

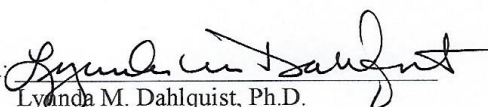


APPROVAL SHEET

Title of Dissertation: Intolerance of Uncertainty and Protective Parenting in Parents of Children with Food Allergy and Healthy Children

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Doctor of Philosophy, 2020

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Haverford College, Haverford, PA

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- Provide outpatient psychological therapy for children and adolescents with psychological disorders and comorbid pediatric conditions.
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- Responsible for preparing, administering, scoring, and interpreting testing materials and writing integrated assessment reports and autism assessment.
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- Conduct behavioral feeding evaluations, develop feeding protocols, and implement feeding treatment plan for children presenting with feeding disorders.

***Children's National Hospital*, Washington, DC**  
**Combined Anxiety & Food Allergy Externship**

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*Psychology Extern*

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- Conducted outpatient psychology therapy for children and adolescents diagnosed with food allergy to address challenges related to adherence, anxiety, and depression.
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***Children's National Hospital*, Washington, DC**  
**Diabetes Externship**

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- Conducted psychological consultations during outpatient medical appointments for families and children to address issues related to family conflict, adherence, and elevated depressive symptoms reported on depression screener.
- Led psychoeducational group with youth recently diagnosed with type 1 diabetes and their families.
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***Mount Washington Pediatric Hospital*, Baltimore, MD**     **August 2017 – June 2018**  
**Weigh Smart Externship**

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*Psychology Extern*

- Participated in interdisciplinary team to conduct intake evaluations for children diagnosed with obesity and their parents in order to determine appropriate treatment plan to help them reach their health goals.
- Conducted follow-up appointments with patients and their families to address challenges to implementing healthy lifestyle changes or ways to maintain positive health behaviors.
- Co-led weekly psychology group therapy with children and their parents to discuss strategies to improve healthy lifestyles and potential barriers.
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***Mount Washington Pediatric Hospital*, Baltimore, MD**

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### **General Outpatient Externship**

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- Conducted weekly diagnostic intake interviews and bi-weekly psychological assessments for children and adolescents ages 5 to 17 years.
- Provided individual outpatient psychological therapy to children and adolescents presenting with various externalizing and internalizing disorders.
- Responsible for preparing, administering, scoring, and interpreting testing materials and writing integrated assessment reports.
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- Participated in group testing and therapy seminars and weekly didactic presentations.

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### **Healthy Lifestyle Interventions**

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- Coordinated and completed 24-hour dietary recall interviews in research study on healthy lifestyle changes among children recently prescribed anti-psychotic medication.
- Conducted participant home visits; helped parents and children complete questionnaires and gathering participant vital signs (blood pressure, heart rate, height, weight).
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- Developed training materials and activities on communication and substance abuse.
- Assisted with planning and conducting trainings for home visitors in Maryland.

**University of Pittsburgh**, Pittsburgh, PA

**August 2014 – July 2015**

**Behavioral Immunology Lab**

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*Research Associate, Psychology Department*

- Conducted screening and follow-up home visits of participants in research study on a school-based stress management program for children with asthma of low socioeconomic status.
- Led one-on-one sessions of American Lung Association “Open Airways for Schools” program with student participants.

**University of Pennsylvania**, Philadelphia, PA

**June 2012 – July 2014**

**Penn Infant Language Center**

Supervisor: Daniel Swingley, Ph.D.

*Lab Manager, Psychology Department*

- Researched infant language acquisition in approximately 400 research participants.
- Responsible for recruiting, running participants, compiling data, and related administrative functions.
- Trained and supervised research assistants and built experiments according to study design.

**Drexel University**, Philadelphia, PA

**January 2014 – April 2014**

*Research Assistant, Psychology Department*

- Screened potential participants for study on neural and biological correlates of obesity and eating disorders.
- Assisted in running EEG protocol and gathering data.

**University of Pennsylvania**, Philadelphia, PA

**May 2013 – December 2013**

*Research Assistant, Psychology Department*

- Coded over 50 hours of therapy session videos on (1) parents’ resistance to treatment for their adolescent children diagnosed with OCD and (2) psychologist adherence to therapy guidelines for children with trichotillomania.

**Haverford College**, Haverford, PA

**May 2010 – May 2012**

**Biopsychology Lab**

Supervisor: Wendy Sternberg, Ph.D.

*Research Assistant, Psychology Department*

- Examined the moderating role of physical and social enrichment on pain and stress behavior in mice.
- Responsible for experimental measures and procedures involving surgeries on mice, blood analysis, and coding behaviors.
- Summer 2011, responsible for managing lab and research assistants.

**University of Kentucky**, Lexington, KY

**May 2009 – August 2009**

*Lab Assistant, Psychology Department*

- Assisted with research on the influence of biological and environmental variables during development on the prevalence of drug abuse in rats.

## TEACHING EXPERIENCE

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**University of Maryland, Baltimore County**,

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Dahlquist, L.M., Pinder, W., Bento, S., **Steiner, E.**, Zeroth, J., & Parr, N. (2019). Working memory and visual discrimination tasks improve cold pressor pain tolerance in children. *Health Psychology*, 1-11.

**Steiner, E. M.**, Weiss, D. E., Dahlquist, L. M., Hahn, A. L., & Bollinger, M. E. (*in press*) Which Food Should a Child with Food Allergy Avoid? The Role of Parental Knowledge in Food Avoidance Appraisals. *Children's Health Care*.

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Zeroth, J. A., Jehl, B., Dahlquist, L., Rasooly, T., **Steiner, E.**, & Byrne, D. W. (April, 2020). Children's pain-specific gender role stereotypes and gender differences in acute pain tolerance. Poster presented at the Society of Pediatric Psychology Annual Conference held virtually.

**Steiner, E.**, Bussell, K., Roberts, M., Holobaugh, S., Rangos, N., Wehring, H.,...Reeves, G. (April 2019). Factors influencing food security in children treated with antipsychotic medication. Poster presented at Society of Pediatric Psychology Annual Conference (SPPAC), New Orleans, Louisiana.

**Steiner, E.**, Dahlquist, L., Bento, S., Zeroth, J., Weiss, D., Rasooly, T. & Pinder, W. (April 2018). Maternal intolerance of uncertainty and meal preparation: Effect on perceived stress in parents of children with food allergy. Poster presented at the Society of Pediatric Psychology Annual Conference (SPPAC), Orlando, Florida.

Pinder, W., Dahlquist, L., Bento, S., **Steiner, E.**, Zeroth, J. & Parr, N. (April 2018). The effects of working memory executive load on pain tolerance in children. Poster to be presented at the Society of Pediatric Psychology Annual Conference (SPPAC), Orlando, Florida.

Bento, S., Pinder, W., Dahlquist, L. & **Steiner, E.** (March 2017). Dispositional optimism, coping style, and pain: The mediating effect of pain catastrophizing on the relation between dispositional optimism and acute pain intensity. Poster presented at Society of Pediatric Psychology Annual Conference (SPPAC), Portland, Oregon.

Pinder, W., Dahlquist, L. S. Bento, & **Steiner, E.** (March 2017). Dispositional mindfulness and pain tolerance: Sex differences in healthy school-age children. Poster presented at the Society of Pediatric Psychology Annual Conference (SPPAC), Portland, Oregon.

Pinder, W., Dahlquist, L., Bento, S., Zeroth, J., **Steiner, E.**, & Parr, N. (April 2016). Social Competence, Task Performance, and Elicited Maternal Help in Young Children with Food Allergy and Healthy Peers. Accepted for presentation at the Society of Pediatric Psychology Annual Conference (SPPAC), Atlanta, GA.

Sternberg, W., Dehority, R., Edwards, T., Kazinka, McClure, J., **Steiner, E.** (2012). Environmental enrichment ameliorates the effects of early life pain in mice. Poster presented at Society for Neuroscience Conference, New Orleans, LA.

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***Health Psychology***

Ad hoc Mentored Reviewer with Lauren Clary, Ph.D.

## ABSTRACT

Title of Document:

INTOLERANCE OF UNCERTAINTY AND  
PROTECTIVE PARENTING IN PARENTS OF  
CHILDREN WITH FOOD ALLERGY AND  
HEALTHY CHILDREN

Emily Michelle Steiner, Ph.D., 2020

Directed By:

Lynnda M. Dahlquist, Professor, Department of  
Psychology, Human Services Psychology Program

Parents of children with health conditions are at risk for protective parenting, which can have adverse effects on child development. Intolerance of uncertainty is a dispositional trait in which an individual finds any uncertainty or the potential for a negative outcome to be unacceptable. Caring for a child with food allergy typically involves frequent and potentially life-threatening unpredictability, which may be particularly challenging for caregivers high in intolerance of uncertainty and may also increase the risk of protective parenting in order to decrease parental and child negative affect and avoid negative outcomes. The current study examines how both intolerance of uncertainty and having a child with food allergy may be risk factors for the development of protective parenting. The current study included 80 mothers of children with food allergy and 78 mothers of children without any chronic medical conditions. A vignette methodology was used to assess caregiver appraisals of uncertainty, threat, and negative affect in the face of uncertain situations and caregivers' report of their likelihood of using protective parenting behaviors in response to an uncertain parenting situation. Participants also completed questionnaires assessing intolerance of uncertainty, worry, parenting behaviors, and food allergy history (if applicable). Results indicated that child health

status moderated the relation between intolerance of uncertainty and protective parenting, such that the strength of the relation was stronger for mothers of children with food allergy compared to mothers of healthy children. Affective and cognitive caregiver appraisals of uncertain parenting situations mediated the association between intolerance of uncertainty and protective parenting. Furthermore, child health status moderated the indirect effects of intolerance of uncertainty on protective parenting via negative affect and via uncertainty appraisal, such that the indirect effect was stronger for mothers of children with food allergy. Worry did not mediate the relation between intolerance of uncertainty and protective parenting. The study helps to identify the mechanisms by which caregivers may develop protective parenting behaviors. Caregivers who are intolerant of uncertainty who also have a child with food allergy may engage in more protective parenting as a result of the frequent and life-threatening uncertainty associated with food allergy. The present findings identify potential areas of intervention to prevent the development of protective parenting.

Intolerance of Uncertainty and Protective Parenting in Parents of Children with Food

Allergy and Healthy Children

Emily M. Steiner

Doctoral Dissertation

University of Maryland, Baltimore County

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Emily Michelle Steiner



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## Table of Contents

<b>Acknowledgements.....</b>	<b>ii</b>
<b>List of Tables.....</b>	<b>v</b>
<b>List of Appendices.....</b>	<b>vi</b>
<b>Introduction.....</b>	<b>1</b>
Typical Parenting Expectations Across Developmental Stages.....	3
Toddlers/preschool-aged children.....	3
Middle childhood.....	4
Adolescence.....	5
Protective Parenting.....	7
Types of Protective Parenting.....	9
Intrusive protectiveness.....	9
Behavioral control/parental monitoring.....	10
Cultural Considerations within Protective Parenting.....	11
Caring for a child with Chronic Illness.....	13
Protective Parenting Among Caregivers of Children with Chronic Illness.....	15
Intrusive protectiveness.....	16
Avoidance/behavioral control.....	17
Parental Factors Influencing Protective Parenting.....	19
Parental anxiety.....	19
Parental perception of child's health status.....	21
Intolerance of Uncertainty.....	22
Definition.....	22
Impact on perception.....	23
Coping efforts to reduce discomfort associated with uncertainty.....	25
Two dimensions of intolerance of uncertainty.....	26
Implications for parenting.....	28
Parental Worry.....	29
Food Allergy.....	32
Role of caregivers.....	34
Vignette Methodology.....	39
Present Study.....	41
Aims & Hypotheses.....	43
<b>Method.....</b>	<b>46</b>
Participants.....	46
Measures.....	47
Demographic questionnaire.....	47
Food allergy history.....	47
Intolerance of uncertainty.....	48
Protective parenting: Protectiveness.....	48

Protective parenting: Problem-solving directiveness.....	49
Caregiver worry.....	50
Procedure.....	50
Recruitment.....	50
Vignette task.....	51
Vignette development.....	52
Vignette refinement and pilot testing.....	53
Vignette administration.....	54
Power Analyses.....	55
<b>Results.....</b>	<b>56</b>
Preliminary Analyses.....	56
Data screening.....	56
Covariates.....	57
Primary Analyses.....	57
Hypothesis 1.....	57
Hypothesis 2.....	58
Hypothesis 3.....	59
Hypothesis 4.....	61
Hypothesis 5.....	63
Hypothesis 6.....	65
Hypothesis 7.....	67
Exploratory Analysis.....	68
Hypothesis 8.....	68
<b>Discussion.....</b>	<b>69</b>
Aim 1.....	70
Aim 2.....	71
Aim 3.....	73
Aim 4.....	74
Aim 5.....	78
Aim 6.....	80
Aim 7.....	81
Exploratory Aim 8.....	82
Implications & Contributions to the Literature.....	83
Limitations.....	89
Future Directions.....	91
Conclusion.....	93
<b>Tables.....</b>	<b>94</b>
<b>Appendices.....</b>	<b>106</b>
<b>References.....</b>	<b>131</b>

## List of Tables

Table 1. Sample Characteristics.....	94
Table 2. Geographic Characteristics.....	95
Table 3. Descriptive Statistics – Overall Sample.....	96
Table 4. Descriptive Statistics – Mothers of Children with Food Allergy.....	97
Table 5. Descriptive Statistics – Mothers of Healthy Children.....	98
Table 6. Correlation Matrix for Main Variables: Mothers of Children with Food Allergy .....	99
Table 7. Correlation Matrix for Main Variables: Mothers of Healthy Children.....	100
Table 8. Correlation Matrix for Potential Covariates.....	101
Table 9. Aim 4 Moderated Mediation .....	102
Table 10. Aim 5 Moderated Mediation .....	103
Table 11. Aim 6 Moderated Mediation .....	104
Table 12. Aim 7 Moderated Mediation .....	105

## **List of Appendices**

Appendix A: Demographics.....	106
Appendix B: Food Allergy History.....	111
Appendix C: Intolerance of Uncertainty - Short Scale.....	113
Appendix D: Protectiveness Scale.....	114
Appendix E: Problem-Solving Directiveness Scale.....	116
Appendix F: Penn State Worry Questionnaire .....	118
Appendix G: Eligibility Screener.....	119
Appendix H: Uncertain Situation Vignettes with Behavior Choices.....	120
Appendix I: Expert Rater Protectiveness Ratings .....	124
Appendix J: Vignette Response Questions .....	128
Appendix K: Descriptive Statistics for Vignette Protective Parenting by Group .....	130

## Introduction

Caregivers are responsible for keeping their children safe from both physical and emotional harm. The type of responsibilities and degree of involvement needed varies across the lifespan and is impacted by both caregiver and child characteristics. Caring for a child with a chronic illness results in many, often unpredictable, challenges. Caregivers may experience increased stress to ensure their child's physical and emotional health (Guite, Logan, McCue, Sherry, & Rose, 2009; Holmbeck et al. 2002). These added challenges and increased risk to a child's well-being can contribute to the development of protective parenting behaviors (Herbert & Dahlquist, 2008; Holmbeck et al., 2002). Protective parenting can occur in the form of intrusive parenting and behavioral control among caregivers of children with chronic illness and can also manifest in parents of children who are healthy (Power, Dahlquist, Thompson & Warren, 2003; Symeou & Georgiou, 2017). Caregivers who are too protective may limit their child's ability to develop necessary coping skills (Clarke, Cooper, & Creswell, 2013). Because protective parenting exists across different populations of children, it is important to also study parental characteristics that can help explain the development of these protective behaviors, rather than child characteristics alone.

Intolerance of uncertainty, or the tendency to believe that the possibility of a negative outcome is unacceptable, is a dispositional characteristic (Buhr & Dugas, 2002, Carleton et al., 2012), which may contribute to protective parenting. Caregivers who cannot tolerate any uncertainty or potential for a negative outcome are more likely to engage in protective parenting behaviors as a way to increase certainty in a situation (Steiner, Dahlquist, Power, & Bollinger, 2019). Furthermore, intolerance of uncertainty

has been shown to be a contributing factor to worry (Carleton et al., 2012; Chen, Yao, & Qjan, 2018; Dugas & Ladouceur, 2000). Therefore, caregivers who are more intolerant of uncertainty could be more likely to worry, which can contribute to protective parenting.

There is minimal research on the relation between intolerance of uncertainty and protective parenting, both among caregivers of healthy children and caregivers of children with chronic illness, and only one published study to date linking protective parenting to intolerance of uncertainty (Steiner et al., 2019). Similarly, despite the increased potential of protective parenting among caregivers of children with chronic illness due to the many unpredictable challenges, there is limited research demonstrating that caregivers of children with chronic illness engage in more protective parenting compared to caregivers of healthy children (Dahlquist et al., 2014; Power et al., 2003) and even less research on the additional factors that can contribute to these parenting behaviors. The proposed study extends the study of how intolerance of uncertainty may impact protective parenting in order to better understand this relation in the context of healthy children as well as children with chronic illness.

Therefore, the current study aims to address several gaps in the literature. The study aims to examine the relation of intolerance of uncertainty and protective parenting and what factors may influence this relation, including child health status, parental worry, and caregiver appraisal in uncertain situations. This study will contribute to the limited existing literature on protective parenting, intolerance of uncertainty, and pediatric chronic illness, as well as add a novel contribution examining how these three factors are all related in families of healthy children and children with a chronic health condition.

## **Typical Parenting Expectations Across Developmental Stages**

To better understand what qualifies as protective parenting, it is important to review typical parenting expectations as children develop. Parenting behaviors and attitudes often change and adapt to fit children's developmental stages and expectations. A toddler typically requires more parental involvement and supervision compared to an older adolescent who typically need more indirect support from caregivers. In general, parents want to promote their child's well-being, including physical and emotional health. The ways in which caregivers promote these positive components tend to vary by child's developmental stage.

**Toddlers/preschool-aged children.** Caregivers of toddlers or preschool-aged children (i.e., 12-36 months old) are responsible for helping to support toddlers' development and growing competencies, including autonomy, impulse control and emotion regulation, and development of social connections (Edwards & Liu, 2002). During this time period, caregivers are active agents in their child's development and learning and also provide direct support (Kopp, 1989). For instance, mothers are more inclined to help younger children with tasks during this stage as children gradually develop competencies (Dahlquist et al., 2014; Mermelshtine, 2017). Caregivers help children learn about societal norms and expectations as well as ways to stay safe by establishing rules. Expectations and limit-setting help children learn to self-monitor and self-inhibit (Gralinski & Kopp, 1993). As toddlers grow older, they learn self-control (e.g., how to comply with requests, wait their turn, or wait for an instruction), even in the absence of a caregiver (Edwards & Liu, 2002).

During this period of development, it is important for toddlers and preschool-aged children to develop relationships beyond the immediate family (e.g., with peers, neighbors, other adults) (Edwards & Liu, 2002). Caregivers can help facilitate these social relationships by encouraging children to play with others and providing such opportunities. Additionally, caregivers can promote social competence in their children by indirectly supervising or checking-in occasionally, rather than constantly monitoring their child (Crouter & Head, 2002). This indirect supervision is adaptive because, as children advance in this developmental stage, they develop autonomy and independence by completing and mastering simple tasks. Young children often experience improved self-concept and self-efficacy when completing simple tasks independently (e.g., feeding self, dressing, toileting, etc.) (Edwards & Liu, 2002). Caregivers can support this autonomy development and sense of accomplishment in their children by setting rules or providing instruction to help shape a child's behavior (Gralinski & Kopp, 1993). However, during this developmental stage, caregivers would be expected to more closely monitor certain activities or behaviors to help prevent injuries and ensure child's safety (Crouter & Head, 2002).

**Middle childhood.** Middle childhood (i.e., 5-12 years old) is a period in which children are gaining knowledge and improving competencies to problem-solve and reason in more complex situations. For example, children are better able to organize tasks and responsibilities independently (Collins, Madsen, & Susman-Stillman, 2002). It is important for caregivers to promote child autonomy and independence for responsibilities related to school and home, while still continuing to be a source of support. Caregivers tend to no longer focus solely on the child's needs. The caregiver-

child relationship typically becomes more reciprocal as children's responsibilities increase (e.g., the child helping in the home) (Collins et al., 2002). Additionally, children tend to spend more time outside the home, developing friendships and relationships with others, and less time with family (Higgins & Parsons, 1983; Power, 2000). Children seek support from others (e.g., peers rather than parents) and must learn how to resolve issues and conflicts with friends without significant help from their caregivers (Bacikova-Sleskova, Benka, & Orosova, 2019; Collins et al., 2002).

Caregivers often have to supervise their children at a distance (i.e., decrease in direct monitoring or supervision) to allow children the opportunity to learn how to cooperate on more complicated tasks and problem-solve more independently (Bacikova-Sleskova et al., 2019). This supervision can take the form of increased knowledge about the child's activities outside the home (i.e., parental knowledge) or indirect monitoring (Crouter & Head, 2002; Collins et al., 2002; Bacikova-Sleskova et al., 2019). Therefore, it is important for caregivers to help a child develop self-regulation and self-management skills throughout this developmental period. This can take the form of co-regulation, in which a caregiver indirectly supervises their child or has some type of supervisory control but expect that their child takes on more responsibility for moment-to-moment regulation (e.g., emotion control, problem-solving, etc.) (Collins et al., 2002). Caregivers tend to give up more control as children learn more self-management skills and become increasingly autonomous. These skills are gradually acquired throughout middle childhood to adolescence (Collins et al., 2002).

**Adolescence.** Compared to the early childhood and middle childhood developmental stages, the level and type of parental involvement changes even further

during adolescence. Adolescents spend less and less time with caregivers and experience an increase in activities outside the home. Adolescents have more unsupervised time as a result of having increased independence and not needing direct supervision, seeking out such opportunities, and caregivers placing fewer restrictions on adolescents' activities (Steinberg & Silk, 2002; Symeou & Georgiou, 2017). During this time, peer relationships become more important than caregiver or family relationships (Givertz & Segrin, 2014). Peers can provide advice and guidance and may have an influence on adolescent behaviors (both positive and negative). Additionally, adolescents have more complex problem-solving abilities and their thinking is more advanced, which allows them to engage in more independent activities. Adolescents who feel autonomous and whose caregivers support their autonomy tend to rely on or go to their caregivers for support when needed (e.g., to help with more complex problems), have closer parent-child relationships, have fewer family conflicts, and enjoy spending time with their caregivers (Cheung & Pomerantz, 2011; Steinberg & Silk, 2002). Therefore, developmentally appropriate autonomy is adaptive for adolescents, caregivers, and family functioning.

Compared to middle childhood, during which children view caregivers as the authority or decision-maker, adolescence typically involves more joint-decision making. Allowing adolescents the opportunity to voice their opinions or emotions, be a part of a decision-making process, or discuss designated parental rules or expectations with caregivers can lead to more positive outcomes, rather than a caregiver deciding for the adolescent (Costa, Barberis, Guigliandolo, Larcan, & Cuzzocrea, 2018; Murray, Dwyer, Rubin, Knighton-Wisor, & Booth-LaForce, 2014; Steinberg & Silk, 2002). In fact,

adolescents whose caregivers make final decisions for them (i.e., remain the authority figure on the issue) are often less inclined to discuss issues with their caregivers (Steinberg & Silk, 2002). During this time period, caregivers may choose to indirectly monitor their children by gaining information about their child's activities outside the home. Adolescents are more likely to disclose their whereabouts to their caregivers if a caregiver is supportive, warm, and nurturing (Crouter & Head, 2002).

Caregivers play a key role in their child's development, but their level and type of involvement varies as a child develops. Toddlers and preschool-aged children rely on their caregivers for functional and emotional support, being unable to complete many tasks independently. Furthermore, these children must be monitored closely to ensure their physical safety. Middle childhood is an important developmental stage in which children begin to gain further autonomy and problem-solving abilities, with a gradual decrease in parental monitoring and supervision in order to encourage those developing competencies and self-efficacy. Compared to adolescence during which individuals work to develop more complex problem-solving skills, there is less independence in middle childhood, so caregivers are of primary importance. Based on these developmental stages, it is important to balance parental involvement during middle childhood to ensure children feel supported while also developing age-appropriate coping skills.

### **Protective Parenting**

Caregivers are responsible for protecting their children from significant physical or emotional harm. As a result, caregivers may engage in parenting behaviors specifically to protect a child from a potentially negative event or outcome. Certain parenting behaviors can be considered overly protective when the behaviors do not align

with developmental expectations (Bacikova-Sleskova et al., 2019; Barber, 1996; Givertz & Segrin, 2014) or present themselves in low-stress situations (Kiel & Buss, 2012; Kopp, 1989) and potentially promote child dependence on caregivers (Kalomiris & Kiel, 2016). It is important for children and adolescents to rely on their own skills, or have the opportunity to develop skills, to problem-solve without having their caregivers directly supervise or direct them (Givertz & Segrin, 2014; Kalomiris & Kiel, 2016). Therefore, it is important for caregivers to adapt parenting strategies accordingly.

Defining the concept of protective parenting can be challenging because the terms “protection” and “overprotection” have both been used by various researchers (Power, 2004; Rubin, Burgess, & Hastings, 2002; Thomasgard & Metz, 1996). However, the term “protection” rather than “overprotection” helps to “maintain objectivity in describing these behaviors as a continuous dimension” (Kiel & Buss, 2011, p. 954). Therefore, the present study used the dimensional approach to conceptualize protective parenting.

Additionally, the present study focused on caregivers of children in the middle childhood stage of development ages 8-12 years. This developmental stage provides a key opportunity for children to work towards increased independence in problem-solving (Bacikova-Sleskova et al., 2019; Collins et al., 2002). Caregivers typically transition toward more indirect supervision and give up more control as a way to assist their children in taking on more responsibility and autonomy (Collins et al., 2002), while still being available for support as needed based on the child’s age and abilities. Conversely, caregivers of toddlers or preschool-aged children typically provide direct support or would be expected to closely monitor their child’s activities to ensure their child’s safety

(Crouter & Head, 2002; Kopp, 1989). Caregivers of adolescents are typically expected to grant their children more independence in regard to both supervision and problem-solving (Steinberg & Silk, 2002; Symeou & Georgiu, 2017). Based on the developmental expectations of increased child autonomy and decreased direct supervision, middle childhood could be a time period in which protective parenting becomes more noticeable and could inhibit appropriate developmental expectations for a child. Therefore, examining caregivers of children ages 8-12 years can improve understanding for factors impacting protective parenting among caregivers of children in middle childhood.

### **Types of Protective Parenting**

Intrusive protectiveness and behavioral control/parental monitoring are two types of protective parenting. Given that the function of various behaviors can differ among parents, certain behaviors may overlap or appear similar across the defined protective parenting behaviors (i.e., a caregiver's actions could be interpreted as behavioral control or intrusion). Depending on the child's developmental stage, certain parenting behaviors can be adaptive in some contexts and protective in another. For example, a mother remaining in the room and supervising her 13-year-old son's activities when his friend is visiting may not be developmentally appropriate. However, the same behavior for a 3-year-old son would be adaptive and necessary. Therefore, it is important to consider the child's developmental level when operationalizing protective parenting behaviors and attitudes.

**Intrusive protectiveness.** Caregivers are responsible for helping their child problem-solve in a developmentally appropriate manner as well as promote autonomy (Collins et al., 2002; Steinberg & Silk, 2002), which can be adaptive to help a child

become more independent and competent. Intrusive protectiveness involves caregivers problem-solving for their child, taking control of situations, directing their child, and becoming involved in their child's situations or activities (Kiel & Buss, 2010; Kiel & Buss, 2011; LeMoyne & Buchanan, 2011; Rubin et al., 1997; Segrin, Woszidlo, Givertz, Bauer, & Murphy, 2012), all of which allow for minimal child autonomy (Rubin, Nelson, Hasting, & Asendorpf, 1999). Caregivers engage in this type of protective parenting as a way to prevent a negative outcome (e.g., failure, physical harm) or negative affect (Givertz & Segrin, 2014). For example, a caregiver may choose to solve a child's problem for her to avoid any potential risks of failure and/or maintain the child's happiness. These parenting behaviors done in an excessive manner or not in line with developmental expectations can lead to poor self-efficacy and poor coping skills among children (Chorpita & Barlow, 1998; Rubin et al., 1997; Segrin et al., 2012). Children may not learn how to manage a challenging situation without the presence of a caregiver because they were never allowed the opportunity to develop coping skills and competencies.

**Avoidance/behavioral control.** Behavioral control includes parental supervision as well as consistent rule and limit setting to help manage a child's behavior to be consistent with parental expectations (Bacikova-Sleskova et al., 2019, Barber, 1996; Symeou & Georgiu, 2017). This type of control tends to be helpful as a way to provide structure for a child (e.g., consistent contingencies) (Bacikova-Sleskova et al., 2019, Barber, 1996). Additionally, parental monitoring is caregivers' attention to and tracking of a child's whereabouts and activities (Crouter & Head, 2002) and can be considered a component of behavioral control (Bacikova-Sleskova et al., 2019). However, excessive

behavioral control or parental monitoring can be problematic (Barber, 1996; Symeou & Georgiou, 2017). If caregivers are too controlling or restrictive, children can interpret those actions to mean their caregivers do not have confidence in their abilities to complete tasks or responsibilities, and therefore caregivers need to restrict, limit, or supervise them (Mills & Rubin, 1998). Consequently, caregivers' attempts to gain more information about their child by monitoring or controlling them often cause a child to disclose less information (Bacikova-Sleskova et al., 2019). This pattern of negative outcomes emerges even in young children. Excessive parental monitoring or direct supervision can lead to worse social competence and functioning (Crouter & Head, 2002). Therefore, it is necessary for caregivers to learn to supervise and establish rules for their children in a developmentally appropriate manner.

Overall, it is important to examine protective parenting because of the impact these parenting behaviors could have on children. Children can experience a decreased sense of self-efficacy, limited coping skills to manage complex situations, and greater dependence on others to problem-solve for them (Chorpita & Barlow, 1998; Rubin et al., 1997; Segrin et al., 2012). Children experience increased worry or anxiety when they observe their caregivers' engaging in a protective manner and subsequently view the world as a more dangerous or fearful place (Rubin, Hastings, Stewart, Henderson, & Chen, 1997; Rubin, Burgess, & Hastings, 2002).

### **Cultural Considerations within Protective Parenting**

Parenting practices have similarities and differences across cultures and may vary in their form and function. The concept of protective parenting is based on the research from primarily Western, individualistic cultures. The values of individualistic cultures

may influence the conceptualization, and negative connotation, of protective parenting. For example, individualistic cultures value independence, self-efficacy, and self-development, and overly protective parenting practices inhibit these traits in a child (Crouter & Head, 2002; Chorpita & Barlow, 1998; Rubin et al., 1997). Conversely, caregivers from collectivistic cultures tend to engage in the same form of behaviors considered “protective” by Western, individualistic cultures, but for a different function. Therefore, it is necessary to understand how cultural differences may influence the interpretation of different parenting behaviors

For example, Chinese caregivers from collectivistic cultures often use “training” techniques to socialize their child’s behaviors to meet parental and cultural expectations and values, including obedience, interdependence, filial piety, and group harmony. Caregivers tend to provide guidance to their child through consistent behavior monitoring or control in addition to parental concern and responsiveness (i.e., nurturance) (Chao, 2000; Chen, Chen, & Zheng, 2010; Pinquart & Kauser, 2017). People from Western, individualistic cultures, who typically value independence, may observe these behaviors and interpret them as excessive behavioral control. However, for many caregivers within collectivistic cultures, behavioral control and responsiveness can be common and culturally appropriate ways to convey their love, warmth, and support for their child (Bornstein, 2010; Ngai & Cheung, 2009; Cheah, Li, Zhou, Yamamoto, & Leung, 2015; Chou & Chou, 2018). Furthermore, children within these cultures often view these behaviors as normative and experience positive outcomes (Rudy & Grusec, 2006). Therefore, it is necessary to consider race and ethnicity as potential influencing factors that may impact parenting decisions.

## **Caring for a Child with Chronic Illness**

Raising a typically developing, healthy child involves many stressors and challenges. However, caregivers caring for a child with a chronic illness face additional, unique stressors and challenges. Having a child with a chronic illness can be a stressful experience for a caregiver, who is responsible for the child's physical, emotional, and behavioral health (Guite et al., 2009; Holmbeck et al., 2002). An illness is considered chronic if it persists over 12 months, impacts typical daily functioning, and requires extensive and ongoing hospitalization or medical care (Goldbeck, 2006). As a result, caregivers of children with chronic illness are typically highly involved in their child's care and are responsible for managing their child's illness, ensuring adequate care and safety outside the home and handling many unpredictable challenges (Anderson & Coyne, 1993; Bollinger et al., 2006; Wood, 2003). Because of this stressful lifestyle, caregivers often feel fearful and anxious about their child's well-being (Trollvik & Severinsson, 2004). Furthermore, caregivers can perceive their child's chronic illness to be more severe, and their child more vulnerable to negative outcomes, compared to objective health status or child self-report (Eiser & More, 2001; King et al., 2008; Spurrier et al., 2000).

Children and adolescents often take on an active role in their illness management. It is important for caregivers to help their young children in high-stress or threatening situations, yet caregivers should also provide their child the opportunity to work to manage low-stress situations independently to develop coping skills (Kiel, 2012; Kopp, 1989). Therefore, it is important for caregivers to be involved in their child's care but allow opportunities for children to develop self-efficacy and competencies to manage

their own illness (Anderson & Coyne, 1993). For example, depending on the complexity of the medical or self-care task, caregivers can take complete control of responsibility, direct their child on what to do, or simply observe the child to promote safety and adherence (Williams, Mukhopadhyay, Dowell, & Coyle, 2007).

In addition to the type and complexity of the medical regimen, the child's age or stage of development may impact the level of caregiver involvement. While infants and toddlers require consistent monitoring of physical symptoms and medication adherence, medical responsibilities gradually shift from the caregiver to the child in middle childhood (e.g., 8-11 years old) (Anderson & Coyne, 1993). Caregivers and children can work together to help the child gradually become more autonomous as they develop additional skills and competencies for improved self-regulation and management by the time they reach adolescence. It is important for children to become less dependent on their caregivers during this time and develop problem-solving skills, related to both their chronic illness and general challenges (Anderson & Coyne, 1993; Holmbeck et al., 2002; Power et al., 2003).

During the time period of middle childhood, children have enough cognitive capacity and competence to help with decision-making or solving problems, but caregivers can vary in their willingness to allow children to make decisions or grant autonomy (Holmbeck et al., 2002). Those caregivers who do grant their children autonomy may find that their children become more competent in medical adherence and responsibilities. Caring for an adolescent with a chronic illness presents a unique set of challenges because this time period is when children seek more independence. As a result, adolescents challenge caregiver involvement in their care as they desire more

independence and less input from caregivers (Anderson & Coyne, 1993). Caregivers who are protective of their adolescents could inhibit an adolescent's self-care abilities and feelings of self-efficacy. Comparatively, caregivers who engage in collaborative parenting (e.g., increased communication, emotional support, and independence promotion) help to bolster an adolescent's competence to manage his or her illness (Gruhn, Lord, & Jaser, 2016).

It is important to examine the unique challenge of caring for a child with a chronic illness given the potential for unpredictable challenges. Given this uncertainty, caregivers often engage in certain parenting behaviors to help manage their own stress and anxiety as well as protect their child from physical or emotional harm (Cohen, 1995; Trollvik & Severinsson, 2004), leading to a potential increase in protective parenting behaviors.

### **Protective Parenting Among Caregivers of Children with Chronic Illness**

Research has demonstrated that caregivers of children with chronic illness are likely to develop or value protective parenting strategies (Herbert & Dahlquist, 2008; Holmbeck et al., 2002; Power, Dahlquist, & Pinder, 2019; Thomasgard & Metz, 1996). Parenting practices within this population of caregivers are considered protective when the caregiver's concern for their child's health and safety and subsequent parenting behaviors or attitudes do not align with the child's objective health status, environment, or the child's abilities and developmental level (Anderson & Coyne, 1993; Holmbeck et al., 2002; Thomasgard, Shonkoff, Metz, & Edelbrock, 1995). There is limited literature on protective parenting among caregivers of children with chronic illness (Power, Dahlquist, & Pinder, 2019), which may be due to the fact that an increased level of

parental involvement can be adaptive, making the identification of protective parenting more challenging. Therefore, it is important to conduct further research examining protective parenting among caregivers of children with chronic illness to better understand the factors influencing these parenting practices. Additionally, prior research indicates that middle childhood is often a time period in which children's involvement in medical responsibilities and management increases (Anderson & Coyne, 1993). Therefore, it is useful to answer these research questions within the context of middle childhood, during which protective parenting may become more salient and potentially problematic for a child's development.

**Intrusive protectiveness.** Caregivers who engage in intrusive protectiveness are less likely to grant their children behavioral autonomy or allow them to make their own decisions (Holmbeck et al., 2002). Among a sample of children (ages 8-9 years), caregivers of children with spina bifida were more intrusively protective by limiting behavioral autonomy (i.e., not allowing child decision-making) compared to caregivers of healthy children. These caregivers were more intrusive in order to help manage their child's complicated illness or because they viewed their children as more vulnerable (Holmbeck et al., 2002). If a caregiver engages in intrusive protectiveness (e.g., problem-solving for their child, directing their child on what to do, etc.), the child can become dependent on his or her caregivers to solve problems (Power et al., 2003).

In a study of mothers of children with juvenile rheumatoid arthritis of varying severity and healthy children, mothers of children with severe juvenile rheumatoid arthritis were more directive of their children's behavior on a visual memory task compared to mild juvenile rheumatoid arthritis and healthy children. These mothers used

intrusive protective behaviors, such as providing the child more clues and prompting them (Power et al., 2003). Caregivers may have engaged in these types of behaviors because of their own anxiety about ensuring that the child has a specific, positive outcome or because they perceived their child as needing more help in general. Children with severe juvenile rheumatoid arthritis often need more functional help from their caregivers (e.g., get ready for the day) or help with illness management. As a result, these parenting behaviors and intrusive protectiveness can generalize to other settings (Power et al., 2003). These findings are consistent across other chronic illnesses. A study by Dahlquist et al. (2014) found that mothers of children with food allergy were more likely to provide unsolicited help and direct their child's behavior on a puzzle task compared to mothers of healthy children, even though food allergy should have no impact on puzzle completion abilities. This study demonstrates that caregivers of children with chronic illness tend to overgeneralize the need for parental intrusive protectiveness to care for their children. Caregivers may engage in intrusive protective behaviors in situations unrelated to their child's chronic illness, which could be developmentally inappropriate. It is necessary to understand what mechanisms could cause a caregiver to overgeneralize these protective behaviors.

**Avoidance/Behavioral control.** Caregivers of children with chronic illness also may value or engage in behavioral control strategies. Behavioral control can help reduce a caregiver's stress associated with caring for a child by putting limits in place to help control the types of situations or environments a child may experience (e.g., avoidance of uncertain environments) (Guite et al., 2009; Power, Dahlquist, & Pinder, 2019). For instance, some caregivers choose to keep their children home from school in order to

monitor symptoms themselves rather than allow them to be treated by the school nurse (Spurrier, Sawyer, Staugas, Martin, Kennedy, & Streiner, 2000). In this situation, caregivers are controlling the child's environment and actions to avoid an uncertain, or potentially negative, outcome if the child is treated by someone other than themselves. Caregivers of children with a severe chronic illness often value rules and establishing structure more than caregivers of healthy children. For example, mothers of children with severe juvenile rheumatoid arthritis were more likely to set rules for their child during a puzzle task compared to mothers of healthy children or mothers of children with milder juvenile rheumatoid arthritis (Power et al., 2003). This finding demonstrates that caregivers engage in behavioral control even in contexts not directly related to their child's chronic illness.

Establishing excessive rules or limits or restricting activities can lead to negative outcomes. A study by Butler, Skinner, Gelfand, Berg, and Wiebe (2007) examined glycemic control and reported parenting practices in adolescents with type 1 diabetes (aged 11-17 years). Researchers found parental behavioral control was related to worse glycemic control and worse well-being overall (e.g., higher levels of depression and worse self-efficacy). These outcomes were more severe in older adolescents. This age group may desire more autonomy and dislike parental control. Adolescents may perceive parental rules and restrictions to mean their caregivers do not trust them to manage their diabetes independently, which leads to decrease self-efficacy (Butler et al., 2007). Therefore, it is important for caregivers to be mindful and collaborate with children when setting rules, limitations, or supervising them.

Caring for a child with a chronic illness can be stressful and challenging for caregivers. Protective parenting practices can help a caregiver manage his or her stress and feel more confident dealing with the various, unpredictable problems and concerns that frequently accompany a pediatric chronic illness. Additionally, these behaviors generalize to situations unrelated to their child's chronic illness, which may not be developmentally appropriate and limit a child's sense of self-efficacy. More research is still needed to better understand the factors that lead to protective parenting, both within this population of caregivers and caregivers of healthy children.

### **Parental Factors Influencing Protective Parenting**

There are various reasons why caregivers use protective parenting practices, some of which stem from parental characteristics or interpretations of their child's functioning. Because protective parenting may have maladaptive outcomes, it is important to understand how this type of parenting develops and persists.

**Parental anxiety.** Research has demonstrated that caregivers with anxiety are more likely to be controlling (i.e., promoting less autonomy by directing their child's actions, and making decisions for their child) as well as more critical and less warm (Clarke, Cooper, & Creswell, 2013; Lindhout et al., 2006; Ollendick & Benoit, 2012). Caregivers who are highly anxious tend to be less warm and more critical of their children because they are more focused on their own anxiety and less focused on their child's emotional needs (Drake & Ginsburg, 2011). There are various mechanisms or pathways that help explain how parental anxiety may lead to increased protective parenting. Anxious individuals have a cognitive schema that leads them to view the world as an inherently threatening place overall (i.e., interpretation bias) and are more

likely to focus on negative aspects of life, which can cause these individuals to be more fearful (Lester, Field, Oliver, & Cartwright-Hatton, 2009). As a result, anxious caregivers often interpret ambiguous situations as threatening and are more likely to catastrophize when faced with ambiguity (Kalomiris & Kiel, 2016; Ginsburg, Grover, Cord, & Ialongo, 2006; Ollendick & Benoit, 2011). Because of this interpretation bias and catastrophizing, anxious individuals overestimate the anticipation of harm or danger and focus on their own, and others' (i.e., their children), vulnerability to threat (Epkins & Harper, 2016). Therefore, anxious caregivers may be more likely to engage in protective parenting practices as a way to manage their own fears and stress as well as minimize threat and harm to their child.

Additionally, research has shown that anxious caregivers tend to view their children as less capable or competent to manage tasks independently. Anxious caregivers of children with type 1 diabetes viewed their children as less capable to manage their illness independently, even after controlling for objective health status (Butler et al., 2007). Caregivers who already view the world as threatening may lack confidence in their child's abilities to complete responsibilities accurately and safely. These caregivers could therefore choose to complete tasks for their children, direct their behaviors, or maintain vigilant monitoring as a way to buffer the effects of their anxiety.

While these mechanisms help explain how protective parenting manifests among anxious caregivers, there are mixed findings within the research on parenting behaviors among anxious caregivers. Maternal anxiety is predictive of protective parenting in some studies, especially behavioral control and intrusive protectiveness (Bogels & van Melick, 2004; Clarke, et al., 2013; Epkins & Harper, 2016; Kalomiris & Keil, 2016; Ollendick &

Benoit, 2011). However, research has also shown that child anxiety is a stronger predictor of protective parenting, independent of mothers' anxiety status (Gar & Hudson, 2008). Furthermore, anxiety was not related to protective parenting in other studies, regardless of child or caregiver anxiety status (Drake & Ginsburg, 2011; Ginsburg, et al. 2006). Because of these mixed findings, it is important to consider additional parental characteristics or situational antecedents that may influence the development and use of protective parenting.

**Parental perception of child's health status.** Parental perception of their child's vulnerability may influence protective parenting practices. Research has demonstrated that perceived child vulnerability and parental overprotection (i.e., protective parenting) are two distinct constructs (Mullins et al., 2004; Thomasgard et al., 1995; Thomsgard & Metz, 1997). Perceived child vulnerability relates to caregivers' attitudes or beliefs, and related worry or anxiety, about their child's health status and susceptibility to illness or injury (Green & Solnit, 1964; Hullman et al., 2010a). Protective parenting, in the context of perceived child vulnerability, is related to the parenting practices that help ensure the security of the child (Thomasgard et al., 1995). There are mixed findings regarding antecedents to parental perception of child vulnerability. Some studies found that caregivers perceived their child as more vulnerable following a previous life-threatening illness or injury (Green & Solnit, 1964; Thomasgard et al., 1995). Conversely, another study found that greater parental perception of vulnerability was not significantly associated with previous life-threatening events for the child (Thomasgard & Metz, 1997). Therefore, there may be additional caregiver traits playing a role in their interpretation of events.

Independent of a history of life-threatening events, caregivers of children with chronic illness tend to have higher ratings of perceived child vulnerability and greater susceptibility to illness because of the child's medical condition (Anthony, Gil, & Schanberg, 2003; Hullman et al., 2010a; Hullman et al. 2010b). As a result of this heightened perception of child vulnerability, caregivers engage in protective parenting practices (Hullman et al., 2010b), such as behavioral control and avoidance (Anthony et al., 2003; Spurrier et al., 2000). Caregivers may use protective parenting strategies in an attempt to gain control over a complicated and potentially unpredictable medical concern. Caregivers who are protective may consistently view their children as more vulnerable (Mullins et al., 2004; Thomasgard & Metz, 1997). However, research has also demonstrated that caregivers' increased perception of child vulnerability does not always relate directly to increased protective parenting behaviors among caregivers of children with medical conditions (Thomasgard et al., 1995). Therefore, just because a caregiver perceives his or her child as vulnerable because of a previous health scare or life-threatening illness does not translate directly to protective parenting practices. This provides evidence for another variable playing a role in the development of protective parenting practices.

### **Intolerance of Uncertainty**

**Definition.** Protective parenting may be influenced by caregivers' degree of comfort with uncertainty and their ability to handle unpredictability, which is often associated with chronic illness. The construct of intolerance of uncertainty highlights this potential difficulty in managing uncertainty and unpredictability. Intolerance of uncertainty is the "excessive tendency of an individual to find it unacceptable that a

negative event may occur, however small the probability of its occurrence” (Buhr & Dugas, 2002, p. 932). Consequently, this ambiguity can lead to increased anxiety, worry, and uncertainty (Ladouceur, Talbot, & Dugas, 1997). Intolerance of uncertainty is considered a dispositional characteristic (Carleton et al., 2012; Shihata, McEvoy, Mullan, & Carleton, 2016; Shihata, McEvoy, & Mullan, 2017) that can influence cognitive, emotional, and behavior reactions in response to uncertainty (Freeston et al., 1994). Daily life can be filled with uncertainty, and individuals who are highly intolerant of uncertainty find uncertainty to be unfair and work to avoid any ambiguity in their lives (Dugas, Gosselin, & Ladouceur, 2001).

**Impact on perception.** Individuals who are highly intolerant of uncertainty are more inclined to interpret uncertain or ambiguous situations as threatening or view them negatively, contributing to increased worry or anxiety (Buhr & Dugas, 2002; Carleton, Norton, & Asmundson, 2007; Dugas, Gosselin, Ladouceur, 2001; Koerner & Dugas, 2008). For example, Kirschner, Hilbert, Hoyer, Leuken and Beesdo-Baum (2016) examined intolerance of uncertainty in regard to safety or danger in an experimental study in which participants viewed pictures displaying a safe scene, dangerous scene, or ambiguous scene. Participants with greater levels of intolerance of uncertainty reported greater threat (i.e., danger) as well as feeling more anxious in response to the ambiguous scenes, but not within the safe or dangerous scenes.

Koerner and Dugas (2008) conducted a study in which participants were presented with a number of positive, negative, and ambiguous vignettes related to various areas of life (e.g., academic performance, health, self-concept, etc.). Participants with greater levels of intolerance of uncertainty interpreted the ambiguous situations, as well

as positive and negative, to be more disconcerting compared to individuals with a lower level of intolerance of uncertainty. These studies demonstrate how individuals who are more intolerant of uncertainty may be more likely to perceive ambiguity negatively or more threatening.

A study found that individuals who are intolerant of uncertainty have a lower threshold for the perception of ambiguity and may be more likely to perceive ambiguity where others do not (Ladouceur et al., 1997). Additionally, Dugas et al. (2005) found that when participants were presented with a list of words that were either neutral or related to uncertainty (e.g., unknown, questionable, unclear), participants who were highly intolerant of uncertainty were able to recall significantly more words referring to uncertainty than participants who were less intolerant of uncertainty. Furthermore, participants who were highly intolerant of uncertainty remembered significantly more words referring to uncertainty than neutral words. This study highlights how people who are more intolerant of uncertainty may be primed to notice uncertainty. There is minimal existing research for this impact on perception.

Intolerance of uncertainty is related to increased catastrophizing when faced with an uncertain situation (Fergus & Valentiner, 2011). For example, Fergus and Valentiner (2011) examined intolerance of uncertainty, catastrophic health appraisals (i.e., interpretation of ambiguous symptoms as a sign of major health concerns), and health anxiety among a sample of university students. The researchers found catastrophic health appraisals were significantly related to health anxiety only at high levels of intolerance of uncertainty. Therefore, those participants with greater reports of intolerant of uncertainty were more likely to interpret minor health symptoms as major health concerns, which

contributed to health anxiety. This study demonstrates how individuals who are intolerant of uncertainty find uncertain situations to be threatening and distressing.

Based on these varying perceptual differences due to intolerance of uncertainty, it is important to understand the impact that intolerance of uncertainty can have on individuals' appraisals of situations and how those appraisals may then influence behaviors. There is limited existing literature on this impact on appraisals, and the existing research is not always explicit in what appraisal is being assessed. For example, Dugas et al. (2005) assessed threat interpretation in response to an ambiguous situation among participants who were either high or low on intolerance of uncertainty. Researchers used a 5-point Likert scale that ranged from "*not at all concerned*" to "*extremely concerned*" in order to measure threat. No operational definition was provided for either threat interpretation or concern. Because these are both vague terms with various meanings, it remains unclear what aspect of appraisal, as influenced by intolerance of uncertainty, was assessed in the study. Similarly, Koerner and Dugas (2008) used the same Likert scale of concern to assess how "disconcerting" individuals perceived ambiguous situations. This term is equally vague with various interpretations. Further research is needed to understand how intolerance of uncertainty can impact specific areas of appraisal.

**Coping efforts to reduce discomfort associated with uncertainty.** If any uncertainty exists, research findings suggest that individuals who are intolerant of uncertainty will be motivated to increase certainty, even if the threat or likelihood of risk is low. As a result, intolerance of uncertainty can lead to coping efforts as a way to reduce discomfort or worry associated with uncertainty (Dugas, Freeston, & Ladouceur,

1997; Fergus & Valentiner, 2011). A study by Ladouceur et al. (1997) examined intolerance of uncertainty and certainty-seeking behaviors in an experimental study of moderately ambiguous situations. One component of the study involved the moderately ambiguous task of participants drawing as many marbles as they would like out of bag before determining the proportion of black and white marbles (i.e., either 50/50, 70/30, or 90/10). Higher reports of intolerance of uncertainty were significantly related to a greater number of marbles withdrawn. The findings of this study support the fact that individuals who are intolerant of uncertainty also tend to seek further information about a situation (Carleton, 2016), in this case withdrawing more marbles. Additionally, intolerance of uncertainty can lead to less effective problem-solving strategies that may temporarily reduce uncertainty in a situation but fail to solve the problem (Freeston et al., 1994). For example, avoidance of uncertain situations is one way in which an individual may remove all uncertainty but not effectively solve a problem. There is limited research on avoidance coping and intolerance of uncertainty when examining it as a broad construct.

**Two dimensions of intolerance of uncertainty.** Past research has identified two dimensions of intolerance of uncertainty. Prospective intolerance of uncertainty is related to cognitive appraisals and uncertainty about future events (Carleton et al., 2012; McEvoy & Mahoney, 2011). Prior research conceptualized this dimension as “desire for predictability” (Birrell et al., 2011). Individuals who desire predictability prefer to actively seek certainty or predictability. Desire for predictability is related to more approach coping strategies as a way to anticipate a situation to increase certainty (Berenbaum, Bredemeier, & Thompson, 2008; Birrell et al., 2011). For example, an

individual may seek more information as a way to make a situation more predictable (Birrell et al., 2011). There is limited existing research on how else desire for predictability directly influences behaviors and attitudes. Therefore, it is useful to examine how this dimension of intolerance of uncertainty impacts protective parenting behaviors.

Inhibitory intolerance of uncertainty involves uncertainty inhibiting an individual's actions or experiences (Carleton et al., 2012; McEvoy & Mahoney, 2011). Previous studies conceptualized this dimension as "uncertainty paralysis" (Berenbaum et al., 2008; Birrell et al., 2011). Individuals who experience uncertainty paralysis may be unable to act or may engage in maladaptive coping strategies when faced with uncertainty. Individuals are more likely to use avoidant strategies as a way to prevent facing an uncertain situation (Birrell et al., 2011). A study by Carleton, Fetzner, Hackl, and McEvoy (2013) found that participants with panic disorder with greater scores on the uncertainty paralysis subscale were more likely to avoid situations due to fear of panic attacks (i.e., the uncertainty of whether or not they may have a panic attack in that situation). Additionally, Fourtounas and Thomas (2016) found that university students who reported greater uncertainty paralysis scores were more likely to procrastinate (i.e., avoid) on academic tasks. The researchers suggest that students may experience anxiety and discomfort when having to engage in new and uncertain academic tasks, and therefore may prefer to avoid that negative affect. Avoidance works to remove any uncertainty and protect against negative affect among those who score high on the uncertainty paralysis dimension. Further research is needed to understand how

uncertainty paralysis may impact parenting practices among caregivers who score high on this dimension of intolerance of uncertainty.

**Implications for parenting.** Intolerance of uncertainty can help to explain why some caregivers engage in more protective parenting strategies, regardless of their child's health status. These caregivers may be more likely to perceive any uncertainty or ambiguity related to their child as potentially threatening to the safety or well-being of their child. As a result, protective parenting can act as a way to increase the likelihood of a more certain, desired outcome. Whether a caregiver more closely monitors their child, problem-solves for their child, or does not allow their child to take part in any activities that could be uncertain (i.e., avoidance), these protective parenting practices can help a caregiver to feel that they have control of a situation, which may help manage their stress and anxiety. However, even with the use of protective parenting strategies, parents may still worry as a result of intolerance of uncertainty.

There limited research on the impact intolerance of uncertainty can have on protective parenting behaviors, and minimal literature on this association within the context of pediatric chronic illness. A study by Steiner, Dahlquist, Power, and Bollinger (2019) examined the relation between the intolerance of uncertainty dimensions and protective parenting within a sample of mothers of children with food allergy ages 3-6 years. The study found that mothers of children under the age of 4.5 years who were higher on the desire for predictability dimension reported more avoidant and intrusive parenting behaviors. Mothers of children over the age of 5 years who scored high on the uncertainty paralysis dimension reported more avoidant parenting behaviors. Further research is needed to better understand how this dispositional characteristic, as well as the

two dimensions of desire for predictability and uncertainty paralysis, can impact parenting practices among caregivers of healthy children and caregivers of children with chronic illness. Additionally, examining caregivers of elementary school-aged children will help to expand on the findings of Steiner et al. and whether these protective parenting behaviors occur at different stages of development.

### **Parental Worry**

Worry involves unwanted intrusive thoughts about potentially stressful events that could work to promote negative mood, such as anxiety (Davey, 1994). Worry can be adaptive to some extent and is often present in non-clinical populations. Therefore, individuals do not need to eliminate worry from their lives entirely, but it is important for worry to be managed to prevent the development of more clinical, functionally impairing, anxiety (Dupuy, Beaudoin, Rheamue, Ladouceur, & Dugas, 2001).

Worry should be conceptualized as existing on a continuous dimension, rather than as a dichotomous construct (i.e., worried or not worried) (Davey 1994). Functionally impairing, persistent worry that leads to psychological dysfunction, which is a key characteristic of Generalized Anxiety Disorder (GAD) and other anxiety disorders, is at one end of the continuum. Constructive, or useful worry, exists at the opposite end (Davey, 1994; Quertstret & Cropley, 2013). Individuals who experience greater levels of worry, both in regard to severity and frequency, often have negative thoughts even in neutral or relaxed settings. Additionally, they tend to have more reasons for why negative situations or outcomes could occur. These individuals also tend to have worse self-efficacy in regard to their problem-solving abilities (Davey, 1994). Individuals who experience lower levels of worry (e.g., day-to-day worries) and perceive worry to be

more constructive or task-oriented tend to engage in more adaptive problem-solving strategies, in which worry leads to more positive outcomes. These effective strategies could include assessing the problem or situation or information-seeking (e.g., monitoring). However, these strategies can be considered effective primarily when a situation is perceived as controllable (Davey, 1994; Querstret & Cropley, 2013).

The perception or assessment of whether a situation or problem is controllable can vary between people based on their own personal appraisals and existing coping skills. When a problem is considered to be more controllable, worry is perceived as constructive and adaptive because it can help an individual feel more in control and help to solve the problem (Davey, 1994). Additionally, worry can be interpreted as helping to make a situation more certain or protect against negative outcomes (Dugas & Ladouceur, 2000; Freeston et al., 1994). Therefore, individuals who are highly intolerant of uncertainty may worry but feel that some situations are within their control if they engage in particular behaviors, including protective parenting practices. In this case, these caregivers may not perceive worry to be impairing.

Thus, intolerance of uncertainty can be conceptualized as a predictor or contributing factor to worry (Carleton et al., 2012; Chen et al., 2018; Dugas & Ladouceur, 2000) and can help explain why some people tend to worry (i.e., dislike of ambiguous situations) (Dugas, Freeston, & Ladouceur, 1997; Freeston et al., 1994; Ladouceur, Talbot, & Dugas, 1997; Zlomke & Young, 2009). People who are intolerant of uncertainty tend to focus on uncertain details of a situation, even if they are minor, as a way to increase certainty but may subsequently trigger worry in the process (Dugas & Ladouceur, 2000). Furthermore, intolerance of uncertainty can elicit a “what if” style of

thinking, which could lead an individual to catastrophize and consider all possible outcomes. This thought process can exacerbate worry because an individual may focus on any uncertain details of a situation, even if they are minor, which could cause a problem or any uncertainty to seem more severe (Britton, Neale, & Davey, 2019; Davey, 1994; Dugas & Ladouceur, 2000) or increase worry where problems may not actually exist (Freeston et al., 1994). Overall, intolerance of uncertainty contributes to the development and maintenance of worry because of increased threat appraisal and the propensity to perceive threats or difficulties, even where none exist, which tends to heighten worry.

This pattern of identifying any uncertainty in situations can be reinforcing because it may help an individual feel as though they are more in control of an uncertain situation by considering all possible outcomes and mentally preparing themselves or taking action in each hypothetical situations (Borkovec, Robinson, Pruzinky, & DePree, 1983; Dugas & Ladouceur, 2000; Kircasni, Thompson, Sorenson, Sherdell, & Gotlib, 2015). This may help a person to feel as though the future is more certain and less threatening. However, when there are actual problems, the persistent, excessive worry often inhibits an individual's problem-solving skills. (D'Zurilla & Goldfried, 1971; Dugas et al., 1997; Freeston et al., 1994). The act of worrying involves cognitive effort and a negative perception of uncertain future events (Dugas, Gosselin, & Ladouceur, 2001). This can limit one's ability to objectively evaluate a situation because of the reduction in cognitive or processing resources available, heightened negative schema or emotional state as well as decreased confidence in their problem-solving abilities (Freeston et al., 1994, Koerner & Dugas, 2008).

Frequent worry, even within a nonclinical population, tends to be related to: (a) more ineffective problem-solving strategies, including impulsive decision-making or avoidance strategies, in order to reduce worry, as well as (b) failure to fully or objectively assess a situation (D’Zurilla & Goldfried, 1971; Freeston et al., 1994). These ineffective strategies, such as avoiding worry-inducing situations, can reduce feelings of worry in the moment and thereby increase the likelihood of avoidance in the future. Consequently, a caregiver may not develop more effective problem-solving skills or coping strategies (Freeston et al., 1994).

However, additional research has demonstrated that worry does not always relate to poor problem-solving skills (Davey, 1994). Individuals who demonstrate maladaptive worry perceive that they have limited personal control over problem situations and lack confidence in their ability to effectively address a problem. Therefore, it is important to understand other mechanisms that may be influencing worry-related behaviors and coping strategies (e.g., protective parenting), including a caregiver’s level of confidence in their ability to solve problems and the role of intolerance of uncertainty. Additional research is needed to better understand the relation between intolerance of uncertainty and worry among caregivers, especially within the context of caring for a child with a chronic illness.

### **Food Allergy**

Parental uncertainty and worry are common in many chronic health conditions, including food allergy. Approximately 8% of children in the United States have some form of food allergy (Gupta et al., 2011), and the prevalence of food allergy has been increasing over the past several decades (Keet et al., 2014; Loh & Tang, 2018).

Specifically, the prevalence of food allergy has increased by 2.1% among African-American children, 1.2% among Latino/a children, and 1% among Caucasian children each decade between 1988-2011 (Keet et al., 2014). Food allergy typically develops around age 2 or 3 years, and some allergies can be lifelong (e.g., nut and seafood allergies). Common food allergens include milk, eggs, peanuts, and tree nuts. Additionally, rare food allergies are becoming more common in younger children (e.g., kiwifruit) (Cummings, Knibb, King, & Lucas, 2010). Young children who have at least one confirmed food allergy are likely to develop additional food allergies (Wood, 2003).

Food allergy develops when the immune system responds to certain food proteins, which causes the development of allergen-specific immunoglobulin E (IgE) and sensitization to a specific food (Wood, 2003). After ingesting an allergen, immediate symptoms include abdominal pain, mouth itching, or vomiting (American College of Allergy, Asthma & Immunology, 2015; Food Allergy Research & Education, 2016; Mayo Clinic, 2014). Additionally, more severe, life-threatening reactions may occur, including food-induced anaphylaxis (Demkin, 2017). This severe reaction can cause shortness of breath, drops in blood pressure, circulatory collapse, coma, and even death (American College of Allergy, Asthma & Immunology, 2015a; Broome, Lutz, & Cook, 2015). The frequency of pediatric emergency department visits and hospital admissions for food-induced anaphylaxis has doubled since 2006, indicating the increasing burden of pediatric food allergy (Demkin, 2017). There is no cure or preventative treatment for food allergy. Therefore, this chronic illness is managed by avoidance of specific food proteins (i.e., allergens) and emergency treatment of symptoms (Cummings et al., 2010; Demkin, 2017).

**Role of Caregivers.** Caregivers of children with food allergy play an important role in managing their child's food allergy and protecting him or her from these potentially life-threatening reactions (Valentine & Knibb, 2011). In order to succeed in this role, caregivers must learn skills, knowledge, and maintain communication with medical providers (Wood, 2003). Caregivers are responsible for managing their child's food allergy if their child is unable to do so independently, which leads to changes in daily life (Cummings et al., 2010; Valentine & Knibb, 2011). Caregivers are responsible for reading labels, monitoring food preparation, and being prepared in food allergy-related emergencies (Williams, Parra, & Elkin, 2009). As children with food allergy mature and develop, they may become more independent in their food allergy management and are often exposed to more environments with less supervision.

A study by Bollinger, Dahlquist, and Mudd (2006) examined how food allergy impacted daily function in various areas of life. Participating caregivers reported a significant impact on meal preparation as well as increased restriction of their child's social activities and reluctance to leave their child in someone else's care. Daily functioning is impacted by the need to maintain contact with medical providers, communicate with the child's daycare or school regarding food allergy, and keep track of medical appointments and medication (Peterson-Sweeney, McMullen, Yoos, & Kitzman, 2003). Additionally, caregivers must monitor their child's food intake more closely and often limit the family's activities because of food allergy (Bollinger et al., 2006; Valentine & Knibb, 2011). These ongoing daily stressors (e.g., persistent fear of accidental allergen exposure) and responsibilities (e.g., monitoring food intake, preparing food, etc.) involved in caring for a child with food allergy can lead to increased parental

frustration or distress, and ultimately lowered quality of life (Primeau et al., 2000; Sicherer, Noone, & Muñoz-Furlong, 2001; Valentine & Knibb, 2011).

There are numerous sources of uncertainty when caring for a child with a food allergy. Caregivers must make sure their child's food is safe for him or her to eat. However, inconsistent or inaccurate food labeling, or cross-contamination, limits a caregiver's ability to control the safety of the food purchased and prepared (Broome, 2015; Demkin, 2017), thus leading to increased uncertainty surrounding food allergy. For example, the US Food and Drug Administration does not require precautionary labels, such as "may contain peanuts" or "manufactured in same facilities with peanuts." Therefore, some companies include this information while others choose not to. As a result, caregivers may be uncertain about the possibility of cross-contamination during food manufacturing. Additionally, problems also exist when manufacturers use the incorrect label, cross-contaminate food, or omit an included ingredient. Cross-contamination occurs at 21% of facilities not using precautionary labeling and 46% of facilities using precautionary labeling (Demkin, 2017). Therefore, caregivers may remain uncertain regarding the safety of the food they are providing to their child with food allergy. As a result, caregivers must remain vigilant and alert because a food allergen is not always obviously apparent within a given food item (Cummings et al., 2010).

Accidental allergen ingestion is another situation related to uncertainty and unpredictability for caregivers of children with food allergy. Caregivers of children with food allergy tend to be hypervigilant and experience persistent uncertainty regarding the possibility of accidental food exposure in varying situations (Gillespie et al., 2007;

Primeau et al., 2000). Many anaphylactic reactions occur outside the home when children are away from their primary caregivers (Bollinger et al., 2006; Cummings et al., 2010). Based on this fact, caregivers may dislike when their child attends social events, goes on field trips, spends time at friend's house, or uses public transportation. Everyday activities can be perceived as anxiety-provoking because they can be uncertain and potentially life-threatening (Cummings et al., 2010). As a result, caregivers may be reluctant to separate from their children in response to this uncertainty.

Caregivers may engage in avoidance strategies as a way to prevent food-induced anaphylaxis when faced with an uncertain situation. Caregivers have been shown to restrict a child's activities outside the home or activities when they are not able to supervise directly (Bollinger et al., 2006; King et al., 2008). For example, a caregiver may not allow his child to go to a friend's birthday party or on a school field trip if his caregiver is not present as a way to minimize or eliminate any risk or uncertainty (Bollinger et al., 2006). Additionally, caregivers are often inclined to accompany their child to social situations, beyond a developmentally appropriate age, in order to monitor their child's food intake (Cummings et al., 2010), likely in an attempt to increase certainty for their child's safety. A caregiver could perceive this behavior as adaptive to ensure the child's safety but may be developmentally inappropriate depending on the child's age and ability to manage his or her food allergy.

Gillespie and colleagues (2007) conducted semi-structured interviews with mothers of children with food allergy. Mothers reported increased vigilance to help identify and assess potential risks in situations or environments for their child as well as strategies to minimize risks "to a personally acceptable level." Caregivers may engage in

avoidance strategies, increased parental monitoring or supervision, and problem-solving for their child to better control an environment. However, it is possible the “personally acceptable level” can vary based on an individual’s level of intolerance of uncertainty. Therefore, it is necessary to examine the role intolerance of uncertainty plays on parenting practices among caregivers of children with food allergy.

Some degree of protection is adaptive given the severe reactions associated with food allergy, such as food-induced anaphylaxis, and limited control in many situations (Bollinger et al., 2006). However, it is still appropriate for children to take on more responsibility for food allergy management as they develop, via collaborative management with caregivers (Gillespie et al, 2007; Klinnert et al., 2015). It is important for caregivers to keep their child safe while still promoting autonomy both in food allergy management and daily life (Gillespie et al., 2007). In fact, caregivers who encouraged shared management in early or middle childhood help their children to become more competent and confident in self-management of their food allergy (Williams et al, 2009). However, caregivers who engage in protective parenting as a way to increase certainty in uncertain or ambiguous situations might limit appropriate developmental activities, such as problem-solving and increasing social competence (Klinnert et al., 2015). For many caregivers, they eventually adjust to having a child with food allergy, have improved confidence and competence in their abilities to manage, and have a decreased sense of fear and worry (Cummings et al., 2010; Gillespie et al., 2007). However, caregivers who are highly intolerant of uncertainty could have more difficulty adjusting to the unpredictability of food allergy and engage in protective parenting behaviors not aligned

with their child's developmental stage (e.g., accompanying child to parties, restricting activities, etc.).

There is limited research on the impact of intolerance of uncertainty on caregivers of children with food allergy. One study by Herbert, Dahlquist, and Bollinger (2012) examined the role maternal intolerance of uncertainty played in mothers' adherence to food challenge referrals. A food challenge is the gold standard for both diagnosing a food allergy and determining whether a child has outgrown a food allergy (Eigenmann, 2018; Herbert et al., 2012) and involves giving children a small dose of the questioned or existing food allergen (Muraro et al., 2014). Herbert and colleagues found that intolerance of uncertainty was related to worry and anxiety among mothers of children with food allergy. The findings also demonstrated that those mothers who did not follow through on a recommended food challenge reported greater intolerance of uncertainty than mothers who did adhere to provider referrals; however, intolerance of uncertainty was not a predictor of adherence. Mothers did report the possibility that the child would tolerate the food was a motivating factor to participate in an oral food challenge. Additionally, mothers reported their trust in the medical provider to effectively treat an allergic reaction was another motivating factor. The opportunity to gain more information about their child's food allergy and confidence in the medical provider may have made the situation seem more certain with increased predictability for potential outcomes, which could help explain why intolerance of uncertainty was not related to adherence.

Additionally, there is minimal research on the relation between pediatric food allergy and protective parenting behaviors. Herbert and Dahlquist (2008) conducted a

study examining young adults with food allergy and their ratings of past parental protection. Participants with a history of food-induced anaphylaxis rated their caregivers as more protective compared to participants without a history of anaphylaxis. This finding demonstrates that caregivers who perceive their child's food allergy to be more severe may engage in more protective parenting behaviors. Additional research is needed to understand the relation between food allergy, intolerance of uncertainty, and protective parenting.

### **Vignette Methodology**

There is limited research on the relation between intolerance of uncertainty and protective parenting as well as the additional factors that play a role in this association. Therefore, determining the most effective methodology for examining the various research questions within the given study required important consideration. Vignette methodology is especially useful when examining topics that may be sensitive to participants or difficult to assess in an ethical manner within an experimental or clinical study (Aguinis & Bradley, 2014; Crafter, Abreu, Cline, & O'Dell, 2015; Evans et al., 2015; O'Dell, Crafter, de Abreu, & Cline, 2012). Vignette studies are commonly used in clinical or health care settings because certain research questions regarding decision-making can be difficult due to ethical or sensitivity concerns, preventing researchers from using an experimental method (Brauer et al., 2009). For instance, vignettes can be used to examine how health care workers make decisions when caring for their patients (Evans et al., 2015). Given this past use of vignette methodology, vignettes may be used to assess how parents make decisions when it comes to caring for their children. Furthermore, vignettes may be useful for assessing attitudes, perceptions, and beliefs in

addition to decision-making (Brauer et al., 2009; Evans et al., 2015), which are important for better understanding parenting decisions.

Past research demonstrates that vignettes do accurately reflect decisions or responses to real-life situations (Evans et al., 2015; Rahman, 1996). Additionally, the use of vignettes can diminish the effects of social desirability in participant responses compared to participants completing an experimental study in person or being asked questions directly (Evans et al., 2015; McKeganey, Abel, & Hay, 1996). The vignette methodology may increase participants' comfort in answering questions more openly and honestly, compared to being asked questions directly or being observed. For example, a study by McKeganey et al. (1996) examined risk behaviors among participants currently using intravenous drugs. The researchers found that participants were more likely to report their willingness to share needles in response to vignettes compared to direct questions about sharing needles. These findings demonstrate the efficacy of vignette methodology in protecting against social desirability and obtaining honest answers to potentially sensitive topics, such as parenting behaviors.

There is limited existing research on intolerance of uncertainty using a vignette methodology. However, a study by Reuman et al. (2015) examined participant anxiety as it related to threat and uncertainty appraisal using vignettes. The researchers were able to depict scenarios that would be challenging to create in a real-life setting through the use of vignettes. For instance, one vignette involved a participant waiting in a physician's waiting room surrounded by other patients who were coughing. Researchers were able to obtain a better understanding for participants' anxiety as it related to their threat and uncertainty appraisals while avoiding any physical or mental harm for the individuals.

This study indicates that vignettes can be useful for learning how participant appraisals of situations can impact their emotions or behaviors.

Vignette methodology has also been used to assess parent perceptions of child's behaviors as it relates to their health status. Walker, Garber, and Slyke (1995) conducted a study in which parent participants read a vignette about a child who was misbehaving. The child either has medically explained pain, medically unexplained pain, depression, or no physical or mental health conditions. Participants were asked to report why they believed the child was misbehaving, affective reactions, and how the child should be punished for their behavior. Study findings indicated that participants viewed the children with medically explained pain as less responsible for their actions and would likely not respond with anger or disappointment. This study helps to demonstrate how vignettes can be used to assess parent views and attitudes and how those may differ based on child's health status.

Past research describes the benefits of using a vignette methodology to help examine more sensitive topics or depict situations that would be difficult or unethical to create in an experimental or clinical setting. Additionally, vignettes may help to limit the impact of social desirability on participant answers. Therefore, vignette methodology was used to help examine a number of research aims for the present study.

### **Present Study**

Within the present literature on protective parenting, there is limited research on the impact of being a caregiver of a child with a chronic illness and even more limited research on being a caregiver of a child with food allergy. Furthermore, there is minimal research examining how intolerance of uncertainty can play a role in the development of

protective parenting practices in general, as well as limited research on the impact of intolerance of uncertainty on protective parenting among caregivers of children with food allergy. Pediatric food allergy presents many unpredictable situations for caregivers to manage in order to keep their child safe, which may contribute to increased protective parenting in situations involving possible allergen exposure. Furthermore, existing literature demonstrates that caregivers of children with chronic illness engage in protective parenting behaviors, even in situations unrelated to the chronic illness (Dahlquist et al., 2014; Power et al., 2003). This finding indicates that protective behaviors may generalize to everyday situations for caregivers of children with chronic illness. Understanding the individual differences and key mechanisms that can help predict protective parenting can help to identify potential areas of intervention to promote more adaptive parental coping strategies.

The present study has a number of different goals including examining how intolerance of uncertainty plays a role in protective parenting and parental worry, how a child's health status may influence protective parenting, and how parental intolerance of uncertainty and child's health status interact to play a role in protective parenting. Additionally, because there is limited research on how intolerance of uncertainty impacts affective and cognitive appraisals in response to ambiguous situations, the current study aims to examine the relation between intolerance of uncertainty and caregiver negative affect, and appraisal of threat and uncertainty within the uncertain parenting situations. The study also explored whether intolerance of uncertainty influences caregivers' appraisals of uncertain situations as possible mediators of the relation between

intolerance of uncertainty and protective parenting and whether health status moderates that mediation.

Caregivers of healthy children and caregivers of children with food allergy between the ages of 8-12 completed an online survey that included measures of protective parenting behaviors and attitudes, intolerance of uncertainty, and worry. Caregivers also responded to four vignettes describing a child in a situation involving some degree of ambiguity or risk, such that the outcome was not certain. Participants rated level of perceived threat, level of perceived uncertainty, and their negative affect in response to each vignette. Participants also rated how likely they would be to engage in a variety of possible parenting behaviors varying in level of protectiveness. The following aims and hypotheses were examined.

**Aim 1:** To examine the relation between intolerance of uncertainty and protective parenting.

*Hypothesis 1a:* Caregivers who are more intolerant of uncertainty will report more protective parenting practices and attitudes on general measures of protective parenting.

*Hypothesis 1b:* Caregivers who are more intolerant of uncertainty will report more protective parenting behaviors in response to vignettes portraying uncertain parenting situations.

**Aim 2:** To examine the relation between child health status (i.e., healthy or food allergic) and protective parenting.

*Hypothesis 2a:* Caregivers of children with food allergy will report more protective parenting behaviors and attitudes compared to caregivers of healthy children on general measures of protective parenting.

*Hypothesis 2b:* The same relation will be seen for reported protective parenting in response to vignettes portraying uncertain parenting situations.

**Aim 3:** To examine whether child health status moderates the relation of intolerance of uncertainty on protective parenting.

*Hypothesis 3a:* Child health status will moderate the association between intolerance of uncertainty and protective parenting in general, such that relation between intolerance of uncertainty and protective parenting will be stronger among caregivers of children with food allergy compared to mothers of healthy children.

*Hypothesis 3b:* The same relation is predicted for reported protective parenting in response to vignettes portraying uncertain parenting situations.

**Aim 4:** To examine whether health status moderates the indirect effect of intolerance of uncertainty on general protective parenting via parental worry.

Hypothesis 4: Child health status will moderate the indirect effect, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

**Aim 5:** To examine the relation between intolerance of uncertainty and reported negative affect in uncertain parenting situations. To examine whether health status moderates the indirect effect of intolerance of uncertainty on protective parenting in vignette scenarios via negative affect.

*Hypothesis 5a:* Caregivers who are more intolerant of uncertainty will report greater negative affect in response to vignettes portraying uncertain parenting situations.

*Hypothesis 5b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

**Aim 6:** To examine the relation between intolerance of uncertainty and uncertainty appraisal in uncertain parenting situations. To examine whether health status moderates the indirect effect of intolerance of uncertainty on protective parenting in vignette scenarios via uncertainty appraisal.

*Hypothesis 6a:* Caregivers who are more intolerant of uncertainty will report greater uncertainty appraisal in response to vignettes portraying uncertain parenting situations.

*Hypothesis 6b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via uncertainty appraisal, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

**Aim 7:** To examine the relation between intolerance of uncertainty and threat appraisal in uncertain vignette situations. To examine whether health status moderates the indirect effect of intolerance of uncertainty on protective parenting in vignette scenarios via threat appraisal.

*Hypothesis 7a:* Caregivers who are more intolerant of uncertainty will report greater threat appraisal in response to vignettes portraying uncertain parenting situations.

*Hypothesis 7b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

**Aim 8:** To explore whether the two dimensions of intolerance of uncertainty (i.e., desire for predictability and uncertainty paralysis) differ in the degree to which they predict protective parenting.

*Hypothesis 8:* There is limited existing literature on how the two dimensions of intolerance of uncertainty may differ in the degree to which they predict protective parenting. Given the exploratory nature of the present aim and limited existing literature, there are no existing directional hypotheses for these exploratory analyses.

## **Method**

### **Participants**

The participants were 158 English-speaking mothers of children ages 8-12. Approximately half of the sample ( $n = 80$ ) were caregivers of children with food allergy, who were at risk for food-induced anaphylaxis as indicated by having been prescribed an epinephrine auto-injector (i.e., Epi-pen). The other half of the sample ( $n = 78$ ) were caregivers of healthy children, who did not have a chronic condition (e.g., asthma, eczema, cancer, cystic fibrosis, diabetes, autism, developmental delay). Prior to enrolling

in the study, eligibility criteria were reviewed to ensure potential participants met necessary requirements. Caregivers of children with autism spectrum disorder, significant developmental delay, or intellectual disability were excluded from both groups. Participants were compensated for their time and effort with a \$10 Amazon gift card. All data were collected between December 2019 and February 2020, prior to the COVID-19 pandemic.

## **Measures**

**Demographic questionnaire.** Caregivers completed a demographic questionnaire (see Appendix A) including number of children in family, child's age, date of birth, sex, race, ethnicity, grade in school, whether or not the child is home-schooled, and special education status. Caregivers were asked about diagnosed medical conditions for their child, including allergic rhinitis/environmental allergies, asthma, eczema, eosinophilic esophagitis (EoE), cancer, cystic fibrosis, diabetes, autism, developmental delay, other chronic illness. Furthermore, caregivers provided information on their own age, race, ethnicity, marital status as well as occupation, educational attainment, and household income. Caregivers were asked to provide the same information about the child's other caregiver (if applicable). Caregivers reported on additional children or adolescents living in the home, their ages, relation to child, and medical conditions (if applicable) (e.g., asthma, eczema, cancer, etc.).

**Food allergy history.** Caregivers of children with food allergy answered questions about their child's food allergy, including age of diagnosis, history of allergic reactions (and in what types of settings), whether or not their child had been prescribed an Epi-pen, whether or not they had to use an Epi-pen, frequency of Epi-pen use, visits to

the emergency department because of food allergy, and what type of doctor cares for their child's food allergy (see Appendix B).

**Intolerance of uncertainty.** Caregivers completed the Intolerance of Uncertainty-12 (IU-12) (Carleton et al., 2007) (see Appendix C). The IU-12 consists of 12 statements describing different aspects of intolerance of uncertainty (e.g., “*I must get away from uncertain situations*” and “*It frustrates me not having all the information I need*”) that caregivers rate on a 5-point Likert scale (1 = *not characteristic of me* to 5 = *entirely characteristic of me*). The IU-12 has two subscales: a 5-item uncertainty paralysis subscale with possible scoring ranging from 5-25, and a 7-item desire for predictability subscale with possible scores ranging from 7-35. The IU-12 also yields a total score, with possible scores ranging from 12-60. The items were summed for each subscale and full scale to generate an *uncertainty paralysis* score, *desire for predictability* score, and total *intolerance of uncertainty* score, with higher scores representing a greater level of intolerance of uncertainty. The IU-12 has been shown to have excellent internal reliability ( $\alpha = .93$ ), convergent validity with measures of worry, anxiety, and depression, and discriminant validity in its ability to better explain symptoms worry, anxiety, and depression over and above neuroticism and other anxiety disorder symptoms (Carleton et al., 2007; Hale et al., 2016; McEvoy & Mahoney, 2011). The coefficient alpha was .89 for the current sample for the IU-12.

**Protective parenting: Protectiveness.** Parents completed the Protectiveness Scale developed by Hardy, Power, and Jaedicke (1993), which measures the construct of protectiveness in the form of parents taking control of a situation and protecting their child from negative affect (see Appendix D). There are 12 items (e.g., “*If my child hurt*

*himself at a friend's house I would not let him or her go back there to play*" and *"If my child is upset about something that happened at school, I would call his or her teacher to schedule a conference"*) rated on a 6-point Likert scale (1 = *not at all descriptive of me* to 6 = *highly descriptive of me*). Possible scores range from 12-72. High scores represent greater protective parenting. The coefficient alpha for the original sample was .76 (Hardy et al., 1993) and .62 in a previous study on intolerance of uncertainty and protective parenting among mothers of children with food allergy (Steiner, 2017). The coefficient alpha was .78 for the current sample.

**Protective parenting: Problem-solving directiveness.** Participants completed the Problem-Solving Directiveness scale developed by Hardy, Power, and Jaedicke (1993), which measures protectiveness in the form of parental intrusion and autonomy granting (see Appendix E). There are 10 items (e.g., *"I sit with my child while he or she is doing homework in case he/she needs help"* and *"I allow my child to work out small arguments with friends independent of adult help"*) rated on a 6-point Likert scale (1 = *never* to 6 = *always*). Possible scores range from 10-60. After reverse scoring where appropriate, the answers were summed with greater scores representing greater protective parenting. The coefficient alpha of the original sample was .76 (Hardy et al., 1993) and .64 in a sample of mothers of children with food allergy (Steiner, 2017). The coefficient alpha was .72 for the current sample.

Past research demonstrates that the Protectiveness Scale and Problem-Solving Directiveness Scale are significantly correlated ( $r = .51, p < .01$ ) (Steiner, 2017). The Protectiveness Scale and Problem-Solving Directiveness Scale were significantly correlated ( $r = .56, p < .01$ ) in the present study as well. Consequently, the total scores

from each measure were standardized to account for the discrepant number of items in each measure (i.e., 12 items in the protectiveness measure and 10 items in the problem-solving directiveness measure) and then combined to form the *general protective parenting* score. The coefficient alpha for the combined measures was .83 for the current sample.

**Caregiver worry.** Participants completed the Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990) to assess the frequency and intensity of worry (see Appendix F). There are 16 items rated on a 5-point Likert scale (1 = *not at all typical of me* to 5 = *very typical of me*) with statements such as “*I worry about projects until they are all done*” and “*Many situations make me worry.*” After reverse scoring where appropriate, items were summed to generate a caregiver *general worry* score, with higher scores representing more frequent and intense worry. Possible scores range from 16-80. The measure has good test-retest reliability ( $r = .92$  over 8-10 weeks), excellent internal consistency ( $\alpha = .93$ ), convergent validity with other measures of worry and anxiety, and discriminant validity in its ability to significantly discriminate between anxiety disorder groups (Meyer et al., 1990; Molina & Borkovec, 1994). The coefficient alpha was .94 for the current sample.

### **Procedure**

Approval from the UMBC Institutional Review Board (IRB) was obtained prior to enrolling participants. All study procedures were completed online via a Qualtrics survey.

**Recruitment.** Caregivers of healthy children and caregivers of children with food allergy were recruited from online caregiver groups, neighborhood groups, and social media posts. Caregivers of children with food allergy were also recruited from

online food allergy groups. Additionally, for both groups, caregivers of healthy children and children with food allergy who participated in prior studies in the Pediatric Psychology Lab and expressed interest in future participation were contacted.

Participants completed an eligibility screener in which caregivers of both healthy children and children with food allergy reported their child's age, whether or not their child had a food allergy diagnosis, whether or not their child had been prescribed an Epi-pen (in order to determine their risk of anaphylaxis), and any existing chronic conditions (Appendix G). Caregivers of children with food allergy who had not been prescribed an Epi-pen were considered ineligible. Those participants whose children did not meet eligibility criteria were informed and directed out of the link. Caregivers whose children met eligibility criteria then completed informed consent and proceeded with the demographics questionnaire and vignette task followed by self-report measures. Self-report measures were completed last to prevent caregivers from being sensitized to study aims. Given the possibility that caregivers may have more than one child with food allergy within the given age range of 8-12, prior to beginning the study, caregivers were instructed to provide information and consider their oldest child between the age of 8-12 as the target child. Caregivers of multiple healthy children within this age range were instructed to do the same to maintain consistency across groups.

**Vignette task.** A vignette methodology was used to assess a number of variables, including caregiver appraisals of uncertainty, threat, and negative affect in the face of uncertain situations and caregivers' report of their likelihood of using protective parenting behaviors in response to an uncertain situation. Four different scenarios that involved some degree of uncertainty and the potential for a negative outcome for the

child (e.g., physical harm or negative affect) were created (see Appendix H). The vignettes detailed situations that were applicable to both healthy children and children with food allergy to better assess how protective parenting generalizes to everyday situations (i.e., no details about medication adherence, medical appointments, etc.). Vignettes were presented in a randomized order generated by Qualtrics. All vignettes were phrased in the second person and instructed participants to imagine themselves in the given scenario involving their child (Koerner & Dugas, 2008).

*Vignette development.* For the present study, caregiver behaviors were considered protective when the behavior was not developmentally appropriate given a child's age or necessary given the risk-potential of the situation. Protective parenting constructs included intrusive protectiveness, avoidance/behavioral control, and parental monitoring. Three protective parenting behaviors that corresponded to above constructs were generated for each vignette. Specifically, avoidance/behavioral control was operationalized as the caregiver restricting the child from participating in an activity as a way to protect against physical or negative affect for the child. Parental monitoring was defined as a caregiver directly observing the child and monitoring their behaviors or decisions. Finally, problem-solving was operationalized as the caregivers providing input or unsolicited help (i.e., being intrusive) in a child's situation, as a way to remove potential obstacles for the child in order to protect against physical or negative affect.

Six filler items were also created to help mask the main purpose of the task. Three of these items reflected less protective parenting behaviors that paralleled the protective parenting behaviors. Less avoidance/behavioral control was defined as having the child participate in an activity with certain modifications or support (i.e., engagement

with accommodation). Less intrusive parental monitoring was defined as obtaining information about a situation by asking questions or periodically checking in with one's child. Less intrusive problem-solving was operationalized as caregivers informing their child that they are available to help if needed. Three general parenting behaviors were also created as filler items. The general parenting behavior categories included providing resources, giving information, and providing emotional support. Thus, a total of nine parenting behaviors (i.e., three protective, three less protective, three general) were developed for each vignette.

*Vignette refinement and pilot testing.* The first step in finalizing the vignettes was to pilot test each vignette with parents and use the “think-aloud” methodology to identify any potential confusion, as done in previous research (Hahn, Dahlquist, Hoehn, & Bollinger, 2017; Jaspers, Steen, van de Bos, & Geenen, 2004). Three parents volunteered to provide input and report their thoughts aloud as they completed the measure. Their comments, questions, and ratings on behavioral items were used to revise the vignettes and parenting behaviors to improve clarity.

The next step was to obtain expert input on the vignette content and behavioral response items as well as rate each of the nine items on level of protectiveness. Three psychologists with parenting research experience were provided with the operational definitions for protective parenting and definitions for each parenting construct and asked to rate the behavioral items on a 5-point Likert scale (1 = *not at all protective* to 7 = *very protective*). Revisions were made based on their feedback. Expert raters (i.e., one developmental psychologist, two child clinical psychologists) then rated the revised items. These revisions and ratings yielded a set of nine items for each vignette. As

expected, the three items designed to reflect protective parenting were rated as more highly protective by all three raters, and the remaining items were rated as less protective or not at all protective (see Appendix I).

*Vignette administration.* Vignettes were presented in a randomized order generated by Qualtrics. Caregivers provided a series of Likert ratings assessing uncertainty appraisal (e.g., “*How uncertain is this situation?*”) (3 items), negative affect (e.g., “*How worried would you be in this situation?*”) (3 items), perceived threat (e.g., “*How potentially harmful is this situation?*”) (3 items), associated features of intolerance of uncertainty (e.g., “*How difficult would it be for you to decide what to do in this situation?*”) (2 items) as well as a number of filler questions to mask the potential aims of the study (e.g., “*How likely would you be to seek advice from others on this matter?*”) (3 items) (See Appendix J). These items were rated on a 7-point Likert scale (e.g., 1 = *not at all worried* to 7 = *very worried*).

A total *uncertainty appraisal* score was generated by summing the three uncertainty items for each of the four vignettes, with possible scores ranging from 12-84 and higher scores indicating greater uncertainty appraisal. The coefficient alpha for the sample was .73. Total *negative affect* scores and total *threat appraisal* scores were generated in a similar manner, with possible scores ranging from 12-84 and higher scores indicating greater negative affect and greater threat appraisal, respectively. The coefficient alpha for negative affect was .83; coefficient alpha for threat appraisal was .77 for the sample.

Following completion of these ratings, caregivers were presented with a list of nine possible actions they might take for each vignette. Items were presented in random

order, rather than in order of protectiveness (see Appendix H). Caregivers rated each item on a 7-point Likert scale (1 = *not at all likely* to 7 = *very likely*) to indicate how likely they would be to engage in each possible behavior. A *vignette protective parenting* score was generated by summing the answers to the three protective parenting items for each of the four vignettes. Possible scores ranged from 12 – 84. A higher score indicated more protective parenting. Coefficient alpha for vignette protective parenting was .74 for the current sample.

Caregivers then completed the self-report questionnaires in the following order: Intolerance of Uncertainty Scale, Protectiveness Scale, Problem-Solving Directiveness Scale, Penn State Worry Questionnaire, and food allergy history form (if applicable). Upon completion of the study, participants were emailed a \$10 Amazon gift card.

### **Power Analysis**

*G\*Power 3.1* (Faul, Erdfelder, Lang, & Buchner, 2009) was used to conduct a power analysis for linear regression analysis based on guidelines from Cohen (1992). The power analyses indicated that a sample of 158 participants would have adequate power (.80) to detect small/medium effect sizes ( $f^2 > .06$ ) for hypotheses that required three-predictor regression analyses. Additionally, *MedPower* (Kenny, 2017) was used to conduct a power analysis for mediation analyses based on guidelines from Fairchild, MacKinnon, Taborga, and Taylor (2009). For analyses that required mediation analysis, a sample of 158 participants was determined to have sufficient power (.80) to detect small indirect effects (.14)

## Results

Two hundred and seven participants started the survey, 36 participants were not eligible due to child's comorbid chronic illness ( $n = 23$ ), child with food allergy not prescribed an Epi-Pen ( $n = 10$ ), and child age ( $n = 3$ ). Five participants did not complete the survey. The resulting eligible sample of 166 participants included only eight fathers. Because of the disproportionate number of mothers relative to fathers, and given the fact that mothers and fathers may have different levels of involvement in managing their child's food allergy (Hoehn, Dahlquist, Hahn, & Bollinger, 2017) as well as differing levels of food allergy related stress and anxiety (King, Knibb, & Hourihane, 2009), the eight fathers were removed from the final sample.

The final sample consisted of 158 mothers ( $M_{age} = 40.40$  years,  $SD = 6.26$ ) of children aged 8-12 years ( $M_{age} = 10.01$  years,  $SD = 1.37$ ). Approximately half of the sample were mothers of children with food allergy ( $n = 80$ ) and the other half was mothers of healthy children ( $n = 78$ ). The majority of mothers had at least a 4-year college degree (75.9%) and reported their race (84.81%) and their child's race (81.00%) as White. See Table 1 for further demographic information. The majority of participating mothers lived in Maryland (43.00%). See Table 2 for further geographic information.

### Preliminary Analyses

**Data screening.** The means and standardized deviations for the independent and dependent variables are presented in Table 3 for the entire sample, Table 4 for mothers of children with food allergy, and Table 5 for mothers of healthy children. Prior to conducting main analyses, the data were assessed for normality to screen for any skew or kurtosis. Based on the guidelines by Tabachnick and Fidell (2011), all variables had a

normal distribution. No significant outliers were identified, and all cases were analyzed. See Table 6 correlation matrix for main variables for mothers of children with food allergy and Table 7 correlation matrix for main variables for mothers of healthy children. Finally, analyses indicated similar vignette protective parenting scores across vignettes for both groups, with no significant difference across vignettes ( $p = .08$ ). See Appendix K for descriptive statistics for vignette protective parenting scores.

**Covariates.** Child gender, age, birth order as well as caregiver race and level of education were considered as potential covariates (see Table 8). Child age was significantly related to general protective parenting, vignette protective parenting, negative affect, and threat appraisal and were included as covariates in subsequent analyses involving those variables. Child gender was significantly related to general protective parenting scores and therefore was included as covariates in subsequent analyses involving general protective parenting. Caregiver level of education was significantly related to vignette protective parenting scores and therefore was included as a covariate in analyses involving vignette protective parenting scores. Additionally, presence of asthma and eczema diagnoses were considered as potential covariates in the food allergy group given the high comorbidity of asthma and eczema diagnoses among children with food allergy and the associated medical responsibilities and stressors caregivers may experience. However, analyses indicated that neither the presence of asthma nor eczema were not significantly related to any dependent variables; therefore, they were not controlled for in any analyses.

### **Primary Analyses**

#### **Hypothesis 1: Intolerance of uncertainty and protective parenting.**

*Hypothesis 1a:* Caregivers who are more intolerant of uncertainty will report more protective parenting practices and attitudes on general measures of protective parenting.

*Hypothesis 1b:* Caregivers who are more intolerant of uncertainty will report more protective parenting behaviors in response to vignettes portraying uncertain parenting situations.

After controlling for covariates, multiple regression analyses revealed that intolerance of uncertainty was significantly positively related to caregiver general protective parenting ( $\beta = .34, t(154) = 4.66, p < .001$ ), and vignette protective parenting ( $\beta = .32, t(154) = 4.27, p < .001$ ). Caregivers who reported more intolerance of uncertainty were likely to report more protective parenting, which supported the first hypothesis. An independent-sample t-test revealed that the mean for intolerance of uncertainty for mothers of children with food allergy ( $M = 35.19$ ) was significantly greater than the mean for mothers of healthy children ( $M = 31.31$ ) ( $p = .008$ ).

**Hypothesis 2: Impact of health status on reported protective parenting.**

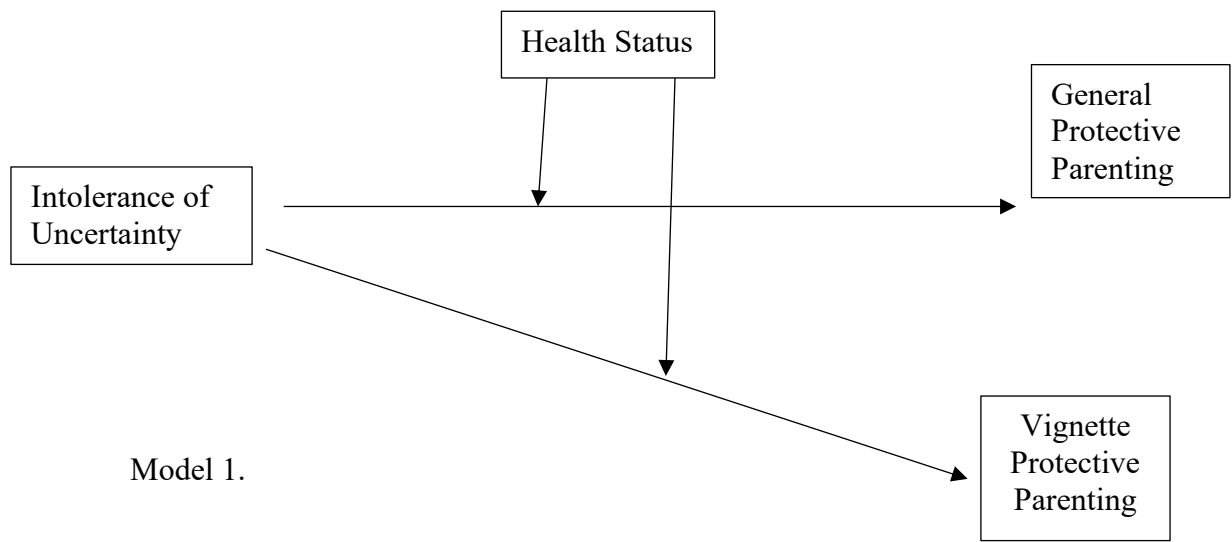
*Hypothesis 2a:* Caregivers of children with food allergy will report more protective parenting behaviors and attitudes compared to caregivers of healthy children on general measures of protective parenting.

*Hypothesis 2b:* The same relation will be seen for reported protective parenting in response to uncertain parenting situations.

Child health status was dummy coded in two linear regression analyses in order to test whether child's health status (i.e., food allergic versus healthy) was related to protective parenting. Analyses demonstrated that, after controlling for covariates, health status was significantly related to general protective parenting ( $\beta = -.20, t(154) = -2.64, p$

=.009). Mothers of children with food allergy reported more general protective parenting behaviors ( $M = .25$ ,  $SD = 2.01$ ) than mothers of healthy children ( $M = -.47$ ,  $SD = 2.17$ ). These findings supported hypothesis 2a.

Linear regression analyses indicated that, when controlling for covariates, child health status was not significantly related to vignette protective parenting ( $\beta = -.09$ ,  $t(154) = -1.09$ ,  $p = .276$ ). Mothers of children with food allergy reported levels of vignette protective parenting behaviors ( $M = 46.43$ ,  $SD = 13.13$ ) similar to mothers of healthy children ( $M = 44.69$ ,  $SD = 10.70$ ), which did not support hypothesis 2b.



**Hypothesis 3: Health status as moderator of the relation between intolerance of uncertainty and protective parenting (See Model 1).**

*Hypothesis 3a:* Child health status will moderate the association between intolerance of uncertainty and protective parenting in general, such that relation between intolerance of uncertainty and protective parenting will be stronger among caregivers of children with food allergy compared to mothers of healthy children.

*Hypothesis 3b:* The same relation is predicted for reported protective parenting in response to vignettes portraying uncertain parenting situations.

Two regression models were tested using PROCESS model 1 (Hayes, 2012) to determine if child health status moderated the relation between intolerance of uncertainty and both protective parenting variables. After controlling for covariates, analyses revealed that child health status moderated the relation between intolerance of uncertainty and general protective parenting ( $b = -.06$ ,  $SE = .03$ ,  $t(152) = -2.29$ ,  $p = .023$ ) (see Figure 1) as well as vignette protective parenting ( $b = -.40$ ,  $SE = .19$ ,  $t(152) = -2.06$ ,  $p = .041$ ) (see Figure 2). These results indicated that the strength of the relation between intolerance of uncertainty and protective parenting was dependent on child health status, such that the relation between intolerance of uncertainty and protective parenting among mothers of children with food allergy was stronger than that of mothers of healthy children. These findings supported hypothesis 3a and 3b.

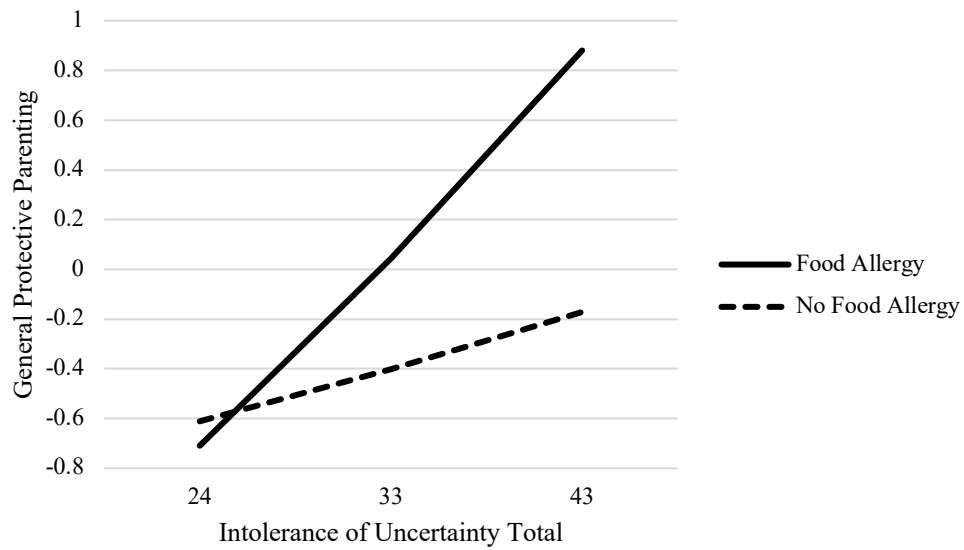


Figure 1. Health status as moderator of the relation between general protective parenting and intolerance of uncertainty

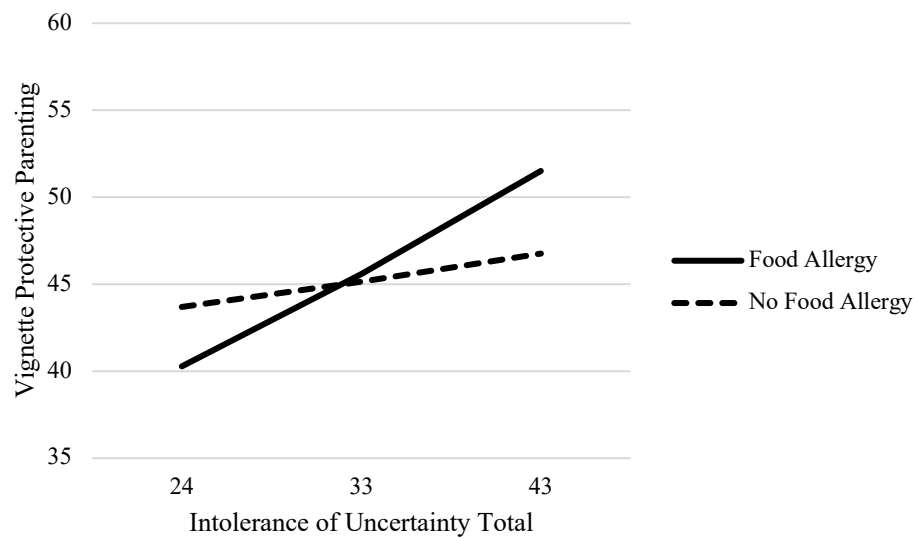
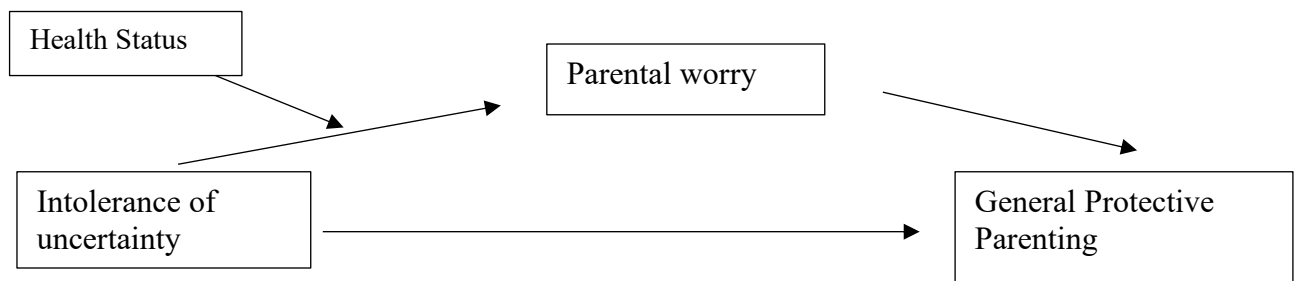


Figure 2. Health status as moderator of the relation between vignette protective parenting and intolerance of uncertainty



Model 2.

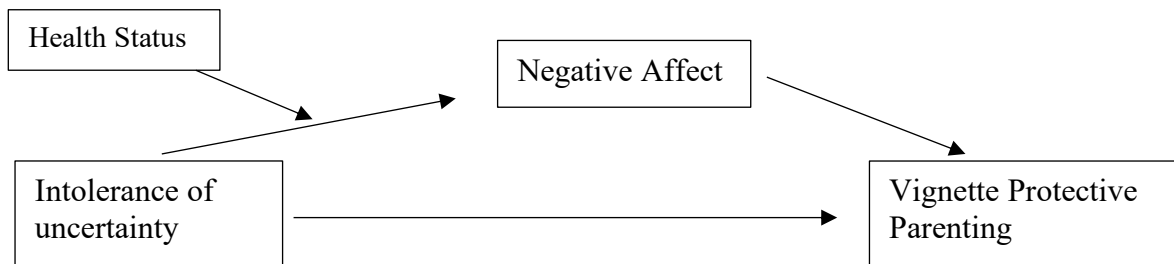
**Hypothesis 4: Moderated mediation – health status, intolerance of uncertainty, parental worry, general protective parenting (See Model 2).**

Hypothesis 4: Child health status will moderate the indirect effect of intolerance of uncertainty on general protective parenting via worry, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

One moderated mediation analysis was conducted using PROCESS model 7 (Hayes, 2012) to assess whether child health status moderated the indirect effect of intolerance of uncertainty on general protective parenting score via parental worry, after controlling for covariates (see Table 7). The bootstrap confidence interval for the index of moderated mediation included zero (95% CI [-.0196, .0037], indicating there was no significant moderated mediation for this analysis, which did not support hypothesis 4.

Examination of the indirect effects yielded bootstrap confidence intervals that included zero for both mothers of children with food allergy 95% CI [-.0325, .0107] and mothers of healthy children, 95% CI [-.0473, .0142], indicating that parental worry did not mediate the effect of intolerance of uncertainty on general protective parenting. The interaction of intolerance of uncertainty and health status on parental worry was

significant ( $b = .40$ ,  $SE = .19$ ,  $t = 2.04$ ,  $p = .043$ ), demonstrating that the relation between intolerance of uncertainty and parental worry was weaker for mothers of children with food allergy ( $r = .62$ ,  $p < .001$ ) compared to mothers of healthy children ( $r = .73$ ,  $p < .001$ ).



Model 3.

**Hypothesis 5: Moderated mediation – health status, intolerance of uncertainty, negative affect, vignette protective parenting (see Model 3).**

*Hypothesis 5a:* Caregivers who are more intolerant of uncertainty will report greater negative affect in response to vignettes portraying uncertain parenting situations.

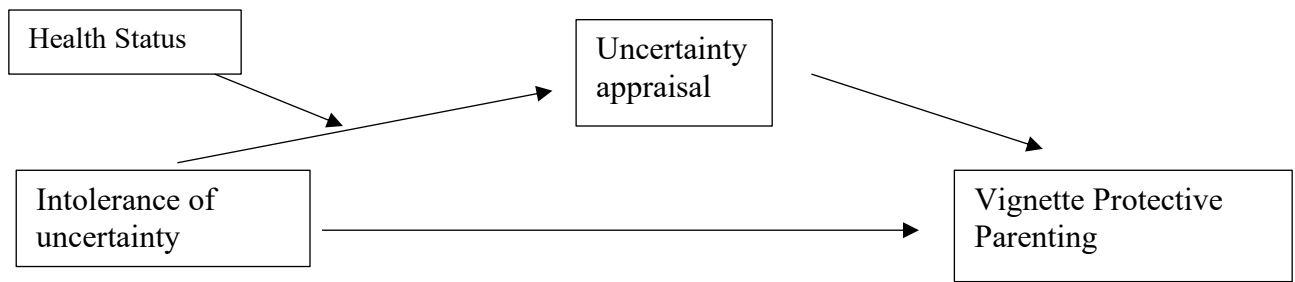
*Hypothesis 5b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

One moderated mediation analysis was conducted using PROCESS model 7 (Hayes, 2012) to assess whether child health status moderated the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect, after controlling for covariates (see Table 8). The relation between intolerance of uncertainty and negative affect was significant ( $b = 1.02$ ,  $t = 3.66$ ,  $p < .001$ ), suggesting that

caregivers who reported more intolerance of uncertainty also reported higher negative affect in response to the uncertain vignette situations. This finding supported hypothesis 5a.

The index of moderated mediation did not include zero (95% CI [-.3657, -.0004]), demonstrating significant moderated mediation. The bootstrap confidence intervals for indirect effects for mothers of children with food allergy (95% CI [.1634, .4639]) and mothers of healthy children (95% CI [.0130, .2701]) did not include zero, signifying that negative affect mediated the relation between intolerance of uncertainty and vignette protective parenting, such that mothers who reported greater intolerance of uncertainty reported more negative affect and more vignette protective parenting behaviors.

The interaction of health status and intolerance of uncertainty on negative affect was significant ( $b = -.36$ ,  $t = -2.00$ ,  $p = .047$ ), indicating the relation between intolerance of uncertainty and negative affect was stronger for mothers of children with food allergy ( $\beta = .64$ ,  $t(77) = .48$ ,  $p < .001$ ) compared to mothers of healthy children ( $\beta = .31$ ,  $t(75) = .27$ ,  $p = .013$ ). This result further explains the direction of the significant moderated mediation, such that the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect was stronger for mothers of children with food allergy compared to mothers of healthy children. This finding provided support for hypothesis 5b.



Model 4.

**Hypothesis 6: Moderated mediation – health status, intolerance of uncertainty, uncertainty appraisal, vignette protective parenting (see Model 4).**

*Hypothesis 6a:* Caregivers who are more intolerant of uncertainty will report greater uncertainty appraisal in response to vignettes portraying uncertain parenting situations.

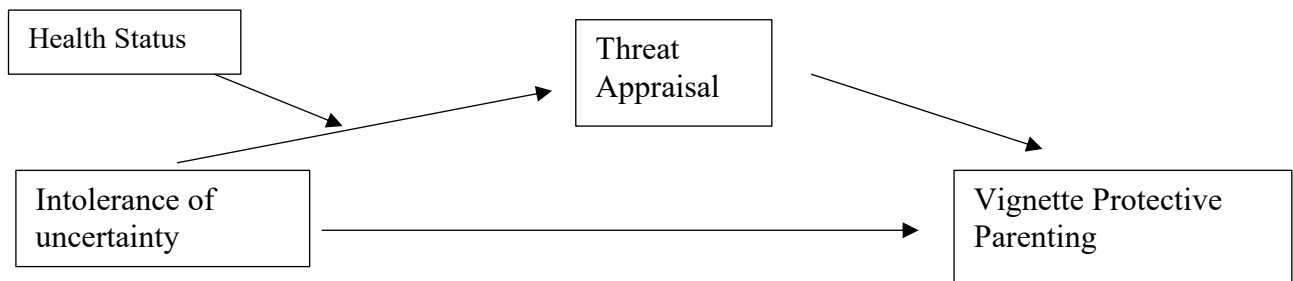
*Hypothesis 6b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via uncertainty appraisal, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

PROCESS model 7 (Hayes, 2012) was used to conduct one moderated mediation analysis to assess whether health status moderated the indirect effect of intolerance of uncertainty on vignette protective parenting score via uncertainty appraisal, after controlling for covariates (see Table 9). Intolerance of uncertainty was positively related to uncertainty appraisal ( $b = 1.07$ ,  $SE = .24$ ,  $t = 4.17$   $p < .001$ ). Mothers who were more intolerant of uncertainty were more likely to report greater uncertainty appraisal, which supports hypothesis 6a.

The index of moderated mediation bootstrap confidence intervals did not include zero (95% CI  $[-.2871, -.0229]$ ), indicating significant moderated mediation. The

bootstrap confidence intervals for the indirect effect for mothers of children with food allergy did not include zero (95% CI [.0601, .3408]), while the bootstrap confidence intervals for mothers of healthy children did include zero (95% CI [-.0194, .1355]). These results indicated that uncertainty appraisal significantly mediated the association between intolerance of uncertainty and vignette protective parenting, but only for mothers of children with food allergy.

The interaction of health status and intolerance of uncertainty on uncertainty appraisal was significant ( $b = -.42$ ,  $SE = .16$ ,  $t = -2.72$ ,  $p = .007$ ), indicating that health status moderated this association, such that the association between intolerance of uncertainty and uncertainty appraisal was stronger for mothers of children with food allergy ( $r = .50$ ,  $p < .001$ ) compared to mothers of healthy children ( $r = .17$ ,  $p = .140$ ). Based on these results, the association between intolerance of uncertainty on vignette protective parenting via uncertainty appraisal was stronger for mothers of children with food allergy, which supports hypothesis 6b.



Model 5.

**Hypothesis 7: Moderated mediation – health status, intolerance of uncertainty, threat appraisal, vignette protective parenting (see Model 5).**

*Hypothesis 7a:* Caregivers who are more intolerant of uncertainty will report greater threat appraisal in response to vignettes portraying uncertain parenting situations.

*Hypothesis 7b:* Child health status will moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal, such that the indirect effect will be stronger for mothers of children with food allergy compared to mothers of healthy children.

One moderated mediation analysis was conducted using PROCESS model 7 (Hayes, 2012) to assess whether health status moderated the indirect effect of threat appraisal on intolerance of uncertainty on vignette protective parenting score via threat appraisal in an uncertain vignette situation, after controlling for covariates (see Table 10). The relation between intolerance of uncertainty and threat appraisal was not significant within the moderated mediation analysis ( $b = .41$ ,  $SE = .22$ ,  $t = 1.82$ ,  $p = .071$ ), given the variance accounted for by the interaction effect. However, a post-hoc linear regression analysis for the effect of intolerance of uncertainty on threat appraisal, when controlling for covariates, yielded a significant association ( $\beta = .25$ ,  $t(155) = 3.20$ ,  $p = .002$ ). Thus,

mothers who reported more intolerance of uncertainty reported great threat appraisal in response to the uncertain vignette situations, which supports hypothesis 7a.

The index of moderated mediation bootstrap confidence intervals included zero (95% CI [-.2904, .1119]), indicating no significant moderated mediation for this analysis. The interaction of health status and intolerance of uncertainty on threat appraisal was not significant ( $b = -.12$ ,  $SE = .15$ ,  $t = -.83$ ,  $p = .409$ ). However, examination of the indirect effects yielded bootstrap confidence intervals that did not include zero for mothers of children with food allergy (95% CI [.0388, .3528]) but did include zero for mothers of healthy children (95% CI [-.0232, .2374]). Post-hoc exploration of the data found intolerance of uncertainty was significantly positively related to threat appraisal for mothers of children with food allergy ( $\beta = .28$ ,  $t(77) = .27$ ,  $p = .014$ ) but not for mothers of healthy children ( $\beta = .18$ ,  $t(75) = .21$ ,  $p < .063$ ). The bootstrapped indirect effect was .18 for mothers of children with food allergy and .11 for mothers of healthy children. The small effect sizes for both groups can help to explain the lack of significant moderated mediation. Taken together, these analyses suggest that threat appraisal mediated the relation between intolerance of uncertainty and vignette protective parenting only for mothers of children with food allergy.

### **Exploratory Analysis**

**Hypothesis 8: Association between desire for predictability and uncertainty paralysis (i.e., two dimensions of intolerance of uncertainty) and protective parenting.** Four multivariable regression analyses were conducted to examine whether the two intolerance of uncertainty dimensions differed in the degree to which they predict protective parenting. After controlling for covariates, regression analyses revealed that

desire for predictability was significantly related to general protective parenting ( $\beta = .29$ ,  $t(154) = 3.94$ ,  $p < .001$ ) and that uncertainty paralysis dimension was also significantly related to general protective parenting ( $\beta = .33$ ,  $t(154) = 4.57$ ,  $p < .001$ ). The Fisher  $r$  to  $Z$  transformation was applied to the  $r$  values for each correlation, followed by the Steiger's  $Z$ -test for dependent samples to compare the magnitude of the paired correlations (Lee & Preacher, 2013). Analyses yielded no significant difference in the magnitude of the paired correlations ( $Z = -.32$ ,  $p = .746$ ).

The same pattern of analyses was conducted for the vignette protective parenting variable and two intolerance of uncertainty dimension variables. After controlling for covariates, regression analyses revealed that both desire for predictability ( $\beta = .28$ ,  $t(154) = 3.72$ ,  $p < .001$ ) and uncertainty paralysis ( $\beta = .30$ ,  $t(154) = 4.07$ ,  $p < .001$ ) were significantly related to vignette protective parenting. Using the calculator from Lee and Preacher (2013), findings yielded no significant difference in the magnitude of these paired analyses ( $Z = -.24$ ,  $p = .814$ ). These results demonstrated that the strength of the relations between the two intolerance of uncertainty dimensions and vignette protective parenting was not significantly different.

## **Discussion**

The present study examined the relation between intolerance of uncertainty and protective parenting and the various factors that can impact this relation, including child health status, parental worry, and caregiver negative affect and appraisal of uncertainty and risk in ambiguous parenting situations. Caregivers who were more intolerant of uncertainty were more likely to report protective parenting behaviors in response to a general parenting questionnaire and in response to vignettes portraying uncertain

parenting situations. The findings also demonstrated that child health status moderated this relation, such that the relation was stronger for mothers of children with food allergy than mothers of healthy children. Additionally, caregiver negative affect, uncertainty appraisal, and threat appraisal in uncertain situations explained the association between intolerance of uncertainty and protective parenting in response to uncertain parenting vignettes. However, the results did not support the hypothesis that parental worry would mediate the relation between intolerance of uncertainty and protective parenting. These findings will be discussed in greater detail in the following sections.

**Aim 1: Relation between intolerance of uncertainty and protective parenting.**

Mothers who reported greater intolerance of uncertainty reported more general protective parenting and more protective behaviors in response to the uncertain parenting vignettes. These results are consistent with the concept that individuals who are more intolerant of uncertainty will work to avoid ambiguity in their lives (Dugas et al., 2001) and may use coping strategies to help manage discomfort related to uncertainty (Carleton, 2016; Dugas et al., 1997; Fergus & Valentiner, 2011). Mothers who are more intolerant of uncertainty may utilize protective parenting behaviors as a coping strategy in the face of uncertainty in order to increase the likelihood of a certain outcome and avoid a negative outcome. The finding that intolerance of uncertainty was positively related to general protective parenting is consistent with past research by Steiner et al. (2019) that used the same measure to assess general protective parenting. However, the study by Steiner et al. only examined mothers of children with food allergy. The present study demonstrates that intolerance of uncertainty is an important predictor of protective

parenting and can help explain individual differences in parenting decisions regardless of the child's health status.

**Aim 2: Relation between child health status and protective parenting.**

As predicted, mothers of children with food allergy reported significantly more general protective parenting behaviors compared to mothers of healthy children. The general protective parenting questionnaires explored parental behaviors related to taking control, protecting from negative affect, and autonomy granting. The questionnaires assessed these parenting behaviors in situations that a child may encounter in everyday life, including spending time with friends, completing school assignments, choosing activities, and having disputes with peers. These situations were not directly related to food allergy management or food allergen exposure; nonetheless, mothers of children with food allergy reported more general protective parenting behaviors.

This finding was consistent with past research that revealed that caregivers of children with chronic illness engage in or report more protective parenting behaviors, even in situations unrelated to their medical condition (Dahlquist et al., 2014; Power et al., 2003). Caregivers of children with chronic health conditions, including food allergy, experience frequent, unpredictable challenges and potential threats to a child's physical safety (Anderson & Coyne, 1993; Bollinger et al., 2006; Gillespie et al., 2007; Valentiner & Knibb, 2011). Caregivers of children with food allergy may therefore be more primed to engage in protective parenting, even in situations not directly related to food allergy, based on their experience with potentially life-threatening challenges in caring for their child. This finding adds to the limited literature demonstrating that caregivers of children

with chronic illness engage in protective parenting behaviors, even outside the scope of their chronic illness (Dahlquist et al., 2014; Holmbeck et al., 2002; Power et al., 2003)

In contrast, child health status did not affect caregivers' protective parenting responses to the uncertain vignette situations. There was no significant difference in reports of protective parenting in response to the uncertain vignettes between the mothers of healthy children and mothers of children with food allergy. Research by Dahlquist et al. (2014) and Power et al. (2003) demonstrated that mothers of children with chronic illness engaged in more protective parenting behaviors during an in-person experimental task involving a puzzle or a game compared to mothers of healthy children. Therefore, it was expected that mothers of children with food allergy would have reported greater protective parenting in response to the vignettes. In comparison to the existing experimental research by Dahlquist et al. (2014) and Power et al. (2003), the specific situations described in the vignettes involved greater potential for an adverse outcome (i.e., physical harm, poor grade on assignment, etc.) compared to the potential resulting negative affect if the child did not accurately complete a puzzle. Therefore, the described uncertain situations may have elicited similar levels of reported protective parenting from participating mothers, regardless of child health status.

Examining child health status and its relation to uncertain situation protective parenting alone may not have yielded a strong enough association without considering additional influencing factors. Having a child with food allergy may not always lead to significantly greater reports of protective parenting in the context of an uncertain situation. Individual differences in the caregiver, such as intolerance of uncertainty,

rather than the child's health status alone may play an important role in whether caregivers engage in protective parenting behaviors in uncertain situations.

**Aim 3: Health status as a moderator of the relation between intolerance of uncertainty and protective parenting.**

Health status moderated the relation of intolerance of uncertainty on both protective parenting variables, such that the relation between intolerance of uncertainty and protective parenting was stronger for mothers of children with food allergy compared to mothers of healthy children. As previously indicated, individuals who are more intolerant of uncertainty dislike any ambiguity or the potential for a negative outcome (Buhr & Dugas, 2002). Because food allergy is often unpredictable and involves potentially life-threatening reactions (Gillespie et al., 2007; Primeau et al., 2000; Valentine & Knibb, 2011), mothers of children with food allergy experience frequent uncertain situations involving their child. Given this unpredictable nature of food allergy, intolerance of uncertainty may become especially salient with repeated exposure to uncertain situations. In this case, food allergy may heighten the impact of intolerance of uncertainty for caregivers and heighten the need to engage in coping strategies, such as protective parenting, in order to manage uncertainty.

The mean for intolerance of uncertainty for mothers of children with food allergy ( $M = 35.19$ ) was greater than the mean for mothers of healthy children ( $M = 31.31$ ). The respective intolerance of uncertainty means are comparable to the clinical and non-clinical sample means reported in the literature. Khawaja and Yu (2010) found that the overall mean on the Intolerance of Uncertainty Scale – Short Version was greater for clinical sample (i.e., participants diagnosed with an anxiety disorder) ( $M = 36.76$ ) than

the non-clinical sample ( $M = 30.62$ ). There is not a specific clinical cutoff for the Intolerance of Uncertainty Scale (either full or short version). However, in the current study, the mothers of children with food allergy had scores comparable to individuals with a diagnosed anxiety disorder. This finding provides support for the fact that mothers of children with food allergy experience increased uncertainty and related stress.

It is possible that the more uncertainty or ambiguity an individual tends to experience in their life, the more the intolerance of uncertainty personality characteristic plays a role in subsequent affective and cognitive appraisals and behaviors. For example, a caregiver of a healthy child with similar levels of intolerance of uncertainty may not experience as much frequent unpredictability with the potential for severe, life-threatening consequences and may be less primed to engage in protective parenting behaviors. This difference in the frequency and severity of uncertainty exposure between caregivers of children with food allergy or healthy children can help to explain why the association between intolerance of uncertainty and protective parenting was stronger for mothers of children with food allergy. Intolerance of uncertainty and having a child with a chronic condition are both risk factors for protective parenting; however, when these two factors interact, the likelihood of a mother engaging in protective parenting increases even further. This significant moderation effect of intolerance of uncertainty and child health status on protective parenting is a novel contribution to the literature.

**Aim 4: Health status as a moderator of the indirect effect of intolerance of uncertainty on general protective parenting via parental worry.**

The study also attempted to understand the processes by which intolerance of uncertainty influences general protective parenting. Individuals who have been shown to

be more intolerant of uncertainty are more likely to experience increased worry (Carleton et al., 2012; Dugas & Ladouceur, 2000). This relation was evident in the current sample as well; intolerance of uncertainty was positively correlated with worry. However, parental worry did not mediate the relation between intolerance of uncertainty and general protective parenting in this study. There are a few explanations for the lack of significant indirect effects.

Worry involves unwanted, negative thoughts about potentially stressful or negative events that could occur in the future (Davey, 1994; Querstret & Cropley, 2013). In an intervention study examining intolerance of uncertainty and worry, Dugas and Ladouceur (2000) described two types of worry: 1) worry that can be managed with problem-solving strategies (e.g., conflict with a peer) and 2) worry that cannot be managed through such strategies (e.g., fear of family member becoming ill). Within the intervention study, participants who were able to implement appropriate coping strategies to manage their intolerance of uncertainty spent less time worrying and had decreased worry, as measured by the PSWQ. Therefore, worry may not have mediated this association because parents may preempt worry by using protective parenting coping strategies.

Because intolerance of uncertainty elicits a “what if” thinking style, caregivers who are intolerant of uncertainty may therefore consider all possible outcomes of a situation and prepare accordingly (Borkovec et al., 1983; Dugas & Ladouceur, 2000; Kircanski et al., 2015). This thinking style leads to mental preparation or elicits certain behaviors, which can help an individual feel more in control (Davey, 1994). Additionally, these caregivers can identify appropriate problem-solving strategies to

manage, and decrease, any associated worry. Therefore, general worry may not be a contributing factor to the relation between intolerance of uncertainty and protective parenting because these preparatory controls (e.g., avoiding risky situations, etc.) may serve to prevent or minimize worry.

A study by Ruggiero et al. (2012) supports this rationale and provides further explanation as to why parental worry did not mediate the predicted relation between intolerance of uncertainty and protective parenting. Participants in the study by Ruggiero et al. (2012) completed self-report measures of intolerance of uncertainty, worry (measured by the PSWQ), anxiety control, and negative beliefs about worry. Anxiety control was conceptualized as one's perceived ability to both control an external threat as well as manage one's internal emotional response (e.g., fear). The study described negative beliefs about worry as the perception that worry was uncontrollable and harmful, while positive beliefs about worry could organize one's thought process and identify potential threats.

In the study by Ruggiero et al., anxiety control moderated the relation between intolerance of uncertainty and worry, such that the positive relation between intolerance of uncertainty and worry was strongest for participants who reported low levels of anxiety controls. Additionally, negative thoughts about worry moderated the same relation, with the positive relation between intolerance of uncertainty and worry strongest for participants who reported greater levels of negative thoughts about worry. These findings demonstrate there are a number of other influencing factors, besides child health status, that can impact the relation between intolerance of uncertainty and worry. Within the current study, it is possible that mothers had more positive beliefs about worry, such

that worry can elicit problem-solving in response to uncertain or worrying situations. Protective parenting could have increased mothers' perceived control over external threats and their emotional responses (i.e., anxiety control), helping to explain why parental worry did not mediate the association between intolerance of uncertainty and protective parenting. Additionally, the PSWQ may have assessed parental worry too broadly to help explain why mothers respond with protective parenting behaviors in specific uncertain situations.

This rationale can also help explain why parental worry did not mediate this association for mothers of children with food allergy, as predicted. As previously described, mothers caring for children with food allergy likely have more frequent exposure to uncertainty because of the unpredictability of food allergy. Those mothers who are both intolerant of uncertainty and have a child with food allergy could commonly engage in a "what if" thinking style to prepare for any unpredictability in situations and engage in problem-solving strategies. As a result, intolerance of uncertainty may not significantly impact parental worry because mothers take steps to control the situation and increase certainty.

Overall, the indirect effect of intolerance of uncertainty on general protective parenting via parental worry was not significantly stronger among mothers of children with food allergy compared to mothers of healthy children. Further research is needed to examine levels of parental worry before and after caregivers engage in certain coping strategies (i.e., protective parenting behaviors). Significant levels of worry could arise only after protective parenting behaviors fail to yield a desired outcome.

**Aim 5: Health status as a moderator of the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect.**

In contrast to the findings about worry, intolerance of uncertainty was significantly related to the other affective and cognitive appraisal variables. Mothers who reported more intolerance of uncertainty reported greater negative affect in response to the uncertain parenting vignettes. This finding supports prior research that intolerance of uncertainty leads to feeling more anxious in response to ambiguous stimuli (Kirschner et al., 2016) and negative emotional responses when faced with uncertainty (Carleton et al., 2016). Intolerance of uncertainty can be viewed as a cognitive/affective filter that impacts information processing (Dugas et al., 2005). Individuals who are intolerant of uncertainty perceive the possibility that a negative outcome could occur to be unacceptable (Buhr & Dugas, 2002). Therefore, increased negative affect may result from caregivers' cognitive bias that all uncertainty should be perceived negatively.

The indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect was significant for both mothers of children with food allergy and mothers of healthy children. The significant indirect pathways helped to further explain the mechanism by which intolerance of uncertainty led to increased reports of protective parenting in response to uncertain parenting situations. Mothers who were more intolerant of uncertainty were more likely to experience heightened negative affect in direct response to ambiguous situations, likely because individuals with this dispositional trait have difficulty managing uncertainty and view uncertainty negatively (Buhr & Dugas, 2002; Koerner & Dugas, 2008). Therefore, mothers who cannot tolerate uncertainty were more likely to engage in protective parenting behaviors, such as parental

monitoring, problem-solving for their child, or avoiding an uncertain situation, as a way to manage their personal negative affect about the situation and obtain a desired outcome.

As depicted by the moderated mediation analysis, the indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect was stronger for mothers of children with food allergy. This finding helps to highlight how biased information processing because of intolerance of uncertainty can lead to increased protective parenting among caregivers of children with a chronic condition. Mothers of children with food allergy tend to view everyday activities as anxiety-provoking due to the possibility of accidental food exposure and related uncertainty (Gillespie et al., 2007; Primeau et al., 2000). The impact of intolerance of uncertainty may be enhanced because of recurring exposure to unpredictable situations, even unrelated to food allergy, when caring for a child with food allergy. Because caregivers who were intolerant of uncertainty viewed any uncertainty through a negative cognitive filter, caregivers of children with food allergy who already perceived everyday situations to be anxiety-provoking likely experienced even greater negative affect in response to these common uncertain situations. In order to manage this increased negative affect, caregivers may use more protective parenting behaviors because of the increased certainty that would result from problem-solving for their child, avoiding an uncertain situation, or monitoring their child. Taking steps to increase the predictability of a situation and prevent negative outcomes (e.g., by protective strategies, such as problem-solving for the child or restricting the child's activities) could help a caregiver reduce their negative affect in uncertain situations.

**Aim 6: Health status as a moderator of the indirect effect of intolerance of uncertainty on vignette protective parenting via uncertainty appraisal.**

Intolerance of uncertainty was significantly related to uncertainty appraisal. Mothers who were more intolerant of uncertainty viewed the ambiguous parenting vignettes as more uncertain than parents of healthy children endorsed greater uncertainty appraisal in response to an uncertain parenting situation. This finding supports the limited existing research on the impact of intolerance of uncertainty on perceptions of uncertainty or ambiguity, such that individuals who are more intolerant of uncertainty have a lower threshold for ambiguity or perceive uncertainty where others may not (Ladouceur et al., 1997). Thus, intolerance of uncertainty may act as a cognitive filter and impact information processing, which may then cause an individual to focus on uncertainty (Dugas et al., 2005).

The indirect effect of intolerance of uncertainty on vignette protective parenting via uncertainty appraisal was only significant for mothers of children with food allergy. Mothers of children with food allergy are often faced with unpredictable or potentially life-threatening situations in everyday life because of food allergy (Cummings et al., 2010), thus potentially enhancing the dispositional trait of intolerance of uncertainty. Because individuals who are intolerant of uncertainty have a lower threshold for ambiguity (Ladouceur, 1997), having a child with food allergy and viewing situations through this cognitive filter could cause caregivers to identify or perceive greater uncertainty in situations unrelated to food allergy. Protective parenting behaviors may then function as a coping strategy to increase a sense of control and certainty in situations where they perceive a significant amount of ambiguity or unpredictability. This finding

supports prior research that demonstrates that intolerance of uncertainty leads to increased coping efforts in order to promote certainty (Dugas et al., 1997; Fergus & Valentiner, 2011; Ladouceur et al., 1997).

Mothers of healthy children who are intolerant of uncertainty may not experience as much enhancement of this dispositional trait because they are likely do not experience regular, life-threatening uncertainty for their child on a regular basis, thus leading to less uncertainty appraisal and less protective parenting in uncertain situations. Uncertainty appraisal is one more mechanism that helps to explain the relation between intolerance of uncertainty and protective parenting among mothers of children with food allergy.

**Aim 7: Health status as a moderator of the indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal.**

Mothers who reported being less tolerant of uncertainty also perceived a greater level of threat (e.g., likelihood of a negative outcome or potential for harm) within the uncertain vignette scenarios. This finding supports the limited existing research on threat appraisal and intolerance of uncertainty demonstrating that individuals who are more intolerant of uncertainty are more likely to perceive ambiguous situations (e.g., daily activities such as crossing the street) as more threatening (Kirschner et al., 2016).

The overall test of moderated mediation did not support the hypothesis that health status would moderate the indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal. However, there was a significant indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal for mothers of children with food allergy, in contrast to no significant indirect effect for mothers of healthy children. Examination of the data revealed small effect sizes for the

indirect effects in both groups and small magnitude difference in effect sizes between the two groups, which the study was not adequately powered to detect.

Taken together, the findings suggest that mothers of children with food allergy who are intolerant of uncertainty tended to perceive greater risk associated with the ambiguous parenting vignettes, which was then associated with greater protective parenting. These mothers may engage in protective parenting behaviors as a way to decrease perceived threat potential. These behaviors may then be negatively reinforced when a mother decides to problem-solve for her child, removes all uncertainty and related threat, and obtains a desired outcome.

### **Exploratory Aim 8**

The exploratory aim to examine whether the two dimensions of intolerance of uncertainty (i.e., desire for predictability and uncertainty paralysis) differ in the degree to which they predict both vignette protective parenting and general protective parenting was not significant. Prior research showed that these two dimensions may differ in the degree to which they predict the specific types of protective parenting (i.e., avoidance versus intrusive behaviors). (Steiner et al., 2019). The present study examined the overall construct of protective parenting and did not explore these specific subtypes within protective parenting. Therefore, the intolerance of uncertainty dimensions may only impact specific protective parenting subtypes and are not applicable in the present study on overall protective parenting. Further research is needed to examine how these two dimensions relate to the specific types of protective parenting to provide further support for past research.

## **Implications & Contributions to the Literature**

The current study adds important findings to the existing literature on intolerance of uncertainty, protective parenting, and caring for a child with a chronic condition. The fact that child health status is a risk factor for protective parenting, as demonstrated by prior research (Dahlquist et al., 2014; Holmbeck et al., 2002; Power et al., 2003), was replicated in the present study. Caregivers' parenting decisions can be influenced by child characteristics, such as having a chronic condition. The study also provides evidence that intolerance of uncertainty is an important individual trait that contributes to the development of protective parenting, both independent of and in conjunction with child health status. Caregivers of children with food allergy are likely exposed to frequent and potentially life-threatening uncertainty in situations involving their child. This unpredictability may make these caregivers who are intolerant of uncertainty more primed to engage in protective parenting behaviors in response to any potential uncertainty.

Protective parenting may be considered adaptive in some capacity when caring for a child with a chronic illness, given the number of challenges and stressors both a caregiver and child may face. For instance, it may be necessary for caregivers of a child with food allergy to be more involved in their child's care both in and out of the home compared to a healthy child, as a way to ensure their safety or avoid any accidental food allergen exposure (Bollinger et al., 2006; Wood, 2003). However, protective parenting can be less adaptive if it inhibits a child's ability to develop independent coping skills or decreased self-efficacy. Therefore, understanding the factors contributing to protective parenting is necessary because of these potential consequences. Children who are not

given the chance to problem-solve independently or develop illness management skills can experience increased rates of depression, anxiety, and decreased sense of self-efficacy, especially as children enter adolescence (Butler et al., 2007; Drake & Ginsburg, 2012). Furthermore, it is equally important for caregivers of children with chronic illness to grant opportunities for their children to develop general autonomy and problem-solving skills as well as competencies for managing their illness (Anderson & Coyne, 1993; Holmbeck et al., 2002; Power et al., 2003).

The novel vignette methodology used in this study demonstrates how intolerance of uncertainty plays a role in parenting, which can be difficult to examine in an experimental study. This methodology allows for a more in-depth examination of caregiver thought processes beyond self-report measures, which helps to explain the mechanism by which intolerance of uncertainty can lead to increased protective parenting. Furthermore, the study adds to the literature examining affective and cognitive appraisals by providing more clearly described appraisal constructs, thus explaining how intolerance of uncertainty can lead to increased protective parenting. Past research examined cognitive appraisals or emotional responses without clear operational definitions of what was assessed (Dugas et al., 2005; Koerner & Dugas, 2008), thereby limiting understanding of how intolerance of uncertainty is related to differences in affective and cognitive appraisals.

Intolerance of uncertainty involves cognitive, emotional, and behavioral responses to ambiguity (Freeston et al., 1994). Therefore, affective and cognitive appraisals are a key factor in the relation between intolerance of uncertainty and protective parenting in the face of uncertainty. The study illustrates that intolerance of uncertainty impacts the

perception of negative affect and cognitive appraisals of uncertainty and threat in distinct ways. First, negative affect may be heightened in response to ambiguous situations because individuals who are intolerant of uncertainty perceive all uncertainty negatively. Viewing such situations through a negative filter would likely lead to increased negative emotions. Caregivers may engage in protective parenting as a way to minimize personal negative affect and increase their own emotional comfort within a situation. Second, intolerance of uncertainty leads to increased uncertainty appraisal in ambiguous situations because of the decreased threshold for ambiguity and likelihood to perceive uncertainty where others may not (Ladouceur et al., 1997). Protective parenting can therefore act as a way to ensure that all aspects of a situation are clear and certain. Finally, intolerance of uncertainty can also impact threat appraisal because of the cognitive bias that may overestimate the potential for negative outcomes in uncertain situations. As a result, caregivers may use protective parenting in order to reduce risk.

Taken together, these findings help explain why caregivers may engage in protective parenting behaviors, despite the importance of allowing children to develop a sense of self-efficacy and independent coping skills rather than becoming dependent on their parents to solve problems for them (Chorpita & Barlow, 1998; Power et al., 2003; Rubin et al., 1997; Segrin et al., 2012). Based on the current findings, mothers of children with food allergy who are intolerant of uncertainty are more likely to report protective parenting behaviors, which may be problematic given the potential for child psychopathology. These findings also have implications for how providers can support caregivers. Providers should assess caregiver intolerance of uncertainty and help

caregivers develop appropriate coping skills to better manage unpredictability and related affective and cognitive appraisals.

Intolerance of uncertainty is a dispositional trait that may not be amenable to change. However, the finding that affective and cognitive appraisals can influence the relation between intolerance of uncertainty and protective parenting highlights an area for potential caregiver intervention. Rather than attempting to alter an individual's level of intolerance of uncertainty, providers can instead address those mediating affective and cognitive appraisals to help caregivers develop more adaptive coping and parenting strategies. A cognitive-behavioral therapy approach could be an effective intervention in this case. Working to reframe the implicit cognitive bias that any ambiguity should be perceived negatively and is unacceptable could help caregivers develop more realistic appraisals for the risk level inherent in different situations. Psychotherapy providers can help caregivers identify what aspects of uncertain parenting situations are most distressing or concerning and directly address those negative thoughts and emotions. With this knowledge, providers can then help caregivers develop more adaptive behavioral strategies, in place of protective parenting, as a way to manage caregiver negative affect and risk appraisal.

For example, a caregiver who perceives their child going to play basketball without any parental supervision as highly threatening with significant accompanying negative affect could be inclined to restrict the child's activities or directly monitor them (i.e., not allowing the child to go play basketball down the street or going along with them). Through cognitive behavioral therapy, caregivers could understand what about that situation is most threatening (e.g., potential for physical injury, getting lost on the

way, staying out too late, etc.) and work to develop strategies to help decrease that specific risk and thereby decrease overall threat perception as well as manage their negative affect. The caregiver could gather further information and set expectations about the situation to allow for a heightened sense of certainty (e.g., who will be there, time expected back, etc.), while still granting the child autonomy.

In regard to caregivers of children with food allergy, intervention that focuses on increasing caregivers' and/or patients' comfort and knowledge surrounding food allergy management could also help decrease perceived threat and uncertainty as well as negative affect surrounding ambiguous situations. For instance, practicing how to effectively use an Epi-Pen with the caregiver and child, reviewing how to properly read food labels and ensuring the child knows how to do so as well, or teaching other family members about food allergy management could help a caregiver feel more confident and certain in their child's safety when he or she is not in their care. As a result, a caregiver who is highly intolerant of uncertainty may not view such situations as so threatening or uncertain. Their increased feelings of certainty in regard to illness management could then also generalize to other ambiguous situations, potentially limiting protective parenting behaviors beyond the scope of food allergy management as well.

Intervention can be useful for both children and caregivers to develop a more collaborative parenting approach in order to promote general autonomy, independent problem-solving, and illness management competencies, depending on the complexity of the task (Gruhn et al., 2016; Williams et al., 2007). This collaborative approach can involve more emotional support, rather than instrumental support, and increased communication, which can be reassuring to a caregiver without him or her stepping in to

provide direct support or problem-solving for the child. Caregivers may then feel an increased sense of certainty or predictability in potentially ambiguous situations if they feel confident in their child's ability to manage their illness. Additionally, shared illness management in middle childhood has been shown to improve a child's competence and confidence in food allergy self-management (Williams et al., 2009). Therefore, providing intervention, such as developing coping skills or collaborative parenting, to caregivers who may be more at risk for engaging in protective parenting because of intolerance of uncertainty could help prevent potential, negative long-term outcomes for their children and improve illness management.

These findings for the role of intolerance of uncertainty on protective parenting are important when considering medical decision-making. When making decisions about the level of child involvement or responsibility in illness management, medical providers should check in with both caregivers as well as the patient. If a caregiver is highly intolerant of uncertainty, he or she may choose to take control of all illness management and fail to delegate any responsibilities to their child or grant them the opportunity to manage their illness independently. As a result, the child could perceive that their caregiver does not trust them to effectively manage their illness, which could negatively impact self-efficacy. For instance, a 12-year-old child could feel competent in her ability to use an Epi-Pen and confident in her knowledge of food allergen avoidance. This patient may be eager to spend time at a friend's house. If her mother is highly intolerant of uncertainty, she could decide that her daughter should only spend time with friends at their home to avoid the possibility of accidental exposure. Involving the child in this decision-making and addressing the mother's concerns could grant the child an increased

sense of control over her illness and improved self-efficacy and independence. This reasoning could apply to situations outside the scope of food allergy as well. Therefore, it could be important for providers to also assess whether caregivers are being protective in other contexts as well.

### **Limitations**

The study yielded a number of important findings, but study limitations need to be considered. Even though a wide range of urban and suburban areas were targeted with regard to social media group posting and flyering for recruitment, the sample of participants was homogeneous in regard to race. As a result, it is not possible to generalize the findings to all mothers of healthy children or mothers of children with food allergy. Because of this homogenous sample, it was not possible to assess race and ethnicity as potential factors influencing parenting behaviors. Additionally, the final sample was homogeneous in regard to socioeconomic status (SES), which also limits the ability to generalize these findings to all caregivers. Mothers from higher SES families may have increased access to medical resources (e.g., multiple EpiPens, anti-histamines) that could lead to increased feelings of certainty, which could impact parenting behaviors. Future studies could aim for more in-person recruitment in physicians' offices that serve a diverse patient population to increase direct access to study information. Recruitment from urban food allergy clinics yielded a diverse sample in regard to race and socioeconomic status in prior research (Hahn et al., 2017).

Although multiple recruitment methods were used, the vast majority of participants (74.1%) were recruited via posting in Facebook groups. Posts were made in both neighborhood groups as well as parent groups specifically for caregivers of children

with food allergy. Data regarding the type of Facebook group from which participants were recruited were not collected. This lack of data is a limitation as well because caregivers who choose to join a Facebook support group may have individual characteristics or experiences that caused them to seek further support compared to mothers who choose not to join a food allergy support group. A study by Ward and Greenhawt (2015) demonstrated that caregivers of children with food allergy who self-selected to participate in a research study on quality of life among this parent population experienced worse quality of life compared to caregivers who were referred for the study at a food allergy clinic. This finding indicates that the recruitment method and population from which participants are recruited (e.g., parents seeking out additional support) can impact study samples. Future research should collect further data on recruitment to examine as a potential variable.

Attempts were made to recruit both mothers and fathers of children within the specific age range. However, the vast majority of participants were mothers. Working to recruit more fathers in future studies would help to improve understanding of whether the factors impacting protective parenting are the same for both mothers and fathers. Recruitment methods could include extended recruitment time to allow for more father to participate. Additionally, recruiting parent dyads would lead to an equal number of mothers and fathers for heterosexual couples and provide the opportunity to examine gender differences with regard to protective parenting. Hoehn et al. (2017) used this recruitment strategy previously when studying parents of children with food allergy.

The method by which IgE-mediated food allergy was identified also was a limitation. Whether or not the child had an IgE-mediated food allergy, and therefore at

risk for potentially life-threatening anaphylaxis, was determined by whether or not the child had been prescribed an Epi-Pen. This eligibility criterion was used as a proxy for a medical diagnosis of IgE-mediated food allergy and worked to effectively exclude ineligible caregivers of children with other types of food allergies (i.e., not IgE-mediated). However, a diagnosis from a medical provider would have better guaranteed the accuracy of food allergy diagnosis for the children whose parents participated.

### **Future Directions**

To my knowledge, the current study is the first within the existing literature to examine how child health status can play a role in the relation between intolerance of uncertainty and caregiver reports of protective parenting. A replication study with a more diverse sample would help improve understanding for whether the current findings are the same across differing races and SES statuses. It is especially important to assess differences in parenting practices with a diverse sample because the form and function of parenting behaviors can differ between cultures. Caregivers from collectivistic cultures may engage in behaviors that may be perceived as protective by Western, individualistic cultures (Chao, 2000; Chen, Chen, & Zheng, 2010; Pinquart & Kauser, 2017). However, the function of that seemingly protective behavior would not be considered protective within a collectivistic culture (Ngai & Cheung, 2009; Cheah, Li, Zhou, Yamamoto, & Leung, 2015; Chou & Chou, 2018). Future studies should include participants from differing race and socioeconomic status to help generalize the existing findings as well as explore how form and function can differ across cultures within the context of protective parenting and intolerance of uncertainty. Additionally, the vignettes and parenting behaviors used were all novel and created specifically for this study. Efforts were taken

to maximize the validity and reliability of the vignette methodology prior to conducting the study. However, additional research is needed to establish the utility of these vignettes with a more diverse sample.

Because the current study only examined the pediatric illness of food allergy, additional studies could explore whether the same pattern of results occur among caregivers of children with other pediatric chronic illnesses. For example, a caregiver of a child with type 1 diabetes could display similar levels of protective parenting because of the potentially life-threatening symptoms of type 1 diabetes, which can act to heighten intolerance of uncertainty. Comparatively, a caregiver of a child with juvenile rheumatoid arthritis might report a different pattern of protective parenting or different relation between intolerance of uncertainty and protective parenting because this condition does not involve life-threatening symptoms. Such studies could clarify whether intolerance of uncertainty is heightened primarily for caregivers who experience frequent, life-threatening unpredictability when caring for their child.

Gaining a better understanding of the relation between intolerance of uncertainty, parental general worry, and protective parenting is also important. Future research could examine whether parental worry increases only after protective parenting behaviors are deemed ineffective, and whether protective parenting can help buffer against parental worry. Additionally, future studies should assess caregiver thoughts about worry (i.e., positive or negative) and anxiety control to determine whether these factors impact the association between intolerance of uncertainty, worry, and protective parenting among caregivers of healthy children and children with chronic conditions.

Including children in future studies examining intolerance of uncertainty and protective parenting would also be useful to learn how they perceive their caregivers' parenting behaviors. A study by Herbert and Dahlquist (2008) examined food allergy and protective parenting from the perspective of young adults with food allergy. Researchers found that participants with a history of anaphylaxis perceived their caregivers to be more protective than participants without a history of anaphylaxis (Herbert & Dahlquist, 2008). Future studies could explore how children perceive their caregivers' parenting behaviors and whether those behaviors and perceptions could influence a child's sense of self-efficacy, autonomy development and potential medical decision-making. A longitudinal study would be ideal for examining this research question, especially across the middle childhood and adolescent developmental stages.

## **Conclusion**

Extensive literature exists for intolerance of uncertainty, protective parenting, and pediatric food allergy. However, there is limited research connecting these three literatures (Steiner, 2017; Steiner et al., 2019). The current findings emphasize how both child and caregiver characteristics impact the development of protective parenting through the use of a novel vignette methodology. Even though protective parenting can prevent a child from experiencing physical harm or negative affect, it is also important for children to develop their own coping strategies when faced with a challenge. The present study highlights potential areas of intervention for caregivers who are intolerant of uncertainty who have a child with food allergy in order to limit the development of protective parenting behaviors.

Table 1. Sample Characteristics ( $n = 158$ )

Variable	<i>n</i>	%
Caregiver race		
Native American	1	.6
Asian	10	6.3
African American	7	4.4
Caucasian	134	84.8
Biracial	2	1.3
Other	4	2.5
Caregiver Latino/a		
Yes	8	5.1
No	150	94.9
Child race		
Asian	8	5.1
African American	8	5.1
Caucasian	128	81.0
Biracial	13	8.2
Other	1	.6
Child Latino/a		
Yes	7	4.4
No	151	95.6
Child gender		
Female	85	53.8
Male	73	46.2
Caregiver years of education		
10 – Some High school	1	.6
12 – Completed High School/GED	16	10.1
14 – Completed 2-year college/Associates Degree	21	13.3
16 – Completed 4-year college	42	26.6
17 – Completed some graduate school	7	4.4
18 – Completed Master's program	59	37.3
20 – Completed Advanced Degree	12	7.6
Child age (years)		
8	30	19.0
9	29	18.4
10	37	23.4
11	34	21.5
12	28	17.7

Table 2. Geographic Characteristics ( $n = 158$ )

State of Residence	$n$	%
Alabama	1	.6
Alaska	1	.6
Arizona	1	.6
Arkansas	1	.6
California	6	3.8
Connecticut	2	1.3
Florida	3	1.9
Georgia	2	1.3
Illinois	6	3.8
Kentucky	2	1.3
Louisiana	1	.6
Maryland	68	43.0
Michigan	3	1.9
Minnesota	3	1.9
Mississippi	2	1.3
New Jersey	1	.6
New Mexico	1	.6
New York	5	3.2
North Carolina	7	4.4
Ohio	1	.6
Pennsylvania	18	11.4
South Carolina	2	1.3
Tennessee	2	1.3
Texas	4	2.5
Virginia	6	3.8
Washington	2	1.3
Washington, DC	1	.6
Wisconsin	4	2.5
Missing	2	1.3

# INTOLERANCE OF UNCERTAINTY AND PROTECTIVE PARENTING

Table 3. *Descriptive Statistics – Overall Sample*

Variable	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Skewness	<i>SE</i>	<i>Kurtosis</i>	<i>SE</i>
Intolerance of Uncertainty <sup>a</sup>	158	12	56	33.27	9.32	.16	.19	-.36	.38
Protectiveness <sup>b</sup>	158	13	63	31.47	9.50	.89	.19	.86	.38
Problem-Solving Directiveness <sup>c</sup>	158	12	44	23.95	6.36	.99	.19	1.28	.38
General Protective Parenting <sup>d</sup> (unstandardized)	158	29	107	55.42	13.99	1.14	.19	1.95	.38
General Protective Parenting <sup>d</sup> (standardized)	158	-3.19	6.12	-.10	1.68	1.16	.19	2.05	.38
Caregiver worry <sup>e</sup>	158	17	80	50.63	15.15	-.17	.19	-.73	.38
Vignette Protective Parenting <sup>f</sup>	158	15	75	45.57	11.98	-.09	.19	-.16	.38
Negative Affect <sup>g</sup>	158	14	69	39.17	11.47	.17	.19	-.16	.38
Uncertainty Appraisal <sup>g</sup>	158	12	65	32.79	9.63	.33	.19	.19	.38
Threat Perception <sup>g</sup>	158	13	59	33.84	8.57	.35	.19	.39	.38

a. Intolerance of Uncertainty Scale

b. Protectiveness Scale

c. Problem-Solving Directiveness Scale

d. Summed values from Protectiveness Scale & Problem-Solving Directiveness Scale

e. Penn State Worry Questionnaire

f. Total score of three protective parenting behaviors across four vignettes

g. Total score of vignette appraisal for three questions across four vignettes

Table 4. *Descriptive Statistics Mothers of Children with Food Allergy*

Variable	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Skewness	<i>SE</i>	<i>Kurtosis</i>	<i>SE</i>
Intolerance of Uncertainty <sup>a</sup>	80	17	56	35.19	9.51	.15	.27	-.51	.53
Protectiveness <sup>b</sup>	80	13	63	34.09	10.86	.67	.27	.05	.53
Problem-Solving Directiveness <sup>c</sup>	80	12	44	24.54	7.56	.92	.27	.57	.53
General Protective Parenting <sup>d</sup> (unstandardized)	80	29	107	58.63	16.61	.91	.27	.71	.53
General Protective Parenting <sup>d</sup> (standardized)	80	-3.19	6.12	.25	2.01	.95	.27	.79	.53
Caregiver worry <sup>e</sup>	80	18	80	52.91	14.27	-.23	.27	-.46	.53
Vignette Protective Parenting <sup>f</sup>	80	15	75	46.43	13.13	-.21	.27	-.22	.53
Negative Affect <sup>g</sup>	80	14	69	39.99	12.71	.24	.27	-.29	.53
Uncertainty Appraisal <sup>g</sup>	80	12	65	33.73	10.92	.32	.27	.08	.53
Threat Perception <sup>g</sup>	80	14	59	34.13	9.61	.33	.27	.04	.53

a. Intolerance of Uncertainty Scale

b. Protectiveness Scale

c. Problem-Solving Directiveness Scale

d. Summed values from Protectiveness Scale & Problem-Solving Directiveness Scale

e. Penn State Worry Questionnaire

f. Total score of three protective parenting behaviors across four vignettes

g. Total score of vignette appraisal for three questions across four vignettes

Table 5. *Descriptive Statistics – Mothers of Healthy Children*

Variable	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Skewness	<i>SE</i>	<i>Kurtosis</i>	<i>SE</i>
Intolerance of Uncertainty <sup>a</sup>	78	12	53	31.31	8.75	.07	.27	-.32	.54
Protectiveness <sup>b</sup>	78	16	47	28.79	6.98	.37	.27	-.42	.54
Problem-Solving Directiveness <sup>c</sup>	78	14	34	23.35	5.78	.44	.27	-.31	.54
General Protective Parenting <sup>d</sup> (unstandardized)	78	34	81	52.14	9.71	.33	.27	-.02	.54
General Protective Parenting <sup>d</sup> (standardized)	78	-2.67	2.99	-.47	1.17	.35	.27	-.01	.54
Caregiver worry <sup>e</sup>	78	17	80	48.29	15.74	-.06	.27	-.92	.54
Vignette Protective Parenting <sup>f</sup>	78	22	74	44.69	10.70	.02	.27	-.16	.54
Negative Affect <sup>g</sup>	78	16	60	38.33	10.05	-.14	.27	-.47	.54
Uncertainty Appraisal <sup>g</sup>	78	15	47	31.83	8.05	.03	.27	-.78	.54
Threat Perception <sup>g</sup>	78	13	55	33.54	7.42	.28	.27	.70	.54

a. Intolerance of Uncertainty Scale

b. Protectiveness Scale

c. Problem-Solving Directiveness Scale

d. Summed values from Protectiveness Scale & Problem-Solving Directiveness Scale

e. Penn State Worry Questionnaire

f. Total score of three protective parenting behaviors across four vignettes

g. Total score of vignette appraisal for three questions across four vignettes

Table 6. *Correlation Matrix for Main Variables: Mothers of Children with Food Allergy*

Variable	1	2	3	4	5	6
1. Intolerance of Uncertainty	-	-	-	-	-	-
2. General Protective Parenting	.40**	-	-	-	-	-
3. Vignette Protective Parenting	.47**	.66**	-	-	-	-
4. Parental Worry	.62**	.11	.18	-	-	-
5. Negative Affect	.50**	.45**	.61**	.29**	-	-
6. Uncertainty Appraisal	.49**	.41**	.47**	.25*	.79**	-
7. Threat Appraisal	.29**	.46**	.61**	.10	.83**	.71**

\* $p < .05$ , \*\* $p < .01$

Table 7. *Correlation Matrix for Main Variables: Mothers of Healthy Children*

Variable	1	2	3	4	5	6
1. Intolerance of Uncertainty	-	-	-	-	-	-
2. General Protective Parenting	.18	-	-	-	-	-
3. Vignette Protective Parenting	.13	.56**	-	-	-	-
4. Parental Worry	.73**	.28*	.14	-	-	-
5. Negative Affect	.28*	.21	.31**	.21	-	-
6. Uncertainty Appraisal	.17	.09	.11	.16	.51**	-
7. Threat Appraisal	.21	.16	.33**	.08	.66**	.41**

\* $p < .05$ , \*\* $p < .01$

Table 8. *Correlation Matrix for Potential Covariates*

Variable	Intolerance of Uncertainty	General Protective Parenting	Vignette Protective Parenting	Parental Worry	Negative Affect	Uncertainty Appraisal	Threat Appraisal
1. Child age	-.08	-.20*	-.20*	-.13	-.22**	-.11	-.19*
2. Child gender	.03	-.19*	-.12	.03	-.09	-.09	-.08
3. Child birth order	.03	.10	.04	-.02	.07	.06	.07
4. Caregiver race	-.08	-.08	-.06	-.05	.02	-.01	.04
5. Caregiver level of education	-.03	-.08	-.20*	.01	.07	.10	.07
6. Presence of asthma	-.06	.03	-.07	-.16	.01	.03	-.01
7. Presence of eczema	.07	-.03	-.02	.14	.09	.01	-.01

\* $p < .05$ , \*\* $p < .01$

# INTOLERANCE OF UNCERTAINTY AND PROTECTIVE PARENTING

Table 9. *Aim 4 Moderated Mediation: Health status as moderator of indirect effect of intolerance of uncertainty on general protective parenting via parental worry*

Predictor Variables	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
DV: Parental Worry (mediator)					.49
Intolerance of Uncertainty	.52	.30	1.72	.087	
Child Health Status	-13.53	6.69	-2.02	.045	
Intolerance of Uncertainty X Child Health Status	.40	.19	2.04	.043	
Child Age	-.93	.65	-1.44	.152	
Child Gender	.28	1.77	.16	.875	
DV: General Protective Parenting (dependent variable)					.20
Intolerance of Uncertainty	.07	.02	4.18	<.001	
Parental Worry	-.01	.01	-1.11	.267	
Child age	-.22	.09	-2.51	.013	
Child Gender	-.69	.24	-2.83	.005	
Conditional indirect effects based on child health status	Bootstrapped indirect effect	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Food Allergy	-.01	.01	-.03	.01	
Healthy	-.02	.02	-.05	.01	
Index of moderated mediation	Index	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Health Status	-.01	.01	-.02	.004	

Table 10. *Aim 5 Moderated Mediation: Health status as moderator of indirect effect of intolerance of uncertainty on vignette protective parenting via negative affect*

Predictor Variables	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
DV: Negative Affect (mediator)					.23
Intolerance of Uncertainty	1.02	.28	3.66	<.001	
Child Health Status	12.47	6.24	2.00	.048	
Intolerance of Uncertainty X Child Health Status	-.36	.18	-2.00	.047	
Mother Education Level	.61	.37	1.65	.101	
Child Age	-.157	.60	-2.63	.010	
DV: Vignette Protective Parenting (dependent variable)					.32
Intolerance of Uncertainty	.18	.09	1.90	.059	
Negative Affect	.46	.08	5.90	<.001	
Mother Education Level	-1.18	.36	-3.28	.001	
Child Age	-.63	.60	-1.06	.291	
Conditional indirect effects based on child health status	Bootstrapped indirect effect	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Food Allergy	.30	.08	.16	.46	
Healthy	.14	.06	.01	.27	
Index of moderated mediation	Index	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Child Health Status	-.17	.09	-.37	-.0004	

Table 11. *Aim 6 Moderated Mediation: Health status as moderator of indirect effect of intolerance of uncertainty on vignette protective parenting via uncertainty appraisal*

Predictor Variables	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
DV: Uncertainty Appraisal (mediator)					.19
Intolerance of Uncertainty	1.01	.24	4.17	<.001	
Child Health Status	13.57	5.36	2.53	.012	
Intolerance of Uncertainty X Child Health Status	-.42	.16	-2.72	.007	
Mother Education Level	.62	.31	2.00	.051	
Child Age	-.43	.51	-.84	.400	
DV: Vignette Protective Parenting (dependent variable)					
Intolerance of Uncertainty	.27	.09	2.81	.006	
Uncertainty Appraisal	.31	.09	3.40	<.001	
Mother Education Level	-1.13	.37	-3.03	.003	
Child Age	-1.26	.61	-2.06	.041	
Conditional indirect effects based on child health status	Bootstrapped indirect effect	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Food Allergy	.18	.07	.06	.34	
Healthy	.05	.04	-.01	.14	
Index of moderated mediation	Index	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Child Health Status	-.13	.07	-.29	-.02	

Table 12. *Aim 7 Moderated Mediation: Health status as moderator of indirect effect of intolerance of uncertainty on vignette protective parenting via threat appraisal*

Predictor Variables	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup>
DV: Threat Appraisal (mediator)					.11
Intolerance of Uncertainty	.41	.23	1.82	.071	
Child Health Status	4.44	5.03	.88	.379	
Intolerance of Uncertainty X Child Health Status	-.12	.15	-.83	.409	
Mother Education Level	.37	.30	1.24	.215	
Child Age	-1.08	.48	-2.25	.026	
DV: Vignette Protective Parenting (dependent variable)					.35
Intolerance of Uncertainty	.26	.09	3.01	.003	
Threat Appraisal	.63	.10	6.58	<.001	
Mother Education Level	-1.15	.35	-3.30	.001	
Child Age	-.69	.58	-1.18	.238	
Conditional indirect effects based on child health status	Bootstrapped indirect effect	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Food Allergy	.18	.08	.04	.35	
Healthy	.11	.07	-.02	.24	
Index of moderated mediation	Index	Boot <i>SE</i>	LL 95% CI	UL 95% CI	
Child Health Status	-.08	.10	-.29	.11	

Appendix A  
**Demographics**

**What is your relation to the child?**

- ☐ Mother/female caregiver
- ☐ Father/male caregiver
- ☐ Other (please specify: \_\_\_\_\_)

**Your age:** \_\_\_\_\_

**Your race (please check all that apply):**

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ Other (please specify: \_\_\_\_\_)

**Are you Hispanic or Latino?**

- ☐ Yes
- ☐ No

**Your occupation** \_\_\_\_\_

**Circle One:** Full   or   Part-time   or Not applicable

**Highest level of education you have completed:**

- ☐ Elementary/primary school
- ☐ Middle school
- ☐ Some high school
- ☐ Completed GED
- ☐ Completed high school
- ☐ Some college
- ☐ Completed associates degree/trade school degree
- ☐ Completed 2-year college
- ☐ Completed 4-year college
- ☐ Some graduate school
- ☐ Completed a master's program
- ☐ Completed a doctoral/medical/law program

**Your Marital Status:**

- ☐ Single
- ☐ Living with partner
- ☐ Married
- ☐ Divorced/Separated
- ☐ Widowed

**Is there another adult caregiver living in your household?**

☐ Yes

☐ No

**If yes, what is their occupation?**

---

**Circle One:** Full   or   Part-time

**Highest level of education completed by other adult caregiver:**

☐ Elementary/primary school

☐ Middle school

☐ Some high school

☐ Completed GED

☐ Completed high school

☐ Some college

☐ Completed associates degree/trade school degree

☐ Completed 2-year college

☐ Completed 4-year college

☐ Some graduate school

☐ Completed a master's program

☐ Completed a doctoral/medical/law program

**Total household income:**

☐ <\$20,000

☐ \$20,000 – 40,000

☐ \$40,000 – 60,000

☐ \$60,000 – 80,000

☐ \$80,000 – 100,000

☐ >\$100,000

☐ Prefer not to answer

**Number of people in household:** \_\_\_\_\_

**Number of children in household:** \_\_\_\_\_

**What kind of health insurance coverage does your child with food allergy have?**

☐ Medical assistance (e.g., Medicaid, Public Aid)

☐ Private insurance (e.g., commercial insurance, insurance offered through an employer)

☐ Health insurance provided through Affordable Care Act

☐ No health insurance coverage

*If multiple children between the ages of 8-12, please consider the oldest child within this age range as the target child*

First names of full or half-siblings	Age	Relationship to child (e.g., brother, sister, half-brother, etc.)	Does this person have any of the following conditions?
			Asthma: Yes No Allergic rhinitis/ environmental allergies Yes No Eczema: Yes No Eosinophilic esophagitis (EoE) Yes No Cancer: Yes No Cystic Fibrosis: Yes No Diabetes: Yes No Autism: Yes No Developmental Delay: Yes No Other Chronic Illness: Yes No <b>(If yes, please specify: )</b>
			Asthma: Yes No Allergic rhinitis/ environmental allergies Yes No Eczema: Yes No Eosinophilic esophagitis (EoE) Yes No Cancer: Yes No Cystic Fibrosis: Yes No Diabetes: Yes No Autism: Yes No Developmental Delay: Yes No Other Chronic Illness: Yes No <b>(If yes, please specify: )</b>
			Asthma: Yes No Allergic rhinitis/ environmental allergies Yes No Eczema: Yes No Eosinophilic esophagitis (EoE) Yes No Cancer: Yes No Cystic Fibrosis: Yes No Diabetes: Yes No Autism: Yes No Developmental Delay: Yes No Other Chronic Illness: Yes No <b>(If yes, please specify: )</b>

**Answer the following questions about your child:**

*(Reminder: If multiple children between the ages of 8-12, please consider the oldest child within this age range as the target child)*

**Child's date of birth:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**Child's age:** \_\_\_\_\_

**Child's gender:**

- ☐ Female  
☐ Male

**Race of child (please check all that apply):**

- ☐ American Indian or Alaska Native  
☐ Asian  
☐ Black or African American  
☐ Native Hawaiian or Other Pacific Islander  
☐ White  
☐ Other (please specify: \_\_\_\_\_)

**Is your child Hispanic or Latino?**

- ☐ Yes  
☐ No

**Child's grade in school:**

- |  |  |
|--|--|
| <input type="checkbox"/> 1 <sup>st</sup> | <input type="checkbox"/> 5 <sup>th</sup> |
| <input type="checkbox"/> 2 <sup>nd</sup> | <input type="checkbox"/> 6 <sup>th</sup> |
| <input type="checkbox"/> 3 <sup>rd</sup> | <input type="checkbox"/> 7 <sup>th</sup> |
| <input type="checkbox"/> 4 <sup>th</sup> | <input type="checkbox"/> 8 <sup>th</sup> |

☐ Does not attend school (specify reason: \_\_\_\_\_)

**Is your child homeschooled?**

- ☐ Yes  
☐ No

**What type of school does your child attend?**

- ☐ public school  
☐ private school  
☐ charter school

**Does your child receive special education services?**

- ☐ Yes (please specify: \_\_\_\_\_)  
☐ No

**Please indicate whether your child has been diagnosed with:**

Allergic rhinitis/ environmental allergens	Yes	No
Asthma:	Yes	No

Eczema:	Yes	No
Eosinophilic esophagitis (EoE)	Yes	No
Cancer:	Yes	No
Cystic Fibrosis:	Yes	No
Diabetes:	Yes	No
Autism:	Yes	No
Developmental Delay:	Yes	No
Other Chronic Illness:	Yes	No (If yes, please specify:_____)

## Appendix B Food Allergy History

1. How old was your child when he/she was diagnosed with food allergy?

2. What foods is your child allergic to?

Peanuts	YES	NO
Tree nuts	YES	NO
Milk	YES	NO
Eggs	YES	NO
Fish	YES	NO
Shellfish	YES	NO
Wheat	YES	NO
Soy	YES	NO
Sesame	YES	NO
Other _____	YES	NO

3. Family history of food allergy?    YES                      NO

4. Who diagnosed your child with food allergy?

- ☐ allergist
- ☐ pediatrician/family doctor
- ☐ myself
- ☐ my child has not been diagnosed with food allergy
- ☐ other (**please specify:** \_\_\_\_\_)

**Circle:**

Yes                      5. Has your child been prescribed an epinephrine auto-injector for food  
No                      allergy (e.g., Epipen, Auvi Q)

6. Has your child ever had an allergic reaction to a food at home?

Yes  
No

Yes                      7. Has your child ever had an allergic reaction to a food at school or day  
No                      care?

- If yes, approximately how many times? \_\_\_\_\_
- Approximate date of most recent severe allergic reaction:  
\_\_\_\_\_ (mo)/ \_\_\_\_\_ (yr)

Yes                      8. Has your child ever had a serious breathing problem, severe allergic  
No                      reaction, or anaphylaxis caused by a food allergy?

- If yes, approximately how many times? \_\_\_\_\_
- Approximate date of most recent severe allergic reaction:  
\_\_\_\_\_ (mo)/ \_\_\_\_\_ (yr)

- Yes  
No
9. Have you or anyone else ever had to use an epinephrine autoinjector on your child?
- If yes, approximately how many times? \_\_\_\_\_
  - Approximate date of last use: \_\_\_\_\_(mo)/\_\_\_\_\_(yr)
- Yes  
No
10. Has your child ever had a severe allergic reaction to a food where he/she had to go to the Emergency Room (ER)?
- If yes, approximately how many times? \_\_\_\_\_
  - Approximate date of most recent reaction requiring ER visit: \_\_\_\_\_(mo)/\_\_\_\_\_(yr)
11. What kind of doctor does your child see for food allergy care? (Check all that apply)
- ☐ allergist
  - ☐ pediatrician/family doctor
  - ☐ other (**please specify:** \_\_\_\_\_)
12. How often are you the one who takes your child to the doctor for food allergy visits?
- ☐ Most of the time
  - ☐ Some of the time
  - ☐ None of the time/ very rarely
13. How frequently do you prepare foods for your child with food allergies?
- ☐ Most of the time
  - ☐ Some of the time
  - ☐ None of the time/ very rarely
14. How frequently do you plan food purchases for your child with food allergies?
- ☐ Most of the time
  - ☐ Some of the time
  - ☐ None of the time/ very rarely
15. Are you a member of a food allergy support group?
- ☐ Yes
  - ☐ No
16. How often do you attend support group meetings?
- ☐ Weekly
  - ☐ Monthly
  - ☐ Every 2-3 Months
  - ☐ Yearly
  - ☐ Never

Appendix C  
**IU – Short Scale**

The following questions ask you about your response to uncertain events. For each question, please circle your response from a scale from 1 to 5, where 1=“not at all characteristic of me” and 5=“entirely characteristic of me”.

	Not at all characteristic of me			Entirely characteristic of me	
1. Unforeseen events upset me greatly.	1	2	3	4	5
2. It frustrates me not having all the information I need.	1	2	3	4	5
3. Uncertainty keeps me from living a full life.	1	2	3	4	5
4. One should always look ahead so as to avoid surprises.	1	2	3	4	5
5. A small unforeseen event can spoil everything, even with the best planning.	1	2	3	4	5
6. When it's time to act, uncertainty paralyzes me.	1	2	3	4	5
7. When I am uncertain, I can't function very well.	1	2	3	4	5
8. I always want to know what the future has in store for me.	1	2	3	4	5
9. I can't stand being taken by surprise.	1	2	3	4	5
10. The smallest doubt can stop me from acting.	1	2	3	4	5
11. I should be able to organize everything in advance.	1	2	3	4	5
12. I must get away from all uncertain situations.	1	2	3	4	5

Appendix D  
Protectiveness Scale

**The following statements represent matters of interest and concern to some parents. Not all parents feel the same way about them. Circle the number that most closely applies to you.**

1. It is probably better for everyone involved if parents work out the arguments that their children have with their friends.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

2. If my child hurt himself at a friend's house I would not let him or her go back there to play.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

3. It makes me nervous when my child spends the night with a friend whom I do not know very well.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

4. If my child is upset about something that happened at school, I would call his or her teacher and schedule a conference.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

5. If my child hits another child, I usually feel confident that there was a good reason for it and I do not correct him or her.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

6. I would be upset if my child's class went to the local zoo, and I didn't know about it beforehand.

1	2	3	4	5	6
Not at all descriptive	Slightly descriptive	Somewhat descriptive	Fairly descriptive	Quite descriptive	Highly descriptive

of me                      of me                      of me                      of me                      of me                      of me

7. If a neighbor complained about my child, I would probably assume it had more to do with my neighbor than my child.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

8. I prefer that my child play at our house with his or her friends rather than playing at his/her friend's house.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

9. I prefer to drive my child to school rather than have him or her walk or use school transportation.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

10. I prefer that my child get involved in activities that I am familiar with rather than activities I know nothing about.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

11. If my child and I disagree about something I explain to him or her that I know what is best for him/her and I make decisions accordingly.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

12. I think it is important that my child does not get involved in activities or tasks where he or she may potentially fail.

1	2	3	4	5	6
Not at all descriptive of me	Slightly descriptive of me	Somewhat descriptive of me	Fairly descriptive of me	Quite descriptive of me	Highly descriptive of me

## Appendix E

### Problem-Solving Directiveness Scale

For each of the following statements, circle the number that indicates how often the statement is true of you.

1. I sit with my child while he or she is doing homework in case he/she needs help.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

2. When my child has school projects I let him or her do them on his/her own from start to finish.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

3. I help my child with tasks that he or she is having trouble with in order to prevent him/her from getting frustrated.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

4. I plan my child's day so that he or she has enough activities to keep him/her busy.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

5. I allow my child to make his or her own decisions about how to spend his/her money.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

6. When my child has a problem, like being invited to two birthday parties on the same day, I decide for him or her which one to go to.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

7. When my child misplaces his or her things I stop what I am doing and help him or her look before he/she gets too upset.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

8. Even if my child wants to buy something that he or she doesn't need, I give him or her the money.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

9. I allow my child to work out small arguments with friends independent of adult help.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

10. When my child is unable to complete a homework assignment on his or her own, I finish the portion he or she is unable to do rather than let him or her turn in an incomplete assignment.

1	2	3	4	5	6
Never	Once in a while	Sometimes	Frequently	Most of the time	Always

# Appendix F

## The Penn State Worry Questionnaire (PSWQ)

Rate each of the following statements on a scale of 1 (“not at all typical of me”) to 5 (“very typical of me”). Please do leave any items blank.

	Not at all typical of me					Very typical of me				
1. If I do not have enough time to do everything, I do not worry about it.	1	2	3	4	5					
2. My worries overwhelm me.	1	2	3	4	5					
3. I do not tend to worry about things.	1	2	3	4	5					
4. Many situations make me worry.	1	2	3	4	5					
5. I know I should not worry about things, but I just cannot help it.	1	2	3	4	5					
6. When I am under pressure I worry a lot.	1	2	3	4	5					
7. I am always worrying about something.	1	2	3	4	5					
8. I find it easy to dismiss worrisome thoughts.	1	2	3	4	5					
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5					
10. I never worry about anything.	1	2	3	4	5					
11. When there is nothing more I can do about a concern, I do not worry about it anymore.	1	2	3	4	5					
12. I have been a worried all my life.	1	2	3	4	5					
13. I notice that I have been worrying about things	1	2	3	4	5					
14. Once I start worrying, I cannot stop.	1	2	3	4	5					
15. I worry all the time.	1	2	3	4	5					
16. I worry about projects until they are all done.	1	2	3	4	5					

Appendix G  
Eligibility Screener

**1) How old is your child?**

- ☐ 5 years old
- ☐ 6 years old
- ☐ 7 years old
- ☐ 8 years old
- ☐ 9 years old
- ☐ 10 years old
- ☐ 11 years old
- ☐ 12 years old
- ☐ 13 years old
- ☐ 14 years old
- ☐ 15 years old

**2) Has your child been diagnosed with a food allergy?**

- ☐ Yes
- ☐ No

(If yes proceed to #3; if no, proceed to # 4)

**3) Has your been prescribed an epinephrine auto-injector (e.g., EpiPen, Auvi Q, Adrenaclick) for food allergy?**

- ☐ Yes
- ☐ No
- ☐ Don't Know

**4) Please indicate whether your child has been diagnosed with:**

Allergic rhinitis/ environmental allergens	Yes	No
Asthma:	Yes	No
Eczema:	Yes	No
Eosinophilic esophagitis (EoE)	Yes	No
Cancer:	Yes	No
Cystic Fibrosis:	Yes	No
Diabetes:	Yes	No
Autism:	Yes	No
Developmental Delay:	Yes	No
Other Chronic Illness:	Yes	No (If yes, please specify:_____)

## Appendix H

### Uncertain Situation Vignettes with Behavior Choices

#### Vignette 1

Imagine you have an 11-year-old child who would like to play basketball with some friends one afternoon at a community recreation center a few blocks from your home, where they have played before. Your child does not need to cross any busy streets to get to there. Your child lets you know some friends are already there and none of their caregivers are with them.

Given the situation, how likely would you be to do the following:

		Not at all likely							Very Likely
<b>Protective behaviors:</b>									
Not allow your child to go.	Avoidance	1	2	3	4	5	6	7	
Accompany your child to the recreation center and stay while they play basketball	Parental monitoring	1	2	3	4	5	6	7	
Provide step-by-step directions for how they should get to the recreation center.	Problem-solving for the child	1	2	3	4	5	6	7	
<b>Less protective behaviors</b>									
Suggest that they walk with a friend.	Less avoidance	1	2	3	4	5	6	7	
Ask who will be there.	Less intrusive parental monitoring	1	2	3	4	5	6	7	
Let them know you are available if needed.	Less intrusive problem-solving	1	2	3	4	5	6	7	
<b>General behaviors</b>									
Give your child a water bottle to bring along.	Provide resources	1	2	3	4	5	6	7	
Tell them what time you want them to be home.	Give information	1	2	3	4	5	6	7	
Tell them to have a good time.	Provide emotional support	1	2	3	4	5	6	7	

## Vignette 2

Imagine you have a 12-year-old child who has a social studies project on a historical figure that is due in one week. Your child has been receiving good grades in social studies and on past school projects, but still reports feeling worried the project will not turn out well.

Given the situation, how likely would you be to do the following:

		Not at all likely							Very Likely
<b>Protective behaviors:</b>									
Complete some parts of the project for your child if they get stuck.	Avoidance	1	2	3	4	5	6	7	
Sit with your child when they work on the project and observe their progress.	Parental monitoring	1	2	3	4	5	6	7	
Each day give your child a list of tasks they need to complete for that day.	Problem-solving for the child	1	2	3	4	5	6	7	
<b>Less protective behaviors</b>									
Offer to give feedback on the different parts of the project	Less avoidance	1	2	3	4	5	6	7	
Periodically ask your child to share their progress.	Less intrusive parental monitoring	1	2	3	4	5	6	7	
Let them know you are available to answer questions.	Less intrusive problem-solving	1	2	3	4	5	6	7	
<b>General behaviors</b>									
Offer to purchase the supplies necessary for the project.	Provide resources	1	2	3	4	5	6	7	
Tell the hours the library is open.	Give information	1	2	3	4	5	6	7	
Remind your child they have been doing well in social studies.	Provide emotional support	1	2	3	4	5	6	7	

### Vignette 3

Imagine you have an 8-year-old child who likes to cook. Your child has helped you make salads in the past by chopping some of the vegetables. Your child wants to make a dinner salad all on their own that involves chopping cucumber, pepper, and cherry tomato.

Given the situation, how likely would you be to do the following:

		Not at all likely							Very Likely
<b>Protective behaviors:</b>									
Precut the vegetables for your child and let your child mix the ingredients together.	Avoidance	1	2	3	4	5	6	7	
Stand next to your child and watch what they do.	Parental monitoring	1	2	3	4	5	6	7	
Direct your child through each step as they chop each vegetable.	Problem-solving for the child	1	2	3	4	5	6	7	
<b>Less protective behaviors</b>									
Let your child do the easy cutting tasks and offer to help with the more difficult tasks.	Less avoidance	1	2	3	4	5	6	7	
Stay in the kitchen and work on another task.	Less intrusive parental monitoring	1	2	3	4	5	6	7	
Let your child know they can ask for help if needed.	Less intrusive problem-solving	1	2	3	4	5	6	7	
<b>General behaviors</b>									
Give your child a knife, bowl, and cutting board.	Provide resources	1	2	3	4	5	6	7	
Tell them what time the family is having dinner.	Give information	1	2	3	4	5	6	7	
Praise them for their offer to make a salad.	Provide emotional support	1	2	3	4	5	6	7	

#### Vignette 4

Your 10-year-old child comes home crying after playing with a good friend at their house. Your child's friend reportedly told them that they no longer want to be friends with your child.

Given the situation, how likely would you be to do the following:

		Not at all likely							Very Likely
<b>Protective behaviors:</b>									
Do not allow your child to play with this friend in the future.	Avoidance	1	2	3	4	5	6	7	
In the future, only let your child play with this friend when you are present.	Parental monitoring	1	2	3	4	5	6	7	
Call the friend's caregiver to work out the disagreement for your child.	Problem-solving for the child	1	2	3	4	5	6	7	
<b>Less protective behaviors</b>									
Wait a few days and then see if your child wants to invite that friend over.	Less avoidance	1	2	3	4	5	6	7	
Ask your child a few questions to get a sense of what happened.	Less intrusive parental monitoring	1	2	3	4	5	6	7	
Offer to talk about ways to resolve the situation when they are ready.	Less intrusive problem-solving	1	2	3	4	5	6	7	
<b>General behaviors</b>									
Give them some time alone to calm down.	Provide resources	1	2	3	4	5	6	7	
Tell your child those kinds of things happen with friends sometimes.	Give information	1	2	3	4	5	6	7	
Give your child a hug.	Provide emotional support	1	2	3	4	5	6	7	

# Appendix I

## Expert Rater Protectiveness Ratings

### Vignette 1

Imagine you have an 11-year-old child who would like to play basketball with some friends one afternoon at a community recreation center a few blocks from your home, where they have played before. Your child does not need to cross any busy streets to get to there. Your child lets you know some friends are already there and none of their caregivers are with them.

Given the situation, how likely would you be to do the following:

Protective behaviors:		Rater 1	Rater 2	Rater 3	Average
Not allow your child to go.	Avoidance	5	5	5	5
Accompany your child to the recreation center and stay while they play basketball.	Parental monitoring	5	5	4	4.67
Provide step-by-step directions for how they should get to the recreation center.	Problem-solving for the child	4	3	3	3.33
<b>Less protective behaviors</b>					
Suggest that they walk with a friend.	Less avoidance	3	2	2	2.33
Ask who will be there.	Less intrusive parental monitoring	2	1	2	1.67
Let them know you are available if needed.	Less intrusive problem-solving	1	1	1	1
<b>General behaviors</b>					
Give your child a water bottle to bring along.	Provide resources	1	2	2	1.67
Tell them what time you want them to be home.	Give information	2	1	1	1.33
Tell them to have a good time.	Provide emotional support	1	1	1	1

## Vignette 2

Imagine you have a 12-year-old child who has a social studies project on a historical figure that is due in one week. Your child has been receiving good grades in social studies and on past school projects, but still reports feeling worried the project will not turn out well.

Given the situation, how likely would you be to do the following:

<b>Protective behaviors:</b>		<b>Rater 1</b>	<b>Rater 2</b>	<b>Rater 3</b>	<b>Average</b>
Complete some parts of the project for your child if they get stuck.	Avoidance	4	4	5	4.67
Sit with your child when they work on the project and observe their progress.	Parental monitoring	5	5	5	5
Each day give your child a list of tasks they need to complete for that day.	Problem-solving for the child	3	4	4	3.67
<b>Less protective behaviors</b>					
Offer to give feedback on the different parts of the project	Less avoidance	2	1	2	1.67
Periodically ask your child to share their progress.	Less intrusive parental monitoring	3	3	3	3
Let them know you are available to answer questions.	Less intrusive problem-solving	1	1	1	1
<b>General behaviors</b>					
Offer to purchase the supplies necessary for the project.	Provide resources	1	1	1	1
Tell the hours the library is open.	Give information	1	1	1	1
Remind your child they have been doing well in social studies.	Provide emotional support	1	2	2	1.67

### Vignette 3

Imagine you have an 8-year-old child who likes to cook. Your child has helped you make salads in the past by chopping some of the vegetables. Your child wants to make a dinner salad all on their own that involves chopping cucumber, pepper, and cherry tomato.

Given the situation, how likely would you be to do the following:

<b>Protective behaviors:</b>		<b>Rater 1</b>	<b>Rater 2</b>	<b>Rater 3</b>	<b>Average</b>
Precut the vegetables for your child and let your child mix the ingredients together.	Avoidance	4	5	5	4.67
Stand next to your child and watch what they do.	Parental monitoring	4	4	4	4
Direct your child through each step as they chop each vegetable.	Problem-solving for the child	5	4	4	4.33
<b>Less protective behaviors</b>					
Let your child do the easy cutting tasks and offer to help with the more difficult tasks.	Less avoidance	3	2	3	2.67
Stay in the kitchen and work on another task.	Less intrusive parental monitoring	2	2	2	2
Let your child know they can ask for help if needed.	Less intrusive problem-solving	1	1	1	1
<b>General behaviors</b>					
Give your child a knife, bowl, and cutting board.	Provide resources	1	1	2	1.33
Tell them what time the family is having dinner.	Give information	1	2	1	1
Praise them for their offer to make a salad.	Emotional support	1	1	1	1

#### Vignette 4

Your 10-year-old child comes home crying after playing with a good friend at their house. Your child's friend reportedly told them that they no longer want to be friends with your child.

Given the situation, how likely would you be to do the following:

<b>Protective behaviors:</b>		<b>Rater 1</b>	<b>Rater 2</b>	<b>Rater 3</b>	<b>Average</b>
Do not allow your child to play with this friend in the future.	Avoidance	5	5	5	5
In the future, only let your child play with this friend when you are present.	Parental monitoring	4	4	5	4.33
Call the friend's caregiver to work out the disagreement for your child.	Problem-solving for the child	5	5	5	5
<b>Less protective behaviors</b>					
Wait a few days and then see if your child wants to invite that friend over.	Less avoidance	1	1	2	1.33
Ask your child a few questions to get a sense of what happened.	Less intrusive parental monitoring	2	1	3	2
Offer to talk about ways to resolve the situation when they are ready.	Less intrusive problem-solving	3	1	3	2.33
<b>General behaviors</b>					
Give them some time alone to calm down.	Provide resources	1	1	1	1
Tell your child those kinds of things happen with friends sometimes.	Give information	1	2	1	1.33
Give your child a hug	Provide emotional support	1	1	1	1

## Appendix J Vignette Response Questions

### Uncertainty Appraisal

- 1) How uncertain does this situation seem to you?
- |            |   |   |   |   |   |           |
|------------|---|---|---|---|---|-----------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7         |
| Not at all |   |   |   |   |   | Very      |
| uncertain  |   |   |   |   |   | uncertain |
- 
- 2) How unpredictable is the outcome of this situation?
- |               |   |   |   |   |   |               |
|---------------|---|---|---|---|---|---------------|
| 1             | 2 | 3 | 4 | 5 | 6 | 7             |
| Not at all    |   |   |   |   |   | Very          |
| unpredictable |   |   |   |   |   | unpredictable |
- 
- 3) How unclear is this situation?
- |            |   |   |   |   |   |         |
|------------|---|---|---|---|---|---------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7       |
| Not at all |   |   |   |   |   | Very    |
| unclear    |   |   |   |   |   | unclear |

### Negative Affect

- 4) How uncomfortable does this situation make you?
- |               |   |   |   |   |   |               |
|---------------|---|---|---|---|---|---------------|
| 1             | 2 | 3 | 4 | 5 | 6 | 7             |
| Not at all    |   |   |   |   |   | Very          |
| uncomfortable |   |   |   |   |   | uncomfortable |
- 
- 5) How worried would you be in this situation?
- |            |   |   |   |   |   |         |
|------------|---|---|---|---|---|---------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7       |
| Not at all |   |   |   |   |   | Very    |
| worried    |   |   |   |   |   | worried |
- 
- 6) How stressful would you find this situation?
- |            |   |   |   |   |   |           |
|------------|---|---|---|---|---|-----------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7         |
| Not at all |   |   |   |   |   | Very      |
| stressful  |   |   |   |   |   | stressful |

### Threat Appraisal

- 7) What is the potential for a negative outcome?
- |            |   |   |   |   |   |        |
|------------|---|---|---|---|---|--------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7      |
| Not at all |   |   |   |   |   | Very   |
| likely     |   |   |   |   |   | likely |
- 
- 8) How potentially harmful is this situation?
- |            |   |   |   |   |   |         |
|------------|---|---|---|---|---|---------|
| 1          | 2 | 3 | 4 | 5 | 6 | 7       |
| Not at all |   |   |   |   |   | Very    |
| harmful    |   |   |   |   |   | harmful |

9) What is the potential for a positive outcome?

1	2	3	4	5	6	7
Not at all						Very likely
likely						

### Features Associated with Intolerance of Uncertainty

10) How difficult would it be for you to decide what to do in this situation?

1	2	3	4	5	6	7
Not at all						Very
difficult						difficult

11) How confident are you that you could manage in this situation?

1	2	3	4	5	6	7
Not at all						Very
confident						confident

### Additional Filler Questions

12) How relevant is this situation to your life?

1	2	3	4	5	6	7
Not at all						Very
relevant						relevant

13) How confident are you that your child would be able to manage this situation?

1	2	3	4	5	6	7
Not at all						Very
confident						confident

14) How likely would you be to seek advice from others on this matter?

1	2	3	4	5	6	7
Not at all						Very likely
likely						

# INTOLERANCE OF UNCERTAINTY AND PROTECTIVE PARENTING

## Appendix K

### Descriptive Statistics for Vignette Protective Parenting by Group

<i>Variables</i>	<i>n</i>	<i>Min.</i>	<i>Max.</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>	<i>SE</i>	<i>Kurtosis</i>	<i>SE</i>
Mothers of children with food allergy									
Vignette 1	80	3	21	12.49	4.65	-.08	.27	-.74	.53
Vignette 2	80	3	21	11.54	4.79	.14	.27	-.64	.53
Vignette 3	80	3	21	12.56	4.26	-.24	.27	-.60	.53
Vignette 4	80	3	21	9.84	4.66	.46	.27	-.72	.53
Mothers of healthy children									
Vignette 1	78	3	21	10.87	4.42	.35	.27	-.46	.54
Vignette 2	78	3	20	11.32	3.62	-.09	.27	-.30	.54
Vignette 3	78	3	21	13.35	4.72	-.30	.27	-.76	.54
Vignette 4	78	3	19	9.15	4.06	.25	.27	-.63	.54

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