



Western Michigan University  
ScholarWorks at WMU

---

Dissertations

Graduate College

---

8-2016

## Understanding Factors Related to Negative Mental Health Outcomes Following Childhood Unintentional Injuries

Jennifer T. Kuhn  
*Western Michigan University*

Follow this and additional works at: <https://scholarworks.wmich.edu/dissertations>



Part of the Health Psychology Commons

---

### Recommended Citation

Kuhn, Jennifer T., "Understanding Factors Related to Negative Mental Health Outcomes Following Childhood Unintentional Injuries" (2016). *Dissertations*. 1955.

<https://scholarworks.wmich.edu/dissertations/1955>

This Dissertation-Open Access is brought to you for free and open access by the Graduate College at ScholarWorks at WMU. It has been accepted for inclusion in Dissertations by an authorized administrator of ScholarWorks at WMU. For more information, please contact [wmu-scholarworks@wmich.edu](mailto:wmu-scholarworks@wmich.edu).



# UNDERSTANDING FACTORS RELATED TO NEGATIVE MENTAL HEALTH OUTCOMES FOLLOWING CHILDHOOD UNINTENTIONAL INJURIES

Jennifer T. Kuhn, Ph.D.

Western Michigan University, 2016

Unintentional injuries are the leading cause of death for children ages 0-19 and account for 9.2 million emergency room visits in the United States each year (Borse et al., 2008). Research shows that approximately 20% of children meet criteria for PTSD following an unintentional injury (Ostrowski et al., 2011). There are several factors that may contribute to the development of PTSD including caregivers' posttraumatic stress symptoms after the injury event. Research has not explained the association between caregivers' PTSD and children's risk for PTSD symptoms, but it is possible that caregivers with PTSD may be modeling anxious behaviors to their children who are then adopting those anxious behaviors. Examining these behaviors may help to develop effective interventions to prevent child PTSD. The present study examined whether or not caregiver modeling of anxious behaviors or anxious coping affects children's development of PTSD symptoms or other psychological symptoms (e.g., disruptive behavior) after an unintentional injury. We recruited caregivers and their children from a pediatrics office following an Emergency Department visit for an unintentional injury. Caregivers and their children attended two sessions 6 weeks apart. During the first session, caregivers completed several measures regarding their and their child's coping,

anxiety, and PTSD symptoms, and answered questions regarding their child's injury. Children also answered several questions about their injury. In the second session, caregivers completed measures regarding their child's PTSD symptoms and internalizing and externalizing behaviors. We utilized multiple regression analyses to examine our hypotheses and to determine which predictor variables predict PTSD symptoms as well as child internalizing and externalizing symptoms. Results showed that caregiver anxiety and PTSD symptoms along with child internalizing and externalizing behaviors were related to higher levels of PTSD symptoms following a child's unintentional injury. These results suggest that caregivers' anxiety levels regarding children's injuries are important predictors of children's PTSD symptoms. It is possible that caregivers' symptoms of anxiety alter their interactions with their children, and this may lead to negative outcomes for children. We were unable to make conclusions regarding caregivers modeling anxious behaviors since we were not able to make direction observations. However, these findings highlight the importance of assessing for pre-existing child and caregiver symptoms in order to better understand which children are at a higher risk for the development of PTSD or other psychopathology following an injury. By doing this, it may be possible to intervene early to reduce the likelihood of children developing negative outcomes following an injury.

UNDERSTANDING FACTORS RELATED TO NEGATIVE MENTAL HEALTH  
OUTCOMES FOLLOWING CHILDHOOD UNINTENTIONAL INJURIES

by

Jennifer T. Kuhn

A dissertation submitted to the Graduate College  
in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
Psychology  
Western Michigan University  
August 2016

Doctoral Committee:

Amy Damashek, Ph.D., Chair  
Galen Alessi, Ph.D.  
Amy Naugle, Ph.D.  
J. Lia Gaggino, M.D.

© 2016 Jennifer T. Kuhn

## ACKNOWLEDGMENTS

I would first like to thank my advisor, committee chair, and mentor, Dr. Amy Damashek. Dr. Damashek continuously challenged, supported, and encouraged me throughout my graduate training, and her guidance and support with this project has been invaluable. I have truly enjoyed and appreciated working so closely with Dr. Damashek. I would like to thank my committee members, Drs. Galen Alessi, Lia Gaggino, and Amy Naugle, for their help and support throughout this entire process. Drs. Damashek, Alessi, Gaggino, and Naugle have been instrumental in shaping my research and clinical skills throughout my training, and for that, I am forever grateful. In addition, I am thankful for the faculty in the Department of Psychology at Western Michigan University who provided me with the tools and skills required to learn and to grow as a researcher and clinician.

The Student Award Program from the Blue Cross Blue Shield of Michigan Foundation funded this research project. This project could not have been completed without the help of the following individuals: Rachel Petts, Julia Huston, Carmelita Foster, Chelsea Sage-Germain, Kate Burger, Carlie Decker, Aaron Begley, and the clinical staff at Bronson Rambling Road Pediatrics. I am incredibly appreciative of their dedication to my project, their constant hard work, and their companionship.

## Acknowledgments - Continued

I would like to thank my family and friends for their endless love and support throughout my training. My mom and dad, Terri and Irvin Kuhn, provided me with love and encouragement throughout my life that allowed me to succeed in this journey. Finally, I want to thank my husband, Michael Novick, who inspires me every day to be better. His endless patience, love, and support have helped me immensely, and I could not have done this without him.

Jennifer T. Kuhn

## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	ii
LIST OF TABLES .....	vii
CHAPTER	
INTRODUCTION .....	1
Factors Associated with Risk for Unintentional Injury .....	2
Consequences of Unintentional Injury.....	4
Pathways to PTSD and Other Psychopathology Following an Unintentional Injury.....	5
Incident Characteristics.....	5
Child Characteristics.....	7
Caregiver and Family Characteristics .....	9
Behavioral Modeling .....	10
Model of the Development of PTSD .....	11
Summary .....	13
Purposes and Hypotheses.....	13
METHODS .....	15
Participants.....	15
Procedures .....	18
Measures .....	19



## Table of Contents—Continued

CHAPTER	
	Demographics ..... 19
	Child Subjective Rating of Injury Severity..... 20
	Caregiver Subjective Rating of Injury Severity ..... 20
	Caregiver Coping Mechanisms..... 20
	Child Pre-injury Functioning ..... 21
	Child Posttraumatic Stress Symptoms ..... 22
	Caregiver Posttraumatic Stress Symptoms ..... 23
	Caregiver Previous Trauma Exposure ..... 23
	Caregiver Anxiety Levels and Behavioral Modeling in Response to the Injury Event ..... 24
	Plan of Analysis ..... 26
RESULTS	..... 30
	Descriptive Data..... 30
	Bivariate Analyses ..... 32
	Regression Analyses ..... 42
DISCUSSION	..... 47
	Strengths and Limitations ..... 54
	Conclusions..... 56
REFERENCES	..... 57

## Table of Contents—Continued

### APPENDICES

A. WMU HSIRB Approval Letter .....	67
B. Bronson Hospital HSIRB Approval Letter .....	69
C. Demographic Questionnaire.....	71
D. Semi-structured Interview – Injury Event.....	75
E. Interview Coding Sheet .....	80
F. Children’s Semi-structured Interview.....	83

## LIST OF TABLES

1. Participant Demographics .....	17
2. Child Injury Type.....	30
3. Descriptive Information .....	31
4. Correlations among Predictor and Outcome Variables for Session 1.....	34
5. Correlations among Predictor and Outcome Variables for Session 2.....	37
6. Paired Samples T-Test Examining Differences between Outcome Variables at Session 1 and Session 2 .....	40
7. Independent Samples T-Test Examining Differences Gender Differences in Outcome Variables for Session 1 and 2 .....	42
8. Multiple Regression Analysis for Session 1 .....	43
9. Multiple Regression Analysis for Session 2 .....	45
10. Multiple Regression Analyses Predicting PTSD Symptoms at Session 2.....	46

## INTRODUCTION

Unintentional injuries are the number one cause of death among children ages 0-19 and account for 9.2 million emergency room visits yearly in the United States (U.S; Borse et al., 2008). Unintentional injuries are defined as injuries that are not caused intentionally by another person (Borse et al., 2008). Suffocation and drowning are the leading causes of unintentional injury death for children between the ages of 0 and 4, and being an occupant in a motor vehicle accident is the leading cause of unintentional injury death for children between the ages of 5 and 19 (Borse et al., 2008).

The consequences of an unintentional injury can include physical injury (e.g., traumatic brain injury, broken bones) as well as emotional injury (e.g., posttraumatic stress disorder). For instance, on average, 20% of children experience posttraumatic stress disorder (PTSD) following a severe unintentional injury (Ostrowski et al., 2011). Several studies have examined factors that lead to PTSD following an unintentional child injury. Such factors include incident specific characteristics (e.g., subjective trauma severity; Brosbe, Hoefling, & Faust, 2011), child factors (e.g., pre-injury internalizing and externalizing behaviors), and caregiver (e.g., mother, father, grandmother, grandfather, etc.) factors (e.g., pre-injury maternal anxiety). Although maternal anxiety has been found to be related to children's risk of PTSD following an injury, the mechanism by which caregivers' anxiety is related to children's anxiety is unknown. One explanation may be that the behavior of caregivers following an injury and children's

perception of their caregiver's behavior contributes to children's development of PTSD. However, this has not been examined.

### **Factors Associated with Risk for Unintentional Injury**

There are several environmental factors, child factors, and caregiver factors associated with an increased risk for unintentional injury. With regard to environmental variables, the majority of injuries occur in and around the home (Morrongiello, Ondejko, & Littlejohn, 2004), often as a result of hazards (Leblanc et al., 2006). Hazards include the use of baby walkers, burn hazards (e.g., extremely hot water from faucets, not having a working fire alarm or extinguisher), strangulation hazards (e.g., loose cords), fall hazards (e.g., stairways without a gate), poisoning hazards (e.g., medications), choking hazards (e.g., small objects or toys), and drowning hazards (e.g., unsupervised bathtub full of water; Leblanc, et al., 2006; American Academy of Pediatrics, 2013). Another environmental contributor to unintentional injury is when a child is in an unusual circumstance or environment. One study found that children were more likely to be injured when they were in an unusual circumstance (e.g., a new environment such as being at a friend's house, having a new pet in the home; Kuhn & Damashek, 2015).

With regard to child factors, ethnic background is associated with injury risk. American Indian or Alaska Native male children have the highest death rate from unintentional injuries, whereas Asian or Pacific Islander female children have the lowest death rate from unintentional injuries (Borse et al., 2008). The death rate from unintentional child injuries for Caucasians and African-Americans are approximately the same (Borse et al., 2008). In addition, gender is associated with injury risk. Males have a higher death rate, a higher nonfatal unintentional injury rate, are at a higher risk for

injury, and sustain more severe injuries in comparison to females (Borse et al., 2008; Morrongiello et al., 2004; Schwebel, Brezaussek, Ramey, & Ramey, 2004). Child behavior is also related to injury risk. Specifically, children who engage in more risk taking behavior as well as children who are more hyperactive and noncompliant are more likely to be injured than are other children (Morrongiello & Dawber, 1999; Morrongiello et al., 2004; Schwebel et al., 2004; Berry & Schwebel, 2009). Research also indicates that children are at a higher risk for injury when they are engaging in new behaviors (e.g., riding a bike for the first time; Kuhn & Damashek, 2015). Young children engage in new behaviors at a high rate due to typical development, and it is important to be aware of the high risk factor for injury during these new, developmentally appropriate behaviors.

In addition to child characteristics, there are several caregiver and family characteristics that are related to children's increased risk for unintentional injuries. Factors such as caregiver alcohol use and depression have also been associated with an increase in child injury risk (Damashek, Williams, Sher, & Peterson, 2009; Schwebel & Brezaussek, 2008). Additionally, caregivers' safety practices are related to children's injury risk. Poor supervision practices (e.g., having your child out of sight or not checking on your child regularly) and lack of caregiver knowledge of home safety practices (e.g., child proofing the home) are risk factors for unintentional injuries (Damashek et al., 2009; Morrongiello, Corbett, McCourt, & Johnston, 2006; Morrongiello et al., 2004).

Parenting styles also play a large role in children's risk for unintentional injuries, especially with regard to the differences between mothers and fathers. In general, fathers tend to allow children to engage in more dangerous, physical, active, and exploratory

play than mothers (Brussoni & Olsen, 2011; Paquette, 2004). This type of play may put children at an increased risk for unintentional injury. Moreover, while both fathers and mothers view some unintentional injuries as unavoidable, fathers are more likely to report that minor injuries may benefit children because they will learn from them (Lewis, DeLillo, & Peterson, 2004). With regard to supervision levels, although several studies report similarities between mothers' and fathers' supervision practices, studies have found that children are at an increased risk for injury when they are supervised by their fathers (Damashek & Kuhn, 2013).

Finally, children living in single-parent households, in low-income households, and in ethnically diverse households are at a much higher risk for unintentional injury (Brownell et al., 2010; Haynes, Reading, & Gale, 2003; Schwebel et al., 2004).

Therefore, it is important to incorporate caregiver and family variables in research involving childhood unintentional injuries.

### **Consequences of Unintentional Injuries**

The consequences of unintentional injuries include physical and psychological effects. Physical suffering immediately following an injury, long-term pain, and invasive medical interventions are just a few of the consequences of unintentional injury (Brosbe et al., 2011; Landolt, Vollrath, Ribi, Gnehm, & Sennhauser, 2003; Zeigler, Greenwald, DeGuzman, & Simon, 2005). In addition to these physical changes and consequences, the psychological implications are great. Unfortunately, research suggests that many emergency healthcare providers focus primarily on physical symptoms and underestimate the likelihood of children developing psychopathology such as PTSD following an injury (Zeigler et al., 2005).

There are several studies that have specifically examined children's psychological outcomes following an injury. First, it is estimated that 15% of children meet criteria for Acute Stress Disorder (ASD) following an unintentional injury, but it is unclear whether or not symptoms of ASD predict future PTSD symptoms (Kassam-Adams & Winston, 2004). PTSD rates following an unintentional injury range from 10% to 30% (Bryant, Mayou, Wiggs, Ehlers, & Stores, 2004; Sabin, Zatzick, Jurkovich, & Rivara, 2006), and it appears that there may be an association between caregivers' PTSD and children's PTSD symptoms in that if one reports high levels of PTSD, the other also reports high levels of PTSD (Ostrowski et al., 2011). Additionally, research has reported that depression and anxiety are both highly comorbid with PTSD following an unintentional injury (Kahana, Feeny, Youngstrom, & Drotar, 2006; Sabin et al., 2006; Zatzick et al., 2006).

### **Pathways to PTSD and Other Psychopathology Following an Unintentional Injury**

#### **Incident Characteristics**

Research has examined incident, child, caregiver, and family characteristics that may contribute to a child's risk for developing PTSD following an unintentional injury. Regarding incident characteristics, Nugent, Ostrowski, Christopher, and Delahanty (2007) examined psychological symptoms in children following injuries that occurred in several different events (e.g., assaults, burns, sports injuries, falls) and did not find any differences in psychological outcomes. Several other studies found no significant difference in posttraumatic stress following different types of traffic-related injuries (i.e., vehicle occupant, pedestrian, bicyclist; Ehlers, Mayou, & Bryant, 2003; Keppel-Benson,



Ollendick, & Benson, 2002; Zink & McCain, 2003). Additionally, studies have examined whether the type of injury (e.g., fracture, head injury) affects mental health outcomes, and most found that injury type was not associated with posttraumatic stress symptoms (Meiser-Stedman, Dalgleish, Smith, Yule, & Glucksman, 2007; Winston, Kassam-Adams, Garcia-Espana, Ittenbach, & Cnaan, 2003; Zink & McCain, 2003). Finally, LeBrocq, Hendrikz, and Kenardy (2010) examined PTSD trajectories including a resilient trajectory (i.e., low PTS symptoms) and a chronic trajectory (i.e., high and acute PTS symptoms) among children (ages 6-16 years) who sustained an unintentional injury. Children who sustained burns, serious internal injuries, or multiple injuries were more likely to have a chronic trajectory than children with other types of injury. From this study, it appears that type of injury may result in worse outcomes only if the injury is more severe.

In addition to examining mechanism of injury, researchers have examined the relationship between injury severity and psychological outcomes using the Injury Severity Score (ISS), an injury severity rating used by physicians (Baker, O'Neill, Haddon, & Long, 1974). It has been assumed that greater injury severity would lead to greater psychological distress; however, this has not been supported by the literature. Ehlers et al. (2003) conducted a longitudinal study examining children (6-15 years) who were involved in traffic-related accidents and found that injury severity did not significantly predict PTSD symptoms. Several other studies have used the ISS and found similar results (Kassam-Adams & Winston, 2004; Nugent, Christopher, & Delahanty, 2006; Nugent et al., 2007; Zatzick et al., 2006). Other studies have examined hospital involvement, such as admission to and length of stay in the hospital as indicators of

severity; findings using these indicators have been mixed. A few studies found that admission to the hospital and having a longer hospital stay were more likely to predict posttraumatic stress symptoms regardless of their ISS (Bryant, Salmon, Sinclair, & Davidson, 2007; Olsson, Kenardy, De Young, & Spence, 2008; Sanders, Starr, McNulty, & Niacaris, 2005). However, other studies found no association between length of stay and admission to the hospital (Meiser-Stedman et al., 2007; Schreier, Ladakakos, Morabito, Chapman, & Knudson, 2005). Kassam-Adams & Winston (2004) specifically examined admission to the pediatric intensive care unit, and they did not find an association between admission and posttraumatic stress symptoms. One study found that the invasiveness of the medical intervention was significantly associated with posttraumatic stress symptoms, indicating that measuring invasiveness of the medical intervention along with injury severity may be more useful (Keppel-Benson et al., 2002).

### **Child Characteristics**

Research suggests that there are child characteristics that appear to predict PTSD symptoms following an unintentional injury. First, research has found that pre-injury internalizing behavior (e.g., anxiety) and externalizing behavior (e.g., aggression) are significantly associated with PTSD following an injury (LeBrocq et al., 2010; Scheeringa, Wright, Hunt, & Zeanah, 2006; Winston et al., 2003). Additionally, research suggests that children who rate their injury as more subjectively traumatic have more PTSD symptoms, regardless of the actual severity of their injury (Cox, Kenardy, & Hendrikz, 2008; Ehlers et al., 2003; Holbrook et al., 2005; Meiser-Stedman et al., 2007). In particular, children who report thinking they were going to die or report a subjective experience of threat to their life have higher PTSD symptoms following an injury (Cox et

al., 2008; Winston et al., 2003). Furthermore, trauma-specific thoughts, cognitions, and memories appear to have a strong effect on children's PTSD symptoms. Indeed, Ehlers et al. (2003) found that children who believed they were isolated, felt misunderstood, had intrusive thoughts, became angry in response to traumatic thoughts, suppressed thoughts, and dissociated were more likely to develop PTSD symptoms following an injury. Finally, Meiser-Stedman et al. (2007) found that children who endorsed the idea that excessive worry is beneficial were more likely to develop Acute Stress Disorder (ASD) symptoms than those who did not have this belief. Interestingly, with regard to physical symptoms, children who presented to the emergency room with an increased or elevated heart rate following an injury were more likely to have higher PTSD symptoms (Cox et al., 2008; Keppel-Benson et al., 2002; Meiser-Stedman et al., 2007; Scheeringa et al., 2006; Schreier et al., 2005). It may be that those children presenting to the ER with a higher heart rate are more anxious children overall, putting them at a higher risk for developing PTSD.

There are several characteristics of children and their experience that do not appear to play a role in PTSD risk or that have inconsistent findings, including child age and gender (Cox et al., 2008; Holbrook et al., 2005; Kassam-Adams & Winston, 2004; Kassam-Adams, Garcia-Espana, Fein, & Winston, 2005; LeBrocq et al., 2010; Nugent et al., 2006; Nugent et al., 2007; Schreier et al., 2005), as well as race and ethnicity (Kassam-Adams & Winston, 2004; Nugent et al., 2006; Sanders et al., 2005; Scheeringa et al., 2006; Schreier et al., 2005; Zatzick et al., 2006; Zink & McCain, 2003). In addition, pre-injury trauma exposure has not been a consistent predictor of PTSD, and the role of

prior trauma in children remains unclear (Cox et al., 2008; Keppel-Benson et al., 2002; Meiser-Stedman et al., 2007; Scheeringa et al., 2006; Schreier et al., 2005).

### **Caregiver and Family Characteristics**

Caregiver and family factors are also implicated in the development of PTSD in children after an unintentional injury. First, family factors such as socioeconomic status may be associated with the development of PTSD in children post-injury but findings have been mixed. Some studies found that low socioeconomic status predicted higher levels of child posttraumatic stress symptoms following an injury, while some did not find any association between child posttraumatic stress symptoms following an injury (Kahana et al., 2006; Keppel-Benson et al., 2002; Landolt, Vollrath, Timm, Gnehm, & Sennhauser, 2005).

Research suggests that caregiver posttraumatic stress symptoms following a child's unintentional injury are one of the strongest predictors for child PTSD (Bronner, Knoester, Bos, Last, & Grootenhuys, 2008). Although not specific to only unintentional injuries, studies have found that the estimated rates of Acute Stress Disorder (ASD) and PTSD after children's pediatric intensive care unit treatments were estimated to be approximately 30% for ASD and between 12% and 21% for PTSD in caregivers (Baluffi et al., 2004; Bronner et al., 2010). Caregivers in these studies reported that their biggest concern was thinking that their child might die. Several studies found that maternal ASD and PTSD following their child's unintentional injury significantly predicted a child's ASD symptoms and PTS symptoms from 6 to 18 months post-injury (Nugent et al., 2007; Saxe et al., 2005; Schreier et al., 2005; Stoddard et al., 2006). Therefore, it appears that ASD and PTSD symptoms in caregivers following their child's unintentional injury may

be a risk factor for the development of PTSD in children. However, it is unclear why caregiver PTSD following an injury predicts children's PTSD, but it may be due to caregiver displays of anxious coping.

### **Behavioral Modeling**

One way in which caregivers' anxiety influences children's coping may be through behavioral modeling. There is significant evidence that behavioral modeling by caregivers is critical in the development of anxiety and fear in children, but this has not specifically been studied in the context of unintentional injuries and PTSD. Gerull and Rapee (2002) examined maternal modeling of fear responses in response to neutral toys and its effect on toddlers. Following a brief one-minute conditioning task in which mothers were told to respond negatively (i.e., with fear or disgust) to certain toys, toddlers, especially females, showed greater fear responses and avoided objects that received negative reactions from their mother. Furthermore, the toddlers in this study had fear reactions that persisted up to 10 minutes, suggesting that even brief maternal anxiety reactions may contribute to the development of more persistent anxiety in a child.

A study by Burstein & Ginsburg (2010) examined modeling of anxious behavior by both mothers and fathers. Caregivers were randomly assigned to participate with their child in either an anxious spelling test condition or a non-anxious spelling test condition. During the anxious condition, caregivers were trained to act as if they were anxious and worried about their child's spelling test for 2 minutes. During the non-anxious condition, caregivers were trained to be relaxed and confident. Children in the anxious condition reported higher levels of anxiety, more anxious thoughts, and a desire to avoid the spelling test as compared to children in the non-anxious condition. In addition, the

researchers examined whether there were differences between mothers and fathers and found that fathers had a greater effect on their child's anxiety. This study suggests that behavioral modeling of anxiety, regardless of whether a child is anxious, has a significant effect on a child's anxiety level, even in just a brief interaction.

Finally, another study examined threat interpretations of ambiguous scenarios (threatening or non-threatening scenarios) by anxious and non-anxious children (ages 7-15) and their mothers (Cresswell, Schniering, & Rapee, 2005). Researchers found that anxious children interpreted the ambiguous situations as more threatening, and mothers of anxious children also interpreted these scenarios as more threatening in comparison to mothers of non-anxious children. Additionally, the mother and child interpretations were highly correlated in the anxious group but the direction of this relationship is unclear. It is possible that mothers' threat interpretation impacted their child's interpretation in some way, whether it was because mothers were also anxious or because they were modeling a more threatening interpretation.

Thus, based on results from these studies, it appears that even brief, anxious interactions may impact a child's stress reaction, thoughts, and perception of a situation. Therefore, examining the role of caregiver anxiety and behavioral modeling may help us to better understand pathways to PTSD for children who have experienced an unintentional injury.

### **Model of the Development of PTSD**

Kazak and colleagues (2006) created an integrative model for assessing and treating pediatric medical traumatic stress (PMTS). PMTS is defined as "a set of psychological and physiological responses of children and their families to pain, injury,

serious illness, medical procedures, and invasive or frightening experiences” and is not a diagnosis of ASD or PTSD (Kazak et al., 2006). This model is broken down into 3 phases. The first phase is the peritrauma phase that occurs during and immediately following the event. During this phase, the authors suggest that the most important factors affecting future PMTS is the subjective experience of the traumatic event, preexisting psychological factors, and the characteristics surrounding the event. The second phase of the model involves the early, ongoing, and evolving responses of children and families following the traumatic event. This includes possible ongoing medical complications or procedures and the reactions of families to the event. It is during this time that the authors suggest that caregiver anxiety may lead to more symptoms of PMTS in children. Although the authors do not mention the role of caregiver modeling, perhaps caregiver modeling of anxious behaviors impacts children’s anxiety responses during this phase, and intervening during this phase could prevent movement into the third phase. The third phase refers to the long-lasting effects of PMTS. While this model is helpful in understanding PTS symptoms in children and their families, it only focuses on health issues and chronic illness and not as much on unintentional injuries. It also lacks specificity regarding the variables that lead to PTSD (e.g., caregiver modeling of anxious behavior), and it does not focus on any other psychological outcomes besides PMTS. Therefore, examining variables that more specifically lead to PTSD or other psychological symptoms, such as caregiver modeling of anxiety, may be more useful in understanding how to prevent and treat children with unintentional injuries in the future.

## **Summary**

A significant number of children experience trauma symptoms as a result of unintentional injuries (Brosbe et al., 2011; Ostrowski et al., 2011). There are several factors that appear to be significantly related to children's risk for developing PTSD following an unintentional injury, including child and caregiver variables. In particular, children whose caregivers experience PTSD symptoms following an injury are at greater risk for developing PTSD. Unfortunately, research has not explained why this association exists; however, it is possible that caregivers with PTSD may be modeling anxious coping or behaviors to their children who are then adopting such behaviors. Therefore, it is important to examine whether caregivers' displays of anxious coping or behaviors is related to children's increased likelihood of developing PTSD or other psychological symptoms. If caregiver modeling is related to children's symptoms of PTSD, interventions can then address caregivers' coping skills and displays of affect following a child injury.

## **Purpose and Hypotheses**

The goal of this study was to better understand factors that lead to child symptoms of PTSD or other psychopathology following a child's unintentional injury. From the literature, it appears that behavioral modeling may be an important factor that has not been examined in the context of unintentional injuries and psychological outcomes. Therefore, this addition is a new concept that may contribute significantly to understanding the development of PTSD following a child injury. The variables examined in the model included: (1) demographics including child SES, age, and gender; (2) child's perception of injury severity; (3) caregiver's perception of injury severity; (4)



caregiver's positive and negative coping skills; (5) child's internalizing and externalizing behavior prior to the injury; (6) child's PTSD symptoms immediately following the injury; (7) caregiver's PTSD symptoms immediately following the injury; and (8) caregiver's anxiety level and subjective experience in the hospital as reported by both the caregiver and the child. The outcome variables of interest were whether the child displays PTSD symptoms at 6 weeks post-injury or whether the child had an increase in externalizing or internalizing behaviors at 6 weeks post-injury.

The hypotheses of the current study were as follows: (1) caregiver and child perception of injury severity will predict PTSD symptoms such that perception of higher injury severity will predict higher levels of PTSD symptoms in children; (2) higher levels of child anxiety prior to the injury will predict higher levels of child PTSD symptoms; (3) higher reported levels of caregiver anxiety during and after the injury will predict higher levels of child PTSD symptoms; and (4) greater levels of caregiver engagement in anxious/avoidant coping strategies will predict higher levels of child PTSD symptoms. We conducted additional analyses to examine whether the child and caregiver variables noted above predict overall child internalizing and externalizing symptoms. Few studies have examined the variables as outcomes; thus, it is difficult to make hypotheses about them. Due to inconsistent findings regarding age, gender, and socioeconomic status, these variables were explored in the analyses to examine whether they predict levels of PTSD symptoms in children.

## METHODS

### Participants

Participants were recruited from Bronson Rambling Road Pediatrics in Kalamazoo, MI. Children between the ages of 3 and 12 and their caregivers were recruited from a list of Emergency Department (ED) discharges that the office receives each morning. Inclusion criteria were as follows: child sustained an unintentional injury that required a visit to the ED, primary caregiver (e.g., mother, father, grandparent) presented to the ED with their child, primary caregiver and child were fluent in English, the child was a current patient at Bronson Rambling Road Pediatrics, and the child was between the ages of 3 and 12. Exclusion criteria were as follows: the primary caregiver and child were not fluent in English, the child had a pre-injury PTSD diagnosis, the child was not between the ages of 3 and 12, the child's caregiver did not present to the ED, and the injury was intentional or caused by maltreatment.

Sixty-one families were referred from the ED discharge list. Forty-two families from the referral list (69% of referrals) responded to the recruitment phone calls. Of those that responded, 21 participants were recruited (34% of the total referrals and 50% of referrals that responded to the recruitment phone calls). Of the families that responded to the phone calls, 2.4% were ineligible due to their child having a current diagnosis of PTSD. For the other 97.6%, reasons for not participating in the study included the following: no showed for one or more appointments (14.6%), not interested in participating (12.2%), too busy with other obligations (4.9%), difficulty remembering appointments (2.4%), too much time involved in the study (2.4%), available times did not match up with caregiver's schedule (2.4%), did not qualify after attending the first

session (2.4%), and unknown reasons (7.3%). Of the 21 participants who participated in the study, 17 participants (81%) completed both session 1 and session 2. The average time between session 1 and session 2 for participants who completed both sessions was 8.7 weeks.

Child participants included 15 males (71%) and 6 females (29%). Of the 21 participants, children ranged in age from 3 to 11 with a median child age of 9 years ( $M = 7.6$ ,  $SD = 3.1$ ). Children were primarily Caucasian (81%), not participating in outpatient therapy (95%), not taking psychotropic medications (81%), and did not have a previous or current diagnosis of PTSD (100%). Mothers were identified as the primary caregiver 100% of the time. For 91% of the caregiver-child dyads, mothers attended the session and were with the child at the time of the ED visit. For the other 9%, fathers attended the session because they were at the ED visit. Caregivers were primarily Caucasian (95%), married (71%), college graduates or higher (67%), and earned more than \$50,000 annually (74%). See Table 1 for additional demographic information.

Table 1

*Participant Demographics*

<b>Variable</b>	<b>Percentage (n)</b>	<b>Variable</b>	<b>Percentage (n)</b>
Gender		Caregiver Education Level	
Male	71.4% (15)	Some College	19% (4)
Female	28.6% (6)	Vocational/Tech School	14.3% (3)
Age		College Graduate	38.1% (8)
3 years	19% (4)	Master's Degree	28.6% (6)
4 years	9.5% (2)	Annual Household Income	
5 years	4.8% (1)	Less than \$10,000	4.8% (1)
7 years	4.8% (1)	\$10,000-\$19,999	4.8% (1)
8 years	9.5% (2)	\$30,000-\$39,999	4.8% (1)
9 years	9.5% (2)	\$40,000-\$49,999	9.5% (2)
10 years	28.6% (6)	\$50,000-\$74,999	23.8% (5)
11 years	14.3% (3)	\$75,000-\$99,999	19% (4)
Primary Caregiver – Mother	100% (21)	\$100,000-\$149,999	14.3% (3)
Secondary Caregiver		Above \$150,000	9.5% (2)
Father	66.7% (14)	Caregiver Ethnicity	
Other	33.3% (7)	Caucasian	95.2% (20)
Caregiver at Session		Hispanic/Latino	4.8% (1)
Mother	90.5% (19)	Child Ethnicity	
Father	9.5% (2)	White/Caucasian	81% (17)
Lives With Child		Multiracial	14.3% (3)
Full-Time	95.2% (20)	Other	4.8% (1)
Part-Time	4.8% (1)	Child - Outpatient Therapy	
Marital Status		Yes	4.8% (1)
Married	71.4% (15)	No	95.2% (20)
Divorced	9.5% (2)	Child – Psychotropic Meds	
Living with Partner	4.8% (1)	Yes	19% (4)
Single	14.3% (3)	No	81% (17)
Children Living with Child		Child PTSD Dx - Pre	
0	4.8% (1)	Yes	0
1	61.9% (13)	No	100% (21)
2	19% (4)		
3	14.3% (3)		

## **Procedures**

This study was approved by the Human Subjects Institutional Review Board at Western Michigan University (see Appendix A) and at Bronson Methodist Hospital (see Appendix B). Each morning, the nursing staff at Rambling Road Pediatrics received an Emergency Department (ED) discharge list with reasons for presentation in the ED. The nursing staff contacted each family to determine if they needed follow-up care in the office, referrals to other services, or general nursing advice. If the child presented to the ED for an injury and met the inclusion criteria, the nursing staff provided information about the present study and asked if the caregiver would be interested in learning more about the study. If the primary caregiver (e.g., mother, father, grandparent) expressed interest and provided permission to share their contact information, a graduate student research assistant contacted the family via telephone within 1 week of the injury.

Caregivers were given the option to meet at Rambling Road Pediatrics or for the graduate student to travel to their home to participate in the study. For session 1, approximately 57% of participants attended the session at Rambling Road Pediatrics, and approximately 43% completed the session at their home with the graduate research assistants. For session 2, approximately 65% of participants attended the session at Rambling Road Pediatrics, and approximately 35% completed the session at their home.

During the first session, the graduate research assistant reviewed the procedures of the study as well as the consent and assent forms (for children 7 years of age and older). Following consent to participate in the study, the caregiver and their child completed measures regarding their demographics, psychological symptoms, and emotional and behavioral responses to the injury. Additionally, caregivers completed a

semi-structured interview regarding the injury event. This interview was video-recorded in order to reference any details of the interview that may have been missed and in order to code for caregiver levels of distress. The child was not in the room during their caregiver's interview. Additionally, the graduate research assistant assisted the child in answering questions so that caregivers did not influence their child's answers. This meeting lasted between 1 and 1.5 hours. For the first 6 months of the study, the caregivers received \$10 to participate. Following an IRB revision in November 2015, the caregivers received \$20 to participate.

Six weeks after the first session, the graduate research assistant contacted the families who participated to set up another time to complete a second session to assess the child and caregiver levels of PTSD symptoms as well as child internalizing and externalizing symptoms. This time frame was chosen based on the methods of previous studies that examined PTSD following injuries (Nugent et al., 2006; Nugent et al., 2007; Olsson et al., 2008). After completion of the second session, children and their caregivers received an additional \$10 gift card if they participated in the first 6 months of the study and a \$20 gift card if they participated after November 2015. In addition, if a child and/or their caregiver met criteria for any psychopathology, they received information about psychological services.

## **Measures**

### **Demographics**

Caregivers answered questions at the first session regarding their child's gender, age, ethnicity of caregiver and child, household income, and people who live in the home (see Appendix C).

### **Child's Subjective Rating of Injury Severity**

Children answered three questions in the first session to assess their subjective perception of injury severity. The questions were developed by Stallard and Smith (2007). The questions were as follows: "How serious was your accident?"; "Did you think that you were going to get seriously hurt or die during the accident?"; and "How scared did you feel during the accident?" The first question is rated on a 5-point Likert scale, and the second two are rated on a 4-point Likert scale. The subjective appraisal of injury severity is the average score of the 3 questions, with a higher score indicating higher subjective distress. Therefore, the average was utilized in the analyses.

### **Caregiver's Subjective Rating of Injury Severity**

Questions developed by Morris, Lee, & Delahanty (2013) were used to assess the caregiver's subjective rating of their child's injury severity during the first session. Morris and colleagues (2013) modified the three questions that were used by Stallard and Smith (2007) to rate children's subjective perception of injury severity. The questions are as follows: "How serious was your child's accident?"; "Did you think that your child was going to get seriously hurt or die during the accident?"; and "Did you feel frightened or scared during your child's accident?" The first question is rated on a 5-point Likert scale, and the second two are rated on a 4-point Likert scale. Subjective appraisal of injury severity is the average score of the 3 questions, with a higher score indicating higher subjective distress. Therefore, the average was utilized in the analyses.

### **Caregiver Coping Mechanisms**

Caregivers completed a 28-item questionnaire called the Brief Coping (Carver, 1997) during the first session. The Brief Coping is an abbreviated version of the COPE

inventory that assesses how individuals cope with stressors. The Brief Cope has high test-retest reliability and includes the following scales: self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, and self-blame. Items are rated on a 4-point Likert scale in which 1 = “I haven’t been doing this at all” to 4 = “I’ve been doing this a lot”. A higher score indicates that an individual is engaging in that coping mechanism with greater frequency. For the analyses, two separate overall scores were calculated for positive coping versus negative coping. The positive coping category included the self-distraction, active coping, use of emotional support, use of instrumental support, venting, positive reframing, planning, humor, acceptance, and religion scales. The negative coping category included the denial, substance use, behavioral disengagement, and self-blame scales.

### **Child Pre-injury Functioning**

Caregivers completed the Child Behavior Checklist (CBCL) to report the child’s level of internalizing (e.g., anxiety) and externalizing symptoms (e.g., aggressive behavior) at both the first session and second session to determine if there were any changes over time (Achenbach & Rescorla, 2001). The CBCL is a parent self-report measure that has separate forms for children ages 1.5-5 years and 6-18 years. The measure assesses children’s behavior over the past 2 months. At the first session, we asked caregivers to report on their child’s behavior over the past 2 months. However, at the second session, we asked caregivers to report on their child’s behavior for the previous 6 weeks. The form for 1.5-5 year olds consists of 99 items that are scored on a scale where 0 = “not true (as far as you know)”, 1 = “somewhat or sometimes true”, and



2 = “very true or often true of the child” based on the preceding two months. Syndrome scales assess the following: emotionally reactive, anxious/depressed, somatic complaints, withdrawn, sleep problems, attention problems, and aggressive behavior. The form for 6-18 year olds consists of 118 items that are also scored on the same 0-2 scale. Syndrome scales assess the following: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule-breaking behavior, and aggressive behavior. The scales are combined to provide a final internalizing score, externalizing score, and total score on both measures. We used the final internalizing and externalizing scores from session 1 and session 2 for our analyses. Inter-rater reliability for both forms ranged from .48-.88 and test-retest reliability for both forms ranged from .73-.94 (Achenbach & Rescorla, 2001). There is evidence of discriminative, concurrent, convergent, and predictive validities for both forms (Achenbach & Rescorla, 2001).

### **Child Posttraumatic Stress Symptoms**

The Trauma Symptom Checklist for Young Children (TSCYC; Briere, 1995) is a 90-item self-report measure completed by caregivers for children between the ages of 3 and 12. This measure produces scores for the following 8 clinical scales: Posttraumatic Stress – Intrusion, Posttraumatic Stress – Avoidance, Posttraumatic Stress – Arousal, Sexual Concerns, Anxiety, Depression, Dissociation, Anger/Aggression, and Posttraumatic Stress – Total. Items assess child behaviors and are rated on a 4-point Likert scale from 1 = “not at all” to 4 = “very often”. TSCYC scores can be used to evaluate PTSD symptoms and to provide a possible PTSD diagnosis for children. This measure was completed at both the first and second session. The TSCYC has good

internal consistency (average Chronbach's  $\alpha = .87$ ) and good test-retest reliability ( $r = .79$ ; Briere, 2005). Construct validity varies with correlations between the clinical scales and the total scale between .52 and .97 (Nilsson, Gustafsson, & Svedin, 2012). The total scale PTSD summary scores from session 1 and session 2 were used in the analyses.

### **Caregiver Posttraumatic Stress Symptoms**

Caregivers completed the Impacts of Events Scale Revised (IES-R; Weiss & Marmar, 1997). This scale is a 22-item self-report screener for PTSD symptoms in adults including questions about intrusive thoughts, avoidance, and hyperarousal. Caregivers rated distress over the past 7 days on the following scale: 0 (not at all), 1 (a little bit), 2 (moderately), 3 (quite a bit), and 4 (extremely). Internal consistency for the 3 subscales was found to be high (alphas ranging from .79-.92; Weiss & Marmar, 1997). This measure was completed at both the first and second session. There is a total score and separate scores for each PTSD symptom (intrusion, avoidance, hypervigilance). The total score was used in the analyses.

### **Caregiver Previous Trauma Exposure**

Caregivers completed the Trauma History Questionnaire (Hooper, Stockton, Krupnick, & Green, 2011) during the first session. This is a 24-item self-report measure assessing prior trauma exposure. Traumas include exposure to or involvement in crime, general disasters, accidents, sexual assault, and physical assault. The caregivers answered "yes" or "no" to each question regarding whether or not they experienced a particular trauma. The higher the number of traumatic events, the higher the trauma exposure score. The trauma exposure score was used for the analyses.

### **Caregiver Anxiety Levels and Behavioral Modeling in Response to the Injury Event**

Since we were unable to directly observe caregivers' behavior after an injury occurrence, we used indirect methods to assess the level of anxiety caregivers modeled for their children in response to an injury event. During the caregiver interview, we elicited caregiver reactions to the injury by asking them to recall details about the injury event. This allowed us to assess the level of anxiety regarding the injury event that caregivers displayed while discussing the event. Before, during, and after the discussion, we measured caregivers' anxiety levels in response to the injury using two different methods, the State-Trait Anxiety Inventory and SUDS ratings (see below). Following the interview, we coded video-recordings of caregivers' interviews for verbalizations indicative of fear or anxiety.

***State-Trait Anxiety Inventory.*** Prior to the semi-structured interview, caregivers completed the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The STAI is a 40-item measure that asks 20 questions regarding trait anxiety (e.g., "I worry too much over something that really doesn't matter") and 20 questions regarding state anxiety (e.g., "I am tense; I am worried"). Internal consistency ranges from .86 to .95, and test-retest reliability has been found to range from .65 to .75 over a 2-month period (Spielberger, 1989). There is evidence for concurrent validity of the scale (Spielberger, 1989). Following the completion of the semi-structured interview (see below), caregivers completed the state portion of the STAI again. We compared their state anxiety prior to discussion of their child's injury with their score on the measure that was obtained after they discussed their child's injury. A difference score was computed

from the total state scores at pre-interview and post-interview and used in the analyses as a measure of caregivers' anxiety during and after discussing the injury event.

***Subjective Units of Distress (SUDS) ratings.*** A semi-structured interview was utilized to prompt caregivers to describe the injury event from the time the event occurred, through the ED visit, and immediately following discharge (see Appendix D). Specifically, caregivers recalled the events immediately prior to, during, and after the injury event, including any treatment that the child received at the hospital. These interviews were video-recorded; the children were not present at the time of the interview. Throughout this discussion, caregivers rated distress using the Subjective Units of Distress Scale (SUDS) prior to starting the interview and after each answered question (Wolpe, 1969). This is a 1-10 scale ("1 = not distressed" and "10 = the maximum amount of distress a person could feel"). The highest reported SUDS level was used for the analyses to examine caregiver anxiety levels while discussing the injury event.

***Caregiver use of vocabulary indicating anxiety.*** The semi-structured interviews with caregivers were video-recorded. Research assistants listened to the video recordings of the caregiver's detailed discussion of the injury event. The research assistants were trained to tally the number of words caregivers used to describe feeling scared or anxious. The following words are examples of synonyms for scared that were coded: afraid, anxious, terrified, panicked, shaken, worried, fearful, uneasy, concerned, distressed, or nervous (see Appendix E). The interview time in minutes, the number of times a word from the list was spoken, and the number of unique words (e.g., not on the list) were recorded. The number of times a word from the list was spoken was divided by the interview time in minutes to correct for the length of the interview (e.g., one person uses

more anxiety words because they talked more and their interview was longer versus someone with a shorter interview). In addition, the number of unique anxiety words (e.g., not on the list) was divided by the interview time. The total number of words (including repeated words) divided by length of interview was the primary variable used in the analyses.

Kappa was calculated on a sample of videos to determine inter-rater reliability. Kappa was calculated to be acceptable at 0.80 (n=6) for the calculation of number of words spoken divided by interview time. Kappa was calculated to be excellent at 1.00 (n=6) for the number of unique words divided by interview time.

*Child perception of caregiver anxiety.* Children also completed a semi-structured interview (see Appendix F) to determine their perception of their caregiver's anxiety at the time of the injury. Prior to the beginning of the interview, the graduate research assistant explained the Likert scale system to the child. The child answered questions about what their caregiver did at the hospital, how scared their caregiver was after the injury, how sad their caregiver was after the injury, how mad their caregiver was after the injury, whether or not their caregiver helped them feel better, what their caregiver did to make them feel better, and how helpful their caregiver was after the injury. Each of these scores was examined in the analyses.

### **Plan of Analysis**

First, data were analyzed for any outliers, and analyses were conducted to generate descriptive data. Since we examined outcomes for both session 1 and session 2, we were able to utilize the entire sample (N=21) for analyses related to outcomes in session 1, and the 17 participants who completed both sessions for analyses related to

outcomes in session 2. Prior to conducting bivariate analyses and regression analyses, annual household income and education level were dichotomized to simplify the analyses. Annual household income was dichotomized into annual household income below \$50,000 and annual household income above \$50,000. Education level was also dichotomized into high school to some college and college graduate or above.

In order to test our hypotheses, we first performed bivariate analyses to examine the relationship between the predictor variables and outcome variables. The predictor variables included the following: demographic data from the demographic questionnaire, caregiver highest SUDS score during the interview, caregiver State-Trait Anxiety Inventory (STAI) state difference score pre- and post-interview, total number of anxiety-related words utilized (divided by the interview time), caregiver positive coping, caregiver negative coping, caregiver total PTSD score from the IES-Revised (at session 1 and 2), caregiver subjective injury severity, child subjective injury severity, and children's ratings of their caregivers anxiety, sadness, and anger during and immediately following the injury. The outcome variables included children's total internalizing score from the CBCL, children's total externalizing score from the CBCL, and children's PTSD symptom score from the TSCYC. The outcome variables were broken up into session 1 outcome variables and session 2 outcome variables. We also utilized the raw score for each of the outcome variables rather than the overall T-scores.

After performing bivariate analyses, we determined that some predictors represented similar constructs and were highly correlated. Therefore, we elected to use the predictor that was more highly associated with the outcome variables. Using the entire sample, the highest SUDS level and the STAI difference score measured similar

variables and were highly correlated ( $r = -0.52, p = .02$ ). After examining the correlations, it was determined that SUDS level was more highly correlated with the outcome variables so the SUDS level was used in the regression analyses. In addition, highest education level and annual household income level were highly correlated ( $r = 0.60, p = .01$ ), but income level was more highly correlated with the outcome variables. Therefore, annual household income level was utilized in the regression analyses. The remaining predictors that were added to the regression models were not highly correlated. Prior to conducting regression analyses, we performed *t*-tests in order to examine whether or not there was a significant difference between the outcome variables at session 1 and session 2. In addition, we utilized *t*-tests to examine the relation between gender and the outcome variables.

In order to examine our hypotheses, we conducted three separate multiple regression analyses examining children's PTSD, internalizing, and externalizing symptoms measured in session 1 as the outcome variables. The models included variables that were correlated with the outcome variables in our bivariate analyses. We then conducted three separate multiple regression analyses predicting the outcome variables measured in session 2 (i.e., child internalizing symptoms, externalizing symptoms, and PTSD symptoms) using only the participants that participated in both sessions ( $N=17$ ). Again, our models included only those variables that were correlated with the outcome variables in the bivariate analyses. With regard to our main outcome variable of child PTSD symptoms at session 2, we conducted three additional multiple regression analyses to examine whether internalizing, externalizing, and PTSD symptoms from session 1 predicted PTSD in session 2. We conducted separate analyses for each of these predictors

to reduce the chance of multicollinearity since they were all highly correlated, and because our sample size was small.



## RESULTS

### Descriptive Data

Twenty-one caregiver-child dyads completed the first session, and 17 caregiver-child dyads (81%) completed both sessions. Injuries were coded based on the ED discharge information and were categorized based on injury type (e.g., falls/trips/slips, cuts/scrapes; see Table 2). The two most common types of injuries were falls/trips/slips (52%; e.g., fell down while running and hit head) and muscle/joint/bone (24%; sprained ankle playing a game outside; see Table 2).

Table 2

#### *Child Injury Type*

Injury Type	Percent (N)
Falls/Trips/Slips	52.4 (11)
Muscle/Joint/Bone	23.8 (5)
Cuts/Scrapes	9.5 (2)
Bumps/Bruises	9.5 (2)
Car/Other Motorized Vehicle – Occupant	4.8 (1)
Total	100 (21)

See Table 3 for descriptive statistics for the predictor and outcome variables. For each of the predictor variables, the mean T-scores for internalizing behaviors, externalizing behaviors, and trauma symptoms at both session 1 and session 2 fell in the average range. This indicates that the majority of our sample did not fall in the clinical range for internalizing, externalizing, or PTSD symptoms at session 1 or session 2. For

internalizing symptoms at session 1, 19% (n=4) of children's scores were in the clinical range, and at session 2, 17% (n=3) of children's scores were in the clinical range. For externalizing symptoms at session 1, 9.5% (n=2) of children's scores were in the clinical range, and at session 2, 11.8% (n=2) of children's scores were in the clinical range. Lastly, for PTSD symptoms at session 1, 9.5% (n=2) of children's scores were in the clinical range, and at session 2, 6% (n=1) of children's scores were in the clinical range.

Table 3

*Descriptive Information*

Variable	Mean	Standard Deviation	Range
<u>Session 1 (N=21)</u>			
Child Age	7.57	3.1	3-11
Caregiver Anxious Words Spoken During Interview/Time	.38	.27	0-1.04
Highest SUDS Rating	2.4	2	1-8
Difference Score from STAI Trait	.29	6.4	11-16
Caregiver Total PTSD Symptoms from IES-R	7.3	9.2	0-33
Caregiver Previous Trauma History from THQ	4.8	4.1	0-17
Caregiver Positive Coping	1.65	.61	1-2.95
Caregiver Negative Coping	1.15	.25	1-2
Caregiver Subjective Injury Severity	.92	.73	0-3
Child Subjective Injury Severity	2.3	.86	0-3.5

Table 3—Continued

Variable	Mean	Standard Deviation	Range
Child Interview Rating of Caregiver – Scared	3.2	1.3	1-5
Child Interview Rating of Caregiver – Sad	3.1	1.1	1-5
Child Interview Rating of Caregiver – Mad	1.7	1.4	1-5
Child Internalizing T-Score CBCL	49.4	14.4	29-80
Child Externalizing T-Score CBCL			
Child PTSD T-Score from TSCYC	46.4	10.8	33-76
	51.4	15.3	40-110
<i>Session 2 (N=17)</i>			
Caregiver Total PTSD Symptoms from IES-R	2.8	3.2	0-12
Child Internalizing T-Score from CBCL	47.2	14.2	29-74
Child Externalizing T-Score from CBCL	46.4	13.9	33-83
Child PTSD T-Score from TSCYC	50.1	12.9	40-94

### Bivariate Analyses

First, we used the whole sample (N=21) of participants to examine correlations between predictor and outcome variables at session 1 (see Table 4). Caregivers' highest reported SUDS, total PTSD score, and total number of prior trauma exposures were positively correlated with children's internalizing symptoms and externalizing symptoms. In addition, caregivers' highest reported SUDS, total PTSD score, positive coping, and total number of prior trauma exposures were positively correlated with children's PTSD

symptoms. Annual household income was significantly negatively correlated with children's internalizing symptoms and PTSD symptoms. These correlations suggest that higher levels of caregiver anxiety while discussing the injury, higher levels of caregiver PTSD symptoms right after the injury, and higher levels of caregiver previous trauma exposure are associated with higher levels of children's internalizing symptoms, externalizing symptoms, and PTSD symptoms immediately following the injury.

Next, we conducted correlational analyses on predictor variables and outcome variables at session 2 using only the 17 participants who completed session 2 (see Table 5). Caregivers' highest reported SUDS and total number of prior trauma exposures at session 1 were positively correlated with children's internalizing, externalizing, and PTSD symptoms at session 2. In addition, caregiver total PTSD score at session 1 was positively correlated with children's externalizing and PTSD symptoms at session 2. Annual household income was significantly

Table 4

*Correlations among Predictor and Outcome Variables for Session 1*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Child Internalizing S1	--	.84***	.80***	.03	.70***	-.32	.44*	.53*	.31	.40	.13	-.10	-.56*	0	0	-.06
2. Child Externalizing S1		--	.81***	-.34	.56**	-.21	.60**	.63**	.43	.20	.20	-.10	-.32	.01	.06	.11
3. Child PTSD S1			--	-.05	.76***	-.6**	.65**	.72***	.45*	.40	.30	.14	-.57*	.14	-.02	-.20
4. Total Anxious Interview Words				--	.35	-.21	-.12	-.10	-.20	.03	-.12	-.12	-0.4	-.04	.09	.20
5. Caregiver Highest SUDS					--	-.52*	.54*	.53*	.23	.46*	.14	.06	-.7**	-.10	.10	.20
6. Caregiver STAI Trait Difference Score						--	-.20	-.20	-.23	-.32	-.20	.02	.30	.23	.30	.30

Table 4—Continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
7. Caregiver PTSD Symptoms S1							--	.60**	.40	.40	.53*	.22	.60**	.15	.40	.62*
8. Caregiver Previous Trauma History								--	.45*	.40	.20	-.06	-.40	.24	-.05	-.08
9. Caregiver Positive Coping									--	.60**	.06	.30	-.30	.23	-.26	.14
10. Caregiver Negative Coping										--	.06	.32	-.6**	-.02	-.01	.04
11. Caregiver Subjective Injury Severity											--	.62**	-.21	.10	.30	-.01
12. Child Subjective Injury Severity												--	-.32	.55*	.21	.30

Table 4—Continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13. Annual Family Income													--	-.10	-.40	-.10
14. Child Rating of Caregiver - Scared														--	.35	-.00
15. Child Rating of Caregiver - Sad															--	.54*
16. Child Rating of Caregiver - Mad																--

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; N = 21

Table 5

*Correlations among Predictor and Outcome Variables for Session 2*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Child Internalizing S2	--	.80***	.81***	.94***	.85** *	.70**	-.04	.65**	-.13	.48	.61**	.53*	.30	.30	.27	-.06	-.48	-.02	.14	-.05
2. Child Externalizing S2		--	.93***	.80***	.80***	.90***	-.32	.65**	-.26	.68**	.68**	.72***	.38	.16	.30	.04	-.33	.09	.20	.15
3. Child PTSD S2			--	.84***	.90***	.94***	.08	.80***	-.50*	.73**	.76***	.76***	.45	.21	.42	.02	-.55*	.04	.22	.00
4. Child Internalizing S1				--	.85***	.78***	.06	.77***	-.33	.46	.68**	.60*	.30	.41	.20	-.03	-.54*	.01	.14	-.10
5. Child Externalizing S1					--	.84***	-.30	.66**	-.23	.65**	.84***	.74***	.45	.21	.20	-.05	-.33	.00	.07	.10
6. Child PTSD S1						--	-.05	.81***	-.60*	.68**	.76***	.8***	.44	.40	.33	.17	-.54*	.15	.20	-.23
7. Total Anxious Words							--	.34	-.24	-.15	.20	-.14	-.17	.30	-.53	-.15	-.40	-.04	.22	-.16
8. Caregiver Highest SUDS								--	-.60*	.65**	.77***	.82**	.31	.51*	.20	.43	-.70**	-.15	.30	.24
9. STAI Difference									--	-.22	-.30	-.33	-.25	-.42	-.16	.08	.30	.20	.15	.32



Table 5—Continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
10. Caregive r PTSD S1										--	.68**	.61**	.32	.37	.55*	.25	-.61*	-.15	.20	.62*
11. Caregive r PTSD S2											--	.66**	.17	.27	.37	.12	-.51	.10	.30	.05
12. Caregive r Trauma History												--	.40	.13	.30	.07	-.46	.20	.01	-.07
13. Caregive r Positive Coping													--	.60*	.06	.42	-.25	.23	-.25	.11
14. Caregive r Negative Coping														--	.08	.41	.70**	-.06	.00	.05
15. Caregive r Subjecti ve Injury Severity															--	.64**	-.28	.01	-.04	.04

Table 5—Continued

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
16. Child Subjective Injury Severity																--	-.38	.62*	.35	.30
17. Annual Family Income																	--	-.10	.50	-.42
18. Child Rating of Caregive r - Scared																		--	.47	.01
19. Child Rating of Caregive r - Sad																			--	.58*
20. Child Rating of Caregive r - Mad																				--

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ; N = 17

negatively correlated with children's PTSD symptoms. These correlations suggest that higher levels of caregiver anxiety while discussing the injury and higher levels of caregiver previous trauma exposure were associated with higher child internalizing, externalizing, and PTSD symptoms 6 weeks after the injury. Higher levels of caregiver PTSD symptoms right after the injury were associated with higher child externalizing and PTSD symptoms 6 weeks after the injury.

We also conducted correlational analyses to examine the correlations among the outcome variables (see Table 5). Children's internalizing, externalizing, and PTSD symptoms at session 1 were highly positively correlated with children's internalizing, externalizing, and PTSD symptoms reported at session 2. Paired samples t-tests were conducted to determine if there were significant differences between the outcome variables at session 1 and session 2 using the 17 participants who completed the entire study (see Table 6). There was a significant decrease in children's internalizing symptoms from session 1 to session 2 but no change for children's externalizing or PTSD symptoms.

Table 6

*Paired Samples T-Test Examining Differences between Outcome Variables at Session 1 and Session 2*

Outcome Variable	Session 1 – M (SD)	Session 2 – M (SD)	<i>t</i>
Child Internalizing	8.3 (10.3)	6.2 (8)	2.3*
Child Externalizing	7 (8.4)	7.8 (11.7)	-.8
Child PTSD Symptoms	36 (13)	34.1 (9.3)	1.4

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ ;  $N = 17$

Additional exploratory correlations were conducted (see Tables 4 and 5).

Caregiver PTSD symptoms at session 1 were correlated with caregiver subjective injury severity at session 1. Furthermore, caregiver subjective injury severity and child subjective injury severity were significantly correlated. These correlations suggest that there is a relationship between caregiver's subjective rating of their child's injury severity and their own PTSD symptoms after their child's injury. These correlations also suggest that caregivers and their children are rating their injury severity similarly. With regard to children's perception of caregiver anxiety during and immediately after the injury, there was a significant positive correlation between caregivers' PTSD symptoms at session 1 and children's ratings of how mad they thought their caregiver was during the injury ( $r = .62, p = .01$ ). In addition, there was a significant positive correlation between children's subjective injury severity ratings with how scared they thought their caregiver was during the injury ( $r = .55, p = .02$ ). There were no significant correlations with children's internalizing, externalizing, or PTSD symptoms.

Further correlations were conducted to examine relationships among predictor and outcome variables at session 1 and session 2 and caregiver PTSD symptoms at session 2. Children's internalizing, externalizing, and PTSD symptoms at session 1 and session 2 were highly positively correlated with caregiver PTSD symptoms at session 1 and 2. Caregiver highest SUDS, PTSD symptoms, and trauma history reported at session 1 were correlated with caregiver PTSD symptoms at session 2. These results suggest that higher levels of child anxiety and PTSD symptoms, caregiver PTSD symptoms, and caregiver previous trauma history may increase the likelihood of caregivers reporting higher levels of PTSD symptoms 6 weeks after their child's injury.

In addition, an independent samples t-test was conducted to examine whether or not there were gender differences within each of the child outcome variables. Results indicated that there were no significant differences found for any of the outcome variables (see Table 7).

Table 7

*Independent Samples T-Test Examining Differences Gender Differences in Outcome Variables for Session 1 and 2*

Outcome Variable	Male M (SD)	Female M (SD)	<i>t</i>
<i>Session 1</i>			
Child Internalizing	6.5 (9.4)	9.8 (10.1)	-.75
Child Externalizing	6.6 (8.4)	7.3 (6.6)	-.19
Child PTSD Symptoms	36.2 (13.4)	31.2 (6.4)	.87
<i>Session 2</i>			
Child Internalizing	4.9 (6.8)	10.3 (11.3)	-1.2
Child Externalizing	8.2 (12.9)	6.5 (8.2)	.24
Child PTSD Symptoms	34.5 (10)	33 (7.8)	.27

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$

### Regression Analyses

Three multiple regression analyses were conducted for outcome variables in session 1 (see Table 8). A multiple regression analysis was conducted to predict child internalizing symptoms at session 1 from the following predictor variables: caregiver SUDS rating, caregiver PTSD score at session 1, the total number of caregiver prior trauma exposures, and annual household income. The model significantly predicted children's internalizing symptoms at session 1 ( $F = 3.9$ ,  $p = .02$ ,  $R^2 = .53$ ); however, none of the individual predictors were significant. A second multiple regression analysis was

conducted to predict child externalizing symptoms at session 1 using the same predictor variables. This model was also significant. ( $F = 6, p = .006, R^2 = .51$ ); however, none of the individual variables were significant predictors. A third multiple regression analysis was conducted to predict child PTSD symptoms at session 1 using the same predictor variables with the addition of caregiver positive coping. This model was significant ( $F = 9.8, p = .000, R^2 = .79$ ). Caregiver SUDS ratings was the only variable that significantly predicted children's PTSD symptoms at session 1.

Table 8

*Multiple Regression Analysis for Session 1*

Variable	B	Standard Error
<i>Internalizing Symptoms as Outcome Variable:</i>		
Income	-3.8	5.7
Highest SUDS	2.3	1.3
Caregiver PTSD Symptoms	-.06	.26
Caregiver Previous Trauma History	.51	.53
<i>Externalizing Symptoms as Outcome Variable:</i>		
Highest SUDS	.90	.83
Caregiver PTSD Symptoms	.23	.19
Caregiver Previous Trauma History	.68	.41
<i>PTSD Symptoms as Outcome Variable:</i>		
Income	1.8	5.1
Highest SUDS	3.2*	1.1
Caregiver PTSD Symptoms	.24	.23
Caregiver Previous Trauma History	.76	.49
Caregiver Positive Coping	4.2	2.9

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$

Next, three additional multiple regression analyses were conducted for outcome variables in session 2 (see Table 9). A multiple regression analysis was conducted to predict child internalizing symptoms at session 2 from the following predictor variables: caregiver SUDS and the total number of caregiver prior trauma exposures at session 1. The model was significant ( $F = 5.6, p = .02, R^2 = .45$ ); however, none of the individual variables significantly predicted internalizing symptoms. A second multiple regression analysis was conducted to predict child externalizing symptoms at session 2 from the following predictor variables: caregiver SUDS rating, caregiver total PTSD score at session 1, and the total number of caregiver prior trauma exposures. The model was significant ( $F = 7.3, p = .004, R^2 = .63$ ); however, none of the individual variables predicted externalizing behavior. A third multiple regression analysis was conducted to predict child PTSD symptoms at session 2 from the following predictor variables: caregiver SUDS rating, caregiver total PTSD score at session 1, the total number of caregiver prior trauma exposures, and annual household income measured at session 1. The model was significant ( $F = 11.7, p = .001, R^2 = .82$ ). Caregiver highest SUDS ratings at session 1 predicted children's PTSD symptoms at session 2.

Table 9

*Multiple Regression Analysis for Session 2*

Variable	B	Standard Error
<i>Internalizing Symptoms as Outcome Variable:</i>		
Highest SUDS	1.9	.95
Caregiver Previous Trauma History	.42	.51
<i>Externalizing Symptoms as Outcome Variable:</i>		
Highest SUDS	1.1	1.3
Caregiver PTSD Symptoms	.38	.29
Caregiver Previous Trauma History	1.2	.68
<i>PTSD Symptoms as Outcome Variable:</i>		
Income	-3.7	4.1
Highest SUDS	2.5*	1.0
Caregiver PTSD Symptoms	.28	.19
Caregiver Previous Trauma History	.77	.42

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$

Finally, three additional multiple regression analyses were conducted specifically examining child internalizing, externalizing, and PTSD symptoms at session 1 as predictors of child PTSD symptoms at session 2 (see Table 10). Each model included the following predictors: caregiver highest reported SUDS, caregiver total PTSD score at session 1, total number of caregiver prior trauma exposures, and annual household income. The first model also included child internalizing symptoms from session 1. The model was significant ( $F = 27.8$ ,  $p = .000$ ,  $R^2 = .94$ ). Caregiver PTSD symptoms at session 1 ( $p = .015$ ) and child internalizing symptoms at session 1 ( $p = .003$ ) predicted child PTSD symptoms at session 2. Next, another model was conducted including the original predictors listed above and child externalizing symptoms from session 1. The model was significant ( $F = 18$ ,  $p = .000$ ,  $R^2 = .91$ ), and child externalizing symptoms at



session 1 predicted child PTSD symptoms at session 2 ( $p = .02$ ). A final model was conducted including the original predictors listed above and child PTSD symptoms at session 1. This model was significant ( $F = 18, p = .000, R^2 = .91$ ), and child PTSD symptoms at session 1 predicted child PTSD symptoms at session 2 ( $p = .02$ ). Thus, child internalizing, externalizing, and PTSD symptoms at session 1, along with caregiver PTSD symptoms at session 1, predicted child PTSD symptoms at session 2.

Table 10

*Multiple Regression Analyses Predicting PTSD Symptoms at Session 2*

Variable	B	Standard Error
<i>Adding Internalizing Symptoms at Session 1</i>		
Income	3.9	2.5
Highest SUDS	.80	.74
Caregiver PTSD Symptoms	.35*	.12
Caregiver Previous Trauma History	.50	.27
Internalizing Symptoms at Session 1	.50**	.12
<i>Adding Externalizing Symptoms at Session 1</i>		
Income	-.89	3.5
Highest SUDS	1.4	.84
Caregiver PTSD Symptoms	.10	.15
Caregiver Previous Trauma History	.23	.37
Externalizing Symptoms at Session 1	.60*	.21
<i>Adding PTSD Symptoms at Session 1</i>		
Income	1.2	3.2
Highest SUDS	.65	1.0
Caregiver PTSD Symptoms	.17	.15
Caregiver Previous Trauma History	.07	.40
Child PTSD Symptoms at Session 1	.52*	.18

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$

## DISCUSSION

Previous research estimates that 20% of children develop PTSD following an unintentional injury (Brosbe et al., 2008; Ostrowski et al., 2011). Research has examined environmental, child, and caregiver factors that contribute to children's development of PTSD after an injury. Caregiver PTSD symptoms following a child's unintentional injury are one of the strongest predictors for the development of child PTSD (Bronner et al., 2008). The mechanism by which caregiver PTSD symptoms contribute to child PTSD symptoms is unclear, but it may be due to caregivers modeling anxious behaviors to their children during or after an injury event. The present study attempted to examine the role of caregiver modeling of anxiety in children's development of PTSD symptoms following an unintentional injury.

Since we were unable to directly observe caregiver modeling of anxious behaviors, caregiver reported SUDS level when discussing the injury, as well as children's reports of caregiver anxiety during the injury, were collected as a measure of anxiety surrounding the injury. We found that caregiver's highest reported SUDS level predicted child PTSD symptoms at session 1 and 2. This finding supports our hypothesis that higher reported levels of caregiver anxiety during and after the injury would predict higher levels of child PTSD symptoms immediately after and 6 weeks after the injury. This is also consistent with the PMTS model discussed in the introduction (Kazak et al., 2006). The second phase of the PMTS model involves the family's responses to the traumatic event, and the authors suggested that this phase is where caregiver anxiety may lead to more symptoms of PMTS in children. Furthermore, higher caregiver anxiety increases the likelihood that a child will develop PTSD symptoms following the injury,

and it is possible that the mechanism may be caregiver modeling of anxiety. We were unable to observe caregiver interactions with their child at the time of the injury event and thus were unable to directly test whether caregiver modeling of anxious behavior caused higher levels of child PTSD symptoms. The fact that children's ratings of caregiver anxiety after the injury were not correlated with PTSD, internalizing, or externalizing behaviors provide evidence contrary to the idea that caregivers were modeling anxious behaviors to their children. However, it is possible that our method of assessing children's perceptions of their parents' feelings during the injury were not effective.

We also found that caregiver PTSD symptoms, child internalizing symptoms, and child externalizing symptoms at session 1 predicted child PTSD symptoms at session 2. These results are consistent with the literature that caregiver PTSD is one of the strongest predictors of child PTSD symptoms following an unintentional injury, and that child pre-existing internalizing and externalizing behaviors are associated with higher levels of PTSD (Bronner et al., 2008; LeBrocq et al., 2010; Scheeringa et al., 2006; Winston et al., 2003). Furthermore, the finding that child internalizing symptoms at session 1 predicted child PTSD symptoms 6 weeks after the injury supports our hypothesis that higher levels of child anxiety prior to the injury may predict higher levels of child PTSD symptoms post-injury. It is important to note that caregivers reported their children's internalizing and externalizing symptoms after the injury occurred. However, the questionnaire measures prompted caregivers to report on children's symptoms for the 2 months prior to session 1. With this caveat on mind, these results suggest that children with pre-existing internalizing (e.g., anxiety) and externalizing behaviors (e.g.,

oppositional behavior, aggression) are at a higher risk of developing PTSD post-injury. Further, if caregivers display more PTSD symptoms after the injury, children are at a higher risk for developing PTSD symptoms post-injury. These findings highlight the importance of assessing children for pre-existing symptoms and caregivers for current symptoms to provide appropriate services for children who are at a higher risk for developing PTSD post-injury.

After completing correlational analyses, we found several other interesting relationships among variables. There was a significant decrease in child internalizing symptoms from session 1 to session 2 suggesting that children were less anxious 6 weeks post injury. It is important to remember that the majority of children's symptoms were not in the clinical range. In fact, at session 2, only 6% of the sample ( $n=1$ ) reported symptoms in the clinical range for PTSD, 11.8% ( $n=2$ ) reported symptoms in the clinical range externalizing behavior problems, and 17% ( $n=3$ ) reported symptoms in the clinical range internalizing behavior problems. These results are significantly lower than the rates of PTSD following an unintentional injury reported in previous research (20%; Brosbe et al., 2008; Ostrowski et al., 2011). This may be due to the fact that we had a small sample size ( $N=21$ ) or it may be due to the participant population that was recruited (i.e., higher SES families). Other studies have found that low-income families tend to have higher rates of psychopathology and PTSD, and our participant population consisted of mostly higher income families (Amone-P'Olak et al., 2008; Kahana et al., 2006; Wadsworth, Raviv, Compas, & Conner-Smith, 2005).

Our hypothesis that caregiver and child perception of injury severity would predict higher levels of child PTSD symptoms was not supported. This is inconsistent

with the literature suggesting that the higher the subjective rating of injury severity for both caregivers and their children, the higher children's PTSD symptoms post-injury (Cox et al., 2008; Ehlers et al., 2003; Holbrook et al., 2005; Meiser-Stedman et al., 2007). Caregiver and child ratings of injury severity were significantly positively correlated suggesting that children and their caregivers rated injury severity similarly. In addition, caregiver subjective ratings of injury severity were highly positively correlated with their own reported PTSD symptoms at session 1. This suggests that caregivers who believe their child's injury is more severe, regardless of severity, may be more likely to have higher PTSD symptoms. Lastly, children's subjective injury severity was positively correlated with their ratings of how anxious their caregivers were after the injury. This suggests that children may view their injury as more severe if their caregivers displayed more anxiety after the injury.

Our final hypothesis that greater levels of caregiver engagement in anxious/avoidant coping strategies would predict higher levels of child PTSD symptoms was not supported. Caregivers' negative coping strategies were not associated with any of the outcome variables while caregivers' positive coping strategies were positively correlated with child PTSD symptoms at session 1. However, caregivers' negative coping strategies were positively correlated with caregivers' highest reported SUDS ratings. These results suggest that there may be a relationship between caregiver's anxiety levels and their anxious and avoidant coping mechanisms in that the higher the overall anxiety level, the more likely a caregiver is to engage in anxious and avoidant coping.

With regard to some of our exploratory analyses, there were no gender differences in the outcome data. Of interest, there were significantly more males in our sample (71%)

than females (29%). This is consistent with the unintentional injury literature in that males are at a higher risk for unintentional injuries than females (Borse et al., 2008; Morrongiello et al., 2004; Schwebel et al., 2004). In addition, annual household income level was negatively correlated with child internalizing and PTSD symptoms at both session 1 and session 2. This relationship suggests that families with lower household income levels were more likely to have children with higher levels of internalizing symptoms and PTSD symptoms post-injury. Children in low socioeconomic status families are at a higher risk for unintentional injuries and psychopathology (Amone-P'Olak et al., 2008; Brownell et al., 2010; Haynes et al., 2003; Schwebel et al., 2004; Wadsworth et al., 2005). However, the literature is unclear regarding socioeconomic status and its relation to PTSD symptoms following unintentional injuries. Some studies have found no association between socioeconomic status and PTSD symptoms post-injury (Keppel-Benson et al., 2002; Landolt et al., 2005) while other studies have found that lower SES predicts higher levels of PTS symptoms following unintentional injuries in children (Kahana et al., 2006).

There were no variables that specifically predicted children's internalizing or externalizing behaviors. However, in bivariate analyses, caregiver's previous trauma exposure, PTSD symptoms, and SUDS level were positively correlated with children's internalizing and externalizing behaviors at session 1 and 2. These results suggest that caregiver variables associated with anxiety are related to child psychopathology following an injury. This is consistent with the literature suggesting that higher levels of caregiver anxiety and PTSD symptoms influence the development of PTSD in children post-injury (Baluffi et al., 2004; Bronner et al., 2008; Bronner et al., 2010; Nugent et al.,

2007; Saxe et al., 2005; Schreier et al., 2005; Stoddard et al., 2006). In addition, it is possible that caregiver previous trauma exposure puts caregivers at increased risk for PTSD symptoms or other anxiety problems following a child injury.

With regard to children's perception of caregiver anxiety during the injury, children's report of caregivers' anger after the injury was positively correlated with caregivers' PTSD symptoms at session 1. In addition, children's reports of caregivers' anxiety after the injury was correlated with children's subjective injury severity. When examining the Likert-scale responses from the child interview, children did not report that caregivers were displaying high levels of anxiety. However, when the verbal responses to the questions "What did your caregiver do after the injury or at the hospital?" and "Did your caregiver seem scared?" were reviewed, several children responded with answers that indicated some level of anxious behavior that was displayed by their caregivers. Some examples of children's responses include: "Kind of, she had that look on her face like she didn't know what to do. It kind of looked like she wasn't worried but I knew she was because she kept asking questions"; "She was nervous"; "She said she was stressed out because she wasn't sure if I needed surgery. She seemed scared when they put my leg back into place"; "Yes, she was scared. Her face was scared like she saw someone who died. That's how scared her face looked"; "She seemed sad because I was hurt, and she was crying"; and "She picked me up and was yelling at me for not wearing shoes." While the results of children's ratings of their perception of their caregiver's anxiety does not provide evidence that their caregivers were modeling anxious behavior, their verbal answers in the interview suggest that their caregivers may have displayed anxious behaviors that were not easily assessed. Given that caregiver anxiety

and PTSD symptoms predicted child PTSD symptoms at session 1 and 2, it is likely that caregivers were engaging in some anxious behavior but it was not directly measured or observed. It is possible that the questions children were asked to assess caregivers' emotions, along with the Likert-scale choices that were provided, were not effective at assessing caregivers' emotions and did not appropriately capture caregivers' behaviors. Therefore, it will be important to include direct observations in future studies in order to measure modeling of anxious behavior rather than relying only on self-report.

Overall, the present findings suggest that caregiver anxiety during and immediately following the injury and their reported PTSD symptoms are related to the development of PTSD symptoms in children following an unintentional injury. It is possible that caregivers may have been modeling anxious behavior to their children which increases their likelihood of developing PTSD symptoms after the injury. However, since modeling was not directly observed, it is difficult to make conclusions about whether or not caregiver modeling of anxious behavior was the mechanism by which their anxiety affected children's PTSD symptoms post-injury. Moreover, children's reports of caregivers' anxiety during the injury event were not related to children's PTSD symptoms which is contrary to the idea that caregivers were modeling anxious behaviors. It is important to note that the children in our sample were at a relatively low risk given the minor severity of their injuries, their higher socioeconomic status, and their low level of reported symptoms. Caregiver anxiety and PTSD symptoms, although not in the clinical range, predicted children's PTSD levels 6 weeks post-injury. The finding that caregiver anxiety and PTSD symptoms predicted child PTSD symptoms regardless of the severity of the symptoms suggests that even low levels of caregiver



anxiety and PTSD symptoms may increase the likelihood of children experiencing PTSD symptoms following a relatively minor injury. In addition, pre-existing caregiver trauma history and child mental health problems (i.e., pre-existing internalizing or externalizing behaviors) appear to be related to negative child outcomes following an injury event. Given these results, it will be important to assess children and their caregivers for pre-existing (e.g., internalizing or externalizing symptoms, previous trauma history) or current symptoms (e.g., PTSD) at their ED visit to better understand which children are at a higher risk for developing negative outcomes following an injury event.

### **Strengths and Limitations**

Previous literature examining psychological outcomes following children's unintentional injuries focused on child, caregiver, and environmental factors but have not focused on the mechanism by which some of these factors contribute to outcomes. Therefore, a strength of this study is that we attempted to examine caregiver modeling of anxiety as a possible mechanism for the development of child PTSD symptoms following an unintentional injury. Although we were unable to specifically examine modeling, we examined a proxy of caregiver modeling. The results suggested that the higher the caregiver anxiety surrounding the injury event, the higher the likelihood that a child developed PTSD symptoms.

There were several limitations to the study. First, since we were unable to receive permission to make direct observations in the ED, we relied on caregivers' self-report of the injury event and their reaction to the event. Since we did not have a specific measure for caregiver modeling, we had to recreate caregivers' responses to the injuries by trying to elicit their feelings via interview. Therefore, we relied on measures of caregivers'

distress when discussing the injury and on children's reports of their perception of caregivers' behavior during and after the injury. It would be beneficial to create a method to directly measure caregivers' modeling of anxious behavior and utilize that in future studies. Second, our sample was significantly smaller than expected due to difficulty recruiting families. It will be important to gather data from more families in order to make more meaningful conclusions. Third, due to the demographic characteristics of the sample (i.e., primarily Caucasian, higher SES, high caregiver education levels), the results of the study may not be generalizable to other populations. It will be valuable to include a more diverse group of families in the future to determine if these results would be generalizable across populations. Fourth, the ED discharge sheet did not provide information on the severity of the injury based on the Injury Severity Score (Baker et al., 1974). Based on the brief description of injuries that was available, it appeared that the majority of the injuries were relatively minor in severity. In general, it is difficult to collect data regarding severe injuries since they happen so infrequently, but it would be beneficial to include severe injuries. It is likely that these minor injuries do not cause the same amount of distress as injuries that are more severe in nature. However, research suggests that it is the subjective view of injury severity that is more predictive of negative outcomes than the actual injury severity (Cox et al., 2008; Ehlers et al., 2003; Holbrook et al., 2005; Meiser-Stedman et al., 2007). Therefore, this may not have affected our findings. Lastly, only 17 of the 21 participants completed session 2 so we did not have follow up data on 4 families. Fortunately, we were able to examine the data separately for session 1 and session 2.

## **Conclusions**

The finding that caregivers' higher anxiety levels while discussing the unintentional injury predicted children's PTSD symptoms post-injury highlights the importance of examining caregivers' levels of anxiety following an injury. Even though our sample did not report high levels of anxiety or PTSD symptoms following the injury, low levels of caregiver anxiety were predictive of children's PTSD symptoms post-injury. Furthermore, the association between caregivers' anxiety, previous trauma history, and PTSD symptoms with children's negative outcomes also highlights the important role that caregivers play in their children's emotional coping and in the development of negative outcomes after an injury event. By further examining the ways in which caregivers interact with and model anxious behaviors for their child, it may be possible to create an intervention that targets these interactions in an ED setting (or primary care office) to prevent negative outcomes. In addition, given that children's internalizing and externalizing symptoms in session 1 predicted higher levels of PTSD symptoms following an injury, screening for some of these pre-existing concerns in both children and their caregivers at the ED or at an office visit may help determine which children are at a higher risk for the development of negative outcomes. Since we were unable to find evidence for behavioral modeling of anxiety, future studies should focus on directly observing and examining caregiver modeling of anxiety to better understand the effects of modeling anxious behaviors on children's long-term outcomes. This will be helpful in creating and implementing appropriate interventions to prevent negative outcomes in children following an unintentional injury.

## REFERENCES

- Achenbach, T. M. & Rescorla, L. A. (2001). Manual for the ASEBA preschool forms & profiles. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.
- American Academy of Pediatrics (2013). Retrieved on April 4, 2014.  
<http://www.healthychildren.org/english/Pages/default.aspx>
- Amone-P'Olak, K., Burger, H., Ormel, J., Huisman, M., Verhulst, F. C., & Oldenhinkel, A. J. (2008). Socioeconomic position and mental health problems in pre- and early-adolescents: The TRIALS study. *Society of Psychiatry and Psychiatric Epidemiology*, 44, 231-238.
- Baker, S., O'Neill, B., Haddon, W., and Long, W. (1974). The Injury Severity Score: A method for describing patients with multiple injuries and evaluation of emergency care. *Journal of Trauma*, 14, 187-196.
- Baluffi, A., Kassam-Adams, N., Kazak, A., Tucker, M., Dominguez, T., & Helfaer, M. (2004). Traumatic stress in parents of children admitted to the pediatric intensive care unit. *Pediatric Critical Care Medicine*, 5, 547-553.
- Berry, J. W. & Schwebel, D. C. (2009). Implications for predicting risk of unintentional injury in children. *Journal of Personality*, 77, 1381-1410.

- Borse, N. N., Gilchrist, J., Dellinger, A. M., Rudd, R.A., Ballesteros, M.F., & Sleet, D. A. (2008). CDC Childhood Injury Report: Patterns of Unintentional Injuries Among 0-19 Year Olds in the United States, 2000-2006. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.
- Briere, J. (1995). Trauma Symptom Inventory professional manual. Odessa, FL: Psychological Assessment Resources.
- Bronner, M. B., Knoestern, H., Bos, A. P., Last, B. F., & Grootenhuis, M. A. (2008). Posttraumatic stress disorder (PTSD) in children after paediatric intensive care treatment compared to children who survived a major fire disaster. *Child and Adolescent Psychiatry and Mental Health*, 2, 1-9.
- Bronner, M. B., Peek, N., Knoester, H., Bos, A. P., Last, B., & Grootenhuis, M. A. (2010). Course and predictors of posttraumatic stress disorder in parents after pediatric intensive care treatment of their child. *Journal of Pediatric Psychology*, 35, 966-974.
- Brosbe, M. S., Hoefling, K., & Faust, J. (2011). Predicting posttraumatic stress following pediatric injury: A systematic review. *Journal of Pediatric Psychology*, 36, 718-729.
- Brownell, M. D., Derksen, S. A., Jutte, D. P., Roos, N. P., Ekuma, O., & Yallop, L. (2010). Socio-economic inequities in children's injury rates: Has the gradient changed over time? *Canadian Journal of Public Health*, 101, 528-533.
- Brussoni, M. & Olsen, L. (2011). Striking a balance between risk and protections: Fathers' attitudes and practices toward child injury prevention. *Journal of Developmental & Behavioral Pediatrics*, 32, 491-498.

- Bryant, B., Mayou, R., Wiggs, L., Ehlers, A., & Stores, G. (2004). Psychological consequences of road traffic accidents for children and their mothers. *Psychological Medicine*, 34, 335-346.
- Bryant, R. A., Salmon, K., Sinclair, E., & Davidson, P. (2007). The relationship between acute stress disorder and posttraumatic stress disorder in injured children. *Journal of Traumatic Stress*, 20, 1075-1079
- Burstein, M. & Ginsburg, G. S. (2010). The effect of parental modeling of anxious behaviors and cognitions in school-aged children: An experimental pilot study. *Behaviour Research and Therapy*, 48, 506-515.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine*, 4, 92-100
- Cox, C. M., Kenardy, J. A., & Hendrikz, J. K. (2008). A meta-analysis of risk factors that predict psychopathology following accidental trauma. *Journal for Specialists in Pediatric Nursing*, 13, 98–110.
- Cresswell, C., Schniering, C. A., & Rapee, R. M. (2005). Threat interpretations in anxious children and their mothers: Comparison with nonclinical children and the effects of treatment. *Behaviour Research and Therapy*, 43, 1375-1381.
- Damashek, A. & Kuhn, J. (2013). Toddlers' unintentional injuries: The role of maternal-reported paternal and maternal supervision. *Journal of Pediatric Psychology*, 38, 265-275.
- Damashek, A., Williams, N. A., Sher, K., & Peterson, L. (2009). Relation of caregiver alcohol use to unintentional childhood injury. *Journal of Pediatric Psychology*, 23, 344-353.

- Ehlers, A., Mayou, R. A., & Bryant, B. (2003). Cognitive predictors of posttraumatic stress disorder in children: Results of a prospective longitudinal study. *Behaviour Research and Therapy*, 41, 1–10.
- Gerull, F. C. & Rapee, R. M. (2002). Mother knows best: effects of maternal modeling on the acquisition of fear and avoidance behavior in toddlers. *Behaviour Research and Therapy*, 40, 279-387.
- Haynes, R., Reading, R., & Gale, S. (2003). Household and neighbourhood risks for injury to 5-14 year old children. *Social Science & Medicine*, 57, 625-636.
- Holbrook, T. L., Hoyt, D. B., Coimbra, R., Potenza, B., Sise, M., & Anderson, J. P. (2005). Long-term posttraumatic stress disorder persists after major trauma in adolescents: New data on risk factors and functional outcome. *The Journal of Trauma: Injury, Infection, and Critical Care*, 58, 764–769.
- Hooper, L., Stockton, P., Krupnick, J., & Green, B. (2011). Development, use, and psychometric properties of the Trauma History Questionnaire. *Journal of Loss and Trauma*, 16, 258-283.
- Kahana, S. Y., Feeny, N. C., Youngstrom, E. A., & Drotar, D. (2006). Posttraumatic stress in youth experiencing illnesses and injuries: An exploratory meta-analysis. *Traumatology*, 12, 148-161.
- Kassam-Adams, N. & Winston, F. K. (2004). Predicting child PTSD: The relationship between acute stress disorder and PTSD in injured children. *Journal of the Pediatric Injury* 43(4), 403–411.

- Kassam-Adams, N., Garcia-Espana, F., Fein, J. A., & Winston, F. K. (2005). Heart rate and posttraumatic stress in injured children. *Archives of General Psychiatry*, 62(3), 335–340.
- Kazak, A. E., Kassam-Adams, N., Schneider, S., Zelikovsky, N., Alderfer, M. A., & Rourke, M.(2006). An integrative model of pediatric medical traumatic stress. *Journal of Pediatric Psychology*, 31, 343–355.
- Keppel-Benson, J. M., Ollendick, T. H., & Benson, M. J. (2002). Post-traumatic stress in children following motor vehicle accidents. *Journal of Child Psychology and Psychiatry*, 43, 203–212.
- Kuhn, J. & Damashek, A. (2015). The role of proximal circumstances and child behavior in toddlers’ risk for minor unintentional injuries. *Injury Prevention*, 21, 30-34.
- Landolt, M. A., Vollrath, M., Ribi, K., Gnehm, H. E., & Sennhauser, F. H. (2003). Incidence and associations of parental and child posttraumatic stress symptoms in pediatric patients. *Journal of Child Psychology and Psychiatry*, 44, 1199–1207.
- Landolt, M. A., Vollrath, M., Timm, K., Ghehm, H. E., & Sennhauser, F. H. (2005). Predicting posttraumatic stress symptoms in children after road traffic accidents. *Journal of American Academy of Child and Adolescent Psychiatry*, 44, 1276-1283.
- LeBlanc, J. C., Pless, I. B., King, W. J., Bawden, H., Bernard-Bonnin, A., Klassen, T., & Tenenbein, M. (2006). Home safety measures and the risk of unintentional injury among young children: A multicenter case-control study. *Canadian Medical Association Journal*, 175, 883-887.



- LeBrocq, R. M., Hendrikz, J., & Kenardy, J. A. (2010). The course of posttraumatic stress in children: Examination of recovery trajectories following traumatic injury. *Journal of Pediatric Psychology, 35*, 637–645.
- Lewis, T., DiLillo, D., & Peterson, L. (2004). Parental beliefs regarding developmental benefits of childhood injuries. *American Journal of Health Behavior, 28*, S61-S68.
- Meiser-Stedman, R., Dalgleish, T., Smith, P., Yule, W., & Glucksman, E. (2007). Diagnostic, demographic, memory quality, and cognitive variables associated with acute stress disorder in children and adolescents. *Journal of Abnormal Psychology, 116*(1), 65–79.
- Morris, A., Lee, T. & Delahanty, D. (2013). Interactive relationship between parent and child event appraisals and child PTSD symptoms after an injury. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*, 554-561.
- Morrongiello, B.A., Corbett, M., McCourt, M., & Johnston, N. (2006). Understanding unintentional injury risk in young children II. The contribution of caregiver supervision, child attributes, and parent attributes. *Journal of Pediatric Psychology, 31*, 540-551.
- Morrongiello, B.A. & Dawber, T. (1999). Parental influences on toddlers' injury-risk behaviors: Are sons and daughters socialized differently? *Journal of Applied Developmental Psychology, 20*, 227-251.
- Morrongiello, B. A., Ondejko, L., & Littlejohn, A. (2004). Understanding toddlers' in-home injuries: II. Examining parental strategies, and their efficacy, for managing child injury risk. *Journal of Pediatric Psychology, 29*, 433-446.

- Nilsson, D., Gustafsson, P., & Svedin, C. (2012). The psychometric properties of the Trauma Symptoms Checklist for Young Children in a sample of Swedish children. *European Journal of Psychotraumatology*, 3, 1-12.
- Nugent, N. R., Christopher, N. C., & Delahanty, D. L. (2006). Emergency medical service and in-hospital vital signs as predictors of subsequent PTSD symptom severity in pediatric injury patients. *Journal of Child Psychology and Psychiatry*, 47, 919–926.
- Nugent, N. R., Ostrowski, S., Christopher, N. C., & Delahanty, D. L. (2007). Parental posttraumatic symptoms as a moderator of child's acute biological response and subsequent posttraumatic stress symptoms in pediatric injury patients. *Journal of Pediatric Psychology*, 32, 309–318.
- Olsson, K. A., Kenardy, J. A., De Young, A. C., & Spence, S. H. (2008). Predicting children's post-traumatic stress symptoms following hospitalization for accidental injury: Combining the Child Trauma Screening Questionnaire and heart rate. *Journal of Anxiety Disorders*, 22, 1447–1453.
- Ostrowski, S. A., Ciesla, J. A., Lee, T. J., Irish, L., Christopher, N. C., & Delahanty, D. L. (2011). The impact of caregiver distress on the longitudinal development of child acute Post-traumatic Stress Disorder symptoms in pediatric injury victims. *Journal of Pediatric Psychology*, 36, 806-815.
- Paquette, D. (2004). Theorizing the father-child relationship: Mechanisms and developmental outcomes. *Human Development*, 47, 193-219.

- Sabin, J. A., Zatzick, D. F., Jurkovich, G., & Rivara, F. P. (2006). Primary care utilization and detection of emotional distress after adolescent traumatic injury: Identifying an unmet need. *Pediatrics, 117*, 130–138.
- Sanders, M. B., Starr, A. J., Frawley, W. H., McNulty, M. J., & Niacaris, T. R. (2005). Posttraumatic stress symptoms in children recovering from minor orthopaedic injury and treatment. *Journal of Orthopaedic Trauma, 19*, 623–628.
- Saxe, G., Stoddard, F., Chawla, N., Lopez, C. G., Hall, E., Sheridan, R., King, L. (2005). Risk factors for acute stress disorder in children with burns. *Journal of Trauma and Dissociation, 6*, 37–49.
- Scheeringa, M. S., Wright, M. J., Hunt, J. P., & Zeanah, C. H. (2006). Factors affecting the diagnosis and prediction of PTSD symptomatology in children and adolescents. *American Journal of Psychiatry, 163*, 644–651.
- Schreier, H., Ladakakos, C., Morabito, D., Chapman, L., & Knudson, M. M. (2005). Posttraumatic stress symptoms in children after mild to moderate pediatric trauma: A longitudinal examination of symptom prevalence, correlates, and parent-child symptom reporting. *The Journal of Trauma: Injury, Infection, and Critical Care, 58*, 353–363.
- Schwebel D. C. & Brezaussek, C. M. (2008). Chronic maternal depression and children's injury risk. *Journal of Pediatric Psychology, 33*, 1108-1116.
- Schwebel, D. C., Brezaussek, C. M., Ramey, S. L., & Ramey, C. T. (2004). Interactions between child behavior patterns and parenting: Implications for children's unintentional injury risk. *Journal of Pediatric Psychology, 29*, 93-104.

- Spielberger, C. D. (1989). *State-Trait Anxiety Inventory: Bibliograph* (2<sup>nd</sup> ed.). Palo Alto, CA: Consulting Psychologists Press.
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stallard, P. & Smith, E. (2007). Appraisals and cognitive coping styles associated with chronic post-traumatic symptoms in child road traffic accident survivors. *Journal of Child Psychology and Psychiatry*, 48, 194-201.
- Stoddard, F. J., Saxe, G., Ronfeldt, H., Drake, J. E., Burns, J., Edgren, C., & Sheridan, R. (2006). Acute stress symptoms in young children with burns. *Journal of the Academy of Child And Adolescent Psychiatry*, 45, 87-93.
- Wadsworth, M. E., Raviv, T., Compas, B. E., & Conner-Smith, J. K. (2005). Parent and adolescent responses to poverty-related stress: Tests of mediated and moderated coping models. *Journal of Child and Family Studies*, 4, 283-298.
- Weiss, D. S. & Marmar, C. R. (1997). The Impact of Event Scale-Revised. In J. P. Wilson, & T. M. Keane (Eds.), *Assessing Psychological Trauma and PTSD: A Practitioner's Handbook* (pp. 339-411). New York: Guilford Press.
- Winston, F. K., Kassam-Adams, N., Garcia-Espana, F., Ittenbach, R., & Cnaan, A. (2003). Screening for risk of persistent posttraumatic stress in injured children and their parents. *Journal of the American Medical Association*, 290, 643–649.
- Wolpe, J. (1969). Subjective Units of Distress Scale. *The Practice of Behavior Therapy*. New York: Pergamon Press.

Zatzick, D. F., Grossman, D. C., Russo, J., Pynoos, R., Berliner, L., Jurkovich, G., . . .

Rivara, F. P. (2006). Predicting posttraumatic stress symptoms longitudinally in a representative sample of hospitalized injured adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 45, 1188–1195.

Zeigler, M. F., Greenwald, M. H., DeGuzman, M. A., & Simon, H. K. (2005).

Posttraumatic stress responses in children: Awareness and practice among a sample of pediatric emergency care providers. *Pediatrics*, 115, 1261–1267.

Zink, K. A., & McCain, G. C. (2003). Post-traumatic stress disorder in children and adolescents with motor vehicle-related injuries. *Journal for Specialists in Pediatric Nursing*, 8, 99–106.

## Appendix A

### WMU HSIRB Approval Letter

# WESTERN MICHIGAN UNIVERSITY



Human Subjects Institutional Review Board

Date: February 13, 2015

To: Amy Damashek, Principal Investigator  
Jennifer Kuhn, Student Investigator for dissertation

From: Daryle Gardner-Bonneau, Ph.D., Vice Chair

Re: HSIRB Project Number 15-01-05

This letter will confirm that your research project titled "Understanding Factors Related to Negative Mental Health Outcomes Following Childhood Unintentional Injuries," has been **approved** under the **full** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may **only** be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., ***you must request a post approval change to enroll subjects beyond the number stated in your application under "Number of subjects you want to complete the study."*** Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

**Reapproval of the project is required if it extends beyond the termination date stated below.**

The Board wishes you success in the pursuit of your research goals.

**Approval Termination: January 20, 2016**

251 W. Walwood Hall, Kalamazoo, MI 49008-5456  
PHONE: (269) 387-8293 FAX: (269) 387-8276

## Appendix B

### Bronson HSIRB Approval Letter





January 16, 2015

Amy Damashek, PhD  
WMU Department of Psychology MS 5439  
1903 W. Michigan Ave  
Kalamazoo, MI 49008

Dear Dr. Damashek:

**Subject: Full/Final approval of Protocol + Informed Consent/Assent**

**Reference: BMH-2014-0772 "Understanding Factors Related to Negative Mental Health Outcomes Following Childhood Unintentional Injuries"**

This is your official notice that the referenced protocol, Informed Consent, and Assent have full/final BMH IRB approval.


- Submit the approved protocol and attached signed and stamped ICF and Assent to the WMU HSIRB for their approval.
- Submit the WMU HSIRB approval letter to BMH IRB.
- Submit a copy of the Informed Consent and Assent with both IRB's signatures to BMH IRB. Please copy this informed consent and assent for use when consenting participants for your study. Once all signatures are on the informed consent and/or assent, the participant should be provided with a copy.

*You are reminded that any unanticipated problems and adverse events should be reported to the IRB within 48 hours of becoming aware of the event. It is also your responsibility to apply for continuing approval **before** the expiration date.*

**The review period for this protocol will be no more than 365 days and will expire January 15, 2016.**

Should you have any questions or concerns, please do not hesitate to contact the IRB office.

Thank you,

  
Lisa Beverwyk, BS  
IRB Coordinator  
Bronson Methodist Hospital

Telephone: (269) 341-7898  
E-mail: [beverwyk@bronsonhq.org](mailto:beverwyk@bronsonhq.org)  
FAX: (269) 341-8675

enc.  
cc: IRB File

601 John Street  
Kalamazoo, MI 49007  
[bronsonhealth.com](http://bronsonhealth.com)

Appendix C  
Demographics Questionnaire

Participant I.D.: \_\_\_\_\_

**Please fill out the following questions about you and your child.**

1. What is your child's age? \_\_\_\_\_

2. What is your child's gender?

1 – Male

2 – Female

3. Who is your child's primary caregiver (can mark more than one)?

1 – mother

5 - grandmother

2 – father

6 – grandfather

3 – stepmother

7 – other relative \_\_\_\_\_

4 – stepfather

8 – other caregiver \_\_\_\_\_

4. What is your relation to the child?

1 – mother

5 - grandmother

2 – father

6 – grandfather

3 – stepmother

7 – other relative \_\_\_\_\_

4 – stepfather

8 – other caregiver \_\_\_\_\_

5. Does your child live with you full-time or part-time?

1 – full-time

2 – part-time

6. What is your marital status?

1 – Divorced

5 - Separated

2 – Living with partner

6 – Widowed

3 – Married

7 - Other

4 – Single

7. How many other children live with your child? \_\_\_\_\_

8. What is your highest education level?

1 – some high school

6 – Master's degree

2 – high school graduate

7 – Doctoral degree

3 – some college

8 – professional degree (MD, JD, etc.)

4 – vocational/technical school

9 – Other \_\_\_\_\_

5 – college graduate

9. If married or living with partner, what is spouse's/partner's educational level?

1 – some high school

6 – Master's degree

2 – high school graduate

7 – Doctoral degree

3 – some college

8 – professional degree (MD, JD, etc.)

4 – vocational/technical school

9 – Other \_\_\_\_\_

5 – college graduate

10. What is your family's annual household income (you may choose not to answer this question)?

1 – less than \$10,000

6 - \$50,000 - \$74,999

2 – \$10,000 - \$19,999

7 - \$75,000 - \$99,999

3 - \$20,000 - \$29,999

8 - \$100,000 - \$150,000

4 - \$30,000 - \$39,999

9 – over \$150,000

5 - \$40,000 - \$49,999

10 – Other \_\_\_\_\_

11. What is your zip code? \_\_\_\_\_

12. Which of the following ethnic groups do you identify yourself with?

1 – Arab

5 – Hispanic/Latino

2 – Asian/Pacific Islander

6 - Multiracial

3 – African American

7 – Native American

4 – White/Caucasian

8 – Other \_\_\_\_\_

13. Which of the following best describes your child?

1 – Arab

5 – Hispanic/Latino

2 – Asian/Pacific Islander

6 - Multiracial

3 – African American

7 – Native American

4 – White/Caucasian

8 – Other \_\_\_\_\_

14. Is your child currently participating in outpatient therapy?

1 – Yes

2 – No

15. Is your child currently taking any psychotropic medications (e.g., medications for ADHD or anxiety)?

1 – Yes

2 – No

16. Does your child currently have a diagnosis of Posttraumatic Stress Disorder (PTSD)?

1 – Yes

2 - No

17. What type of injury did your child have (e.g., broken bone)?

---

18. Was your child's injury accidental?

1 – Yes

2 – No

## Appendix D

### Semi-structured Interview – Injury Event

Participant I.D.: \_\_\_\_\_

Date: \_\_\_\_\_

**To Interviewer: please record the caregiver's SUDS (1 = not at all anxious, relaxed to 10 = the highest anxiety and discomfort you have ever felt) before completing this interview and following each question. Ask each question in order and record responses on this sheet. Please video tape responses.**

"I am going to ask you to rate your level of anxiety on a SUDS scale. SUDS stands for Subjective Units of Distress. The scale ranges from 1-10, where 1 is feeling no anxiety or discomfort at all, 5 is feeling a moderate amount of anxiety or discomfort, and 10 is feeling the most anxiety and discomfort you have ever felt. I will ask you to rate this several times throughout this interview. I would like to start first by getting a rating of your SUDS right now."

SUDS \_\_\_\_\_

1. Were you with your child when your child was injured? YES NO

*(If yes, proceed to question 2; if no, proceed to question 16)*

If the caregiver was with their child:

2. Please tell me what happened before the injury occurred in as much detail as you can. What was your child doing? What were you doing?

SUDS \_\_\_\_\_

3. What happened during the injury? How did your child get injured? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

4. What happened immediately following the injury? What did your child do? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

5. What did you do? How did you act?

SUDS \_\_\_\_\_

6. How would other people describe you during this situation? How would your child describe you during this situation?

SUDS \_\_\_\_\_

7. How scared were you after your child's injury?

SUDS \_\_\_\_\_

8. What did you do to cope with your feelings of anxiety or fear?

SUDS \_\_\_\_\_

9. What happened during your visit to the ED? How long were you at the hospital? Did you have to stay overnight? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

10. During your ED visit, what did you do? How did you act?

SUDS \_\_\_\_\_

11. How would other people describe you during this situation? How would your child describe you during this situation?

SUDS \_\_\_\_\_

12. Were you worried about anything during this time? If yes, what?

SUDS \_\_\_\_\_

13. Was your child worried about anything during this time? If yes, what?

SUDS \_\_\_\_\_

14. What happened after you left the hospital? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

15. Have you thought about the injury since it happened? *If yes*, did the thoughts about the injury upset you? If so, how much on a 1-5 scale (1 = not at all, 5 = a great deal)

SUDS \_\_\_\_\_

If the caregiver was not with their child at the time of the injury,

16. Who was with your child at the time of the injury? \_\_\_\_\_



17. How did you first find out about the injury? What were you doing when you found out?

SUDS \_\_\_\_\_

18. Based on what you know, please tell me what happened before the injury occurred in as much detail as you can. What was your child doing?

SUDS \_\_\_\_\_

19. From what you know, what happened during the injury? How did your child get injured? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

20. From what you know, what happened immediately following the injury? What did your child do? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

21. What happened during your visit to the ED? How long were you at the hospital? Did you have to stay overnight? Please tell me in as much detail as you can.

SUDS \_\_\_\_\_

22. During your ED visit, what did you do? How did you act?

SUDS \_\_\_\_\_

23. How scared were you after your child's injury?

SUDS \_\_\_\_\_

24. What did you do to cope with your feelings of anxiety or fear?

SUDS \_\_\_\_\_

25. How would other people describe you during this situation? How would your child describe you during this situation?

SUDS \_\_\_\_\_

26. Were you worried about anything during this time?

SUDS \_\_\_\_\_

27. Was your child worried about anything during this time?

SUDS \_\_\_\_\_

28. What happened after you left the hospital?

SUDS \_\_\_\_\_

29. Have you thought about the injury since it happened? *If yes*, did the thoughts about the injury upset you? If so, how much on a 1-5 scale (1 = not at all, 5 = a great deal)

SUDS \_\_\_\_\_

Please record any additional information here:

Highest SUDS level: \_\_\_\_\_

Appendix E  
Interview Coding Sheet

Please count the number of times a caregiver uses one of the following words (all synonyms for anxiety, worry, afraid) during their interview. Make a tally mark next to the word each time it is spoken in the interview.

\_\_\_\_\_Anxiety, anxious

\_\_\_\_\_Concern

\_\_\_\_\_Nervous

\_\_\_\_\_Panic, panicked,  
panicky

\_\_\_\_\_Uncertain,  
uncertainty

\_\_\_\_\_Uneasy

\_\_\_\_\_Worry, worried sick

\_\_\_\_\_Fearful

\_\_\_\_\_Scared

\_\_\_\_\_Distressed

\_\_\_\_\_Disturbed

\_\_\_\_\_Afraid

\_\_\_\_\_Terrified, terrifying

\_\_\_\_\_Startled

\_\_\_\_\_Shocked

\_\_\_\_\_Shaky, shaken,  
shook up

\_\_\_\_\_Troubled

\_\_\_\_\_Distraught

\_\_\_\_\_Bothered

\_\_\_\_\_Wreck, nervous  
wreck

\_\_\_\_\_Inconsolable

\_\_\_\_\_Jittery

\_\_\_\_\_Frantic

\_\_\_\_\_Hysterical

\_\_\_\_\_Flustered

\_\_\_\_\_Freaked/freaking  
out or flipped/flipping out

\_\_\_\_\_Other emotion  
words (e.g., upset,  
angry)

\_\_\_\_\_Words describing  
physical

signs and  
symptoms (e.g., crying,  
dizzy)

\_\_\_\_\_Other synonyms for  
anxiety or

worry

Total number of times a word from the list was spoken (total # of tally marks): \_\_\_\_\_

Total number of unique words used: \_\_\_\_\_

Interview time in minutes: \_\_\_\_\_

Total number of times a word from the list was spoken (total # of tally marks) / interview time in minutes = \_\_\_\_\_

Total number of unique words used / interview time in minutes = \_\_\_\_\_

## Appendix F

### Children's Semi-structured Interview

Participant I.D.: \_\_\_\_\_

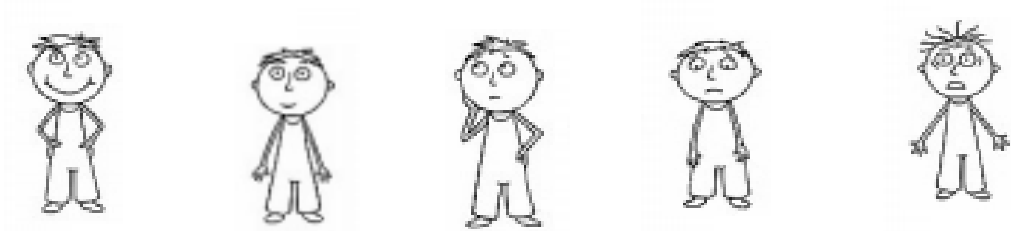
Please ask the child the following question:

1. What did your (*insert appropriate caregiver title – mom, dad, grandma, etc.*) do after you got hurt?

2. Did your (*insert caregiver title*) seem scared?

3. What did your (*insert caregiver title*) do when you were at the hospital?

4. Overall, how scared did your (*insert caregiver title*) seem after your injury?



1 – not scared  
at all

2 – a little  
scared

3 – somewhat  
scared

4 – really  
scared

5 - extremely  
scared

5. Overall, how sad did your (*insert caregiver title*) feel?



1 – not sad  
at all

2 – a little  
sad

3 – somewhat  
sad

4 – really  
sad

5 - extremely  
sad

6. Overall, how mad did your (*insert caregiver title*) feel?



1 – not mad  
at all

2 – a little  
mad

3 – somewhat  
mad

4 – really  
mad

5 - extremely  
mad

7. Did your caregiver do anything to help you feel better? *If yes*, what did your caregiver do to help you feel better?

8. How helpful was that on a 1-5 scale?

1 – not helpful at all, it did not help me feel better

2 – a little helpful, it made me feel a little better

3 – somewhat helpful, it made me feel somewhat better

4 – really helpful, it made me feel better

5 – extremely helpful, it made me feel much better