had to take turns. Two girls sat, one boy sat, and the momma was sitting and they were having pizza. The two little girls each got two little pieces and the boy got one pretty big piece which counts as two. And the momma had two big pieces because she was a grown up. They ate the pizza up and then it was time for the other part of the family's turn to eat. There was only four big pieces left. So, one little girl, two little boys, and the dad. They each had one big piece. They ate it up and then it was the end of dinnertime. The end."</p>
<p>Explanation of Exemplar</p>	<p>Interaction is minimal and not particularly negative or positive. There seems to be a preference for physical proximity, but it cannot be achieved.</p>
<p>Exemplar of Response Rated 5 (Very High) (Age 11)</p>	<p>"The mom tells Kim that it's dinnertime and she needs to get her dad and her sister (Tasha). So she runs to go get her dad and her sister and they all went downstairs and the mom says, 'Sit at the dinner table,' so they all sat down. The mom sits down, the daughter sits down, and then they all said grace. And then they eat their pizza, then they talk about how their days went and Tasha said that she had a rough day because some girls said that she wasn't cool enough to be in the school and she didn't like the way people were making fun of her and Kim doesn't go to school yet and then, um, Kim gave her sister a great idea for school and then Kim said, 'Don't let other kids make fun of you because it's not nice.' And then Kim said, 'Ya that don't let people hurt your feelings.' And then the dad and then the mom said, 'Honey how was your day?' And then the father said it was OK, and then the father said that he got a Christmas bonus and then the mom and the kids gave him a round of applause."</p>
<p>Explanation of Exemplar</p>	<p>Involvement is portrayed as consistently positive and supportive, with individual family members valued. Boundaries are maintained.</p>
Relationship Expectations (in response to general family meal stem)	
<p>Exemplar of Response Rated 1 (Very Low) (Age 12)</p>	<p>"There is eight (pizza slices) – so they each get two pieces and he finishes first and says, 'Bye, I am leaving' (laughs) and the father says, 'Where are you going?' He says, 'To hang out with friends' (laughs). Then his father said, 'Do you have permission?' And he says, 'No, dad' (laughs). And then he is like, 'Well, you can't go.' 'Oh, dad, it is a big party, can't I go, please?' 'No, son' (laughs). 'Fine, then, don't talk to me ever again.' 'Oh, daddy, he hit me.' 'Come here, son. Don't you ever hit your sister.' 'Fine, I am leaving.' He leave and then he be down with some gang and then they beating on somebody. Then he gets shot. Then he die."</p>
<p>Explanation of Exemplar</p>	<p>Relationships both within and outside of the family are portrayed as disrespectful, dissatisfying, and dangerous. There are patterns of abandonment and willful harm.</p>
<p>Exemplar of Response Rated 3 (Medium) (Age 7)</p>	<p>"When they was eating dinner, he ate three and she ate two. I mean, he ate two, and she ate two, and he ate three, and then when they bought another one, and the dad ate all of it. And then, he got um fat and then, and then when he got big, and then he says he didn't want no more. And then the rest for their family and then he didn't have no more pieces. He just wanted the pieces because there they was good but he can't get more because he has to lose weight ... that dad should share and then he had to share with everybody because he will get big again and then he don't want no more. (The little girl was) hungry because he ate it all and then they had no more money to buy. So, when they got home, more money, they ate it together."</p>
<p>Explanation of Exemplar</p>	<p>Relationship are portrayed with a balance of positivity and negativity: Disappointing (when the father, who should fulfill a protective role, eats all of the food and leaves the target child hungry) but also salvageable (when the father learns to share and they all eat together the next time).</p>
<p>Exemplar of Response Rated 5 (Very High) (Age 10)</p>	<p>"Dis their house. One day, it was cousins, and family, and then they said, 'let's have pizza tonight' and they ordered pepperoni, anchovies, and stuff, and everybody had a coke. They all shared. And then they all got a slice and then the boy said, 'This pizza good. Mom, can we get some more later?' And the girl said, 'Mom, this pizza is so good. It make me want to have some more.' And then her mother said, 'Do you want some more mines?' She said, now, okay. Eat it. And then the mother, then their mother had a drink and then they both of their mother had a drink, and then her mother's cup fell and then they had to go get a mop. And then, they started eating again. And then she said, 'Do you know what time it is?' Because you got a sleeper. You know what time it is – that time. Oh, yeah, you can all play the game.' And the girl said, 'Thank you mom. I love you'. And ... then they went upstairs. And then they played the</p>

game for a little while. Then mom went upstairs ... and they both picked their kids up and put them in bed and tuck them under and sang a song. Then went good night."

Relationships are portrayed as safe, reliable, rewarding, and fulfilling. Relationships provide opportunities for success and satisfaction, and interactions are happy and easy.

Security (in response to asthma attack stem)

"He is coughing. He is just laying down and he drooled on the floor because he is having trouble breathing. And then he can't breathe too good, so he dies. They (the family) are trying to find help but then when he - when the help gets there, he is already dead. So, the family starts crying."

Even within a relatively short response, the family is portrayed as ineffectual in helping the child and therefore engendering little security. The threat goes beyond short-term, mild distress from the asthma attack and has clear and serious implications for the child's health.

"(Celia says) 'Mommy, I am not feeling so good. My chest hurts really bad' and the mother says, 'Uh oh, let's get out your nebulizer.' (Celia) is thinking she is really scared about having an asthma attack and having to go to the hospital. (The mother says) 'I will put you on the nebulizer' (takes deep breaths), Robert (the brother) says, 'Mom, I think she is faking'. The brother doesn't like the sister. The mother says, 'Why would she be faking?' 'I don't know, but I think she is.' The mother says, 'We are going to have to take you to the hospital. Let me call. Okay. They will be here any minute.' And then (Celia) gets put in the truck and the brother and the mom come with her and the end." ... (Celia) was feeling very painful ... and she was thinking that she was going to die because she couldn't breathe. She just wasn't feeling good at all."

The family is portrayed as relatively effective in protecting the child, but the threat is still strong enough that the child expects to have to go in the ambulance. While the parents are protective, the brother attempts to undermine the asthma care by claiming she is faking.

"Andrew gets out of the chair, runs up to his mom and says, I am having an asthma attack. And mom gets up from cleaning and runs and tells her son to sit down and runs over to the cabinet, opens up the bottom door, and gets his asthma inhaler and his spacer out. Closes the door, runs it over to him, and gives it to him. He takes a puff. And then the kid takes deep breaths and he says, 'Thank you mom' and then they give each other a hug."

The family is portrayed as a source of safety, predictability, and support. The family competently resolves challenges and problems while improving family harmony, effectively regulating any negative affect, and supporting the physical and emotional welfare of the child.

Explanation of Exemplar

Exemplar of Response Rated 1 (Very Low) (Age 8)

Explanation of Exemplar

Exemplar of Response Rated 3 (Medium) (Age 9)

Explanation of Exemplar

Exemplar of Response Rated 5 (Very High) (Age 10)

Explanation of Exemplar