

Naturalistic Observations of Parent-Child Interactions Following Paediatric Injury

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Abstract

Introduction

Serious unintentional injuries are relatively common in childhood, and can lead to posttraumatic stress symptoms (PTSS) in a minority of both children and parents. Parents model their own stress and coping for their child, and are also affected by their child's reactions. These relationships between parent and child functioning have largely been explored using self-report and observational tasks, with rare examination of naturalistic, home-based interactions. The present thesis aimed to explore naturalistic parent-child interactions in the aftermath of discharge from hospital following the child's serious injury, and how these interactions might relate to child and parent stress and wellbeing. Secondly, this thesis aimed to explore the use of a naturalistic observational smart phone app, the Electronically Activated Recorder (EAR) in both research and clinical settings with families.

Methods

To address the first aim, an existing dataset from the Ear for Recovery study (Alisic et al., 2015) was used. In this study, 71 seriously injured children aged 3 to 16 years wore the EAR within a belt for a two-day period at home. The app recorded 30-second ambient audio "snippets" every 5 minutes. The dataset contained transcripts, coding, and questionnaire data from parents and children. The questionnaires included parent ratings of their own acute stress, optimism and self-efficacy, as well as theirs and their child's wellbeing at six weeks and three months post-injury. Children over 8 years had also rated their own PTSS, and perceived social support. To address the second aim, 69 registered psychologists were surveyed on their use of naturalistic observational methods within psychological therapy with families. Interviewed psychologists (N = 17) provided impressions of a fictitious case and potential uses and obstacles to using the EAR for therapy.

Results

Families spoke about the injury in around one tenth of their interactions at home. Direct injury talk was associated with fewer reported child emotional problems at 3 months post-injury. Mothers tended to be the principal conversation partner, but did not significantly differ from fathers in tone of voice, acute stress, optimism or self-efficacy. The results pointed to a positive relationship between optimism and emotional tone. However, there was much variability in the sample, and thus four cases were presented to demonstrate the rich, qualitative descriptions made possible through use of the EAR, and to identify potential clinical information. Psychologists highlighted the potential benefits of a multimethod approach, including incorporating naturalistic methods within the assessment and treatment process for families. They also reported that naturalistic methods are often avoided due to their perception of being impractical, ethically risky, invalid, unnecessary and potentially uncomfortable for clients and clinicians.

Discussion and Conclusion

The present research offered novel insights into family life post-trauma, through use of the EAR. These data highlighted current opportunities for the child's direct processing of the event, mainly with mothers. Potentially, optimism is conveyed through tone of voice. Regarding adaptation of the EAR method to therapy, the research highlighted the need to further explore potential uses and both practical and ethical barriers prior to clinical use.

Publications during enrolment

The following publications and conference presentations arose during the period of my candidature. (Note: My maiden surname is Gunaratnam).

Publications

- Alisic, E., Gunaratnam, S., Barrett, A., Conroy, R., Jowett, H., Bressan, S., . . . Mehl, M. R. (2017). Injury talk: spontaneous parent–child conversations in the aftermath of a potentially traumatic event. *Evidence-Based Mental Health*, 20(4), e19-e20. doi:10.1136/eb-2017-102736
- Gunaratnam, S., & Alisic, E. (2017). Epidemiology of Trauma and Trauma-Related Disorders in Children and Adolescents. In *Evidence-based treatments for trauma related disorders in children and adolescents* (pp. 29-47). Springer, Cham.
- Mangelsdorf, S. N., Mehl, M. R., Qiu, J. & Alisic, E. (2019). How do mothers and fathers interact with their children after an injury? Exploring the role of parental acute stress, optimism and self-efficacy. *Journal of Pediatric Psychology*, jsy107. doi:10.1093/jpepsy/jsy107

Conference Presentations

- Abstract presented (poster) at the 33rd International Society for Traumatic Stress Studies Meeting 2017, Chicago, USA
- Alisic, E., Conroy, R., Gunaratnam, S., Barrett, A., Jowett, H., Babl, F. E., McClure, R., Bressan, S., Anderson, V., & Mehl, M. (2017, November). Parent-child conversations in the aftermath of injury.
 - Abstract presented at the 15th European Society for Traumatic Stress Studies Conference 2017, Odense, Denmark

- Gunaratnam, S., Barrett, A., Mehl, M., Conroy, R., Jowett, H., Babl, F. E., McClure, R., Bressan, S., Anderson, V., & Alisic, E. (2017, June). Preschool children's daily life after injury: The Ear for Recovery study.
 - Abstract presented (poster) at the 14th International Congress of Behavioral Medicine 2016, Melbourne, Australia
- Gunaratnam, S., Barrett, A., Mehl, M., Conroy, R., Jowett, H., Babl, F. E., McClure, R., Bressan, S., Anderson, V., & Alisic, E. (2016, December). Ear for Recovery: Parent-child communication and traumatic stress after pediatric injury.
 - Abstract presented at the 8th World Congress of Behavioural and Cognitive Therapies 2016, Melbourne, Australia
- Alisic, E., Gunaratnam, S., Barrett, A., Conroy, R., Jowett, H., Babl, F. E., McClure, R., Anderson, V., & Mehl, M. (2016, June). Parent–child interactions after trauma: The Ear for Recovery study.

Thesis including published works declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes 3 original papers published in peer reviewed journals/books and 2 submitted publications. The core theme of the thesis is naturalistic observations of family interactions. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the School of Psychological Sciences under the supervision of A/Prof Eva Alisic. (The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.)

In the case of *chapters 3, 6, 7, 8, 9* my contribution to the work is described in the table below.

Thesis Chapter	Publication Title	Status (published, in press, accepted or returned for revision, submitted)	Nature and % of student contribution	Co-author name(s) Nature and % of Co- author's contribution*	Co- author(s), Monash student Y/N*
3	Epidemiology of Trauma and Trauma-related Disorders in Children and Adolescents	Published	55%. Literature search, synthesis of articles and writing first draft	Eva Alisic, input into manuscript 45%	No
6	Injury Talk: spontaneous parent-child conversations in the aftermath of a potentially traumatic event	Published	40%. Data analysis and writing significant portions of first draft (joint first author, contribution less than 50% due to number of authors)	 Eva Alisic, input into manuscript 40% Anna Barrett, input into manuscript 2.5% Rowena Conroy, input into manuscript 2.5% Helen Jowett, input into manuscript 2.5% Silvia Bressan, input into manuscript 2.5% Franz E Babl, input into manuscript 2.5% Franz E Babl, input into manuscript 2.5% Roderick McClure, input into manuscript 2.5% Vicki Anderson, input into manuscript 2.5% Natthias R Mehl, input into manuscript 2.5% 	No

Thesis Chapter	Publication Title	Status (published, in press, accepted or returned for revision, submitted)	Nature and % of student contribution	Co-author name(s) Nature and % of Co- author's contribution*	Co- author(s), Monash student Y/N*
7	How Do Mothers and Fathers Interact With Their Children After An Injury? Exploring the Role of Parental Acute Stress, Optimism, and Self-efficacy	Published	60%. Research questions, data analysis, writing first draft	 Matthias R Mehl, input into manuscript 15% Jianrong Qiu, input into manuscript 5% Eva Alisic, input into manuscript 20% 	No
8	Listening to Family Life After Serious Pediatric Injury: A Study of Four Cases	Submitted	60%. Research questions, data analysis, writing first draft	 Rowena Conroy, input into manuscript 10% Matthias R Mehl, input into manuscript 10% Peter J Norton, input into manuscript 5% Eva Alisic, input into manuscript 15% 	No
9	Clinicians' Perspectives on Innovative Naturalistic Observations of Families in Therapy	Submitted	65%. Concept, data collection, data analysis, writing first draft	 Rowena Conroy, input into manuscript 10% Matthias R Mehl, input into manuscript 10% Eva Alisic, input into manuscript 15% 	No

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student signature:

Date:

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor signature:

Date:

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Abbreviations

Abbreviation	Definition
APA	American Psychiatric Association
ASD	Acute Stress Disorder
ASDS	Acute Stress Disorder Scale
CBT	Cognitive Behaviour Therapy
CPSS	Child Posttraumatic Stress Disorder Symptom Scale
CRIES-13	Children's Revised Impact of Events Scale
DSM	Diagnostic and Statistical Manual of Mental Disorders
EAR	Electronically Activated Recorder
FACES-IV	Family Adaptability and Cohesion Evaluation Scale IV
ISS	Injury Severity Scale
LOT-R	Life Orientation Test- Revised
MSPSS	Multidimensional Scale of Perceived Social Support
PTE	Potentially Traumatic Event
PTSD	Posttraumatic Stress Disorder
PTSS	Posttraumatic Stress Symptoms
RCH	Royal Children's Hospital
SDQ	Strengths and Difficulties Questionnaire
SDRP	Screener for the Development of a Response Post-trauma
SES	Socio-Economic Status
SF-36	Short-Form Health Survey
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

Note. Australian English has been used throughout this thesis.

CHAPTER 1: THESIS OVERVIEW AND RESEARCH AIMS

Childhood injuries are common, and can be caused by a range of events, including falls, sporting incidents and road traffic accidents (World Health Organization [WHO], 2014; Lam, 2005). For children and their parents, a serious injury is a potentially traumatic experience that can act as a precipitant to posttraumatic stress symptoms (PTSS; Kahana, Feeny, Youngstrom & Drotar, 2006; Trickey, Siddaway, Meiser-Stedman, Serpell & Field 2012). These symptoms can include intrusive recollections of the event, hypervigilance, avoidance and mood and cognitive symptoms (American Psychiatric Association [APA], 2013). Most children and parents recover naturally, but a minority can develop PTSS after some initial distress (Le Brocque, Hendrikz, & Kenardy, 2010). While the development of PTSS involves a potentially complex array of biopsychosocial factors (Marsac, Kassam-Adams, Delahanty, Widaman, & Barakat, 2014), we know that parents play a key role in developing coping strategies and providing support for children post-trauma (Goldwin, Lee, Afzal, Drossos, & Karnik, 2014; Scheeringa & Zeanah, 2001; Williamson et al., 2017). In fact, these parenting behaviours can enhance post-trauma therapeutic interventions for children with PTSS (Cohen & Mannarino, 2015).

However, in some cases, the parent's own PTSS may hinder their ability to provide support or model adaptive emotion regulation for their child (Scheeringa & Zeanah, 2001). In fact, there appears to be a bi-directional relationship between child and parent PTSS (Alisic, Jongmans, van Wesel & Kleber, 2011), implying that symptoms may be shared or amplified within the family unit. This shared symptomatology is thought to arise through parent-child interactions, especially those concerning the trauma (e.g. Alisic, Krishna, Robbins & Mehl, 2016; Bauer et al., 2005; Peterson, Sales, Rees & Fivush, 2007), and these interactions may differ based on parent gender (Manczak et al., 2016) and potentially parent optimism and self-efficacy (Jones & Prinz, 2005; Kurtz-Nelson & McIntyre, 2017). Improving parent-child interactions is therefore often a goal of family interventions (e.g. Havighurst et al., 2013).

THESIS OVERVIEW AND RESEARCH AIMS

However, post-trauma interactions have never been studied naturalistically within the family, in order to explore naturally unfolding social processes, rather than those contrived within a research setting. Past researchers have used laboratory observation, interviews and self-report measures to explore emotion socialisation and the development of a shared event narrative between parents and children (e.g. Alisic et al., 2016; Bauer et al., 2005; Peterson et al., 2007). Such studies have contributed significantly to current knowledge of post-trauma family processes. However, the methods used in these studies may be limited in their ability to mimic everyday life. For example, self-report measures and interviews may be biased by social desirability, avoidance or a lack of awareness (Oberzaucher, 2017). Therefore, there appears to be a need for home-based naturalistic observational research to validate and extend upon the findings of laboratory studies (Gardner, 2000).

Similarly, psychologists who work with families likely routinely use self-report measures, interviews and in-clinic observation as part of the assessment and intervention process. The limitations of solely using self-report measures with families have been demonstrated by mixed methods studies that have found discrepancies between reported and observed emotions and family functioning (e.g. Kichline, Kassam-Adams, Weiss, Herbers, & Marsac, 2017; Martin, Clements & Crnic, 2002). Improving the accuracy of information obtained in the clinic may improve both initial formulations and subsequent generalisability of therapy. However, it remains unclear whether and how much psychologists use observational methods in routine care, and what barriers might exist to using naturalistic observational methods.

Therefore, this thesis aimed to

- a) describe naturalistic, home-based family interactions post-trauma;
- b) explore associations with child and parent stress and wellbeing; and
- c) explore whether and how naturalistic observation of families might be used within therapy.

1.1. Overview of Datasets

In keeping with these aims, we used a naturalistic observational tool, the Electronically Activated Recorder (EAR; Mehl, 2017). The thesis includes two datasets (Studies 1 and 2), which will shortly be outlined.

Study 1 refers to the existing dataset from the Ear for Recovery study (Alisic et al., 2015). This study included 71 unintentionally injured child participants between the ages of 3 and 16, and their families. Families were audio-recorded using the EAR app during a two-day period following discharge from hospital. In this study, the EAR was set to record 30 second audio snippets every 5 minutes over the two-day period, and parents and children (over 8 years) also completed a battery of questionnaires. Therefore, the dataset included EAR recordings, transcriptions and behavioural coding, as well as demographic and raw questionnaire data.

Study 2 refers to data collected for this thesis. The dataset includes surveys and interviews from registered psychologists working with children, parents and/or families. Psychologists were recruited from seven countries, including Australia, New Zealand, United Kingdom, Ireland, South Africa, United States and Canada. The surveys requested background information on each psychologist, their use of and views on naturalistic observation, as well as their initial impressions of the EAR. Of the 69 surveys, 17 participants also completed an interview which included discussion of a fictitious case scenario and review of several audio snippets from the Ear for Recovery study.

1.2. Research Questions

The key research questions of the thesis are provided below.

- 1. How do parents and children interact in daily life after a serious injury and how does this link to parent and child wellbeing? (Study 1; Chapters 6, 7 and 8)
 - How much and with what tone of voice do parents and children interact post-injury, generally, and about the injury? (Chapters 6, 7)

- How does the amount, tone and content of post-injury parent-child interactions relate to child (Chapter 6) and/or parent (Chapter 7) traumatic stress and/or wellbeing?
- Are there parent gender differences in traumatic stress, wellbeing and parent-child interaction time and tone? (Chapters 7, 8)
- 2. How could psychologists use naturalistic observation of families (e.g. using the EAR) in clinical practice? (Studies 1 and 2; Chapters 8 and 9)
 - What clinical information could be gained from naturalistic observations via the EAR? (Chapters 8, 9)
 - What are psychologists' perspectives on measurement techniques in therapy, including naturalistic observation via the EAR? (Chapter 9)

1.3. Structure of the Thesis

1.3.1. Literature review chapters. Chapters 2 to 4 will review and discuss research underpinning the first research question. Chapter 2 will introduce the *Diagnostic and Statistical Manual of Mental Disorders – Fifth Version (DSM-5*; APA, 2013) criteria for Posttraumatic Stress Disorder (PTSD) and Acute Stress Disorder (ASD), as well as the history of the development of the criteria, as it relates to children. Chapter 3 is a published book chapter (Gunaratnam & Alisic, 2017) which explores the prevalence and predictors of trauma exposure, ASD and PTSD for children and adolescents, highlighting the salience of family social support and the prevalence of injury. Chapter 4 will review the research linking child and parental PTSS, the influence of parent-child interactions, and research methods in studying family interactions. A short review for the second research question is provided in Chapter 9.

1.3.2. Method chapters. Chapter 5 outlines the data collection method for Study 1, as well as the data cleaning and analysis methods used for this thesis. The method for Study 2 can be found in Chapter 9.

1.3.3. Chapters relating to Research Question 1. The first research question will be addressed through three journal articles. These include descriptions of the quantity and tone of naturalistic injury conversations and their relationships with child wellbeing (Chapter 6; Alisic et al., 2017), the overall amount and tone of parent-child interactions and their relationships with parent acute stress, optimism and self-efficacy (Chapter 7; Mangelsdorf, Mehl, Qiu & Alisic, 2019), and case descriptions of family interactions and self-reported functioning (Chapter 8; Mangelsdorf, Conroy, Mehl, Norton & Alisic, 2018).

1.3.4. Chapters relating to Research Question 2. The second research question will be addressed using data from both Studies 1 and 2. The question will be addressed through identifying clinically relevant information that may be obtained from EAR recordings (Chapter 8 and 9), and from exploring the perspectives of psychologists on the utility, feasibility and ethics of using naturalistic methods like the EAR in therapy (Chapter 9).

1.3.5. Integrated discussion. Chapter 10 will provide a discussion of the entire thesis, linking the main findings, implications and directions for future research.

CHAPTER 2: DIAGNOSABLE TRAUMA RESPONSES IN CHILDREN AND ADOLESCENTS

Trauma exposure is relatively common, yet in the immediate aftermath of a traumatic event, a minority of children and adolescents develop posttraumatic stress symptoms (PTSS; see Chapter 3 for a review of the epidemiology). This chapter seeks to outline the current *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013) criteria that are relevant to children and adolescents and provide a brief history of diagnosing posttraumatic stress disorder (PTSD) and acute stress disorder (ASD) in this age group. While this thesis will refer to potentially traumatic events (PTEs), it is acknowledged that some individuals are exposed to trauma over a longer period of time (e.g. ongoing abuse), rather than discrete "events".

2.1. Definitions of Trauma Exposure and Traumatic Stress Symptoms

According to the *DSM-5*, PTEs include witnessed or threatened death, serious injury, and/or violent sexual exploitation (APA, 2013). Within a family, multiple family members may be exposed to trauma, whether directly or indirectly. Apart from direct experience or witnessing, trauma exposure may also occur through learning that a loved one has experienced a trauma, and/or being repeatedly or significantly exposed to upsetting details of the event (Criterion A; APA, 2013). Therefore, parents and siblings of children who have been exposed to trauma may also be at risk of developing PTSS.

After a period of initial distress, most individuals recover (Le Brocque, Hendrikz, & Kenardy, 2010). PTSD and ASD describe the rarer, clinical end of trauma responses, and the symptoms of these disorders may include intrusion, avoidance, cognitive/mood, hyperarousal and dissociative symptoms (see Table 2.1 for descriptions). The *DSM-5* denotes diagnostic criteria for adults, adolescents and children over the age of six, with separate PTSD criteria for pre-school children six years old and under.

Table 2.1

DSM-5	Traumatic	Stress	Symptoms
	I i citilitette	511055	Symptoms

Symptom	Definition
Intrusion	invasive and disturbing memories, dreams and dissociative episodes
	regarding the traumatic event, psychological and physiological
	reactions to internal or external reminders of the trauma
Avoidance	avoiding reminders of the trauma, and/or thoughts, feelings or
	memories related to the trauma (children under six may avoid
	situations or people that remind them of the event)
Mood/cognitive	inability to sustain positive emotions, continuous negative mood state,
	decreased involvement in activities, and/or social detachment,
	overstated and global negative beliefs (for individuals over 6 years),
	amnesia for parts of the traumatic event, and/or cognitive distortion
	leading to inappropriate blame regarding the trauma
Hyperarousal	increased irritability or aggression, sleep problems, hypervigilance,
	difficulty concentrating, and an overstated startle response; in those
	over six, irresponsible and damaging behaviour may also be present
Dissociation	amnesia for parts of the traumatic event and/or a distorted or surreal
	perception of reality

Note: Criteria are adapted from APA (2013).

2.2. History of Acute Stress Disorder and Posttraumatic Stress Disorder

When PTSD was initially included in *DSM-III* (APA, 1980), the criteria were written with the experiences of adult war veterans in mind. Several years later, *DSM-III-Revised* (*DSM-III-R*; APA, 1987) included age-specific manifestations of PTSD like repetitive play and perception of a foreshortened future. This transition to considering the unique experiences of children occurred

following documentation of children's reactions to PTEs. Notably, following the 1976 Chowchilla school-bus kidnapping, Terr (1981) disclosed details of responses of the 26 children involved (aged 5 to 14 years), including irritability, avoidance, distorted memories and trauma narratives, repetitive play and trauma-related dreams. Since events like these, there has been increased interest in paediatric trauma responses, as well as a greater focus on developmental perspectives on trauma to guide appropriate assessment and treatment of children (Salmon & Bryant, 2002).

It was theorised that increased traumatic stress symptoms close to the time of the trauma may indicate those at risk of PTSD, therefore ASD entered *DSM-IV* to describe an extreme acute response to trauma and predict future PTSD development, although it has not been as strong a predictor as was hoped (Bryant, 2011). Rather, trauma symptoms may worsen, remit after an initial increase, or remain at a chronic level (Bryant, 2018).

2.3. Changes to Diagnostic Criteria in DSM-5

The present *DSM-5* criteria for PTSD and ASD were derived from examination of research conducted since the previous edition, *DSM-IV-TR* was released in 2000 (Friedman et al., 2011). These disorders have been repositioned from "Anxiety disorders", to a new chapter called "Traumaor Stressor-related Disorders" (APA, 2013; Friedman, 2013). This categorisation highlights the similarity between PTSD, ASD, adjustment disorders, Reactive Attachment Disorder and Disinhibited Social Engagement Disorder, which are all diagnosed within the context of a specific environmental stressor or traumatic event (Friedman et al., 2011).

2.3.1. Changes to the definition of trauma exposure. The current definition of a Criterion A traumatic event does not differ greatly from *DSM-IV-TR*, but has been refined to exclude media exposure. It has also been clarified that learning of a loved one's death is considered traumatic only if the death was "violent or accidental" (APA, 2013, p. 271). For the pre-school subtype, indirect traumatic experiences are considered if the traumatic event occurred to a parent or caregiver (APA, 2013). Additionally, due to inconsistent reporting of this phenomenon and a lack of predictive utility (De Young, Kenardy, & Cobham, 2011a; Friedman, 2013), sufferers of PTSD and ASD no

longer need to report "intense fear, helplessness or horror" as an immediate reaction to warrant a diagnosis (APA, 2000, p. 467, 471). Young children in particular can find these emotions difficult to report, rendering this information difficult to obtain, especially in the absence of witnesses to the event (Scheeringa, Zeanah, Drell, & Larrieu, 1995).

2.3.2. Changes to PTSD criteria. *DSM-5* PTSD is based on a four factor model of the disorder, including intrusion, avoidance, hyperarousal, and mood and cognitive symptoms which have either not been present prior to the traumatic event or must have augmented since the event (Friedman, 2013). The new category of "mood and cognitive symptoms" includes symptoms that were previously referred to as "numbing" symptoms (APA, 2013), as well as two new symptoms concerning blame and negative emotions (Friedman, 2013). The two avoidance symptoms that were previously included within the "numbing" symptoms are now within a separate category. Little has changed for intrusion and hyperarousal symptoms, apart from the addition of "reckless or self-destructive behaviour" (APA, 2013, p. 272) as an arousal symptom which is not included in the current pre-school specifier.

Dissociative symptoms may also occur in PTSD, but are not required for diagnosis (APA, 2013). Instead, a new "dissociative" subtype may be specified when either depersonalisation or derealisation is reported. In addition, "acute" and "chronic" subtypes are no longer specified, but the "delayed" subtype of PTSD remains, describing PTSD onset 6 months or more after the traumatic event. For all ages, PTSD symptoms must occur for at least one month, with significant clinical distress and functional impairment, not due to substance use or another condition (APA, 2013).

2.3.2.1. Pre-school subtype. The distinctive experience of PTSD for children has been recognised since its initial revision in *DSM-III-R* (APA, 1987). Moreover, *DSM-5* acknowledged the different presentation of PTSD in pre-school children by adding a "pre-school" subtype for children under six (APA, 2013). Children under six may be diagnosed with PTSD if they have at least one intrusion symptom, one either avoidance or mood/cognitive symptom, and two arousal

symptoms (APA, 2013; see Table 2.2 for a comparison with standard, four-factor PTSD criteria). The lower threshold of symptoms required for diagnosis was expected to sensitively detect children with impaired functioning and behavioural difficulties, rather than simply including children with milder presentations (De Young et al., 2011a).

The pre-school criteria acknowledge the unique challenges in detecting PTSD in young children who lack complex verbal skills and may present with more behavioural than cognitive and emotional symptoms (Friedman, 2013; Scheeringa & Zeanah, 2001). For example, intrusion symptoms may be more clearly detected by trauma-related play rather than the child's verbal reports (Scheeringa & Zeanah, 2001), especially when relying on parent report for diagnosis (De Young et al., 2011a). It has also been suggested that the three-factor pre-school criteria might also be useful for screening of PTSD in school-aged children, as school-aged children are also still developing emotional literacy and insight (Danzi & La Greca, 2017).

Table 2.2

Standard and Pre-school DSM-5 Criteria for PTSD

Symptoms	Standard (>6 y)	Pre-school (<6y)
Intrusion	1 out of 5	1 out of 5
Avoidance	1 out of 2 $\}$	1 out of 6
Mood/cognitive	2 out of 7	
Hyper arousal	2 out of 6	2 out of 5

2.3.3. Changes to ASD criteria. ASD can be diagnosed when symptoms occur between three days and one month of a Criterion A trauma (Bryant et al., 2015). As in PTSD, ASD symptoms can include intrusion, avoidance, dissociation and/or arousal symptoms, however there is one "negative mood" symptom, referring to the inability to sustain positive emotions (APA, 2013).

ASD also differs from PTSD as diagnosis requires nine or more symptoms from any category (APA, 2013) and there are no age-specific criteria for ASD.

Dissociative symptoms were previously required for an ASD diagnosis but have not adequately identified those at risk of PTSD or shown a more distressing acute stress response compared to responses without dissociation (Bryant, 2011). The updated ASD structure deemphasises dissociative symptoms, so that individuals experiencing clinical levels of posttraumatic distress can access appropriate treatment and intervention even without dissociative symptoms (Meiser-Stedman et al., 2007). The less restrictive *DSM-5* criteria has increased prevalence rates of ASD, compared to past research with *DSM-IV* criteria in children and adolescents (McKinnon et al., 2016). However, children and adolescents with fewer than nine symptoms may still demonstrate clinically significant distress (Meiser-Stedman et al., 2017).

2.4. Comorbidity in Clinical Presentations

Trauma-related disorders rarely "occur in isolation" (Kahana, Feeny, Youngstrom, & Drotar, 2006, p. 158) and while other more common clinical disorders like depression and anxiety do not require a traumatic event for diagnosis, they may nevertheless occur as a result of such events (Grills-Taquechel, Littleton, & Axsom, 2011; Salloum, Carter, Burch, Garfinkel, & Overstreet, 2011; Wasserman & McReynolds, 2011). PTSD is often comorbid with depression, anxiety, conduct disorder, attention-deficit hyperactivity disorder (Copeland, Keeler, Angold & Costello, 2007), suicide, substance use and poor academic achievement (Nooner et al., 2012). Depression, anxiety and PTSD may also share similar risk factors like gender, age and trauma exposure (Fan, Zhang, Yang, Mo, & Liu, 2011). Similarly, *DSM-5* ASD is comorbid with depression and anxiety (Barber, Kohl, Kassam-Adams & Gold, 2014) and can be associated with peri-traumatic panic attacks (Sinclair, Salmon & Bryant, 2007). It has been suggested that, in comparison with the *International Classification of Diseases 11th Edition* (ICD-11) criteria, the *DSM-5* criteria for PTSD is met by children with higher levels of comorbidity in general (La Greca, Danzi & Chan, 2017). These findings highlight the potential complexity of clinical presentations and overlap in symptoms following trauma.

2.5. Summary

PTSD and ASD criteria can classify clinical responses to a traumatic event. Recent changes to the criteria highlight a more developmentally sensitive perspective, especially by including a pre-school subtype for PTSD.

CHAPTER 3 PAPER 1: EPIDEMIOLOGY OF TRAUMA AND TRAUMA-RELATED DISORDERS IN CHILDREN AND ADOLESCENTS

This chapter aimed to outline the prevalence and predictors of exposure to trauma, Acute Stress Disorder and Posttraumatic Stress Disorder amongst children and adolescents. This chapter includes a published book chapter (Gunaratnam & Alisic, 2017). As it was written for clinicians, it encompasses a broad range of trauma exposure types, beyond the unintentional injuries that are the focus of this thesis.

3.1. Abstract

While most research concerning trauma has been conducted in adults, many children appear to be confronted with one or more potentially traumatic events while growing up and are at risk of developing a trauma-related disorder such as Acute Stress Disorder (ASD) or Posttraumatic Stress Disorder (PTSD). This chapter provides an overview of estimates of trauma exposure, ASD rates and PTSD rates among children and adolescents, and their relevant predictors. Exposure to potentially traumatic events is highly frequent among young people across the world. Important predictors vary across the three outcomes of interest. Age, gender, externalising behaviour and stressors in the home environment appear relevant for trauma exposure. While empirical findings for ASD among children and adolescents are fairly scarce, the main predictors of PTSD appear to involve the nature of the trauma (with interpersonal trauma being related to higher rates of PTSD), acute stress levels, cognitive factors and family or broader social support factors. Non-Western countries and young children are underrepresented in research into exposure and trauma-related disorders.

EPIDEMIOLOGY OF TRAUMA AND TRAUMA-RELATED DISORDERS IN CHILDREN AND ADOLESCENTS

How many children and adolescents are exposed to potentially traumatic events (PTEs)? Is exposure a random phenomenon or can we identify specific risk factors? Similarly, how many and which children and adolescents develop trauma-related disorders? The present chapter gives an overview of the current evidence base regarding exposure to PTEs, acute stress disorder (ASD), posttraumatic stress disorder (PTSD) and related predictors. The updated ASD and PTSD criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013) include mood and cognitive symptoms, and a new pre-school subtype which will likely increase prevalence rates of these disorders for preschool aged children compared to the *DSM-IV* (APA, 2000). In general, only a small proportion of children and adolescents faced with a similar type of exposure develop high levels of symptoms or disorders. Therefore, consideration of potential demographic, biological, cognitive and family or environment predictors are important to help guide prevention, screening, assessment, and intervention efforts. We also discuss methodological differences among studies that may affect empirical findings.

3.2. Exposure to Potentially Traumatic Events

3.2.1. Estimates of exposure. Exposure to PTEs is common in children and adolescents. By the time young people reach their 18th birthday, many have faced the loss of a loved one, a serious accident, violence, or other type of trauma. General population studies in the USA have found particularly high rates of exposure. For example, Copeland, Keeler, Angold and Costello (2007) reported that 68% of adolescents in a large population sample had been exposed, about half of whom reported two or more events. These findings are similar to a recent study by McLaughlin et al. (2013), in which 62% of over 6,000 American adolescents reported exposure. Again, about half of the exposed adolescents had been confronted with more than one event. Both American studies used the *DSM-IV* A1 criterion of objective exposure. A recent population study with Swiss adolescents reported around 56% of adolescents reported at least one PTE (Landolt, Schnyder,

Maier, Schoenbucher & Mohler-Kuo, 2013), a figure that is akin to US samples, likely due to a large proportion of migrants in the Swiss study. Most population studies focus on adolescents: population studies among primary school children are fairly rare. One such study in the Netherlands reported an exposure rate of 15% (Alisic et al., 2008), suggesting that trauma is also a common experience in earlier childhood.

Studies that assessed exposure beyond *DSM-IV* A1 criterion events, including experiences such as divorce of parents and bullying, found high rates among young people. In Denmark, 78% of a student sample reported exposure to at least one distressing or traumatic event (Elklit & Frandsen, 2014; N = 1088, age range = 15 to 20 years), with approximately 60% of the exposed students reporting two or more. Similar and even higher rates were reported for adolescents in Malaysia (78%; Ghazali, Elklit, Balang, Sultan, & Kana, 2014), Greenland (86%; Karsberg, Lasgaard, & Elklit, 2012) and Kenya (95%; Karsberg & Elklit, 2012).

In sum, around one in two adolescents report lifetime exposure to at least one PTE according to *DSM-IV*, with lower figures reported for younger children. However, a greater emphasis on developing nations in the literature is warranted. For example, 87% of the peer-reviewed articles on traumatic stress published in 2012 regarded high income countries and 51% of all papers described studies in the United States (Fodor et al., 2014). By contrast, trauma exposure in developing nations tends to be substantially more common compared to developed countries (e.g. Karsberg & Elklit, 2012), lending weight to the importance of these oft overlooked nations. Refugee youth are a particularly under-researched heterogeneous minority. The next few paragraphs discuss specific types of events that children and adolescents are exposed to.

3.2.1.1. *Exposure to the sudden loss of a loved one.* In the studies among adolescents in the USA (McLaughlin et al., 2013) and Switzerland (Landolt et al., 2013) and the study among primary school children in the Netherlands (Alisic et al., 2008), the most frequently reported trauma was the sudden loss of a loved one. In particular, the death of a parent or a sibling is one of the most stressful life events that a child or adolescent can experience (Melhem, Porta, Shamseddeen, Payne

& Brent, 2011). In the study by McLaughlin et al. (2013), 28% of the sample lost a loved one. Strictly speaking, not all of the deaths would meet the DSM-5 stressor criteria, since some of these may not have been sudden or violent (but instead, after a long period of illness).

3.2.1.2. Exposure to injury. Serious accidental injury is the global leading cause of death in the 10 to 19 year old age bracket (World Health Organization [WHO], 2014). As is often mentioned, this is only the 'tip of the iceberg', with millions of children who are not fatally but seriously injured every year. Injuries in children most commonly occur due to motor vehicle accidents, drowning, burns, and falls (WHO, 2014). Motor vehicle accidents tend to be some of the most common PTEs overall (Elklit & Frandsen, 2014; Ghazali et al., 2014).

While not all injuries would be considered serious or traumatic, those that warrant a hospital visit longer than 24 hours are often placed into this category (e.g. Olsson, Le Brocque, Kenardy, Anderson & Spence, 2008). Nevertheless, children may also experience trauma symptoms following an event that leads to an emergency department visit without subsequent hospitalisation (Bryant, Mayou, Wiggs, Ehlers & Stores, 2004). For example, involvement in a motor vehicle accident without serious injury can be traumatic due to the perceived threat to life (Meiser-Stedman, Smith, Glucksman, Yule & Dalgeish, 2008). In addition, invasive medical procedures are relatively common and may be experienced as traumatic, particularly when life-threatening (Marsac, Kassam-Adams, Delahanty, Widaman, & Barakat, 2014).

3.2.1.3. Exposure to violence. Rates of exposure to violence are likely underestimated due to underreporting of physical and especially sexual trauma (Saunders & Adams, 2014). With this in mind, witnessing and experiencing violence and abuse are probably fairly common (Elklit & Frandsen, 2014; Mohler-Kuo et al., 2014). Finkelhor, Turner, Shattuck and Hamby (2015) found that of 4000 US children and adolescents, 1.4% had been sexually assaulted, 5% had been physically abused, 15.2% had suffered any type of maltreatment and 24.5% had witnessed violence in the past year. Given that assault and abuse exposure increases with age (Finkelhor et al., 2015; Saunders & Adams, 2014), the large age range in this study may have diluted findings for the

adolescent age group. Relatively little is known about prevalence in different countries, which is likely to vary as for young females (aged 15 to 19 years), rates of physical or sexual intimate partner violence were 36.6% in Johannesburg, South Africa, 32.8% in Ibadan, Nigeria, 27.7% in Baltimore, USA, 19.4% in Delhi, India and 10.2% in Shanghai, China (Decker et al., 2014). Considering contact or non-contact sexual abuse alone, a Swiss population study with adolescents showed that 40.2% of girls and 17.2% of boys reported at least one incident (Mohler-Kuo et al., 2014), highlighting its high frequency amongst adolescents, particularly females.

3.2.1.4. Exposure to mass trauma. Rates of exposure to natural disasters, terrorism, and war differ from other forms of trauma as they are location-specific. In many cases, countries with the fewest resources are hit the hardest (Neuner, Schauer, Catani, Ruf & Elbert, 2006). While it is apparent that exposure to disaster, terrorism and mass conflict depend on geography and proximity to an event, mass trauma research often arises from high-income countries that are less prone to these disasters compared to low- and middle-income countries. In the US, rates of exposure to disasters ranged from 11.1% (Copeland et al., 2007) to 14.8% (McLaughlin et al., 2013) in the general population. By contrast, the 2010 earthquake in Haiti was labelled "acute on chronic trauma", that is, trauma exposure estimates needed to take into account the existing systemic issues in the country and high rates of pre-existing trauma exposure (Gabrielli, Gill, Koester & Borntrager, 2014). Research in low- and middle-income countries post-trauma tends to lack baseline data, making population estimates of trauma exposure difficult to determine.

3.2.2. Predictors of exposure.

3.2.2.1. Demographic predictors. Exposure to trauma is related to age. Older children and adolescents have had more time available for PTEs to occur (Copeland et al., 2007; Finkelhor, Omrod & Turner, 2009) than younger children. In addition, mobility (Haller & Chassin, 2012), sexual activity, and in some cases risk-taking (Forgey & Bursch, 2013) increase with age, leading to a greater likelihood of trauma exposure. However, the type of PTEs experienced may differ across stages of development. For example, burn injuries are more prevalent in younger children (Stoddard et al., 2006) while risk of sexual trauma is higher for older children (Finkelhor et al., 2015).

It is unclear whether, overall, boys are more exposed to trauma than girls. While several recent studies have found such an effect (Elklit & Frandsen, 2014; Haller & Chassin, 2012; Karsberg & Elklit, 2012; c.f. Karsberg et al., 2012) a few did not (Ghazali et al., 2014; Landolt et al., 2013; Salazar, Keller, Gowen & Courtney, 2013). However, there appear to be differences according to the type of trauma. Particularly, boys are more likely to be exposed to non-sexual violence (Atwoli et al., 2014; Finkelhor et al., 2015; Karsberg & Elklit, 2012; McLaughlin et al., 2013; Salazar et al., 2013; Zona & Milan, 2011) and accidental injury (e.g., Landolt et al., 2013; McLaughlin et al., 2013). The reason may be higher levels of externalising behaviour in boys compared to girls (Lalloo, Sheiham, & Nazroo, 2003). For sexual trauma, the opposite gender difference has been found (e.g., Finkelhor et al., 2015; Landolt et al., 2013; McLaughlin et al., 2013; Salazar et al., 2013).

As mentioned above, while trauma occurs everywhere, exposure rates are related to geography. Within countries, differences in trauma exposure may be better explained by demographic characteristics such as minority status, nativity, parental education, poverty and justice system involvement than ethnicity per se (e.g. Landolt et al., 2013; McLaughlin et al., 2013; Milan, Zona, Acker & Turcios-Cotto, 2013).

3.2.2.2. Behavioural predictors. Intuitively, children who engage in more externalising behaviour put themselves at greater risk of accidents (Lalloo et al., 2003). Additionally, poor sleep
in young children may precipitate externalising behaviour and subsequent injury (Owens, Fernando & McGuinn, 2005). More generally, behaviour disorders have been linked to a higher likelihood of trauma exposure in US adolescents (McLaughlin et al., 2013). Behaviour problems may have differing consequences in boys and girls (e.g. Haller & Chassin, 2012; Zona & Milan, 2011). For example, in males, but not females, internalising symptoms were protective against assaultive violence exposure (Haller & Chassin, 2012). The authors suggested that socially withdrawn males may be less likely to engage in aggressive behaviour or to expose themselves to others engaging in such behaviour, thereby protecting them from violent trauma exposure to some extent.

3.2.2.3. Family and social environment predictors. Poverty and the home environment can set a backdrop upon which trauma exposure is more likely. In lower socio-economic status (SES) households, there is often less supervision of children and consequently higher risk of trauma exposure (e.g. Morrongiello & House, 2004). The mental health of family members and past parenting problems can also confer risk of trauma exposure (Copeland et al., 2007) and physical and sexual abuse often occur within the home environment (Landolt et al., 2013). Externalising problems are also more common in lower SES and single-/step-parent households (Lalloo et al., 2003; Landolt et al., 2013; McLaughlin, 2013).

Looking at children and adolescents' broader context, belonging to a 'deviant' peer group may increase risk of violence exposure in adolescents (Milan et al., 2013). In another study on environmental factors, physical and sexual abuse was highest in street children compared to households and orphanages (Atwoli et al., 2014), as a lack of permanent address and safe place to sleep may leave these children more vulnerable. Living in the city may confer risk for particular traumas like assault-related injury (Irie et al., 2012), physical violence, robbery and being threatened with a weapon (Elklit & Frandsen, 2014). Importantly, prior exposure to violence can predict future violence exposure, as one type of violence exposure increases the chances of experiencing other types of violence (Finkelhor et al., 2015; Milan et al., 2013). **3.2.3. Methodological considerations.** While it is clear that a substantial proportion of young people are exposed to (potential) trauma during their childhood, risk of exposure is difficult to disentangle from definitions of what constitutes a PTE, assessment methodology and sample characteristics. Some studies used definitions of trauma that were broader than the *DSM-5* stipulates (e.g. Karsberg et al., 2012 included divorce and unplanned pregnancy). Therefore, comparisons across countries and studies are to be made with caution. As mentioned earlier, the geographical location of a study makes a difference, in terms of rates of exposure and potential predictors. In addition, the extent to which exposure is measured appear to play a role. For example, Copeland and colleagues (2007) reported substantially higher rates of exposure based on repeated assessments with the adolescents in their sample, than they would have based on a single assessment. The same is likely to apply to children.

Study methodology may also influence outcomes in other ways. For example, it is common for parents to report on trauma exposure on behalf of their young children. However, parent and child reports can conflict and may be subject to memory failures, mental health of the informant, or a lack of knowledge, for example if the primary caregiver was not present during exposure (Finkelhor et al., 2015). This effect may be more pronounced as a child ages (Saunders & Adams, 2014). In self-report of exposure on the other hand, some memories may not be adequately salient to be recalled over time, or distressing memories may even be repressed (Finkelhor et al., 2009) or recalled more easily. Mandatory reporting of abuse by professionals in many countries may decrease willingness to disclose violence and abuse to researchers and clinicians (Copeland et al., 2007). In addition, cultural understandings of what constitutes trauma, in particular violence, may affect reporting (Saunders & Adams, 2014). Finally, there is a need to replicate studies across a number of different regions and trauma types to gain a broader picture of trauma exposure across the globe.

3.3. Acute Stress Disorder

3.3.1. Prevalence estimates of Acute Stress Disorder. Acute Stress Disorder (ASD) is the main trauma-related disorder diagnosed in the almost immediate aftermath of exposure. It signifies the experience of severe stress reactions in the first few weeks after the trauma. Our knowledge of ASD among children and adolescents is relatively limited, since research on this trauma-related disorder is not as plentiful as research on PTSD. According to DSM-5 it requires identification and assessment of survivors within a month after exposure, which is not always feasible, either because the trauma is not detected (e.g. in the case of violence) or because the resources are not available (e.g. after a mass-scale trauma). The majority of currently available studies are hospital-based and regard injury, sometimes in the context of a natural disaster or abuse. Most are based on the DSM-IV criteria. Overall, ASD rates among exposed children and adolescents appear to vary from about 5% (e.g., Ellis, Nixon, & Williamson, 2009) to around 50% (e.g., Liu et al., 2010). Dalgleish and colleagues (2008) combined the data of 367 road accident survivors (6-17 years old) and found that 9% of them met criteria for ASD, with a further 23% meeting criteria for subthreshold ASD. The most robust evidence comes from aggregated data from 15 studies involving 1,645 children and adolescents in four high-income countries (US, Australia, United Kingdom and Switzerland; Kassam-Adams et al., 2012). The authors studied the proposed DSM-5 criteria and found that 41% of the children and adolescents reported clinically relevant impairment. Each ASD symptom was endorsed by 14% to 51% of the sample. While the DSM-5 eventually required 9 symptoms for ASD criteria to be met, at the time of the study this was 8 symptoms. This requirement was met by 12% of the children and adolescents. It did not predict concurrent impairment very well. The authors found that requiring only three to four symptoms substantially improved sensitivity while maintaining moderate specificity.

3.3.2. Predictors of Acute Stress Disorder.

3.3.2.1. Demographic predictors. Age, gender and ethnicity are easily identifiable characteristics that would be useful in identifying youth in need of intervention and treatment in the

direct aftermath of trauma. However, demographic characteristics have produced mixed results in predicting ASD, and because only a small number of studies have been conducted so far, conclusions are somewhat hard to reach.

Concerning age, some studies have found that young children have an elevated risk of ASD (Doron-LaMarca, Vogt, King, King & Saxe 2010; Le Brocque, Hendrikz, & Kenardy 2010; Saxe, Miller, et al., 2005) and may have more severe ASD (McKinnon, Nixon & Brewer 2008). Le Brocque and colleagues (2010) found that younger children were more likely to have high levels of symptoms immediately post-trauma but recovered quickly. Still, other studies have not found evidence of age as a predictor of acute stress (e.g. Bryant et al., 2004; Daviss et al., 2000; Haag, Zehnder & Landolt, 2015; Ostrowski et al., 2011).

Whenever a gender difference in ASD has been found, girls have been at higher risk than boys (Bryant et al., 2004; Doron-LaMarca et al., 2010; Haag et al., 2015; Holbrook et al., 2005; Karabekiroglu, Akbas, Tasdemir & Karakurt, 2008; Liu et al., 2010). Yet, it remains unclear what factors may interact with female gender to produce these findings in some studies and not others (e.g. Daviss et al., 2000; Ellis et al., 2009).

Ethnicity has not been studied as extensively as age or gender. So far, there is a lack of support for the role of race or ethnicity in predicting ASD (e.g. Ostrowski et al., 2011). Further, with respect to SES, parental income has not predicted acute stress either (Ostrowski et al., 2011).

3.3.2.2. *Exposure characteristics as predictors.* There is some evidence to suggest a "dose response relationship" whereby a greater extent of exposure is related to higher risk of acute trauma symptoms. For example, after an earthquake ASD was more common in bereaved children and those whose residence had been damaged, compared to those who did not suffer a loss or were further away from the earthquake (Demir et al., 2010). It has further been suggested that disasters in less well-resourced areas are generally more traumatic due to a lack of infrastructure and therefore greater secondary traumas, death and general distress (Demir et al., 2010).

Injury characteristics may predict ASD in children. For example, among those exposed to a motor vehicle accident, children with injuries who sought medical assistance were at a greater risk of ASD than those who did not (Winston, Baxt, Kassam-Adams, Elliott, & Kallan, 2005). Additionally, experiencing pain following injury predicted ASD symptoms in children (McKinnon et al., 2008; Saxe, Miller, et al., 2005). Yet, injury severity itself does not appear to predict ASD (Bryant et al., 2004; Daviss et al., 2000; Haag et al., 2015; Ostrowski et al., 2011), nor does hospitalisation after a motor vehicle accident (Bryant et al., 2004). For children with burns, burn size was a risk factor for ASD only by its association with increased parental ASD and elevated heart rate (Saxe, Stoddard, et al., 2005).

ASD appears more likely in violently injured youth compared to those with unintentional injuries or medical illnesses (Hamrin, Jonker & Scahill, 2004; Holbrook et al., 2005; c.f. Meiser-Stedman, Yule, Smith, Glucksman & Dalgeish, 2005). These findings lend support to the idea that intentional traumas are more difficult to cope with than unintentional traumas.

3.3.2.3. Cognitive and emotion-related predictors. ASD has been associated with negative cognitive appraisals about the experienced trauma and perceived threat of serious injury (Ellis et al., 2009). Specifically, ASD is more likely when the child perceives that they are going to die during the trauma (Ellis et al., 2009; Holbrook et al., 2005) or that they are vulnerable to consequent harm (Salmon, Sinclair & Bryant 2007). The role of cognitions may differ depending on age (Salmon et al., 2007) and injury type. For children with burns, a positive body image despite the injury was a protective factor (Saxe, Stoddard, et al., 2005). Data-driven processing of the perceptual and physical aspects of the trauma, self-reported memory quality, and peri-traumatic fear were also associated with ASD in injured children (McKinnon et al., 2008). In addition, peri-traumatic guilt has predicted ASD in children following motor vehicle accidents (Haag et al., 2015).

3.3.2.4. *Biological predictors.* Biological predictors of ASD have only been studied sporadically. Elevated heart rate appears to be a risk factor for ASD in children with burns (Saxe,

Stoddard, et al., 2005) and average heart rate mediated the relationship between burn size and ASD symptoms (Stoddard et al., 2006).

3.3.2.5. Behavioural predictors. Pre-existing internalising and externalising behaviours may precipitate acute stress following an injury (Daviss et al., 2000). However, in another study, only higher pre-injury externalising scores predicted initial trauma symptoms in injured children and adolescents, while internalising scores did not (Doron-LaMarca et al., 2010). In the latter study, gender interacted with behaviour such that females with higher externalising scores experienced more symptoms than males with externalising behaviours (Doron-LaMarca et al., 2010).

3.3.2.6. Family and social environment predictors. Caregiver and general family stress has presented as a risk factor for child ASD following injury (Daviss et al., 2000; Haag et al., 2015; Saxe, Miller, et al., 2005; Saxe, Stoddard, et al., 2005). In a study of survivors of assaults and motor vehicle accidents, both parental depression and parental worrying were associated with child acute trauma symptoms (Meiser-Stedman, Yule, Dalgleish, Smith &, Glucksman, 2006). While social support more broadly has been found to be protective against PTSD in children (Langley et al., 2013), it does not appear to hinder initial ASD development (Ellis et al., 2009); potentially, social support takes some time to have an effect post-trauma.

3.3.3. Methodological considerations. Parent and child reports of ASD symptoms can differ (Kassam-Adams, Garcia-Espana, Miller, & Winston, 2006; Meiser-Stedman et al., 2008; Meiser-Stedman, Smith, Glucksman, Yule & Dalgleish, 2007), with internal experiences and symptoms likely being more difficult for parents to estimate (Doron-LaMarca et al., 2010; c.f. Meiser-Stedman, et al., 2007). Given the finding that parental ASD and child ASD are related, it is possible that parents with ASD rate their child's symptoms as more severe (Daviss et al., 2000; Haag et al., 2015) or, conversely, normalise acute responses (Meiser-Stedman, et al., 2007). Therefore, studies involving both parent and child reports are likely to elicit more accurate estimates of the child's acute response to trauma.

As mentioned before, the study of ASD in children and adolescents is relatively new. Early studies did not use proper screening measures for children as they had not yet been developed (e.g. Hamrin et al., 2004) and some have used PTSD criteria within one month of the trauma (e.g. Karabekiroglu et al., 2008; Ostrowski et al., 2011). Despite ASD criteria being present in *DSM-IV* and *DSM-5*, studies have used varying combinations of "subthreshold" symptomatology to derive a measure of general acute stress (e.g. Meiser-Stedman et al., 2005). Particularly, criticism of the dissociative criterion led studies to use a variety of definitions of ASD. Now that dissociation is no longer a necessary criterion, the new *DSM-5* criteria may unite these definitions (see chapter 1).

3.4. Posttraumatic Stress Disorder

3.4.1. Prevalence estimates of posttraumatic stress disorder. Posttraumatic stress disorder (PTSD) is the predominant mental health problem taken into consideration after trauma exposure in children and adolescents. Rates of PTSD among youth who have been confronted with a PTE have varied considerably in previous studies. The most robust information on the conditional risk for PTSD after trauma among children and adolescents comes from a meta-analysis that combines information of studies among 3,563 children who had been assessed with well-established diagnostic interviews. The overall rate of PTSD was 16% (Alisic et al., 2014). Children and adolescents do not randomly experience posttraumatic stress after exposure: specific groups of children appear to be more at risk than others (Alisic et al., 2011; Cox, Kenardy & Hendrikz, 2008; Kahana, Feeny, Youngstrom & Drotar, 2006; Trickey, Siddaway, Meiser-Stedman, Serpell & Field, 2012).

3.4.2. Predictors of posttraumatic stress disorder.

3.4.2.1. Demographic predictors. Gender differences have been reported quite consistently for PTSD, with higher prevalence rates for girls than boys (e.g., Elklit & Frandsen, 2014; Haller & Chassin, 2012; Karabekiroglu et al., 2008; Karsberg & Elklit, 2012; Landolt et al., 2013; Lavi, Green & Dekel 2013; McLaughlin et al., 2013). There have been a few exceptions, where no gender differences were found (e.g. Ghazali et al., 2014; Milan et al., 2013) but overall, meta-analyses indicate a gender difference with girls being more prone to PTSD than boys (Alisic et al., 2011; Alisic et al., 2014; Cox et al., 2008; Trickey et al., 2012). Despite the consistency, the effect sizes of this overall gender difference tend to be rather small. There has been some suggestion that certain types of trauma may affect males and females differently (Elklit & Frandsen, 2014; Landolt et al., 2013) but that overall, PTSD rates are higher for females. Recently, it has been suggested that females may demonstrate greater stress reactivity than males due to the influence of sex hormones, and that these differences might emerge during adolescence (Koss & Gunnar, 2018).

Regarding age alone, the findings are inconsistent. There is some evidence to suggest that PTSD prevalence increases with age, with one study finding significantly more lifetime subclinical PTSD in adolescence than in childhood (Copeland et al., 2007). A review by Nooner et al. (2012) also suggested that adolescents are generally at greater risk of PTSD than children. However, this result may be an artefact of applying *DSM-IV* criteria to young children, whose verbal abilities are unlikely to enable detection of some symptoms (Friedman, 2013). Meta-analyses have found no or relatively small effects for age as a predictor of posttraumatic stress (Alisic et al., 2011; Cox et al., 2008; Kahana et al., 2006; Trickey et al., 2012). Even though there may be no observable age effect in PTSD rates or posttraumatic stress severity scores, it is likely that symptom patterns differ across various developmental stages. For example, younger children may show more behavioural disturbances while adolescents may express more guilt and shame (Scheeringa, Zeanah & Cohen, 2011).

Concerning race and minority status, these appear to predict overall risk for PTSD or rates of posttraumatic stress to a negligible or small extent (Alisic et al., 2011; Trickey et al., 2012). Like with age however, it is possible that ethnicity is related to posttraumatic stress in specific circumstances. For example, African American adolescents in Chicago were more likely to be exposed to violence, but less likely to develop PTSD than their White or Latino counterparts, highlighting a possible influence of ethnicity in this population (Milan et al., 2013). SES may predict PTSD, but is rarely studied and yielded zero or small effect sizes in metaanalyses so far (Alisic et al., 2011; Kahana et al., 2006; Trickey et al., 2012). As an example, markers of SES in Kenyan adolescents, like parental education, number of meals per day and household resources did not predict posttraumatic stress (Karsberg & Elklit, 2012). Although, in Greenland, fathers' limited education did predict posttraumatic stress in adolescents (Karsberg et al., 2012).

3.4.2.2. Exposure characteristics as predictors. Children are more likely to develop PTSD following an interpersonal compared to a non-interpersonal trauma. In a recent meta-analysis, the pooled PTSD rate after interpersonal trauma was 25% (with a 95% confidence interval of 17 - 36%), versus 10% after non-interpersonal trauma (with a 95% confidence interval of 6 - 15%; Alisic et al., 2014). Within both types of exposure, further differences may exist. For example, adolescents who experienced violence perpetrated by a parent were more likely to develop PTSD than those exposed to other types of violence (Milan et al., 2013). Both groups of events may also have differential outcomes for witnesses and direct victims. Following motor vehicle accidents, witnesses reported less internalising symptoms compared to those involved in the accident (Tierens, Bal, Crombez, Loeys, et al., 2012). Conversely, Bayarri Fernàndez, Ezpeleta, Granero, de la Osa and Domènech (2011) found that children who were witnesses, perpetrators, or direct victims of violence, were all similarly affected.

Objective ratings of trauma severity, like injury severity or amount of exposure have shown limited predictive value (e.g. Lavi et al., 2013). In prospective studies among injured children, injury severity failed to predict subsequent posttraumatic stress (Alisic et al., 2011). In a meta-analysis of cross-sectional studies including a range of indications of trauma severity, a moderate effect was found (Trickey et al., 2012). However, this effect showed substantial heterogeneity that could not be explained within the available models; we do not yet know under which circumstances or in what way trauma severity may predict posttraumatic stress.

3.4.2.3. Prior exposure as a predictor. Prior trauma exposure has predicted PTSD in US adolescents (McLaughlin et al., 2013) and is a robust predictor of posttraumatic stress following an accident (Cox et al., 2008). A study on mental health in children in New Orleans 15 months after Hurricane Katrina found that gender, social support, and lifetime trauma exposure, but not hurricane exposure, significantly predicted PTSD. Lifetime trauma exposure was the strongest predictor (Langley et al., 2013). Likewise, previous violence exposure has been linked to an increased likelihood of PTSD (Salloum, Carter, Burch, Garfinkel, & Overstreet 2011). Generally, as the number of PTEs increases, poor psychiatric outcomes increase as well, providing evidence for a "dose-response" relationship (Copeland et al., 2007; Catani, Jacob, Schauer, Kohila & Neuner, 2008; Karsberg & Elklit, 2012; Karsberg et al., 2012; Salazar et al., 2013). This has particular relevance for refugees who have often experienced multiple traumas, leading to high reported prevalence of posttraumatic stress symptoms (PTSS) in these populations (Neuner et al., 2004). Conversely, for the individual, the distinction between discrete traumatic "events" may not be so clear, and symptoms may be difficult to attribute to different events, especially for more "general" symptoms like hypervigilance (Priebe et al., 2018).

As for many predictors, also in this case there are exceptions. A study on Hurricane Gustav showed that children who had endured prior exposure to violence and Hurricane Katrina did not experience an elevation in PTSS following exposure to Hurricane Gustav (Salloum et al., 2011). The authors suggested that either posttraumatic stress levels had reached a threshold, or Hurricane Gustav was not as traumatic as previous PTEs and therefore did not worsen PTSS.

3.4.2.4. Psychiatric history as a predictor. ASD has emerged as a strong predictor of longterm PTSD among children and adolescents (Alisic et al., 2011; Kahana et al., 2006). Nevertheless, ASD has not predicted PTSD as well as was hoped; children with ASD do not all continue to develop PTSD and not all children who develop PTSD, had ASD first. Le Brocque et al. (2010) propose that some children with ASD may follow a "recovery" trajectory, where initial symptoms dissipate, while others follow a "chronic" trajectory, who continue to suffer long-term symptoms. Thus far, the *DSM-IV* criteria have not adequately differentiated these groups. However, alternative criteria for ASD requiring less symptoms have emerged in the literature, and are better predictors of PTSD than *DSM-IV* ASD in young (2 to 6 years; Meiser-Stedman et al., 2008) and older children (7 to 13 years; Bryant, Salmon, Sinclair, & Davidson 2007) exposed to motor vehicle accidents and/or injuries. As alternate definitions of ASD often did not necessitate dissociative symptoms, these criteria may be more akin to the current *DSM-5* criteria for ASD. In adult samples, the *DSM-5* criteria have improved prediction of PTSD from ASD (Bryant et al., 2015); this may also be the case for children and adolescents.

More generally, meta-analyses have revealed that prior psychopathology is a robust predictor of PTSD following an accident (Cox et al., 2008) and depression and anxiety are moderate predictors of PTSD in children (Alisic et al., 2011; Kahana et al., 2006). In single studies, a history of anxiety (Copeland et al., 2007) and prior internalising disorders (McLaughlin et al., 2013) also significantly predicted PTSD in US children and adolescents.

3.4.2.5. Biological predictors. So far, relatively little empirical knowledge is available regarding biological correlates and predictors of posttraumatic stress in children and adolescents. Of these variables, fluctuations in cortisol, heart rate, norepinephrine levels, and interleukin-6 have been studied most frequently to determine their relationship with PTSD (Kirsch, Wilhelm & Goldbeck, 2011). Contrary to research conducted in adults, not low but high cortisol levels appear to be related to PTSD in children (Pervanidou, 2008). More specifically, elevated post-trauma evening salivary cortisol levels and morning interleukin-6 predicted PTSD in children six months later (Pervanidou et al., 2007). Elevated heart rate immediately following a PTE has also predicted PTSS six weeks and six months later (e.g., Nugent, Christopher & Delahanty, 2006), yet has yielded small effect sizes in meta-analyses (Alisic et al., 2011) and may be moderated by parental PTSS (Nugent, Ostrowski, Christopher & Delahanty, 2007). In addition, higher post-trauma norepinephrine has predicted PTSS in children (Kirsch et al., 2011).

3.4.2.6. Cognitive predictors. Both peri-trauma and post-trauma cognitive factors appear to predict PTSD in children. Although the number of underlying studies is still fairly small, perceived life threat during or in the direct aftermath of a PTE appears to predict PTSD to a moderate to strong extent (Kahana et al., 2006; Meiser-Stedman et al., 2009; Trickey et al., 2012). Following motor vehicle accidents and assault, cognitions regarding 'permanent and disturbing change' seem to affect PTSD symptoms (Meiser-Stedman et al., 2009). More in general, posttraumatic thought suppression has been strongly related to PTSD, although, again, the number of studies involved is small (Trickey et al., 2012). A recent study has underlined the potential strength of rumination in predicting PTSD in children and adolescents (Meiser-Stedman et al., 2014). There is also some evidence to suggest an effect of IQ or academic performance, albeit with small to medium effect sizes (Trickey et al., 2012).

3.4.2.7. Behavioural predictors. High externalising and internalising behaviour puts children and adolescents at greater risk of consequent trauma symptoms, whether acutely or long-term. Specifically, injured children with greater externalising and internalising traits were significantly more likely to belong to "recovery" or "chronic" trajectories, than the "resilient" trajectory, that do not develop PTSS (Le Brocque et al., 2010). In a longitudinal study with urban adolescents, Zona and Milan (2011) found that violence exposure itself increased internalising and externalising symptoms, as well as PTSD and dissociative symptoms. Therefore, this relationship may be multifaceted, with trauma exposure increasing behavioural symptoms, which increase posttraumatic stress in tandem. However, the substantial overlap between, in particular internalising, behavioural symptoms and posttraumatic stress, is potentially blurring these findings.

3.4.2.8. Family and social environment predictors. Parental posttraumatic stress has emerged as a strong predictor of child posttraumatic stress (Alisic et al., 2011; Cox et al., 2008; Landolt, Ystrom, Sennhauser, Gnehm & Vollrath, 2012). In fact, initial traumatic stress symptoms in children have also predicted PTSS in parents (Stowman, Kearney, & Daphtary, 2015), highlighting the bi-directional nature of the relationship (cf. Scheeringa & Zeanah, 2001). Poor family functioning in general has been associated with child posttraumatic stress (Trickey et al., 2012) and separation from family has predicted PTSS in resettled refugee youth (McGregor, Melvin & Newman, 2015). Social support more broadly can be protective against PTSD for children and adolescents (e.g. Langley et al., 2013) and low levels of social support are a moderately strong predictor of PTSD in children (Trickey et al., 2012). However, social support is a complex relational construct and potential resources for social support may not be utilised post-trauma for fear of being misunderstood or overburdening others (Thoresen, Jensen, Wentzel-Larsen & Dyb, 2014).

3.4.3. Methodological considerations. As in ASD, reporting of PTSD in children may be over- or under-estimated by parents and nursing staff (Daviss et al., 2000). Prediction of PTSD in older children may be improved by use of child- instead of parent-reports (Meiser-Stedman, et al., 2007) or combined child- and parent-reports, which show even greater predictive ability than either type alone (Meiser-Stedman et al., 2008). Furthermore, the timing of reports is an important consideration. Several studies have assessed lifetime trauma exposure with current PTSD, and post-trauma assessment timing differs across studies and types of samples (Cox et al., 2008). For example, ill youth were often examined years after their trauma and had significantly lower rates of PTSD compared to injured youth, who were examined within months of the trauma (Kahana et al., 2006). Rates of PTSD in injured youth might decrease with time and eventually be comparable to that of ill youth (Kahana et al., 2006). Variables of interest are often examined in cross-sectional studies, making causal relationships difficult to establish, and a general lack of consistency in how predictors are examined makes comparisons between studies difficult (Alisic et al., 2011; Kahana et al., 2006).

3.5. Conclusion

Exposure to potential trauma is common in childhood. Some types of exposure, such as the sudden loss of loved ones, happen everywhere including in the safest parts of the world. Others, such as disaster and war, are more tied to specific locations, and are more prevalent in low- and

middle income than high-income countries. For many parts of the world, we have relatively little knowledge of exposure, especially among children under 13 years of age. The most important factors to keep in mind as predictors of exposure are prior exposure, age (older children have faced more trauma), gender with respect to specific types of trauma (e.g. accidents for boys, sexual trauma for girls), externalizing behaviour, and stressors in the home environment.

Relatively little is known about ASD among children and adolescents. The best estimate of how many children develop ASD according to the *DSM-IV* criteria is 9% (with a further 23% of exposed children showing subthreshold levels of ASD; Dalgleish et al., 2008). Especially the dissociation symptom appeared to be problematic in diagnosis of ASD. The current *DSM-5* criteria no longer require dissociation as a necessary criterion, and it is likely that prediction of PTSD from ASD will improve with the current criteria. In terms of predictors of ASD, the findings remain inconclusive as well. At this point, the extent of exposure (although not severity of an injury), the intentionality of the trauma, peri-traumatic cognitions, emotions and processing, externalizing behaviour, and parental depression and worrying have shown some effect and merit further investigation.

Finally, PTSD is experienced by a substantial minority of children and adolescents exposed to trauma. The best estimate of overall average PTSD rates after exposure is 16% (Alisic et al., 2014). Factors that are more closely linked to the trauma – and generally take more effort to measure – such as acute stress, cognitive appraisals and family or social support, and the interpersonal or non-interpersonal nature of the exposure appear to be more powerful predictors of PTSD than demographic characteristics such as age, ethnicity, and gender (although some gender effect has been found). There is substantial methodological variation between studies, in particular with regard to time points of detection of trauma-related disorders, which make comparisons across studies and trauma types less than straightforward. However, some patterns are emerging. In particular, cognitive and family or social support factors appear to merit further investigation.

EPIDEMIOLOGY OF TRAUMA AND TRAUMA-RELATED DISORDERS

Rather than static conditions, trauma-related disorders and symptom levels appear to show dynamic patterns. We are only just starting to understand what exposure and recovery trajectories in children and adolescents look like. In the future, we will hopefully be able to understand and predict these trajectories much more adequately.

CHAPTER 4: REVIEW: FAMILY INTERACTIONS FOLLOWING CHILD MEDICAL TRAUMA

As outlined in Chapter 3, childhood trauma is relatively common, however a small proportion of trauma-exposed children and adolescents develop Acute Stress Disorder (ASD) and/or Posttraumatic Stress Disorder (PTSD). Social support appears to be a key protective factor against PTSD, and the family provides an environment for children to receive support, learn coping strategies and express emotion (Bai, Repetti, & Sperling, 2016; Hildenbrand, Clawson, Alderfer, & Marsac, 2011). Therefore, understanding the impact of the family following child trauma exposure is important for framing clinical recommendations (Bernardon & Pernice-Duca, 2010). Medical trauma (i.e. injury and illness) will be the focus of this chapter given its high incidence amongst children and parents (Bryant, Mayou, Wiggs, Ehlers, & Stores, 2004; Tierens et al., 2012). This chapter aims to explore the theory linking child and parental PTSS, the importance of parent-child interactions, and research methods in studying family interactions.

4.1. Child and Parent PTSS

4.1.1. Parent-child stress and emotion regulation. The psychological and practical considerations for families dealing with child injury and illness are numerous, regardless of the type of injury or illness (Kazak et al., 2006; Muscara et al., 2015). Children may be confronted with distressing medical procedures, social isolation and their potential death (Hildenbrand et al., 2011). Parents may be seeking to support their child and any other children, dealing with their own grief and worry, seeking normality and routine, and coping with financial and logistic decisions (Norberg & Green, 2007). In some cases, invasive medical procedures may place parents and medical staff as "perpetrators" of the trauma in a child's mind (Stuber, Shemesh, & Saxe, 2003).

Post-medical trauma, most children and parents adjust psychologically following a period of "normal" distress (Kazak et al., 2006). However, up to a third experience ongoing distress and traumatic stress (Rzucidlo & Campbell, 2009). Child and parent PTSS not only occur concurrently,

but have demonstrated a bi-directional relationship (Goldwin, Lee, Afzal, Drossos, & Karnik, 2014; Morris, Gabert-Quillen, & Delahanty, 2012; Scheeringa & Zeanah, 2001). This relationship is believed to stem, in part, from the already important role of the parent-child relationship in developing emotion regulation strategies (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Morris et al. (2007) described how, in their "tripartite model", children learn about emotion regulation through observing their parents naturalistically, through parenting behaviours related to emotion socialisation and the general emotional climate of the family. Therefore, existing parental beliefs about stress, emotions and coping are likely to influence both their and their child's response to a PTE.

In their biopsychosocial model of child PTSS, Marsac, Kassam-Adams, Delahanty, Widaman, and Barakat (2014) highlighted how an array of factors may interrelate in the peritraumatic period to confer risk of PTSS, including parental support, child coping strategies and appraisals, among a broader range of individual factors. For individuals, the objective severity of the trauma (e.g. injury severity scores) and demographic information (e.g. age) have not been found to strongly predict adjustment (Kazak et al., 2006; Thompson, Gustafson, Hamlett, & Spock, 1992). Rather, stress reactions may be mediated by the person's cognitive appraisal of how stressful the situation is (Lazarus & Folkman, 1984; Hitchcock, Ellis, Williamson & Nixon, 2015). The initial subjective interpretation of the event may be influenced by situational factors, however in the acute aftermath, the individual's supports can further influence their development of long-term PTSS through a joint understanding of the event (Hitchcock et al., 2015; Kazak et al., 2006). Therefore, parents and children are likely to influence one another through their subjective interpretations and interactions in the aftermath of trauma.

Moreover, it is possible that parents who are more optimistic and have higher efficacy, or beliefs in their ability to cope, might be less likely to experience PTSD and therefore more able to be there for their child (Benight & Harper, 2002; Birkeland, Blix, Solberg, & Heir, 2017; Jakšić, Brajković, Ivezić, Topić, & Jakovljević, 2012). However, these potential protective factors have been understudied. The small number of studies that have investigated specific parenting behaviours like hostility and warmth indicate a relationship between these behaviours and child PTSD (Williamson et al., 2017).

4.1.2. Post-trauma parenting behaviours and coping strategies. Alisic, Boeije, Jongmans, and Kleber (2012) interviewed parents of children who had experienced a single-event trauma in the last 6 months. They described the "responsive" style of parenting, whereby parents needed to be tuned in to their child's needs and any associated changes in behaviour in order to best support their child. This parenting style appears to be optimal for promoting recovery post-trauma. However, parental PTSS may alter parents' emotional sensitivity towards their child (Scheeringa, Myers, Putnam, & Zeanah, 2015), thus hindering their ability to be responsive.

In their "relational PTSD" model, Scheeringa and Zeanah (2001) described how a young child's response to trauma may be moderated by their parent's symptoms (and vice versa). Additional vicarious trauma may occur through the parent re-experiencing the event or repeatedly asking about it (i.e. reenacting). In addition, parents experiencing PTSD may be limited in their capacity to respond to and provide support for their children (i.e. withdrawn), or may be controlling and encourage avoidance (i.e. overprotective). Children may then be at an increased risk of adopting maladaptive coping strategies, which have maintained the parent's own PTSS. More recently, this model has been extended from young children only, into the pediatric cancer context, suggesting its broader application to parent-child interactions post-medical trauma (Goldwin et al., 2014).

More positively, other post-medical trauma studies (Hildenbrand et al., 2011; Marsac, Mirman, Kohser, & Kassam-Adams, 2011) noted that parents and children used a number of adaptive coping strategies including cognitive restructuring, relaxation, practical methods like healthy eating, emotional expression and social support. Parents were aided by information provision from health professionals who are able to work collaboratively with families (Alisic et al., 2012). In another study, mothers' use of adaptive coping strategies was related to less anxiety in children and more satisfaction with the hospital (Burns-Nader, Hernandez-Reif, & Porter, 2014).

4.2. Post-trauma Family Interactions

Parent-child interactions play a key role in socio-emotional development and attachment (Laible, 2004a; Morris et al., 2007). When a stressful event occurs, parent-child interactions provide an opportunity for children to process the event and their emotional response (Fivush, 2007; Lagattuta & Wellman, 2002; Sales, Fivush, & Peterson, 2003). Consideration of the quality and quantity of post-trauma parent-child interactions is warranted given the prominence of coping strategies, cognitions and support in our present understanding of paediatric trauma (Kazak et al., 2006; Marsac et al., 2014; Thompson et al., 1992). Despite the empirical and theoretical relationship between child and parent PTSS, little is known about the day to day manifestations of parental responsiveness, and the co-creation of coping strategies in daily life (Marsac et al., 2014). We now turn to explore current understandings of the quantity and content of parent-child interactions post-trauma.

4.2.1. Quantity of interactions. It is assumed both in the literature and in clinical practice, that talking about trauma is vital to adjustment and recovery (Cohen & Mannarino, 2015). Longer trauma narratives in the clinic predict better adjustment (Beaudreau, 2007), and a lower frequency or shorter length of trauma-related interactions may reflect avoidance or withdrawal (Goldwin et al., 2014). On the other hand, increased trauma talk may, like rumination, represent an unsuccessful attempt to find meaning (Sales, Merrill, & Fivush, 2013) or pre-occupation with the event (Scheeringa & Zeanah, 2001). Therefore, the quantity of parent-child interactions about a trauma may highlight important clinical information for this group.

Considering the "responsive" style of parenting post-trauma (Alisic et al., 2012), it may be more important that parents are attuned to their child's needs and available to support them as needed, rather than simply increasing or decreasing time spent talking together. More generally, Milkie, Nomaguchi, and Denny (2015), differentiated between "engaged" (talking) and "accessible" (nearby but not interacting) time, asserting that overt interactions do not have to take place for support to be conveyed. It appeared that parents being available to be there for their child as needed was also important. However, in this non-trauma sample, time with parents did not generally predict behavioural/emotional outcomes (with one exception: time spent with the mother in adolescence predicted concurrent delinquent behaviour). Yet, findings may be different within a trauma sample when there is a difficult event to process. It is possible that having a certain amount of trauma talk may increase openness and a sense of parental availability.

Therefore, for parents and children, the amount of trauma talk appears clinically informative, and the utility of general time spent interacting may depend more on its function, quality and necessity. We will explore the topic of trauma talk in Chapter 6.

4.2.2. Content of interactions. Of course, looking at the quantity of interactions simplifies the issue, and it is important to examine what is said (Fivush, 2007). At stressful times, parent-child interactions may be particularly important for processing of negative emotions (Morris et al., 2007). With greater elaboration, children may be able to describe and understand their negative emotions, and with this understanding engage in more effective coping strategies (Fivush, 2007). Thus, it appears that a higher proportion of emotional content in conversations may facilitate emotional processing for children.

It is also possible that some parents naturally pay more attention to sensitive or difficult events. For example, several studies have found that when talking about negative emotions, parents encouraged exploration of causal explanations and cognitions to a greater extent than when talking about positive emotions (Lagattuta & Wellman, 2002; Sales et al., 2003). Additionally, paralanguage, or non-verbal parts of speech like tone and warmth, influence communication in subtle ways (Asselmann, Wittchen, Lieb, Höfler, & Beesdo-Baum, 2014), and may also play a role in PTSD development through conveying support.

4.3. Measuring Family Interactions

The shared symptoms, coping strategies, support and appraisals that are involved in child and parent PTSS, are likely conferred via parent-child interactions. However, methodology has previously moderated the relationship between parent and child PTSS (Morris et al., 2012; Williamson et al., 2017) and may have influenced the aforementioned findings. This section briefly reviews the use of self-report and observational methods with families.

4.3.1. Self-Report. When individual perception is central to the research question, self-report measures are a vital and cost-effective method of tapping into an individual's perceptions, beliefs and values. In fact, social research commonly assumes that the self is the best reporter on psychological and behavioural phenomenon (Vazire & Mehl, 2008). Self-report measures are inherently subjective, which has been both a strength and criticism of this assessment method (Kormos & Gifford, 2014). Questionnaires and interviews can unveil an individual's beliefs, yet be vulnerable to deficits in insight, memory and the social desirability bias (Kormos & Gifford, 2014).

Despite the apparent utility of assessing a child's self-reported response to a trauma, most validated measures are relatively new and none are suitable for children under 6 years of age (Balaban, 2006; Pfefferbaum et al., 2016). As young children are still developing their language skills, parents commonly report on behalf of their children. This can be useful as parents can report on what is perhaps inaccessible or unnoticed by the child, and vice versa (Vazire & Mehl, 2008). For example, children and parents reported different coping strategies when interviewed separately (Marsac et al., 2011), and in another study parents provided more information than their children (Hildenbrand et al., 2011). Therefore, the perspectives of both parents and children are important.

Using self-report, consideration of interactive processes between individual family members appears complicated, but possible, as many perspectives are considered at once (Schrodt, 2015). For example, interviewing family members individually can provide a broad range of perspectives, and provide useful clinical information in what is shared and not shared (Manning & Kunkel, 2015). However, it is difficult for individuals to report on some aspects of interactions, such as accurate measurement of time spent together (Schrodt, Soliz, & Braithwaite, 2008). Furthermore, there are many interesting phenomena within psychological research that cannot be studied using self-report alone.

4.3.2. Observation. The family environment provides an opportunity to observe relationships and interactions rather than focusing solely on individuals' perspectives or intentions (Kerig, 2001). We know something of parents' intentional ways of helping children following trauma (Alisic et al., 2012; Hildenbrand et al., 2011), but observation can demonstrate the type of support that occurs in an unnoticed and unremarkable fashion (Coyne & Bolger, 1990). Some aspects of coping may be unintentional or taken for granted and therefore more easily detected by an observer who can compare families (Hildenbrand et al., 2011). Observational methods are not necessarily more impartial, accurate or less subjective than self-report measures, but rather provide information from the perspective of the observer (Mehl & Pennebaker, 2003b).

Self-report measures can correlate well with observational methods, but with much variance (Kormos & Gifford, 2014). Differences between reported and observed phenomenon have also been found, such as a relationship between PTSS and avoidant coping coaching when reported, but not when observed (Kichline, Kassam-Adams, Weiss, Herbers, & Marsac, 2017). Self-reported emotions and observed emotions can differ (Martin, Clements, & Crnic, 2002), indicating that these methods may be suited to identifying different aspects of emotion, for example, felt versus expressed emotion. The observer's perspective can therefore provide useful collateral information.

Structured and semi-structured observational studies (e.g. where a family is asked to talk about a particular topic amongst themselves) have allowed consideration and comparison of affect (Lord, Rumburg, & Jaser, 2015), language use (Bauer et al., 2005), and conflict (Lennon, Murray, Bechtel, & Holmbeck, 2015), to name a few. However, these structured observational studies may not take into account a shift in modern family life, where there is less structured conversation (e.g. at mealtimes) and a greater proportion of informal conversations in daily life (Poveda, Jociles, & Rivas, 2014). In addition, it is difficult to account for how families may change their behaviour outside the home environment.

Some home-based studies have employed video or audio recordings with researchers present (Bai et al., 2016; Janicke, Mitchell, & Stark, 2005; Lord et al., 2015; Sales et al., 2003). Having researchers in the home environment may be argued to improve ecological validity, however these studies are also subject to potential observer effects and often a burden for researchers in viewing and coding observed interactions in a systematic way (Dunn et al., 2011).

4.3.2.1. The Electronically Activated Recorder. This thesis considers a naturalistic observational tool, the Electronically Activated Recorder (EAR; Mehl, 2017). This smart phone app facilitates audio recording of families over an extended time period without placing excessive administrative and analytic strain on researchers and participants (Mehl, Robbins, & Deters, 2012). The EAR can record short audio "snippets" at regular intervals (e.g. 30 seconds every 5 minutes, with a blackout period at night) to capture the audio environment around an individual, while minimising intrusiveness. A two day sampling period is optimal for balancing data collection with the demands of data analysis and participant compliance. Heightened awareness of being recorded can lead participants to monitor and modify their behaviour, or to take off the device. However, previous studies suggest participants habituate to the device in around two hours and it is otherwise minimally intrusive (Manson & Robbins, 2017; Mehl & Holleran, 2007).

The EAR can offer information on both the quantity and quality of interactions in a naturalistic setting. For example, in a recent study on couples' conversations about cancer (Robbins, López, Weihs, & Mehl, 2014), the study revealed that around 5% of daily interactions were about cancer, and coders rated whether these conversations were emotional or informational. The EAR overcomes biases in reporting "how much" talk occurs. Instead, the EAR quantifies these conversations reliably and can provide information on word use when used in conjunction with the *Linguistic Inquiry and Word Count* software (Pennebaker, Booth, Boyd, & Francis, 2015). An overview of the use of the EAR in this thesis can be found in Chapter 5.

When audio files are coded by research assistants, judgements are made on the basis of small amounts of information. Yet, contrary to most first impressions, in one study, assistants had access to around an hour and a half of data, providing a representation of the person void of physical characteristics that could cloud judgements (Holleran, Mehl, & Levitt, 2009). Judges rating participants from 2.5 minutes of data were able to make judgements as accurate as the participants themselves or those that know them intimately (Holleran et al., 2009). Having multiple coders increases reliability and provides greater accuracy in assessing acoustic data for activity and transcript judgements (Holleran et al., 2009). Therefore, the EAR may be a useful tool to explore naturalistic parent-child interactions post-trauma.

4.4. Conclusion

As Scheeringa and Zeanah (2001) suggested, when a variety of methods converge on a single point, we are closer to the truth. Therefore, it is important to use self-report and observational methods in conjunction, carefully and appropriately, to further elucidate how parents and children convey support, coping strategies and cognitive appraisals following medical trauma.

CHAPTER 5: METHODOLOGY OF THE EAR FOR RECOVERY STUDY

This chapter presents the methodology for the Ear for Recovery study (Alisic et al., 2015), which was conducted through the Trauma Recovery Laboratory at the Monash University Accident Research Centre from 2013 to 2014. The study was approved by the Human Research Ethics Committee of the Royal Children's Hospital Melbourne (study number 33103; see Appendices A and B) and the Monash University Human Research Ethics Committee (file number CF13/2515-2013001322; see Appendix C). While recruitment and data collection did not take place during the period of candidature, this chapter provides background to the questionnaire scoring (see Sections 5.3.5 - 5.3.13) and EAR data preparation and analyses conducted for this thesis (see Section 5.4.2).

5.1. Participants

The Ear for Recovery study (Alisic et al., 2015) included children aged 3 to 16 years who had sustained a serious, unintentional injury, as well as their primary caregivers (henceforth referred to as "parents"). Children were included in the study if they were hospitalised for at least 24-hours (but no more than 4 weeks) at the Royal Children's Hospital (RCH), Melbourne, Australia. Families were not approached for the study or were excluded if the injury was sustained via intentional means (i.e. self-harm or abuse) or if the family had a history of social issues (i.e. family violence). In addition, participants were not approached or were excluded if they did not mainly speak English at home, if the child scored below 9 on the *Glasgow Coma Scale* (Teasdale, & Jennett, 1974) upon arrival, indicating severe brain injury, or if the child's injury was secondary to another medical condition. The recruitment and demographic information for the sample are found in Chapter 6.

5.2. Procedure

The child's age, injury type and severity was obtained using the trauma registry at the RCH. Families who met the inclusion criteria were approached with basic information on the study. Once a family expressed interest in participation, they were provided with further information and both parents were invited to provide informed consent (see Appendix D), as well as the child, if able (see Appendix E). Consent was obtained either in hospital or at the family's home as close to the weekend following discharge as possible.

Following consent, parents and children over 8 years of age completed a battery of questionnaires (see Appendices F, G). Families were lent an iPod Touch with the iEAR app (henceforth referred to as "the EAR", see section 5.3.3). The child was asked to wear the EAR enclosed within a belt for two days, usually a weekend, between the hours of 7:00am and 10:00pm. Families were instructed to charge the iPod overnight and complete an activity diary throughout the two-day period (see Appendix H). Families were encouraged to mention the EAR in their conversations with non-family members, indicating that their conversations may be recorded. They were also told that the EAR would record imperceptibly, and thus they would not know when they were and were not being recorded across the recording period. Following the two-day period, families returned the equipment (iPod and belt) via post. Families were then contacted six weeks and three months after the injury to complete further outcome measures. Upon completion of the study, participants were provided with a \$50 gift card.

5.3. Measures

5.3.1. Demographics questionnaire. Parents completed a demographic questionnaire, recording the child's age, gender, and date and country of birth (see Appendix I). Parents also provided information regarding family composition (e.g. "living with mother and stepfather") and the child's number of siblings.

5.3.2. *Injury Severity Scale* (**ISS**). The ISS (Gennarelli & Wodzin, 2006; NSW Institute of Trauma and Injury Management, 2017) is a widely used measure of physical injury severity, based on the Abbreviated Injury Scale (AIS). While the AIS provides an injury severity score for each body region, the ISS is the sum of squares of each AIS score, ranging from 1 to 75. Bolorunduro et al. (2011) categorised ISS scores as mild (1-8), moderate (9-15), severe (16-24) and profound (>25).

5.3.3. The *Electronically Activated Recorder* (EAR). The EAR is a smart phone app that can record ambient audio information at designated intervals (Mehl, Pennebaker, Crow, Dabbs, & Price, 2001; Mehl, Robbins & Deters, 2012; Mehl, 2017). In its most recent permutation, the EAR is an app for Android devices (Mehl, 2017). However, at the time of the Ear for Recovery study, the app was only available on Apple devices, thus for this study the "iEar" app was loaded onto an Apple iPod Touch for each family. The EAR was programmed to record 30-second audio "snippets" every five minutes over a two-day period, only between the hours of 7:00am and 10:00pm, recording approximately 10% of a participant's day.

The EAR can record a wide range of audible behaviours, for example singing, sighing, and arguing (Mehl, 2007). The EAR has enabled naturalistic observation of interactions for individuals, couples and families, capturing aspects of daily life from an observer's perspective (Mehl & Pennebaker, 2003b; Mehl, et al., 2012). Participants generally rate the EAR as unobtrusive and habituate to its presence in around two hours (Manson & Robbins, 2017; Mehl & Holleran, 2007). Adequate participant compliance has been obtained when using the EAR with university students (Mehl & Pennebaker, 2003b; Mehl & Holleran, 2007), older adults (Mehl et al., 2012) and couples with serious medical conditions (Robbins, Lopez, Weihs & Mehl, 2014). Similarly, in the present study, obtrusiveness was low and compliance was good (see Chapter 6 for further details).

Speech recorded using the EAR can be coded according to tone of voice, topic of conversation and word use itself (Mehl & Pennebaker, 2003b). Behavioural coding of EAR data has demonstrated good reliability, with Cronbach's alpha values of .70 or greater (Mehl & Pennebaker, 2003b; Holleran, Mehl, & Levitt, 2009). In addition, the EAR has shown high criterion validity, high test-rest reliability and parallel-test reliability based on test halves (Mehl & Pennebaker, 2003b; Mehl et al., 2012). See Section 5.4.1 for the coding method in this study.

5.3.4. EAR diary. In addition to the auditory information provided by the EAR, a diary (see Appendix H) was required from each family to aid the accuracy of transcribing and coding of

recordings. Participants were asked to record the activities in the child's day, as well as the people the child was with and any points at which the EAR was not worn.

5.3.5. *Acute Stress Disorder Scale* (ASDS). The ASDS was included as part of the parent questionnaire (Bryant, Moulds & Guthrie, 2000; Appendix F). The ASDS is a 19-item self-report measure of DSM-IV Acute Stress Disorder (ASD) symptoms, with four subscales — "Dissociation", "Reexperiencing", "Avoidance", and "Arousal". Parents rated items on a five-point Likert scale ("1 = not at all", "5 = very much"), with higher scores indicating more impairment. Combined cut-off scores of \geq 9 on the Dissociation subscale and \geq 28 on the sum of the other subscales have shown good sensitivity and specificity for ASD diagnosis compared to diagnostic interview. The ASDS has also demonstrated excellent internal consistency (α = .96) and validity.

5.3.6. *The Child PTSD Symptom Scale* (CPSS). The CPSS (Foa, Johnson, Feeny & Treadwell, 2001; Appendix G) was adapted for this study as a 28-item child-completed measure of DSM-IV traumatic stress symptoms, valid for children aged 8 to 18 years. The scale was completed by children over 8 years at baseline, as well as 6-week and 3-month follow up points. The first 21 items were rated on a four-point scale (0 = "not at all", 3 = "almost always"). The item "feeling very scared, angry, guilty or ashamed" was repeated, however this item was not counted twice when scoring. The total score (range = 0 - 51) is the sum of the first 17 items relating to re-experiencing, avoidance and arousal symptoms, with higher scores indicating higher frequency and incidence of symptoms and a cut-off score of ≥ 11 for probable PTSD. The final seven items required a dichotomous (yes/no) indication of whether the symptoms led to functional impairment (e.g. "gotten in the way with schoolwork"). The CPSS has demonstrated high internal consistency reliability ($\alpha = .89$).

5.3.7. The *Children's Revised Impact of Events Scale* (CRIES-13). The CRIES-13 (Children and War Foundation, 2005; Appendix G) is a 13-item self-report measure of DSM-IV traumatic stress valid for children aged 8 and over. Items were rated on a four-point scale ("not at all'' = 0, "rarely" = 1, "sometimes" = 3, "often" = 5), yielding three subscale scores for intrusion,

avoidance and arousal symptoms. Total scores range from 0 to 65 and a cut-off score of 30 has shown adequate sensitivity and specificity for classifying injured children with probable PTSD (Perrin, Meiser-Stedman & Smith, 2005). The CRIES-13 has also demonstrated high internal consistency reliability ($\alpha = .80$) for children over 8 years.

5.3.8. *Family Adaptability and Cohesion Evaluation Scale IV* (FACES-IV). The FACES-IV (Olson, Gorall, & Tiesel, 2006) is an individual self-report measure of family flexibility, cohesion and satisfaction, completed by parents and children over 12. Responses were rated on a five-point scale from "1 = does not describe our family at all" to "5 = describes our family very well" and the scale was completed independently by family members. The scale is based on the Circumplex model of marital and family systems (see Olson, Sprenkle & Russell, 1979) whereby families operate optimally when both flexibility (e.g. "Our family is highly organized", Olson et al., 2006, p.6) and cohesion (e.g. "We spend too much time together", Olson et al., 2006, p.6) are "balanced" and moderate, rather than extremely high or low. The FACES-IV yields six subscales ("Balanced Cohesion", "Balanced Flexibility", "Disengaged", "Enmeshed", "Rigid", "Chaotic") and four dimension scores ("Communication", "Satisfaction", "Cohesion", "Flexibility"). The FACES-IV has demonstrated good construct and concurrent validity, as well as good internal consistency reliability (*α* ranged from .77 to .89; Olson, 2011).

5.3.9. *Life Orientation Test- Revised* (LOT-R). The LOT-R (Glaesmer et al., 2012; Scheier, Carver & Bridges, 1994; Appendix F) is a reliable and valid 10-item measure of dispositional optimism, which was included in the parent questionnaire. Items were rated on a five-point scale — in this study, "1 = disagree a lot", "5 = agree a lot" to stay consistent with the administration of the ASDS, however responses were transformed to a 0 - 4 scale, as in the original scale prior to scoring. Items 3, 7, and 9 were reverse scored so that higher total scores reflected greater optimism. The total score was the sum of items (and reverse items) 1, 3, 4, 7, 9 and 10, with total scores ranging from 0 to 24. The other items were fillers only. Ranges exist for low (0-13), moderate (14-18) and high (19-24) optimism (After Deployment, 2017).

5.3.10. *Multidimensional Scale of Perceived Social Support* (MSPSS). The MSPSS (Zimet, Dahlem, Zimet & Farley, 1988; Appendix G) is a 12-item questionnaire assessing the child's perceived social support by friends (items 6, 7, 9, 12), family (items 3, 4, 8, 11) and a significant other or "special person" (items 1, 2, 5, 10). Responses were rated on a seven-point scale from "very strongly disagree" (1) to "very strongly agree" (7). Total scores thus ranged from 12 to 84, with ranges for low acuity (12 – 48), moderate acuity (49 - 68), and high acuity (69 – 84; Okonkwo, Larkan & Galligan, 2016). The scale is valid, and has shown good internal consistency reliability (α = .84; Zimet, Powell, Farley, Werkman & Berkoff, 1990).

5.3.11. Screener for the Development of a Response Post-trauma (SDRP). The SDRP

(Cirilli, 2012; Appendix F) is a 54-item self-report measure for parents of hospitalised children. However, only the 15-item "Coping self-efficacy" subscale was included in the parent questionnaire and adapted for the study (i.e. items that referred to "sick/injured child" were revised to "injured child"). While the original questionnaire rated items on a four-point scale, the present study requested participants to rate items on a seven-point scale from "1 = not at all confident" to "7 = totally confident" to allow for more nuanced responses. Items were summed to yield a continuous total score, ranging from 15 to 105. Higher scores indicated greater confidence in their ability to cope practically and emotionally with their child's injury. The average response for each participant was also calculated as a score out of 7.

5.3.12. *Short-Form Health Survey* (SF-36). The SF-36 (Ware & Sherbourne, 1992; Appendix F) is a 36-item multiple choice scale, included in the 6-week and 3-month follow up parent questionnaires. The scale covers 8 domains of physical, emotional, social and general health. Scores were transformed so that higher scores indicated greater wellbeing (Research and Development, 2017).

5.3.13. *Strengths and Difficulties Questionnaire* (**SDQ**). The SDQ (Goodman & Goodman, 2009; SDQ Info, 2016) is a widely used, parent-completed questionnaire of child behaviour, with Australian age-adapted versions for 3 year olds, 4-10 year old and 11-17 year olds. The

questionnaire was completed by parents at 6-week and 3-month follow-up points. The questionnaire yields five subscales ("Emotional problems", "Conduct problems", "Hyperactivity", "Peer problems" and "Prosocial"), with a total score consisting of the sum of all subscales except the "Prosocial" subscale. The measure can also be used to derive externalising ("Conduct problems" + "Hyperactivity") and internalising ("Emotional problems" + "Peer problems") behaviour scores. Norms exist for each subscale and reliability and validity are adequate (Becker, Woerner, Hasselhorn, Banaschewski, & Rothenberger, 2004; Goodman & Goodman, 2009).

5.4. Data analysis

5.4.1. Transcribing and Coding. Audio files were downloaded from the iPod Touch devices and the devices were cleared of all data. Trained students and research assistants were assigned either a coding or transcribing role for the audio data. First, transcriber one (T1) transcribed all speech verbatim, denoting the likely role of each speaker for each 30-second snippet, i.e. child, father, friend, and writing "xxx" if they could not distinguish the words. Next, a second person, coder one (C1), checked the accuracy of the transcript and speaker labels, deleted any personally identifiable data in the transcript and replaced these with functional codes, e.g. [f4ther], [n4me]. C1 was also responsible for coding each snippet according to the Social Environment Coding of Sound Inventory (Mehl & Pennebaker, 2003b; see Figure 5.1, Appendix J). Coder two (C2) then coded the audio data using C1's transcript, without seeing C1's coding.

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Note: ⁷Mutually exclusive; ⁷⁷ Independent.

Figure 5.1. Schematic of the adapted Social Environment Coding of Sound Inventory. *Note.* The above figure was reproduced with permission from "Injury talk: Case examples of families' interactions after a paediatric injury," by P. Bowles, C. Arthur, S. Bressan, H. Jowett, A. Barrett & E. Alisic, 2014, *Poster for the 2014 conference of the Australasian Society for Traumatic Stress Studies (ASTSS).* As seen in Figure 5.1, each snippet was coded according to the perceived speech, activity, mood, topic, and emotional tone in the snippet. Preference was given to interactions with the child, but all verbal data was transcribed and coded according to criteria (Appendix K). "Passive" interactions (7%) included those where the child was coded as part of the interaction (as preceding snippets and the content of transcripts indicated that the child was involved in the interaction) but did not speak during the snippet. On the other hand, "active" interactions (93%) included those where the child was coded as part of the speak during the snippet. On the interaction and they also spoke. Both types of interactions were included in description and analyses.

"Direct" injury talk was coded when interactions included references to the circumstances surrounding the injury, the injury itself or any procedures associated with it. For example, an 8 year old girl explains her injury in the snippet below.

ADULT MALE: Oh [*Child's name*]'s all grown up. Oh my goodness oh what have you done? CHILD: Had to go to hospital... because I fell over the top of my horse's head while he was going over a jump.

ADULT MALE: Ah.

FATHER: Face planted jumping at the pony club.

ADULT MALE: Goodness me.

FATHER: Ended up a couple of days at the Children's. About a week off school -

CHILD: Two nights, three days.

FATHER: - and another half day next week. Maybe another four weeks.

ADULT MALE: Oh my goodness.

By contrast, "indirect" injury conversations included those that may not have happened if not for the injury, for example, a mother requesting to wash their 15 year old son's hair. MOTHER: You alright?

CHILD: [*xxx*]

MOTHER: No, want me [to put] this under it? Is that too heavy?

CHILD: No that's good. Alright, thankyou Mum.

MOTHER: Well I am going to wash your hair.

CHILD: Not now, just give me a minute.

MOTHER: Well.

CHILD: It can wait.

MOTHER: Alright.

CHILD: But thankyou.

A conversation was considered "about emotion" when the speaker noted their likes or dislikes, hopes, considered substantive topics like their parent's divorce, or simply used an emotion word. Therefore, this was a broad category, and one example is included below:

CHILD: What are you doing?
MOTHER: It's really annoying, this, isn't it? It doesn't seem to have any.
CHILD: No it just does it, like, by number.
MOTHER: [*TV show*] is good.
CHILD: Oh, just get rid of it then.
MOTHER: Stop yelling at me.

CHILD: Oh, then stop just, doing nothing. Just choose something and watch it.

Once the EAR data for all 71 participants were transcribed and double-coded, data were cleaned by research assistants. More specifically, transcripts were checked for spelling errors and typos, with extra spaces inserted after punctuation to ensure separation of speaker labels from

utterances. Each snippet occupied one row of an Excel spreadsheet, with individual speakers on separate lines within a cell. Coding was checked to ensure all values were within the appropriate range. Transcripts were again checked for identifiable information like names and places, blanked out in audio files and replaced with functional codes within transcripts, for example, "[s1ster]" if the sister's name was used in a transcript.

5.4.2. Data preparation. Transcripts and coding for all participants were pasted into one master spreadsheet which was then converted to a Statistical Package for the Social Sciences (SPSS) file including coding only (as transcripts contained many lines that complicated the SPSS file). Coding categories were converted to dichotomous variables only to facilitate meaningful aggregation. "Problem" snippets included those where there was evidence from audio data or the diary that the participant was not wearing the device or there were significant recording issues. These "problem" snippets were removed from further analyses, as well as those when the child was asleep during the recording hours (apart from evaluation of interrater reliability for "problem" and "sleep" variables).

5.4.2.1. Evaluating interrater reliability (IRR). The master SPSS file was restructured and aggregated by Participant ID and Coder ID to evaluate IRR. In line with past EAR studies, one-way random intraclass correlations (ICCs) were calculated (Mehl et al., 2012). Only variables with values over 0.7 were included in further analyses (see Table 5.1). The "about emotions" variable initially had an unacceptable ICC. It is likely that initial training on coding this variable did not sufficiently clarify the boundaries of this variable. Therefore, this variable was recoded by the author and another trained coder, which improved reliability. For the re-coding, the coders read transcripts of all snippets and assessed their relevance to emotion, then IRR analyses were re-run.

Table 5.1

Intra-Class Correlations for EAR Variables

Variable	ICC
Anyone talks about EAR study/iPod	0.86
Child alone	0.87
Dyadic interaction	0.86
Group interaction	0.91
Child nearby others not interacting	0.48
Male interaction partners only	0.95
Female interaction partners only	0.97
Both male and female interaction partners	0.86
Child talks	0.95
Child on phone	0.93
Child self-talk	0.84
Mother talks	0.90
Father talks	0.96
Sibling talks	0.97
Friend talks	0.94
Other adult talks	0.92
Other youth talks	0.83
Talks to pet	0.84
Radio/music on	0.94
Television on	0.95
Child gaming	0.87
Child playing	0.90
Child socializing (only)	0.75
Child in a shop	0.93
Child travelling (e.g. in a car)	0.96
Laughter	0.82
Singing	0.92
Crying	0.89
About emotions (original)	-0.02
About emotions (recoded)	0.89
Direct injury talk	0.74
Indirect injury talk	0.84
Overall tone of snippet	0.87
Child tone	0.95
Mother tone	0.94
Father tone	0.96
Other (e.g. sibling/adult/youth) tone	0.90

Note. N = 71.
5.4.2.2. Variable preparation. Using the original master SPSS file, several new variables were created. An "interaction" variable was created, which included both dyadic and group interaction snippets. Similarly, an "injury total" variable was created to include both direct and indirect injury talk. The "friend" and "other youth" variables were combined into one "other young person" variable. Lastly, a series of injury-related variables were created indicating injury talk that occurred with each conversation partner. For example, "direct injury talk with mother" included snippets where "direct injury talk" and "mother" were both selected.

Finally, the original master SPSS file was aggregated by Participant ID to obtain one average value per participant for each coding category. However, in order to evaluate tone, snippets where the corresponding conversation partner (e.g. the mother) were selected, then tone was aggregated for each participant including these snippets only so that tone was meaningfully averaged across the relevant snippets only (i.e. mother tone was evaluated only for snippets that included the mother). Tone was converted from a seven-point scale to a percentage of the maximum possible (POMP) score to aid interpretation (i.e. range = 0% - 100%; Cohen, Cohen, Aiken & West, 1999), with higher scores indicating more positive tone. Similarly, where analyses required consideration of dyadic interactions only, only dyadic snippets were selected and aggregated by Participant ID.

In the aggregated file, variables were converted to a proportion of interactions by dividing the value for each participant by their own "interaction" value. For example, a child may have spoken with their mother for 20% of the day, and if overall they interacted with any conversation partner for 40% of their day, then 50% of interactions included the mother. The "interaction" label was chosen instead of "child talks" in order to include "passive" interactions that are more typical of children than adults. For some analyses, family composition was taken into account from demographics questionnaires and the EAR diary.

5.4.2.3. *Assumption testing.* Despite severe positive skew in most EAR variables, data were not transformed to aid interpretation and stay close to the naturalistic nature of the data. Due to

linearity and normality violations, non-parametric tests like Spearman's correlations were used where possible. As sample sizes greater than 30 are robust to normality violations (Hills, 2011, p.64), paired samples *t*-tests were also run. See Chapters 6 to 8 for further details of the final analyses.

CHAPTER 6: PAPER 2: INJURY TALK: SPONTANEOUS PARENT-CHILD CONVERSATIONS IN THE AFTERMATH OF A POTENTIALLY TRAUMATIC EVENT

Following on from the data collection and analysis methods outlined in Chapter 5, this chapter includes the first data paper for the Ear for Recovery study (Alisic, Gunaratnam et al., 2017). The purpose of this paper was to describe the proportions of naturalistic family injury talk within a two-day period post-discharge. This paper further outlines the rationale and methods for the Ear for Recovery study, as well as key findings about the conversation partners, amount, and tone of injury-related conversations in daily life post-discharge.

6.1. Abstract

Background: While talking about traumatic experiences is considered central to psychological recovery, little is known about how these conversations occur in daily life.

Objective. We investigated spontaneous injury talk among parents and children in the aftermath of a child's hospitalization due to physical trauma, and its relationship with children's socio-emotional functioning.

Methods: In a prospective naturalistic observation study, we audio-sampled the daily life of 71 families with the Electronically Activated Recorder after their child (3-16 years old) was discharged from hospital. We collected close to 20,000 snippets of audio-information, which were double-coded for conversation characteristics, and measured children's socio-emotional functioning with the *Strengths and Difficulties Questionnaire* at 6 weeks and 3 months post-injury.

Findings: The children were involved in injury talk for 46 minutes per day, 9 minutes of which referred to emotions. Children had significantly more injury conversations with their mothers than with their fathers. The tone of injury conversations was significantly more positive than that of non-injury conversations. More direct injury talk was associated with fewer problems on the emotion subscale of the SDQ at 3 months. Other associations between aspects of injury talk and children's socio-emotional functioning were mostly non-significant, although they appeared to be stronger at 3 months than at 6 weeks.

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Conclusions: Families spontaneously talked about the injury and associated issues for about the same amount of time per day as a therapist might within a session (a 'therapy hour'). Clinical Implications: Making full use of naturally occurring injury talk may be a valuable direction for parent- and family-focused post-injury interventions. However, the study design prevents causal inference, and further exploration is warranted.

INJURY TALK: SPONTANEOUS PARENT-CHILD CONVERSATIONS IN THE AFTERMATH OF A POTENTIALLY TRAUMATIC EVENT

6.2. Background

The consequences of injuries in childhood can go beyond physical health. While most children recover well, a minority experience long-term distress, impairing functioning and development (Carrion, Weems, Ray & Reiss, 2002). In particular, children admitted to hospital after injury are at risk of mental health problems (e.g., posttraumatic stress or depressive symptoms), academic underperformance, and social difficulties (see e.g. Price, Kassam-Adams, Alderfer, Christofferson, & Kazak, 2016).

Parents are central support figures after a child's injury and key conversation partners when children process their experiences. Parents can help children to express, clarify and accept experiences, and correct misinformation (Marsac, Donlon, Winston, & Kassam-Adams, 2013; Marsac, Mirman, Kohser, & Kassam-Adams, 2011; Salmon & Bryant, 2002). An emerging body of experimental research suggests that children benefit from adults' capacity to model appraisals and meaning-making, and to develop a shared narrative (Ackil, Van Abbema & Bauer, 2003; Fivush, Sales & Bohanek, 2008; Marsac & Kassam-Adams, 2016). Parents' specific approach to these conversations might also make a difference, for example the degree to which they elaborate or talk about emotions (Laible, 2004b; Sales & Fivush, 2005).

While family research often makes use of elicited narratives (Bauer et al., 2005; Peterson & Biggs, 1998; Sales, Fivush & Peterson, 2003), we are unaware of any studies of spontaneous conversations in the home after a potentially traumatic event, without researchers present. Therefore, this is the focus of our research. A better understanding of natural injury talk – when, how, and with whom it occurs – and its relationship with children's mental health and wellbeing outcomes may identify important opportunities to optimize children's recovery.

Capturing daily life in a reliable and non-intrusive way is difficult. The Electronically Activated Recorder (EAR) (Alisic et al., 2015; Mehl, 2017; Mehl, Pennebaker, Crow, Dabbs &

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Price, 2001; Mehl, Robbins & Deters, 2012) offers a promising method, capturing behaviour in real time via audio recording. It functions on a small mobile device, such as an iPod, and intermittently samples snippets of ambient sounds. Participants find the EAR unobtrusive, while data collected over a short amount of time provide reliable estimates of usual social behaviour (Mehl et al., 2012). One of the important advantages of the method is that it does not listen in on full conversations, but, in sampling short sound bites, acquires just enough information to assess the nature of the interactions. The EAR has been used successfully to study sensitive topics with adults, such as daily life in the context of coping with cancer (Robbins, López, Weihs, & Mehl, 2014) and in the acute aftermath of September 11, 2001 (Mehl & Pennebaker, 2003a). A few studies have used the EAR with children, including in the context of health research (Imami et al., 2014; Slatcher & Robles, 2012; Slatcher & Trentacosta, 2011; Slatcher & Trentacosta, 2012; Tobin et al., 2014). The EAR has specific advantages for child research: it does not require the capacity to read or understand questions posed in questionnaires or to maintain attention during interviews (Alisic, Barrett, Bowles, Conroy, & Mehl, 2016). Likewise, it does not rely on retrospective accounts of behaviour.

6.2.1. Objective

We aimed to investigate the nature of injury talk in the aftermath of a child's hospitalization due to physical trauma, by means of an EAR study in 3- to 16-year-old children and their families. In this article, we focus on two questions:

1) What are the characteristics of injury talk in children's daily life?

2) How do injury talk characteristics relate to children's subsequent well-being?

For the first question, we focus on the frequency of injury talk in daily life, children's conversation partners, and the emotional tone of the injury conversations. For the second question, we explore relationships between these injury talk characteristics and children's subsequent socioemotional functioning. Given the novelty of our method, no a priori hypotheses were made.

6.3. Methods

This study is part of the Ear for Recovery project, a prospective observational study among injured children aged 3-16 years and their families. The full study protocol is provided in Alisic et al. (2015). It has been approved by the Human Research Ethics Committee of the Royal Children's Hospital Melbourne (study number 33103) and the Monash University Human Research Ethics Committee (file number CF13/2515-2013001322).

6.3.1 Participants.

6.3.1.1. Eligibility and recruitment. Participants were children who had sustained an injury that resulted in a stay of at least 24 hours at the Royal Children's Hospital (RCH), Melbourne, Australia, and their families. Children were ineligible if the injury was thought to be intentional, if they arrived at the hospital with a Glasgow Coma Scale (Teasdale & Jennett, 1974) score below 9 (i.e., indicating severe acquired brain injury), if their hospital stay exceeded four weeks, or if the injury was secondary to another medical disorder, since these might not represent typical post-injury interactions after discharge.

Families were approached during their child's hospital admission based on information obtained from the hospital trauma registry in consultation with hospital staff. As depicted in Figure 6.1 below, 339 families were approached for participation, of which 99 (29%) consented. Fourteen families did not participate after consenting; they reported feeling too stressed at the time of the planned data collection, could not be contacted after discharge, or experienced an additional traumatic event. Due to equipment malfunction in the initial phase of the project and a few families eventually opting for questionnaire participation only, we retained 71 families (21% of the approached families) with usable EAR data. This is in line with recruitment rates of previous paediatric traumatic stress studies focused on family functioning (Coakley et al., 2010; Marsac & Kassam-Adams, 2016). Following baseline assessment, 60 families (84.5% of the sample) proceeded to follow up at 6 weeks. Initially, this was the end of our data collection; we later included a 3-month follow-up in the protocol. Of the 35 families invited for follow up at 3 months



Figure 6.1. Recruitment flowchart.

6.3.1.2. *Demographic information.* On average, the 71 child participants (59.2% male) were 10.4 years old (SD = 3.6 years, range 3-16 years) at the time of their injury. All children

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except two were born in Australia. The majority of children (n = 59, 83.1%) lived in two-parent families, three of which with one step-parent. Eleven lived in single-parent households (15.5%), and one had another living arrangement. Overall, 69 female and 63 male caregivers were involved, whom we refer to as mothers and fathers for ease of reading. On average, the families lived 85.4km from the hospital (SD = 101.2 km, range = 3 km - 552 km). In terms of socioeconomic status (SES), our sample had a mean Index of Relative Socioeconomic Disadvantage of 1017.6 (SD = 54.6, range = 880.5-1117.4, based on participants' postcodes), not significantly different from the Australian population mean (M=1000, SD = 100) (Australian Bureau of Statistics, 2013).

Most children had sustained fractures or orthopaedic injuries (see Table 6.1), due to sports incidents, falls, or traffic crashes. The majority spent between one and three days in hospital (n = 53, 74.6%), while 17 children (24.0%) were hospitalized for 4 to 10 days, and one child for 17 days. *Injury Severity Scores* (ISS) (Bolorunduro et al., 2011; Gennarelli & Wodzin, 2005) ranged from mild to profound, with most in the mild and moderate categories (M = 7.1, SD = 6.2).

There were no significant differences in age, sex, SES or injury severity between the children who continued to 6-week follow-up and those who did not, or between the children who continued to 3-month follow-up and those who did not. Similarly, there were no significant differences in these variables between those who only participated at 6 weeks and those who participated at 3 months. However, those who continued to any follow-up (at 6 weeks, 3 months or both) had significantly higher injury severity scores than those who did not (mean difference = 3.07, t(68.94) = 3.70, p < .001), with no other significant differences in age, sex, or SES. Participants with lower scores on the SDQ at 6 weeks were more likely to participate at 3 months (mean difference = 3.68, t(58) = 2.54, p = .014).

Table 6.1

Child Injury Characteristics

	Frequency (%)	
Injury Type*		
Fractures/Orthopaedic	33 (46.5)	
Head Injuries	13 (18.3)	
Soft Tissue Injuries	11 (15.5)	
Multiple Traumas	9 (12.7)	
Other	5 (7.0)	
Context of Injury		
Sports and Recreation	24 (33.8)	
Falls	21 (29.6)	
Motor Vehicle Accidents	20 (28.2)	
Other	6 (8.5)	
Injury Severity Score (ISS)**		
1 – 8 (mild)	48 (67.6)	
9 – 15 (moderate)	18 (25.4)	
16–24 (severe)	2 (2.8)	
25+ (profound)	3 (4.2)	

Note. N = 71. *One child had a skull fracture, which was counted as a head injury. **Scores on the ISS range from 0-75, with severity ratings applied according to Bolorunduro et al. (2011).

6.3.2. Measures.

6.3.2.1. The EAR. The children wore the EAR in a protective elastic belt during two consecutive days in which the child was at home/with the family, such as a weekend, public holiday or school holiday, within a month after the injury. We used the iEAR app (Mehl, 2017) on Apple iPod Touch devices that were loaned to the families. Because we were interested in behaviours that were potentially low-frequency, we recorded a 30-second snippet every 5 minutes. The study yielded a total of 19,407 snippets of 30 seconds (M= 273.3 snippets per family, SD=84.9). The families kept a simple diary to identify the child's activities, who they were with, and any moments that the EAR was not worn by the child. Compliance was good: 90.7% of the snippets were valid,

indicating that the participant wore the device when requested, in line with the compliance rate of a recent study on couples' conversations about cancer (85%; Robbins et al., 2014). On average, 1.0% (SD = 1.1%, range = 0%-5%) of wake time snippets mentioned the EAR or the study, indicating low obtrusiveness.

6.3.2.2. Child socio-emotional functioning. We measured children's socio-emotional functioning via the parent-reported *Strengths and Difficulties Questionnaire* (SDQ; Goodman & Goodman, 2009). The SDQ is a brief behavioural screening questionnaire for 3-17 year olds that is widely used in healthcare settings. It provides scores for emotional problems, conduct problems, hyperactivity, peer problems, and prosocial behaviour (the total score includes the first four of these subscales). The reliability and validity of the SDQ have been shown to be adequate (Becker, Woerner, Hasselhorn, Banaschewski, & Rothenberger, 2004; Goodman & Goodman, 2009). We used the Australian age-adapted versions (for 3-year-olds; 4- to 10-year-olds; and 11- to 17-year-olds). For the other child well-being outcomes described in the study protocol (Alisic et al., 2015; e.g., the child-reported *Children's Revised Impact of Event Scale*, Children & War Foundation, 2005; and the *Child Posttraumatic Stress Scale*, Foa, Johnson, Feeny, & Treadwell, 2001) we had data only for small subsamples of children of 8 years and older. Because the SDQ data were available for all age groups, we used it as our main measure for the current article.

6.3.3. Procedure.

6.3.3.1. EAR transcription and coding. All sound files were transcribed and coded by two independent coders. An overview of the coding is available in the protocol (Alisic et al., 2015) and in the coding manual available via the first authors. We focused on children's interaction partners, injury talk, and tone of the conversations. Regarding *interaction partners*, we coded for each file whether the child was alone or not, and in case of the latter, whether the child was interacting with one or more people, or near to other people but not interacting (e.g., when adults were talking among themselves). When the child was interacting with one or more people, we coded their role (e.g., mother, father, sibling). A snippet was considered '*injury talk*' when it referred to the injury.

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either directly or indirectly. Direct injury talk involved mentions of the injury or the event that caused the injury (e.g. memories of the event, descriptions of the wound, complaining about pain). Indirect injury conversations included those that would not have happened if not for the injury (e.g., discussing reactions at school: "I've got a lot of advantages at school now...well I got away with my homework"). Within injury conversations, a conversation was considered 'emotion talk' when any speaker shared his/her own personal emotions or feelings. Finally, we coded the overall *tone* of a snippet, as well as the tone for each speaker within the snippet, on a rating scale from 'very negative' (1) to 'very positive' (7), with 4 being 'neutral'. Child, mother, and father tone were evaluated only in conversations where they actually spoke.

Once all snippets were transcribed and double-coded in spreadsheet format, 'problem' snippets (i.e. those where there was evidence from audio data or the diary that the participant was not wearing the device or there were significant recording issues), as well as those in which the child was asleep during the recording hours, were removed from further analyses (9.3% of snippets).

6.3.3.2. Statistical analyses. We converted the codes in the master spreadsheet to a Statistical Package for the Social Sciences (SPSS) file, which was restructured and aggregated by participant ID and coder in order to evaluate interrater reliability. In line with past EAR studies, we calculated one-way random intraclass correlations for the average measure (ICC[1,2]; Mehl & Holleran, 2007). The ICCs in the current study all indicated adequate inter-coder agreement (ICC > 0.7, ICC_{range} = 0.75 - 0.96).

The master SPSS file was subsequently aggregated by participant ID to obtain one average value per participant for each coding category across valid snippets. We calculated means, standard deviations and ranges to describe family interactions. Descriptive data were presented as a percentage of children's time awake or of their (injury) interactions, and labelled accordingly. We also translated percentages to the equivalent absolute time in a typical day in which a child is awake for 15 hours (Mehl, Vazire, Ramírez-Esparza, Slatcher, & Pennebaker, 2007). We converted tone

from a seven point scale to the corresponding percent of maximum possible score (POMP) to aid interpretation (range = 0% - 100%, with higher scores indicating a more positive tone; Cohen, Cohen, Aiken & West, 1999). The alpha level was set at .05. We ran paired samples *t*-tests (robust when n > 30; Hills, 2011) to compare mother and father interactions, as well as amount of emotion talk and tone of talk in injury-related versus non-injury-related conversations. We used two-tailed Spearman's correlations to explore associations with child wellbeing (de Winter, Gosling & Potter, 2016), since there was a positive skew in most EAR variables (we opted not to transform the variables, to facilitate interpretation).

6.4. Findings

6.4.1. Characteristics of injury talk in children's everyday life. On average, 46.8% (SD = 18.0%) of children's recorded wake time involved interactions with other people. Of these interaction snippets, 11.0% were injury-related (SD = 13.2%, median = 6.5%, range = 0% to 65.0%). In terms of wake time, injury talk ranged from 0 to 26% of the day (i.e., average 5.0% of wake time recordings). In a 15-hour day this corresponds to an estimated average of 46 minutes of 'injury talk'. Table 6.2 highlights common themes in injury talk, including references to what happened, pain, practical needs, being cautious, and missing out.

About 42.5% of the injury talk was directly referring to the injury or the event that caused it, while 57.5% referred to it indirectly (e.g., a mother made sure her 15-year old son sat comfortably and then suggested washing his hair). Approximately 20.2% of the injury talk referred to emotions, corresponding to an estimated 9 minutes in a typical day. Injury-related conversations were significantly more likely to reference emotion than other conversations (20.2% vs 10.2%; when considering only families that had injury conversations t(67) was 4.36, p < .001).

Children's conversations about the injury involved their mothers (on average 53.8% of injury talk), fathers (24.3% of injury talk), siblings (29.3% of injury talk), and others (youth 18.8%, adults 22.5%; note that these add up to over 100% due to group conversations). In two-parent families (N = 59), mothers talked significantly more about the injury with their children than

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fathers: 6.5% versus 2.8% of interactions (or 2.9% versus 1.2% of wake time), corresponding to 26 minutes vs. 10 minutes in a 15-hour day (t(58) = 62, p = .001). The pattern also occurred in the total sample and in two-parent families in which both parents were present in the home during the recording.

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Table 6.2

Themes in Injury Talk

Theme	Description	Example Verbatim Transcript*
Details of the	A recount / discussion of the	AM: Oh [Child's name]'s all grown up. Oh my goodness oh what have you done?
event	event that caused the injury	C: Had to go to hospital because I fell over the top of my horse's head
		AM: Ah.
		<i>F: Face planted</i>
		AM: Goodness me.
		F: Ended up a couple of days at the Children's. About a week off school.
		C: Two nights, three days.
		F: And another half day next week. Maybe another four weeks.
		AM: Oh my goodness.
Pain	Verbal expressions of pain or	C: I accidentally pulled a bit off and now my hand is stinging a lot. Um it has got two plates it's really
	discomfort	sore.
Practical needs	Interactions surrounding	C: Excuse me mum I know you're doing that but can you get me a glass of water please?
	changing of dressings, requesting	M: Yep.
	food or drink, or the need for a	C: Thank you.
	shower	
Being careful	Some children were warned	C: Hey! Hop on your motorbike! What?
	against future injury	<i>M</i> : You're on your last warning on that bike okay?
		C: Okay.
		<i>M:</i> You understand? Mummy's just really worried that only a week ago You've got to look after
		yourself alright? I know it's just a baby's balance bike but still, you've got to be careful.
Missing out	Some children expressed	C: Do some running and maybe do some jogging you can do all the activities and you can get it wet.
	disappointment at restrictions	<i>Okay? Okay? Let's think that. Especially that I can get it wet. Cause they're going swimming.</i>
	from their injury	M: I know
		C: They're going swimming mum.
		M: I know
		C: That's so not fair. You know I love swimming. Its not fair. How come I have to miss out on all the good stuff?

**Note*. Minor details removed for confidentiality, AM = adult male (not father), C = child, F = father, M = mother

Figure 6.2 shows the average tone in injury-related conversations and other conversations, expressed in percentage of the maximum possible score. Overall tone was rated as more positive in injury conversations compared to non-injury-related conversations (t(67) = 3.23, p = .002, d = 0.39). Mothers' utterances had a more positive tone in injury-conversations compared to non-injury conversations (t(61) = 3.24, p = .002, d = 0.41). Children and fathers did not show this difference. For injury conversations in two-parent families, mothers' tone was significantly more positive than fathers' tone (t(40) = 2.09, p = .043, d = 0.33). For non-injury talk, they did not differ. Further details are available in the supplementary file.



Figure 6.2. Average tone in injury related and other conversations.

Note. POMP = percent of maximum possible score. Tone was only evaluated when conversations with the corresponding conversation partner took place, and three participants had no injury talk, leading to varying N (N range = 42-68). Figures are percentages of maximum scores; error bars are presented. *p < .05. Non-injury related interactions represent 89.0% of all interactions.

The amount of injury talk – overall injury talk, as well as direct and indirect injury talk separately – was not associated with children's age, sex, SES or injury severity. The same was

found for the tone of the conversations; overall tone, mothers' tone, and fathers' tone in injury conversations were not related to the child's age, sex, SES or injury severity (see Table 6.3).

Table 6.3

Spearman's Correlations with Child Demographic Variables

	Age	Sex	ISS	SES
Injury talk	.14	.03	09	.07
Direct injury talk	.10	11	12	01
Indirect injury talk	.09	.08	07	.11
Overall injury talk tone	.02	.00	.08	.08
Mother injury talk tone	18	04	19	.12
Father injury talk tone	21	.01	.28	.24

Note. N ranged from 29 to 71, *p < .05. Sex: male = 0, female = 1. (Direct/Indirect) Injury talk is depicted as a percentage of wake time. ISS = injury severity score, SES = socio-economic status, measured by the Index of Relative Socioeconomic Disadvantage.

6.4.2. Relationships with children's socio-emotional functioning. At 6 weeks after the

injury, on average, parents rated their child's socio-emotional functioning on the SDQ as within the normal range (total score; M = 9.62, SD = 5.84; range 0-25; N = 60; see Table 6.4). For 15 children (25%), however, parents rated their children's behaviour in the borderline or 'abnormal' categories.

Table 6.4

Variable	Time point	Min.	Max.	М	SD
SDQ Emotional	6 weeks	0	Q	2 43	2 34
problems		0)	2.75	2.37
SDQ Conduct	6 weeks	0	8	1 77	1 71
problems		0	0	1.//	1./1
SDQ Hyper-activity	6 weeks	0	10	3.82	2.58
SDQ Peer Problems	6 weeks	0	6	1.60	1.66
SDQ Prosocial	6 weeks	4	10	۹ 07	1.60
Behaviour		4	10	8.07	1.00
SDQ Emotional	3 months	0	6	1 81	2.04
problems		0	0	1.01	2.04
SDQ Conduct	3 months	0	7	1.63	1 72
problems		U	1	1.05	1./2
SDQ Hyper-activity	3 months	0	10	3.38	2.56
SDQ Peer Problems	3 months	0	4	1.06	1.22
SDQ Prosocial	3 months	2	10	Q 10	1 0 /
Behaviour		3	10	8.19	1.84

Average Rated Child Socio-Emotional Functioning at 6 Weeks and 3 Months

Note. Scores are from subscales of the *Strengths and Difficulties Questionnaire* (SDQ). N = 60 at 6 weeks and N = 32 at 3 months.

Children's well-being at 6 weeks post-injury was not associated with the amount of injury talk (either overall, direct, or indirect) or with the tone of the injury conversations (overall or by either parent). Only the amounts of direct injury talk with both mothers and fathers were associated with higher scores on the prosocial behaviour scale (see Table 6.5).

Table 6.5

Variable	SDQ	SDQ	SDQ	SDQ Peer	SDQ	SDQ
	Emotional	Conduct	Hyper-	Problems	Prosocial	Total
	problems	problems	activity		Behaviour	
Injury talk	.12	.07	.02	.08	.22	.07
Direct injury talk	.02	.03	.12	.01	.19	.03
Indirect injury talk	.11	.05	04	.12	.19	.06
Total injury talk w/ mother	.02	09	.07	.01	.24	04
Direct injury talk w/ mother	02	13	.14	02	.26*	05
Indirect injury talk w/ mother	.00	08	.00	.02	.19	06
Total injury talk w/ father	12	15	07	03	.24	16
Direct injury talk w/ father	14	05	.03	11	.27*	14
Indirect injury talk w/ father	14	19	08	02	.13	17
Overall injury talk tone	10	03	12	.11	.20	07
Mother injury talk tone	26	15	12	19	.19	25
Father injury talk tone	31	13	30	17	06	32

Spearman's Correlations with Child Socio-Emotional Functioning at 6 Weeks

Note. N = 60, *p < .05, injury talk presented as percentage of wake time.

For the subset of 32 families that were interviewed by phone at three months post-injury, the children's SDQ total scores were 7.59 (SD = 5.21, N = 27) at 6 weeks and 7.88 (SD = 5.56) at 3 months post-injury respectively, with 6 children (18%) scoring in the borderline or 'abnormal' categories at 3 months.

The associations between injury talk and child socio-emotional functioning at 3 months appeared to be stronger than at 6 weeks, although many were non-significant (note that this was a subsample of N = 32; see Tables 6.4 and 6.6). More total and indirect injury talk with father was associated with lower levels of conduct problems at 3 months, and injury talk had various

associations with lower levels of peer problems and higher levels of prosocial behaviour. Notable is the negative relationship between direct injury talk and emotional problems at three months; a larger amount of direct talk about the injury in the direct aftermath of hospitalization was related to a lower score on emotional problems.

Table 6.6

spearman's Correlations with Child Socio-Emotional Functioning at 5 Month	Sp	pearman's	c Correla	tions with	Child	Socio-	Emotional	Function	ng at	3	Month	S
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Variable	SDQ	SDQ	SDQ	SDQ	SDQ	SDQ
	Emotional	Conduct	Hyper-	Peer	Prosocial	Total
	problems	problems	activity	Problems	Behavio	
					ur	
Injury talk	20	06	20	51*	.06	29
Direct injury talk	36*	.07	26	38*	01	31
Indirect injury talk	15	15	17	55*	.09	29
Total injury talk w/ mother	03	18	29	40*	.23	29
Direct injury talk w/ mother	06	18	30	22	.18	28
Indirect injury talk w/ mother	10	17	23	49*	.27	31
Total injury talk w/ father	18	44*	23	18	.37*	33
Direct injury talk w/ father	26	34	31	14	.31	33
Indirect injury talk w/ father	13	50*	14	19	.32	30
Overall tone	16	.07	19	06	.23	15
Mother tone	.09	16	21	25	.56*	17
Father tone	.05	.24	11	08	08	.00

Note. N = 32, *p < .05, injury talk presented as percentage of wake time.

6.5. Discussion

The current study provided novel insights into naturally occurring injury talk after a child's discharge from the hospital. We made use of daily life observations with the EAR methodology and found that families spontaneously talked about the injury, its causes, or its consequences for an estimated average of 46 minutes per day. This included very "practical" talk as well as recounts of what happened and conversations about emotions associated with the injury. The study showed that conducting EAR research with children in the aftermath of a potentially traumatic experience is feasible: compliance with the study procedures was good, and obtrusiveness appeared to be low, in line with earlier EAR studies in sensitive contexts (Robbins et al., 2014; Tobin et al., 2014). Our study confirms that the EAR methodology works well with child participants within a wide age range, from 3- to 16-year-olds and provides valuable findings regarding real life interactions that cannot be captured by questionnaires, interviews, or laboratory observations.

A key finding of the study is the amount of spontaneous injury talk in children's daily life. Forty-six minutes is similar to what is called a 'therapy hour' for psychotherapists (45 minutes; Sandberg, 2013). While therapy typically takes place once a week, this injury talk at home occurred across multiple days, for most families. Even though spontaneous talk is not the same as systematic, structured therapy, this result reinforces the notion that the family context provides a powerful opportunity to support children in the aftermath of injury, and raises questions about how parents might be engaged more pro-actively in providing this support.

A number of other findings are of note. First, families differed substantially in how much they talked about a child's injury; ranging from 0% to 65% of a child's interactions, and from 0% to 26% of a child's wake time. What brings about this large variation? Intuitively, one might expect children and parents to show different communication styles across ages and situations. However, the amount of injury talk was not related to injury severity nor child demographics. It is likely that such parental tailoring of conversations is reflected in more subtle aspects of the conversation, such as word choice and coherence (Fivush, 2007) rather than the overall amount of injury talk. In the current study we did not explore the reasons for talking or not talking about the injury with the families (Barnes et al., 2000). To address this, an interesting future direction for EAR research might be to provide families with insight in their individual interaction patterns and elicit thoughts about "the how and why" of their conversations.

Second, our findings suggest that there are considerable differences between fathers and mothers in how they support their children post-injury, even when both are at home and – in principle – have the same opportunity to talk about the injury. Mothers spoke more often with their children in general, and about the injury. Furthermore, mothers used a more positive tone when speaking with their children about the injury compared to fathers. Previous reminiscing studies (Adams, Kuebli, Boyle, & Fivush, 1995; Reese & Fivush, 1993) suggest no substantial differences between fathers and mothers but considerable differences in conversations with sons versus daughters, yet our spontaneous injury talk data suggest an opposite pattern: no substantial differences according to the sex of the child, but sizable differences between fathers and mothers. Possibly, mothers start such conversations more often than fathers, or children initiate them more often with their mothers than with their fathers. This would be worthwhile to explore in more depth in future studies.

Regarding the relationships between injury talk characteristics and children's socioemotional functioning at 6-weeks and 3-months, we did not find a consistent set of strong associations indicating an overall pattern. Rather, we found many non-significant correlations, with a few exceptions. One explanation is that there simply is no connection of note, and parent-child conversations are not a major factor in children's psychological recovery. While this is a possibility, we consider it unlikely and certainly too premature a conclusion, considering the strength of the evidence regarding therapeutic interventions involving trauma processing (Foa, Keane, Friedman, & Cohen, 2008), emotion socialization (Fivush et al., 2008), and the effects of parental modelling of avoidance on child anxiety (Dadds, Barrett, Rapee, & Ryan, 1996). Another explanation is that the relationships of importance are more subtle than could be captured by the current protocol, and that certain tendencies may cancel each other out in the correlations that we measured. For example, some children might not benefit from injury talk (e.g., because they do not have substantial stress symptoms in the first place) while others might (e.g. because they are avoiding reminders of what happened, and would benefit from the exposure to narratives about the experience). The "fever model" of disclosure proposes that, much like fever, which indicates both the presence of an illness and an ongoing recovery process, trauma talk can reflect an ongoing, unresolved disturbance and an active restorative process (Stiles, Shuster & Harrigan, 1992). This is also in line with notion of 'efforts after meaning', the occurrence of longer narratives with more cognition and emotion words after stressful events compared to pleasant events (Fivush et al., 2008). We hope that larger, indepth studies will be able to push the boundaries of this knowledge.

Although there was no overwhelmingly clear pattern regarding the associations between injury talk characteristics and child socio-emotional functioning, a few interesting observations can be made. To start with, direct injury talk was related to emotional well-being at 3 months. To the extent that discussions helped children to make meaning of their experiences, process their emotions, and consider coping strategies (Fivush et al., 2008; Salmon & Bryant, 2002), then talking more about what happened may have fostered children's emotional recovery. If this was the case, there might be value in instructing parents about helpful ways to directly talk about the injury and its cause. Of course, cause-effect relationships cannot be concluded due to the non-experimental design. In any case, our findings appear to stand in contrast to the oft-held lay belief that talking about a distressing event may further distress or harm children (Barnes et al., 2000); where correlations were significant, these rather indicated support for the benefits of trauma talk. These and the other significant associations with greater frequency of injury talk, such as lower levels of conduct problems and higher levels of prosocial behaviour, would benefit from replication and more in-depth exploration of the possible mechanisms at play.

Interestingly, the associations between injury talk and child socio-emotional functioning, for example the total score on the SDQ, were stronger for 3-month outcomes than for 6-week

outcomes. This is in line with earlier observations that, in the first few weeks post-traumatic experience, there is little differentiation between those who have transient distress and those who will experience persistent symptoms, which led to the recommendation of 'watchful waiting' before starting interventions (National Institute for Health and Clinical Excellence, 2005). Future studies might benefit from taking a longer timeframe, for example, doing follow-up measures at 6 months, since at that point spontaneous remission of posttraumatic stress seems infrequent (Hiller et al., 2016).

The EAR methodology allowed us to generate and analyse data that are novel for the domain of mental health in general and the emerging field of behavioural psychotraumatology in particular. Due to its sampling approach, the method makes it possible to study nuanced behaviours and conduct fine-grained analyses regarding substantial numbers of participating families. While our study is innovative in assessing subtle behaviour in daily life after trauma, the following limitations should be taken into account. First, the sample size is still modest, precluding us from nuanced analyses and firm conclusions, also with respect to differences between the baseline sample and the follow-up samples. Second, the study is exploratory. We considered it important to show the various significant associations and lack thereof; it is therefore vital to keep in mind that this study was not hypothesis-driven, and no solid conclusions can be drawn from the statistics as yet. In addition, even when there was a temporal lag in measurements (e.g., between the EAR data collection and the 6-weeks measure), the direction of relationships is not clear for various variables. For example, it may be the case that prosocial children talk more about the injury, that injury talk increases prosocial behaviour, or that parents who talk with their children more about the injury also perceive them as more prosocial and less problematic. Again, further research is required to disentangle these possibilities. Apart from obvious limitations regarding causality, it is important to keep in mind that the sample is selective; not only are people cautious regarding participation in a behaviour-assessment project in their own home, we also invited only English-speaking families in

order to make transcription and coding feasible. It would be valuable to include a control group in future research (e.g., children experiencing no or other types of transition in life).

6.6. Clinical Implications

This study reported the first insights from the Ear for Recovery project. The EAR provided a snapshot of daily life after the injury that could not have been otherwise obtained through questionnaires or laboratory observation. Our results offer hints at what may aid psychological recovery in children post-injury, such as direct injury talk, and demonstrated the basic feasibility of using the EAR with families post-trauma. Although our study design prevents conclusions about causal relationships, the EAR offers new opportunities for research data collection regarding mental health, and it may also be further developed as a tool for mental health professionals and families wishing to get a better understanding of daily family interactions.

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CHAPTER 7: PAPER 3: HOW DO MOTHERS AND FATHERS INTERACT WITH THEIR CHILDREN POST-INJURY? EXPLORING THE ROLE OF PARENTAL ACUTE STRESS, OPTIMISM AND SELF-EFFICACY

In Chapter 6, we gained an overview of the injury-related conversations within the Ear for Recovery sample. The paper included in this chapter (Mangelsdorf, Mehl, Qiu & Alisic, 2019) aimed to explore more general relationships between parent-child interaction time and tone and parent factors, including parent acute stress, optimism and self-efficacy. This paper also aimed to determine whether mothers and fathers differed in any of these constructs.

7.1. Abstract

Objective: In the aftermath of a child injury, children and parents can jointly experience acute stress symptoms. Optimism and self-efficacy might buffer against posttraumatic stress disorder. Knowing that children are innately receptive to parent modelling, we were interested in exploring how parent acute stress, optimism and self-efficacy might transpire in parent-child interactions and whether any differences existed between mothers and fathers.

Methods: We recruited 71 families of seriously injured children who were hospitalized for at least 24 hours. Parents completed self-report measures of acute stress, optimism and self-efficacy. Children wore the Electronically Activated Recorder (EAR; Mehl, 2017) for a two-day period post-discharge. The EAR recorded ambient sounds for 30 seconds every 5 minutes. The audio recordings were transcribed and coded. We derived a percentage of time spent with each parent (interaction time), and average ratings of the emotional tone of voice for each speaker.

Results: Overall, parental acute stress and self-efficacy were not associated with interaction time or emotional tone, and parents generally spent less time with older children. Compared to fathers, mothers spent significantly more time with their child, particularly for daughters, but mothers did not differ from fathers in emotional tone, acute stress, optimism or self-efficacy. For mothers, optimism may be associated with greater interaction time and more positive emotional tone. Conclusions: The present study highlighted parent gender differences in time spent with children and enabled the inclusion of more fathers using a naturalistic observational tool.

HOW DO MOTHERS AND FATHERS INTERACT WITH THEIR CHILDREN POST-INJURY? EXPLORING THE ROLE OF PARENTAL ACUTE STRESS, OPTIMISM AND SELF-EFFICACY

7.2. Background

A child's serious injury can precipitate a stressful time for parents as well as children (Muscara et al., 2018). In addition to the physical and practical repercussions, parents may be coping with their own emotional reactions while aiming to support their child (Kassam-Adams, Fleisher, & Winston, 2009). In some cases, symptoms of Acute Stress Disorder may develop, within a month post-trauma (American Psychiatric Association, 2013). Child and parent traumatic stress symptoms tend to covary, and parents' distress following child injury is thought to influence children's psychosocial recovery (Alisic, Jongmans, van Wesel & Kleber, 2011; Morris, Gabert-Quillen, & Delahanty, 2012; Wise & Delahanty, 2017).

Recently, there has been interest in the influence of optimism (i.e. positive expectations about the future; Scheier & Carver, 1987; Dougall, Hyman, Hayward, McFeeley, & Baum, 2001) and self-efficacy (i.e. perception of sufficient resources to manage the personal and practical demands of the situation; Benight & Bandura, 2004). Optimism and self-efficacy may buffer against the development of posttraumatic stress in adults (Benight & Harper, 2002; Birkeland, Blix, Solberg, & Heir, 2017; Jakšić, Brajković, Ivezić, Topić, & Jakovljević, 2012), and influence how parents manifest their distress and their ability to "be there" for their child, potentially protecting against child traumatic stress (Jones & Prinz, 2005; Kurtz-Nelson & McIntyre, 2017).

While it is established that parents model a wide range of behaviours to their children, likely including coping and emotion regulation strategies (Morris, Silk, Steinberg, Myers, & Robinson, 2007), it is unclear exactly how acute stress, optimism and self-efficacy might manifest in daily interactions. It is possible that parents who are less stressed, and more confident in their own sense of competency and expectations for the future, might demonstrate this in their interactions with their child.

It could be hypothesised that parents who are traumatised by their child's injury might also avoid reminders of the event (American Psychiatric Association, 2013), including interactions with their child. It is also possible that parents who are less confident in their abilities and less hopeful about the future in general, see less of a purpose to their interactions with their child and might therefore interact less. Emotional tone of voice is another understudied, but potentially influential aspect of parent-child interactions that may capture subtle emotional shifts within a conversation (DeBoer et al., 2017). Positive parental emotional tone (e.g. warmth) can promote coping, emotion regulation and adjustment into adulthood (Moran, Turiano, & Gentzler, 2018). Therefore, parents' emotional tone of voice and interaction time with their children warrant further investigation in the context of psychosocial recovery.

While both parents likely play a role in their child's recovery, we know little about fathers; mothers tend to participate in greater numbers in research studies (Muscara et al., 2018; Shudy et al., 2006). Furthermore, when fathers are included, there appear to be differences in their reported distress and in how they support their children, compared to mothers. In line with overall gender differences in adults (Tolin & Foa, 2006), mothers tend to report more traumatic stress symptoms than fathers (Holt, Jensen, Dyb, & Wentzel-Larsen, 2017; Tifferet, Manor, Constantini, Friedman, & Elizur, 2011). A meta-analysis further indicated a stronger relationship between child and maternal traumatic stress, compared to child and paternal traumatic stress (Morris et al., 2012).

A possible explanation for these differences in stress between mothers and fathers is that the relationship between parent and child traumatic stress occurs via parent-child interactions (Gil-Rivas, Holman, & Silver, 2004; Snyder et al., 2016; Williamson et al., 2017) and that these interactions differ for mothers and fathers. For example, consistent with gender roles in parenting, mothers may simply be around more often, more engaged in caregiving duties and therefore more exposed to their child's distress, with a greater opportunity for influence (Australian Institute of Family Studies, 2009; Holt et al., 2017; Milkie, Nomaguchi, & Denny, 2015). In addition, compared to fathers, mothers may be more likely to encourage children to elaborate on their

memories of the event and emotionally support their children in processing their distress (Manczak et al., 2016; Zaman & Fivush, 2013). Apart from parent gender, the age and gender of the child likely influence both parent-child interactions and traumatic stress (Åman-Back, & Björkqvist, 2004; Wise & Delahanty, 2017). Younger children may be especially responsive to parent

modelling and thus sensitive to parent stress. Younger children may also be more likely to take what is said literally and miss emotional tone of voice (Friend, 2003).

Despite the potential importance of parent-child interactions, it is difficult to request parents to report on their own oft automatic or unnoticed ways of interacting (Alisic, Barrett, Bowles, Conroy & Mehl, 2016; Mehl, Robbins, & Deters, 2012). Furthermore, observation remains the "gold standard" for studying interactions (Williamson et al., 2017) but can be costly and time-consuming. In order to study parent-child interactions naturalistically, the present study used an ecological momentary assessment app, the Electronically Activated Recorder (EAR; Mehl, 2017; Mehl et al., 2012; Mehl, Pennebaker, Crow, Dabbs & Price, 2001). The EAR imperceptibly and automatically records ambient audio data at regular intervals. The EAR has been used to capture audible behaviour and interactions for a variety of populations in the context of trauma and health issues (e.g. Karan, Wright, & Robbins, 2017; Mehl & Pennebaker, 2003a; Mehl et al., 2012; Tobin et al., 2014).

Therefore, the present study aimed to:

- 1. Explore behavioural markers of parental acute stress, optimism and self-efficacy via associations with interaction time and emotional tone.
- 2. Explore parent gender differences in acute stress, optimism, self-efficacy, interaction time and emotional tone.

Based on past research, we expected that mothers would be more stressed in the aftermath of a child's serious injury and interact more with their children than fathers. We did not hypothesise parent gender differences in optimism, self-efficacy and emotional tone, due to the lack of consensus within the literature. However, we hypothesised that, in keeping with the potential buffering effects of optimism and self-efficacy, parents who reported fewer acute stress symptoms, and greater optimism and self-efficacy would have more and more positive interactions with their child.

7.3. Method

The present study is part of the Ear for Recovery study, conducted through the Royal Children's Hospital in Melbourne, Australia (Alisic et al., 2015). The study was approved by the Human Research Ethics Committee of the Royal Children's Hospital Melbourne (study number 33103) and Monash University Human Research Ethics Committee (file number CF13/2515-2013001322).

7.3.1. Participants. We approached families of seriously injured children aged between 3 and 16 years who had been hospitalized at the Royal Children's Hospital for at least 24 hours. Families were ineligible if the child's injury was due to child abuse, self-harm, or an existing medical condition or if the child was hospitalized for more than four weeks. The potential range of hospital stay was 1 to 28 days, to capture the acute period post-trauma. Families were also required to mainly speak English at home, for the purpose of transcription of recordings in English. Of the 99 families who provided written informed consent, 71 families with valid EAR data were included in the current analyses (see Alisic et al., 2017 for full recruitment details).

While most of the families included both parents, a subset of the sample included 11 singleparent households (15.49% of the total sample), three (4.23%) with one parent and one step-parent, and one participant with a different living situation (1.41%). Overall, 69 female and 63 male caregivers were involved in EAR recordings, henceforth referred to as mothers and fathers for ease of reading. Of these, 64 mothers (92.75%) and 31 fathers (49.21%) returned at least two questionnaires (described below). Fathers who did not return questionnaires spent significantly less time with their child (M = 6.71% wake time, SD = 6.91%) than those who did (M = 15.60% wake time, SD = 11.24%), t(49.54) = -3.77, p < .001. Otherwise, participating and non-participating parents did not differ in their child's age or injury severity and there were no differences in interaction time for participating and non-participating mothers. Out of an eligible 53 children over the age of 8, 48 (90.57%) completed their questionnaire.

7.3.2. Measures.

7.3.2.1. Child demographics and injury severity. Demographics and child injury severity data were obtained from the hospital registry. We employed a widely used measure of the injury severity for each child, the *Injury Severity Score* (ISS, Bolorunduro et al. 2011; Genarelli & Wodzin, 2006), with higher scores indicating greater injury severity. The number of days the child spent in hospital was also included as a measure of injury severity. ISS and days in hospital were significantly positively correlated, r(71) = .42, p < .001.

7.3.2.2. Child acute stress. The Children's Revised Impact of Events Scale (CRIES-13; Children and War Foundation, 2005; Perrin, Meiser-Stedman & Smith, 2005) is a reliable and valid 13 item self-report measure of *DSM-IV* traumatic stress symptoms (Intrusion, Avoidance and Arousal) completed by children aged 8 and over. The scale is scored on a four-point scale ("not at all" = 0, "rarely" = 1, "sometimes" = 3, "often" = 5) and items were summed to yield a single total score.

7.3.2.3. Parent-child interactions. The *Electronically Activated Recorder* (EAR; Mehl, 2017; Mehl et al., 2012; Mehl et al., 2001) is an app that records audio information automatically, and imperceptibly, at regular intervals. The EAR has been shown to be a reliable and valid tool for exploring the social environment (Mehl et al., 2012) and participants typically habituate to its presence in around two hours (Mehl & Holleran, 2007). In our study, the child wore a belt with an iPod Touch enclosed with the EAR app running, over a two-day period of recording at home, as close to discharge as possible. The audio recordings were taken for 30 seconds every 5 minutes between the hours of 07:00 and 22:00. Each family yielded an average of 328 snippets, or 2.73 hours of recordings.

These audio files were transcribed verbatim and behaviourally coded by two independent coders according to who the child was speaking with, their current activity, topic and emotional

tone of voice. The double-coding process was implemented to increase reliability. Participant diaries were taken into account during the coding process, particularly when determining the identity of the speaker. For example, if the diary reported that the mother was taking care of the child on the morning of the first day, then the dominant adult female voice was coded as the mother.

In our study, "mother/father interaction time" referred to the percentage of snippets in which the mother/father was present with or actively engaged with the child. Overall, the number of snippets of parent interactions per family ranged from 0 to 189 for mothers (M = 61.21, SD = 44.42, median = 55.68) and 0 to 118 for fathers (M = 28.95, SD = 32.04, median = 14.98). For the parent interaction snippets, "mother/father tone" was also coded on a seven-point scale, ranging from "very negative" to "very positive" with higher scores indicating more positive emotional tone. Emotional tone was conceptualized as the emotional interpretation of the combination of tone of voice and content of speech, signifying the emotional "feeling" of the conversation. For example, a sarcastic comment may include positive words and tone of voice, but would be coded as a more negative tone, due to the negative meaning of the comment.

In our study, inter-coder reliabilities (one-way random intraclass correlations; ICCs) were adequate for interaction time (ICC_{Mother interaction} = 0.90, ICC_{Father interaction} = 0.96) and emotional tone (ICC_{Mother tone} = 0.94, ICC_{Father tone} = 0.96) variables. The transcription and coding process is described in more detail in Alisic et al. (2017).

7.3.2.4. Parent acute stress. The Acute Stress Disorder Scale (ASDS; Bryant, 1999; Bryant, Moulds & Guthrie, 2000) is a reliable and valid self-report measure of *DSM-IV* Acute Stress Disorder (ASD) symptoms (including Dissociation, Re-experiencing, Avoidance, and Arousal subscales). Mothers and fathers rated the 19 items on a 5-point Likert scale ("1 = not at all", "5 = very much"), with higher scores indicating greater symptom severity.

7.3.2.5. Parent optimism. The Life Orientation Test- Revised (LOT-R; Glaesmer et al., 2012;
Scheier, Carver & Bridges, 1994) is a reliable and valid measure of dispositional optimism
completed by mothers and fathers. Ten items were rated on a 5-point scale (in our study "1 =

disagree a lot", "5 = agree a lot" to stay consistent with the administration of the ASDS, but scored from 0 - 4). Four items were fillers only. The total score is the sum of items 1, 4, and 10 and reverse-scored items 3, 7, and 9, with higher total scores reflecting greater optimism.

7.3.2.6. Parent self-efficacy. The Screener for the Development of a Response Post-trauma SDRP (Cirilli, 2012) was adapted for our study as a 15-item measure of parental self-efficacy (i.e. items that referred to "sick/injured child" were revised to "injured child", responses were rated on a seven- instead of four-point scale). Items were summed to yield a continuous total score, with higher scores indicating greater self-efficacy. Thirty of the families included in our study were recruited prior to this questionnaire being included in the study.

Overall, parental acute stress scores were significantly negatively associated with both optimism, r(91) = -.20, p = .028 and self-efficacy, r(69) = -.35, p = .002. Optimism and self-efficacy scores were significantly positively correlated, r(66) = .47, p < .001.

7.3.3. Procedure. After providing written informed consent, initially one parent (most commonly mothers) was requested to complete the ASDS, and LOT-R, and after a change in protocol, both parents were asked to complete these measures as well as the SDRP. After discharge from the hospital, children wore the EAR for a two-day period at home, usually a weekend. The recordings occurred up to a month post-injury, varying due to length of admission and availability of families. Children aged over 8 completed the CRIES-13. The EAR recordings were downloaded, transcribed verbatim and coded by two independent coders.

7.3.3.1. Analyses. Multilevel modelling was conducted using STATA 15. Otherwise, all statistical analyses were conducted using IBM SPSS version 24, with an alpha level of .05 for all statistical tests. For the purposes of interpretation, however, we have chosen to focus on effect sizes (Sullivan & Feinn, 2012). The only normally distributed variables were mother interaction time, child acute stress (CRIES-13 scores), optimism (LOT-R scores) for both parents, and father's self-efficacy (SDRP scores). Emotional tone ratings were converted to a percentage of the maximum

possible score, ranging from 0% to 100% (Cohen, Cohen, Aiken, & West, 1999) to facilitate interpretation. This did not affect the non-normal distribution of emotional tone ratings.

Given the normality violations, we used non-parametric Spearman's correlations and Friedman tests (Hills, 2011, p. 110, 235) and presented the median as a measure of central tendency. Non-parametric Friedman tests were conducted to test differences in mean ranks of acute stress, optimism, self-efficacy, interaction time and emotional tone for mothers and fathers. Mixed-model analyses of variance (ANOVAs; parent gender x child gender) were conducted on parent interaction time and emotional tone. The ANOVAs were robust to normality and homogeneity of variance assumption violations (Hills, 2011, p. 118). We also used partial correlations and chi-squared analyses where appropriate.

Spearman's correlations explored associations between parent acute stress, optimism, selfefficacy, interaction time and emotional tone. We evaluated statistical independence of mother and father data and found non-independence for only parent optimism, ICC = .21, F(25, 26) = 1.54 (α = .1, critical value = 1.50) and emotional tone, ICC = .50, F(52, 53) = 3.01 (α = .1, critical value ranged 1.20-1.38; Grawitch, & Munz, 2004; Kenny, Mannetti, Pierro, Livi, & Kashy, 2002). Given the non-independence of these variables, we presented Spearman's correlations for mothers and fathers separately, as well as for all parents. We also checked for associations with child age, gender, injury severity and length of hospitalization (days).

Multilevel modelling was conducted to acknowledge the nested nature of the data (see Figure 7.1; Peugh, 2010). However, it did not account for the lack of normality in the data, or residuals (Peugh, 2010). We restructured the data so that each snippet for each parent was on a separate line. That is, we used raw values of parent interaction time (binary, 0 = no interaction, 1 = interaction present) to conduct a logistic multilevel model and emotional tone (continuous) for a normal multilevel model, thus taking into account both within-family and within-parent correlations for each outcome variable.





Note. Parent-child interactions include the binary presence/absence of interaction and emotional tone ratings for each snippet.

Regarding the fixed effects, the predictors at level 2 (parent level) included parent gender, acute stress, and optimism. We used grand mean centring for parent acute stress and optimism variables (Peugh, 2010). We opted to remove self-efficacy from this analysis as it did not appear to have a relationship with either of the outcome variables, and substantially reduced the number of parents with complete data. With the exclusion of SDRP scores, we had an adequate number of parents (n = 88 for the emotional tone model, n = 91 for the interaction time model) for inclusion in the multi-level models, within a total of 65 clusters (i.e. families; McNeish & Stapleton, 2016).

We also included level 3 predictors of child age, gender and ISS. We did not include the child's number of days in hospital as it was strongly correlated with ISS, but not with interaction time or emotional tone. To further meet our second aim, we included interactions between parent gender and each of our variables of interest (acute stress and optimism). The random effects included the random intercepts for each level, as well as a random slope to adjust for the effect of time (snippet number).
7.4. Results

7.4.1. Child demographics, injury severity and acute stress. The 71 included children (n = 42 male, 59.15%) ranged in age from 3 to 16 years (M = 10.41 years, SD = 3.60 years). For the children in our sample, the median number of days in hospital was 2 days (range = 1 to 17 days) and the median injury severity score was 5 (range = 1 to 34; ranging mild to profound according to Bolorunduro et al., 2011). Eligible children (> 8 years old, n = 48) had a median CRIES-13 score of 25.50 (range = 0 to 50) and 19 children (39.58% of eligible children) scored above the cut-off point of 30 for probable Posttraumatic Stress Disorder (Perrin et al., 2005). Although children under 8 could not be included as they were too young to complete the questionnaire, there was a small negative correlation between CRIES-13 scores and child age, r(48) = -.27, p = .034, such that older children reported fewer traumatic stress symptoms. Child traumatic stress was not significantly correlated with child gender, r(48) = .01, p = .467 (dummy coded male = 0, female = 1), injury severity, r(48) = .05, p = .371, or days in hospital, r(48) = .11, p = .231.

7.4.2. Parent gender differences. Table 7.1 presents medians and ranges for total scores of parent acute stress, optimism, and self-efficacy, as well as interaction time (as a percentage of time spent awake) and emotional tone (presented as a percentage of the maximum possible score) for mothers, fathers, and both parents together.

Median (Min – Max)	Parents	Mothers	Fathers
Acute stress (ASDS) ^a	33.00 (19 - 81)	35.00 (19 - 81)	31.00 (19 – 61)
Optimism (LOT-R) ^b	17.00 (3 – 24)	16.50 (4 – 24)	18.00 (3 – 24)
Self-efficacy (SDRP) ^c	86.00 (34 - 105)	89.00 (34 - 101)	84.50 (54 - 105)
Interaction time with	14.16 (0 – 58)	18.92 (0 - 58)	9.01 (0 - 36)
child (% wake time)			
Emotional Tone (%	46.67 (20.00-57.00)	46.75 (20.00-57.00)	45.61 (24.00-55.00)
maximum possible			
score)			

Average Parent Acute Stress, Coping and Interaction Characteristics

Note. N varied from 30 to 69, depending on the number of questionnaires available. $^{a}ASDS =$ Acute Stress Disorder Scale, $^{b}LOT-R =$ Life Orientation Test-Revised, $^{c}SDRP =$ Screener for the Development of a Response Post-trauma.

For parent interaction time, there was a statistically significant Chi-square value of 25.8, *p* <.001, indicating differences between mothers and fathers in time spent interacting with their child; mothers interacting more with their children than fathers. There were no significant differences between mothers and fathers for acute stress, $\chi^2 = .36$, *p* = .549, optimism, $\chi^2 = .36$, *p* = .549, selfefficacy, $\chi^2 = .14$, *p* = .705, or emotional tone, $\chi^2 = 2.28$, *p* = .131.

Using combined cut-off scores of ≥ 9 on the Dissociation subscale and ≥ 28 on the sum of the other subscales (Bryant et al., 2000), 23 (35.94% of respondents) mothers and 6 (19.35% of respondents) fathers were classified with probable Acute Stress Disorder. There was no relationship between parent gender and classification of the disorder, according to a chi-square test, $\chi^2(1, N =$ 95) = 2.71, p = .153. Child traumatic stress was significantly positively correlated with mother acute stress, r(44) = .37, p = .007 but not father acute stress, r(21) = .04, p = .426, and these findings persisted when child age or gender was controlled. Mother and father acute stress were not significantly correlated, r(28) = .21, p = .145. For two-parent families only, we conducted mixed-model ANOVAs (parent gender x child gender) on parent interaction time and emotional tone. For interaction time, there was a significant interaction between parent and child gender, F(1, 59) = 10.57, p = .002, $\eta_p^2 = .15$. Simple effects analyses revealed that mothers spent more time with their daughters (M = 27.78% wake time, SD = 15.44%) than sons (M = 18.79%, SD = 10.39%), F(1, 59) = 7.35, p = .009. However, there were no significant differences in the proportion of time fathers spent with sons (M = 12.43%, SD = 11.42%) or daughters (M = 8.82%, SD = 8.05%), F(1, 59) = 1.71, p = .196. On the whole, both daughters, F(1, 59) = 37.49, p < .001, and sons, F(1, 59) = 7.50, p = .008, spent more time with mothers than fathers.

For parent emotional tone, there was no significant interaction between parent and child gender, F(1, 51) = 3.87, p = .055, $\eta_p^2 = .07$. The main effects for parent gender on parent emotional tone, F(1, 51) = 2.22, p = .142, $\eta_p^2 = .04$, and child gender on parent emotional tone, F(1, 51) = 3.44, p = .070, $\eta_p^2 = .06$, were also non-significant.

7.4.3. Associations with parent-child interaction time and emotional tone. Figure 7.2 shows average parent interaction time and emotional tone across the two days of recording for mothers and fathers. Table 7.2 shows a correlation matrix for all parents, including parent gender (coded 0 = father, 1 = mother), acute stress, optimism, self-efficacy, interaction time, emotional tone, as well as child age, gender, ISS and number of days in hospital. Considering that the optimism and emotional tone variables were non-independent, we present correlations separately for mothers and fathers in Table 7.3.



Figure 7.2. Percentage of mother (A) and father (B) interactions and average emotional tone for mothers (C) and fathers (D) across the two days of recording. Median line notes distinction between Days 1 and 2.

Table 7.2

		Acute	Optimism	Parents Self-	Interaction	Emotional
		stress		efficacy	time	tone
Parents	Interaction	02	.16	10	-	
	time					
	Emotional	06	.27**	.20	.26**	-
	tone					
	Parent	.14	05	.05	.42***	.07
	gender ^a					
Children	Age	.10	16	.14	33***	.02
	Gender ^a	.13	06	00	.03	16*
	Days in	.19*	25**	.08	10	08
	hospital					
	ISS	.26**	19*	07	15*	.07

S	'pearman's	: (Correlations	for	Parent	Stress.	Coping	and	Interaction	Char	racteristics	5
~~~	p	-										÷.,

*Note.* ***p < .001, **p < .01, *p < .05, *N* varied from 65 to 95 depending on the number of questionnaires available. ^aGender was coded 0 = male, 1 = female.

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# Table 7.3

spearman's Correlations for Mother and Father Stress, Coping and Interaction Characteristic	Spearman's	Correlations f	or Mother and	l Father Stress.	Coping and	Interaction	<b>Characteristics</b>
---------------------------------------------------------------------------------------------	------------	----------------	---------------	------------------	------------	-------------	------------------------

-		<u> </u>		Mothers	<u> </u>				Fathers		
		Acute	Optimism	Self-	Int. time	Emo.	Acute	Optimism	Self-	Int. time	Emo.
		stress		efficacy		tone	stress		efficacy		tone
Mothers	Int. time ^a	05	.33**	23							
	Emo.	10	.26*	.14	.26*	_					
	tone ^b										
Fathers	Int. time						01	16	04	—	
	Emo. tone						01	.31	.29	.19	—
Children	Age	.04	28*	.22	38**	.05	.15	.08	.01	35**	02
	Gender ^c	.04	13	10	.17	32**	.34*	.11	.10	18	.03
	Days in	.08	36**	.07	20*	11	.50**	06	.07	16	03
	hospital										
	ISS	.24*	25*	05	31**	06	.27	04	09	21*	.21

*Note*. ***p < .001, **p < .01, *p < .05, *N* varied from 27 to 71 depending on the number of questionnaires available. ^aInt. time = interaction time. ^bEmo. tone = emotional tone. ^cGender was coded 0 = male, 1 = female.

*7.4.3.1. Interaction time.* There was a medium to large coefficient for the relationship between parent gender and interaction time, with mothers interacting more with their children than fathers. There was also a medium sized correlation between interaction time and child age, such that parents (and mothers and fathers separately) spent less time with children as they increased in age. Interaction time and parent gender were still significantly positively related when child age was controlled, r = .44, p < .001. For mothers only, there was a medium-sized relationship between optimism and interaction time, with more optimistic mothers spending more time with their children. Apart from this, interaction time was not significantly associated with parent acute stress, optimism or self-efficacy, or child gender. Overall, and especially for mothers, as parent-child interaction time increased, parental emotional tone of voice became more positive.

*7.4.3.2. Emotional tone.* Consistent with the idea that optimism surfaces in interactions in a positive outlook, parents who were more optimistic also spoke to their children in a more positive tone. This medium-sized correlation held for mothers, and approached significance for fathers (p = .055). Parent emotional tone was not significantly associated with parent acute stress, self-efficacy, parent gender or child age, overall and for mothers and fathers separately. There was a small overall relationship between child gender and parent emotional tone, and this correlation was medium-sized for mothers, but non-significant for fathers, such that mothers used a more negative tone of voice with their daughters. Parent emotional tone and optimism were still significantly positively related when child gender was controlled, r = .28, p = .009.

*7.4.3.3. Injury severity, days in hospital and other relationships.* There was one large relationship between father (but not mother) acute stress and days in hospital, where fathers were more stressed the longer their child was in hospital. Fathers of daughters reported more acute stress symptoms than fathers of sons. However, this relationship with child gender was not found for mothers. Conversely, there was a small to medium relationship between mother (but not father) acute stress and injury severity, where mothers were more stressed the greater their child's injury severity. Injury severity and days in hospital were not significantly associated with parent self-

efficacy or emotional tone. Particularly for mothers, as days in hospital and injury severity increased, maternal (but not paternal) optimism decreased. Maternal (but not paternal) optimism also decreased with child age. There was also a small to medium negative relationship between injury severity and parent-child interaction time for both mothers and fathers, such that parents spent less time with more severely injured children. For mothers only, interaction time also decreased with more time in hospital.

**7.4.4. Multilevel models.** Two multilevel models (see Table 7.4) were conducted to predict either parent interaction time (logistic) or emotional tone (normal) from parent gender, acute stress and optimism, and child age, gender and ISS. We also checked for interactions between parent gender and our variables of interest (acute stress and optimism). Intra-class correlations revealed that the family accounted for 10.60% of the variance of interaction time and 12.34% of the variance of emotional tone. Within-parent factors accounted for an additional 14.59% of the variance of interaction time and 0.96% of the variance of emotional tone.

As seen in Table 7.4, child age and parent gender were significant predictors of interaction time, with mothers interacting more with children than fathers, and the probability of parent interactions being lower for older children. None of the predictors were significantly associated with emotional tone.

#### Table 7.4

	Interact	ion time	Emotional tone		
	$\beta$ (SE)	р	$\beta$ (SE)	р	
Fixed Effects					
Intercept	32 (.44)	.470	3.61 (.15)	<.001	
Level 3 predictors (Child)					
Age	17 (.04)	<.001	.00 (.01)	.791	
Child gender ^a	.15 (.27)	.577	.02 (.10)	.833	
ISS	.02 (.02)	.411	.01 (.01)	.401	
Level 2 predictors (Parent)					
Acute stress (centred)	00 (.02)	.935	.00 (.01)	.724	
Optimism (centred)	06 (.04)	.144	01 (.01)	.441	
Parent gender ^a	.69 (.23)	.003	.02 (.06)	.808	
Within-level interactions					
Parent gender x acute	.01 (.02)	.799	00 (.01)	.455	
stress (centred)					
Parent gender x	.08 (.05)	.071	.01 (.01)	.228	
optimism (centred)					
Random Effects		[95% CI ^b ]		[95% CI]	
Intercept variance ^c	-	-	.73 (.01)	[.71, .76]	
Intercept variance	.47 (.22)	[.18, 1.19]	.10 (.03)	[.06, .17]	
(level 3)					
Intercept variance	.64 (.21)	[.34, 1.22]	.01 (.01)	[.00, .09]	
(level 2)					
Random slope	.00 (.00)	[.00, .00]	.00 (.00)	[.00, .00]	
variance (level 2)					

Associations Between Predictors and Interaction Characteristics

*Note.* Significant effects are in bold text. ^aGender was coded 0 = male, 1 = female. ^bCI = confidence interval. ^cThe level 1 intercept variance for interaction time was defined as  $\pi^2/3$  (StataCorp, 2017).

# 7.5. Discussion

The present study explored parent-child interactions in the context of serious paediatric injury and related parental distress, using an ecological momentary assessment tool, the EAR. More specifically, this study aimed to explore relationships between parent acute stress, optimism and

self-efficacy with interaction time and emotional tone. For these variables, we also explored parent gender differences and associations with child demographics and objective injury characteristics.

The findings supported the hypothesis that mothers spend more time interacting with their child post-injury compared to fathers. This is consistent with past parent reports of time spent together (Australian Institute of Family Studies, 2009; Milkie et al., 2015) and may reflect a general difference in time with each parent that persists within the child injury context. This may also explain the significant relationship between child and mother acute stress, but not father acute stress, as mothers may have a greater opportunity to be affected by their child's condition and influence their child's wellbeing, and may also be more burdened with caregiver duties which potentially heighten stress (Holt et al., 2017; Milkie et al., 2015).

In keeping with developmental norms (Åman-Back, & Björkqvist, 2004), parents spent less time with children as they grew older, however the difference in interaction time between mothers and fathers persisted regardless of child age. Mothers also spent more time with daughters than sons, although the direction of this relationship is difficult to determine. It may be that mothers spend more time with daughters, or that daughters seek out more interaction time with mothers. It may also explain mothers' more negative tone of voice with daughters, as mothers have a greater opportunity for conflict to arise with daughters, with more time spent together.

Contrary to our expectations, we did not find a relationship between parent gender and acute stress. This contrasts research on gender differences in traumatic stress symptoms in adults (Tolin & Foa, 2006), as well as studies that have found mothers to be more distressed post-trauma compared to fathers (e.g. Holt et al., 2017). It reinforces that child injury and hospitalization can take a toll on both parents, as both mothers and fathers reported clinical levels of acute stress. However, it is also possible that a higher powered analysis may have identified a gender difference in acute stress, especially as there were unequal numbers of mothers and fathers, and mother and father acute stress were not related.

Mothers and fathers also reported similar levels of optimism and self-efficacy, and did not differ significantly in emotional tone. Our hypotheses regarding behavioural markers of parental stress, optimism and self-efficacy were partially supported. However, findings must be interpreted with caution as the multilevel model was conducted using non-normal data (Peugh, 2010) and correlations did not account for nesting. Spearman's correlations showed a significant relationship between emotional tone and optimism for mothers, such that more optimistic mothers used a more positive tone, or vice versa. For mothers only, optimism was also positively related to interaction time, such that more optimistic mothers spent more time with their children. Put another way, more optimistic mothers were likely to display this in the way they spoke. As these findings did not persist within the multilevel model, relationships between parent gender, optimism and interaction characteristics warrant further attention in larger samples.

Contrary to our hypotheses, amount and emotional tone of parent-child interactions were not significantly associated with parental acute stress or self-efficacy. That is, parents who were more stressed or higher in self-efficacy did not exhibit this in how much time they spent with their child or their emotional tone. Our findings may suggest that acute stress and self-efficacy are shown more subtly in behaviour and mannerisms, rather than more overt interactions. Optimism as a construct may also be more amenable to translation into an objectively measurable interaction characteristic. It may also be that optimism, as a stable personality trait (Dougall et al., 2001), was easier to detect compared to more fluctuating stress and self-efficacy levels that may not have produced a consistent pattern or may have been better evidenced by specific rather than overall interaction characteristics. We also looked at dispositional optimism, rather than specific optimistic beliefs about the injury itself (as in Baker et al., 2005).

Furthermore, greater injury severity and more days in hospital were associated with higher parent stress and lower maternal optimism, but were not associated with parent self-efficacy or emotional tone. While children both in past research (Alisic et al., 2011) and our sample tend to report traumatic stress symptoms regardless of the objective injury severity, parents appeared to be affected by the objective severity of their child's condition. This research lends further support to the notion that paediatric hospitalization itself can be stressful for parents and reduce their hope for the future (Commodari, 2010). Child demographics also may have influenced these relationships as fathers of daughters were more stressed than fathers of sons, and mothers' optimism decreased with child age.

The naturalistic nature of the data enabled consideration of naturally unfolding processes within the home environment, however, there are several limitations of the present study. It is possible that the sampled interactions were an indication of more stable patterns rather than directly influenced by the injury and we did not have any pre-injury data for comparison. However, the injury context may also have provided more time at home, with more care required. The self-report measures and recordings in our study were taken close together. As past research suggests socialization takes place over time, post-trauma (e.g. Bauer et al., 2005), it is possible that effects of parent behaviour on child stress might be seen over the months following the event (Wise & Delahanty, 2017).

Another limitation is that over half of fathers did not return questionnaires. This rate is also in line with many past studies with parents (see included papers in a meta-analysis by Morris et al., 2012), indicating that fathers generally are less likely to participate in research studies compared to mothers. In our dataset, this was partially explained by fathers being less involved in their child's care, as we found that fathers who did not participate in questionnaires also spent significantly less time with their child than those who did. The completion rate was also due to a change in protocol whereby initially data was only required from one parent and this was most commonly the mother.

Nevertheless, looking at the quantity of interactions may be simplistic and we need to move towards considering the quality of interactions, which was hinted at by the emotional tone variable. Future studies could examine interactions at a level of micro-dynamics across time, something which was beyond the scope of this paper. In addition, time spent with parents may not unidirectionally be influenced by the parent but also by the child; the child may also bring their own

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needs, wants and behaviour which may affect time spent together and even parental emotional tone of voice. We also compared mothers and fathers from the same family, meaning parents' time spent with child, and emotional tone may be influenced by their shared circumstance (e.g. employment, designation of parent roles, etc.).

In conclusion, this study showed that mothers spent more time with their child post-injury compared to fathers, but that regardless of gender, parents may experience distress following their child's injury. While fathers are generally underrepresented in surveys and structured observational studies, fathers participated in greater numbers using the EAR. This correlational study cannot draw causal conclusions, however the results ought to encourage further exploration of the role of optimism, as well as differences between mothers and fathers in how they interact with their children after a serious injury.

# CHAPTER 8: PAPER 4: LISTENING TO FAMILY LIFE AFTER SERIOUS PAEDIATRIC INJURY: A STUDY OF FOUR CASES

In Chapter 7, the included paper explored associations between parent acute stress, optimism, self-efficacy and broad interaction characteristics (interaction time and emotional tone). Within the Ear for Recovery dataset, families demonstrated great variability in all aspects of family life. Therefore, the present chapter is a paper (Mangelsdorf, Conroy, Mehl, Norton & Alisic, 2019) which aimed to describe four families qualitatively, in the style of case studies, in order to further illustrate the relationships observed within Chapters 6 and 7.

# 8.1. Abstract

Objective: Following a serious child injury, the entire family system can be affected. Gaining an understanding of support and stress levels within a family can help clinicians tailor treatment. Presently, we understand parental support for children post-trauma mainly from self-report and structured observational tasks. This study aimed to describe naturalistic parent-child interactions following a child's injury using the Electronically Activated Recorder (EAR; Mehl, 2017) and to highlight how clinicians might use these data in their practice.

Methods: Children who had been hospitalised with a serious injury wore the EAR. Over a two-day period post-discharge, the EAR recorded 30-second audio "snippets" every 5 minutes. Families also completed self-report measures on family functioning, child stress and social support, parent stress, optimism and self-efficacy. We included four families with complete EAR and self-report data. For each case, two researchers independently used an ethnographic method, integrating self-report measures, family and injury characteristics, audio recordings and transcripts to mimic integration of information within clinical practice. The researchers then reached a consensus on the main themes for each case through discussion.

Results: Four cases were presented in depth. Across the families, there were multiple examples of family communication in content, tone and frequency, including moments of stress, humour, and

injury-related conversations. EAR data yielded potentially relevant clinical information in how they converged and diverged from the self-report data.

Conclusions: The EAR provided an opportunity for rich descriptions of individual families' communication and activities, yielding potential clinical information that may be otherwise difficult or impractical to obtain.

# LISTENING TO FAMILY LIFE AFTER SERIOUS PAEDIATRIC INJURY: A STUDY OF FOUR CASES

### 8.2. Background

Child hospitalization can be a stressful experience for the whole family (Kosta et al., 2015), and both parents and children can develop traumatic stress symptoms after a child's serious injury (American Psychiatric Association, 2013; Zatzick et al., 2006). Parental behaviour may influence the development of child posttraumatic stress disorder (PTSD; Williamson et al., 2017). Illustrating this, the relational model of PTSD (Scheeringa & Zeanah, 2001) described several ways (i.e. withdrawn, overprotective and re-enacting parenting), in which the parent's own traumatic stress symptoms can hinder their ability to respond appropriately to their child and moderate the development of child PTSD.

More generally, parents play a role in providing support for their children and modelling their own emotion regulation, particularly in stressful times (Kichline, Kassam-Adams, Weiss, Herbers, & Marsac, 2017; Morris, Silk, Steinberg, Myers, & Robinson, 2007). For example, parents may model adaptive "approach" behaviours, by talking about the trauma, or avoid the topic (Alisic, Boeije, Jongmans & Kleber, 2012; Kassam-Adams, 2014). Parent-child interactions can therefore provide an opportunity for processing of cognitions and emotions (Bauer et al., 2005), and coping strategies can be co-created within a family (Hildenbrand, Clawson, Alderfer, & Marsac, 2011; Marsac, Donlon, Hildenbrand, Winston, & Kassam-Adams, 2014). Parental responsiveness has also been noted as an important protective factor for children (Alisic et al., 2012).

Despite the apparent importance of parent-child interactions, it is difficult for both researchers and clinicians to observe what takes place within the home. While self-report measures and clinical interviewing can provide insight into subjective experience, observation remains the "gold standard" for measuring parental behaviour and parent-child interaction (Kichline et al., 2017; Williamson et al., 2017). Furthermore, combining self-report measures and observation appears to provide a clearer picture than either method alone (Kichline et al., 2017; Scheeringa & Zeanah,

2001). For example, Kichline and colleagues (2017) used a structured observational tool, the Trauma Ambiguous Situations Task (TAST) to examine avoidant coping coaching by parents following a serious child injury. Parents who reported traumatic stress symptoms were found to also report more avoidant coaching, however this relationship between PTSD and avoidant coping coaching was not demonstrated in observed interactions with their child. Interpretations of the aforementioned finding highlighted the importance of a multimethod approach, which explores both global and situation-specific behaviors, rather than relying on one method alone.

Furthermore, structured observational tasks like the TAST can provide insight into interactions within a controlled environment with researchers or clinicians present, but may not represent interactions in daily life. Where multiple methods converge on similar findings (e.g. Holman & Jarvis, 2003), methodology is not an issue. However, the more spontaneous or routine aspects of family life are difficult to tap into in a clinical setting. On the other hand, naturalistic observation can demonstrate interactions in the home, but can also be a costly and time-consuming process involving recording equipment, and time to review content (e.g. Repetti, Reynolds & Sears, 2015; Vosoughi, Goodwin, Washabaugh & Roy, 2012). Recent developments in ecological momentary assessment techniques allow the monitoring of a multitude of factors in real time, including stress, mood and family communication (Dunton et al., 2018; Miller, 2012; Timmons et al., 2017). The field of family research has begun to explore the potential for these naturalistic observations within both research and clinical practice, hopefully enabling easier application of therapeutic interventions into everyday life.

The Ear for Recovery study (Alisic et al., 2015, 2017), used a naturalistic observational tool, the *Electronically Activated Recorder* (EAR; Mehl, Pennebaker, Crow, Dabbs & Price, 2001) to explore home-based family interactions in the context of trauma (serious injury). In the past, EAR research has typically involved aggregating data across cases and using quantitative methods (Mehl, Robbins & Deters, 2012). Conversely, the present paper will use a qualitative, ethnographic method to integrate information from different sources from the perspective of case studies. This method is intended to acknowledge the uniqueness of each family as, in the clinic, research findings tend to be "tailored" to individual families (Kazdin, 2008, p.149).

Our first aim was to describe family interactions post-discharge from the hospital, using a combination of EAR recordings and self-report measures, in order to illustrate naturally unfolding social processes within the family post-trauma. Our second aim was to highlight the potential for enhancement of existing family interventions using a combination of self-report measures and home-based audio recordings, using our work with the EAR as an example.

### 8.3. Method

The Ear for Recovery study (see Alisic et al., 2015, 2017 for recruitment details, procedure, participant demographics and descriptions of measures for the full sample, N = 71 families) was approved by the Human Research Ethics Committee of the Royal Children's Hospital Melbourne (study number 33103) and the Monash University Human Research Ethics Committee (file number CF13/2515-2013001322).

**8.3.1. Participants.** We recruited children aged 3 to 16 years who had been hospitalized for at least 24 hours at the Royal Children's Hospital Melbourne with a serious, unintentional injury. The families included in the present study had at least 100 30-second snippets of audio data, and completed all relevant questionnaires at all three time points (following discharge, then six weeks and three months post-discharge). Informed consent was obtained from both parents and children who were old enough to do so.

**8.3.2. Measures.** Where possible, children aged 8 and over were eligible to complete child reports, and both mothers and fathers completed questionnaires. At follow up, children over eight years and one parent were requested to provide data. These questionnaires are summarised in Table 8.1.

#### Table 8.1

Questionnaire	Construct	Respondent	Time 1	Time 2 (6	Time 3 (3
			(baseline)	weeks post-	months post-
				discharge)	discharge)
CRIES-13	Child	Child > 8	Yes		
	traumatic	years			
	stress				
	symptoms				
CPSS	Child	Child > 8	Yes	Yes	Yes
	traumatic	years			
	stress				
	symptoms				
MSPSS	Child	Child > 8	Yes		
	perceived	years			
	social support	•			
ASDS	Parent acute	Parents	Yes		
	stress				
LOT-R	Parent	Parents	Yes		
	optimism				
SDRP	Parent self-	Parents	Yes		
	efficacy				
SF-36	Parent	Parents		Yes	Yes
	wellbeing				
FACES-IV	Family	Child $> 12$	Yes		
	functioning	vears: Parents			

### Timing of Self-Report Measures

*Note:* CRIES-13 = Children's Impact of Event Scale-Revised, CPSS = Child Posttraumatic Stress Scale, MSPSS = Multidimensional Scale of Perceived Social Support, ASDS = Acute Stress Disorder Scale, LOT-R = Life Orientation Test – Revised, SDRP = Screener for the Development of Response Posttrauma, SF-36 = Short-Form Health Survey, FACES-IV = Family Adaptability and Cohesion Evaluation Scale IV.

# 8.3.2.1. Child demographics and injury severity. Age, gender, and Injury Severity Scale

(ISS, Bolorunduro et al., 2011; Gennarelli & Wodzin, 2005) scores were obtained from the hospital

registry.

8.3.2.2. Child reports of social support and traumatic stress. At baseline, eligible children

completed measures of perceived social support, the Multidimensional Scale of Perceived Social

Support (MSPSS, Zimet, Dahlem, Zimet & Farley, 1988) and traumatic stress symptoms, the

Children's Impact of Event Scale-Revised (CRIES-13, Children and War Foundation, 2005).

Children also completed the Child Posttraumatic Stress Scale (CPSS, Foa, Johnson, Feeny &

Treadwell, 2001) at all time points as an additional measure of traumatic stress.

*8.3.2.3. Family functioning.* Parents and children over 12 years completed an individual self-report measure of family flexibility, cohesion and satisfaction, the *Family Adaptability and Cohesion Evaluation Scale IV* (FACES-IV; Olson, Gorall, & Tiesel, 2006). The FACES-IV is based on the Circumplex Model of Marital and Family Systems (see Olson, Sprenkle & Russell, 1979) whereby families operate best when flexibility and cohesion are both "balanced" and neither extreme.

*8.3.2.4. Parent-child interactions.* This study used the "EAR" (Mehl et al., 2001; Mehl et al., 2012; Mehl 2017), or the iEAR app on an iPod Touch, to record 30-second audio snippets every five minutes between 7:00 and 22:00, yielding up to 2.73 hours of recording per family. The iPod was enclosed within a belt worn by the child for a two-day period at home (with two exceptions where only one day of recording was available) as close to discharge as possible. The files were transcribed, and interactions were coded by two trained independent coders according to the child's conversation partner(s), current activity, the topic of conversation and emotional tone (see Alisic et al., 2017 for more details on coding). Intraclass correlations (ICC [1,2]) for all reported variables exceeded 0.8, indicating adequate inter-coder agreement.

*8.3.2.5. Parent wellbeing.* Parents rated their acute stress disorder (ASD) symptoms (*Acute Stress Disorder* Scale, ASDS, Bryant, Moulds & Guthrie, 2000) optimism (*Life Orientation Test – Revised*, LOT-R, Scheier, Carver & Bridges, 1994) and self-efficacy (*Screener for the Development of Response Posttrauma*, SDRP, Cirilli, 2012) at baseline and their own wellbeing (*Short-Form Health Survey*, SF-36, Ware & Sherbourne, 1992) at follow up points.

**8.3.3. Analysis.** Following transcription and behavioural coding of the audio files, we used an ethnographic method to interpret data for the included families. The intention of the method is to describe and interpret what is seen, through immersion of the observer within the naturalistic setting, with systematic "jotting" of salient observations (Emerson, Fretz, & Shaw, 1995). While researchers were not physically present within the family home, this method was adapted for use

with interval recording by immersion in the details of the background, self-report and audio data, mimicking the process of integrating and interpreting clinical information.

Therefore, the following process was undertaken by two researchers per family. First, scored hospital and questionnaire data were consulted for an overview of the injury, family circumstances and self-report data. For example, we read that a participant was a 10-year-old girl with a mild leg fracture who lives with both parents and that no one in the family reported traumatic stress symptoms. Next, we read each item response of each questionnaire, especially paying attention to very high or low item scores, as well as subtle differences between family members' responses (e.g., comparing child and parent reporting of specific trauma symptoms). Finally, we read all EAR transcripts and listened to the audio files unless the transcript noted the child was asleep or the snippet contained little speech (e.g. watching television).

Researchers involved in this process were the first author (SNM), as well as two research assistants with at least an undergraduate-level major in Psychology. Each case was discussed until consensus on key themes and quotations was reached between the researchers who had examined the case. This entire process took several hours per family. SNM wrote a brief case report for each family, which was reviewed by the research team. We have given all children aliases, and minor details have been omitted or altered to maintain anonymity.

# 8.4. Results

Here we present the cases of "George", "Anna", "Carmen", and "Holly".

**8.4.1. George.** George was a 10-year-old boy with a mild ankle fracture witnessed by his mother. George lived with both parents and reported high family social support. George admitted few traumatic stress symptoms, and his reported difficulties with concentration were longstanding prior to the injury. His mother reported a number of dissociative symptoms following the injury, but high optimism and high self-efficacy. George's father was above the threshold for Acute Stress Disorder (ASD), and reported moderate optimism and high self-efficacy. George's father had a mental health history in the past three years and endorsed the statement that the injury (that he had

not witnessed) reminded him of a prior event. Both parents rated their family as having balanced cohesion and flexibility and there was close agreement between the parents' responses. George did not complete the measure of family functioning (FACES-IV) due to his age.

Across the weekend of recording, George spent approximately 57% of his waking hours interacting with others. Most interactions were with family – his mother (51%), father (45%) or sibling (41%), and his injury was mentioned in 9% of interactions, mainly indirectly with parents. Both parents were present for most of the recording, which was rare in our sample. The television was on for approximately a third of their day, as the family watched several movies across the weekend.

This family stood out due to their use of humour. This is illustrated by an example below:

FATHER: The advantages of [George]'s broken leg.

MOTHER: I know.

FATHER: When that one's finished we'll break the other one.

CHILD: Hey!

FATHER: So we can keep the handicapped card.

CHILD: Hey!

FATHER: I hope it's recording now.

MOTHER: He's joking, he's joking, he's joking!

During the recording, this family sounded respectful and polite in their communication. For example between parents, saying "thank you" and using a calm tone of voice was common. In one snippet, when George was instructed to go to bed instead of watching another movie, he cried and was told not to use his more negative tone of voice. It appeared that this family valued calm, assertive communication.

George's family demonstrated cohesion and both practical and emotional support. For example, this family frequently offered to help one another. Both parents offered to help George with daily tasks, and George, in turn, expressed a desire to help with dinner, despite a lack of easy mobility. The family spent much time together, were able to bring up the injury in a non-threatening way, used humour and a calm, positive and reassuring tone throughout their interactions. These characteristics could easily be goals for family therapy, as modelling "approach" behaviours (Kassam-Adams, 2014), parental warmth (Asselmann, 2014) and generally responsive parenting (Alisic et al., 2012) may be protective against PTSD. This hypothesis was supported by the follow-up data, where George's traumatic stress symptoms remained low and his mother gave very positive ratings of her own mood and wellbeing.

Alternatively, while humour can be buffer against stress (Kuiper & Martin, 1998), it could also be a defence against talking about difficult subjects. Of note, the recording did not appear to demonstrate the distress George's father reported. Moderate to high parental optimism and selfefficacy appeared to partially explain this, as both parents acknowledged the life disruption of an injury but believed they possessed the skills to cope and be there for their child, likely impacting their consequent parenting behaviour (Jones & Prinz, 2005). Also, given George's father's mental health history, it could be speculated that the family has had some experience with coping with difficult emotions. Nevertheless, the family's coping resources were well demonstrated within the recording.

**8.4.2. Anna.** Anna, a four year old girl, sustained a moderately severe head injury, witnessed by her mother. The family also reported a sequence of personal and health difficulties apart from Anna's injury. Due to Anna's age, no child self-report measures were available. Both parents reported traumatic stress symptoms, including intrusion, avoidance, dissociation and hyperarousal. Anna's mother's score exceeded the threshold for ASD. Both parents reported a moderate level of self-efficacy and low optimism. Anna's parents reported very low levels of satisfaction with their family, but their perceived family flexibility and cohesion were within the normal range. More specifically, Anna's mother reported feeling less cohesive as a family than desired, and Anna's father expressed that their family life was chaotic.

In the EAR recording, Anna interacted with others for 39% of her wake time during the weekend, and the television was on 73% of the time. Of the interactions, 71% were with her mother, 37% with her father, 30% with extended family and 13% with her younger brother. Two percent of interactions were about the injury, and many of these interactions involved the parents explaining part of their experience of the injury, as well as their involvement in the study. The EAR recording demonstrated a mixture of light-hearted moments (e.g. mother and daughter singing a theme song together) and some evidence of marital discord and emotional avoidance (e.g. the father joking that Anna needed to tell her mother to "take a chill pill"). Anna's mother's reported high stress levels were upheld by the recording, where her own financial and health issues came to light, and she was heard crying and raising her voice in several snippets. Her distress was also discussed with Anna:

#### [Mother crying]

CHILD: What did they do to you?

MOTHER: Nothing sweetie, no-one's done anything to mummy. Mummy's done something to someone to get this much bad luck.

Anna's mother reported below average emotional wellbeing at six weeks' post-discharge, which increased to average at the 3-month mark.

Anna's family appeared to be experiencing high levels of stress prior to her injury. Therefore, it remains unclear how Anna's injury further precipitated distress within this family unit. The literature suggests that multiple traumas or stressors may accumulate risk for poor mental health (Breslau, Wilcox, Storr, Lucia, & Anthony, 2004). While the questionnaire data highlighted stress within the family and hinted at the stressors involved, the EAR illustrated the situation further, showing a range of family strengths and weaknesses, including conflict and times of closeness. It was easy to sense hostility between parents, which could have created an atmosphere of tension and emotional insecurity for Anna (Davies & Cummings, 1994). Nevertheless, it is difficult to determine the impact of the injury and family situation on Anna, as we cannot obtain self-report measures for her at her age and she did not speak much in the recording. The low percentage of interactions during the day is of note, as young children tend to spend more time with parents than older children (Milkie, Nomaguchi & Denny, 2015), and Anna apparently spent much time alone during the recording. It could be hypothesised that the unpredictable nature of the emotional climate in the house affected attachment and reduced Anna's perceived ability to disclose thoughts and feelings (Mikulincer, & Nachshon, 1991). The interactions that did occur likely provided Anna with an opportunity to hear her parents appraise the injury, however, there were few opportunities for Anna to express her own emotions with her parents.

**8.4.3. Carmen.** Carmen was a 6-year-old girl who sustained a mild broken arm. Carmen lived with her mother and brother, and Carmen's mother did not witness her injury. Due to Carmen's age, no child self-report measures were available. Carmen's mother reported a history of mental ill-health. At baseline, Carmen's mother reported traumatic stress symptoms above the threshold for ASD, as well as moderate optimism and self-efficacy. She also reported low satisfaction with her family on the FACES-IV. At the 6-week follow up, Carmen's mother reported below average emotional wellbeing, and this increased to above average at the 3-month mark.

Carmen interacted with others for the majority (73%) of her time spent awake. These interactions occurred mainly with her mother (79% of interactions) and brother (69%). Other adults (8%) and her father (2%) were also heard in the recording (via online video call). There were no direct conversations about the injury, but the recording did include a few indirect references (2% of interactions) to the injury in terms of how it affected daily tasks like getting dressed (e.g. Mother: "You can wear your brace if you want to be a bit more comfortable, I don't mind"). Emotions were mentioned in 7% of interactions, often regarding love between family members.

During the recording, Carmen's family was preparing for a holiday. It was also evident that they had recently bought a pet. Carmen and her brother interacted with their mother mainly by making requests and verbalizing their day, e.g. "Mummy, can I pat the dog?" and "I downloaded the game". In the absence of her mother, Carmen took on a somewhat parental tone with the dog. Carmen and her brother, both under the age of 10, also conversed independently and supportively about which items they would pack for their holiday. Across the two days, the mother was heard attending to her children's questions and comments and providing calm, but firm guidance while carrying out day-to-day tasks. Carmen's mother sounded engaged, calm and reassuring.

At times the concept of who was in the family was brought up, as in the example below.

MOTHER: My girl, she is the only one I have, and I never want to let her go. CHILD: [*xxx*] I love my Mum, she is the only Mum I have.

In another snippet, Carmen's brother reflected on who he considered part of their family during a "family cuddle", stating that their new pet, grandparents and father were missing. After including the pet, Carmen's mother replied "this is just our family who lives here" and had mentioned that the hug could be repeated with others present.

This family seemed close-knit. The family spent much of their time together, engaged in every aspect of life together, which may set Carmen up well for adolescence (Milkie et al., 2015). We also saw the strengths of these relationships in how the siblings supported one another throughout the day. Love was expressed openly, and all family members appeared to be available to offer support to one another. Carmen also took responsibility within the family but maintained her childlike interaction style with her mother. The snippets about who made up the family were consistent with parent-child exploration of the family system, thought to especially occur in singleparent families (Poveda, Jociles & Rivas, 2014).

The self-report data and EAR data complemented one another by displaying differences between observed and reported emotion. Despite Carmen's mother's reported distress, we did not hear Carmen's mother articulating her concerns with her children or other adults. Rather, throughout the day she responded to her children's concerns. This "responsive" style of parenting is considered protective against child PTSD, as the mother's symptoms were not evident in her interactions with Carmen, thus reducing the likelihood of shared stress (Alisic et al., 2012; Scheeringa & Zeanah, 2001). However, it is unknown whether Carmen's mother expressed her feelings with others when her children were not around, which have been beneficial for her own mental health.

**8.4.4. Holly.** Holly, a 12-year-old girl, sustained a profoundly severe head injury that was witnessed by both parents. Holly and her parents reported many acute stress symptoms and both parents exceeded the threshold for diagnosis of ASD. Nevertheless, both parents reported being highly optimistic, with high self-efficacy about her recovery and their ability to help her. Holly's reported level of support from family and friends was also very high. Holly and her parents provided responses on the FACES-IV indicating balanced cohesion and flexibility. However, Holly's father reported being less satisfied with their family and level of communication than both Holly and her mother. Holly and her mother's scores were very close on all subscales of the FACES-IV. For example, regarding family communication, Holly's satisfaction level was "high", her mother's was "very high" and her father's was "very low".

Holly wore the EAR for one day, during which she spent 65% of her time interacting with others. Of these interactions, 58% included her mother, 41% included a sibling, 30% friends, 23% other adults and only 13% included her father. Holly attended a friend's party during the recording, which may explain the substantial time spent interacting with friends and adults outside the family. Below is an example snippet of a conversation between Holly and her mother about the party.

MOTHER: Were you inside the whole time?

CHILD: We went outside the backyard for a little bit.

MOTHER: Yep.

CHILD: But that's all really.

MOTHER: What did you play out there or?

CHILD: Oh nothing really. People were just jumping on the trampoline.

MOTHER: Yeah ok, you couldn't do that though. Were you just watching honey or?

CHILD: Yeah. No, not everyone was outside. It was only a couple of people outside.

MOTHER: Ok. Did you feel like you could join in with most things that were happening at the party?

CHILD: Yeah.

MOTHER: Oh that's good.

This transcript depicts Holly's mother enquiring about any risk-taking behaviours, as well as Holly's enjoyment of the party despite obvious limitations due to her injury. Holly's father was more directive in his approach to the party, as depicted in the interaction with Holly prior to the party, below.

FATHER: Just when you're at that party if they're playing games where they're jumping around each other just back off from it ok?

CHILD: Yep.

FATHER: Just sit down. You can talk to them but just -

SIBLING: Don't be running around and -

CHILD: [Sibling's name], [Sibling's name]. I know.

SIBLING: If they're playing basketball just -

CHILD: I know I know I know I know I know I know.

Overall, Holly spent 6% of all interactions talking about the injury or its consequences, e.g. talking about pain, and recounting the injury itself. On average, emotional tone was rated as neutral or slightly positive for Holly and her parents, and there was a trend towards injury conversations being more positive in tone than non-injury-related conversations.

Six weeks later, Holly's traumatic stress symptoms had increased to a mild level, some of which may, though, be attributed to her head injury (e.g. difficulty concentrating). Three months later, Holly's traumatic stress symptoms were minimal. At both follow-up points, Holly's mother self-reported average emotional wellbeing, with fewer difficulties reported at three months. We did not obtain follow up data from Holly's father.

Holly and her parents reported many traumatic stress symptoms following her injury, and it was an event witnessed by both parents. Despite this, their cohesion as a family, Holly's perception of social support, and the outlook of both parents indicated that their psychological resources were rich. The EAR recordings corresponded with the questionnaire data, as Holly reported feeling well supported and the EAR data provided a snapshot of the supportive environment around Holly. The recordings showed how Holly had opportunities to discuss her injury with a range of family and friends and that others generally took a curious and supportive approach, again modelling "approach" behaviours (Kassam-Adams, 2014). Holly's parents also demonstrated their caution, optimism and care. Overprotection can increase risk of PTSD (Williamson et al., 2017), yet Holly's parents demonstrated a parenting style that provided her with flexibility and a degree of independence and choice. For example, despite their concerns for her safety at the party, they did not prevent her from participating in the party and Holly also assured them she would be careful.

It is of note that Holly's father was highly distressed following the injury and also appeared to spend the least time with Holly out of the potential conversation partners. Certainly, taken together with the discrepant scores on the FACES-IV, the EAR data raise, rather than answer questions. These findings raise the question of whether the recordings represented a reduction in father-daughter communication following the injury, potentially indicating avoidance or whether this was an example of the broader finding of fathers interacting less with their children than mothers (Alisic et al., 2017).

#### **8.5.** Discussion

To our knowledge this is the first study to use a combination of sampled naturalistic ambient audio recordings (via the EAR), self-report measures and background data to describe families posttrauma. In keeping with our aims, we described four cases: George, a 10-year-old boy with a broken ankle, Anna, a 4-year-old girl with a head injury, Carmen, a 6-year-old girl with a broken arm, and Holly, a 12-year-old girl with a head injury. We also aimed to identify ways in which this mixed method approach may have implications in clinical settings, which will shortly be explored in more detail.

Overall, the EAR data exposed the observer to information that would be difficult to obtain using self-report alone (Mehl et al., 2012). For example, we were able to determine how much time the children spent with each family member, how the family naturally interacted and especially discussed the injury event, and listen to tone of voice. The mere frequency of interactions between family members showed who spent the most time in the child's vicinity and therefore who might be best positioned to offer support to the child.

The self-report measures, taken together with audio recordings, enabled comparison between reported and observed phenomenon. For Anna's family, the EAR recordings expanded upon self-reports by depicting an atmosphere of distress. We also saw family dynamics that may evade self-report, like members of a family forming a stronger alliance with one another compared to other members of the family. As each family may have a perception of how "normal" their family is, Anna's significant amount of time alone may have been overlooked if we asked the family to report on this.

During the recordings, each family's context was noticeably different. Families differed in activities, outings, television use, and conversation topics. This highlighted the importance of

considering families individually and lends support for *N*-of-1 research with families, and case formulation within therapy, so that interventions are targeted for each family's particular needs (Lundkvist-Houndoumadi, Thastum, & Hougaard, 2016) and trauma symptom trajectory (Hiller et al., 2016).

Within the presented cases, parents modelled emotional expression, advised caution against further injury and encouraged independence. Importantly, parents were responsive to their children's needs, and there were many examples of parental warmth (Asselmann, 2014) and more general approach behaviours, rather than avoidance (Alisic et al., 2012; Kassam-Adams, 2014). Our data supported parents, particularly mothers, as key providers of support, lending support for research and interventions focused on parent-child relationships post-trauma (e.g. Marsac et al., 2013). Siblings also often spent a considerable amount of time with the injured child, indicating they may be an overlooked resource.

The frequency and nature of injury talk highlighted the opportunities for emotional processing of the event, and showed how it was handled by the family. In Holly's family, in particular, we were able to hear how she explained her injury to others and how others responded, thereby inferring her social resources. We sampled many interactions that her parents would not have been aware of (e.g. with friends at a party). By contrast, Anna's case demonstrated a potential lack of opportunity to discuss her own emotions about the injury event, and this was also the case for Carmen's mother.

With the exception of Anna, each case with a parent who exceeded the threshold for ASD demonstrated marked differences in reported and expressed emotion, highlighting that while the parent was stressed, the child was unlikely to encounter this. Parents were observed to regulate their emotions around their child as a support and model, somewhat akin to the findings from a structured observational task by Kichline et al. (2017). Alternatively, parent stress may have been difficult to detect using objectively coded interaction characteristics and may be more obvious to family members with more in-depth knowledge of their own typical interaction styles.

The main strengths of the approach we used might be explained in terms of the potential utility of this information within clinical settings. We imagine that naturalistic data may enhance existing therapeutic interventions in a number of direct and indirect ways. Firstly, naturalistic data on tone of voice, strengths and time spent together may directly provide additional information for case formulation, thereby informing treatment planning. Audio recordings may also enable checking of progress and application of skills in therapy. Listening to recordings with the family may even increase client self-awareness within therapy. Recordings may also enable the perspective of young children to be involved. For example, Anna and Carmen were too young to complete self-report measures, but the EAR enabled the observer to hear what they heard.

More indirectly, the discrepancies between self-report measures and recordings raised questions that may be appropriate for therapy. For example, we wished to know how Holly's time spent with each parent linked to reported satisfaction and communication. In therapy, it may have been appropriate to ask the family how typical the recording was. We also saw how Carmen's interaction styles differed in the presence or absence of her mother – being more childlike with her mother and taking more responsibility in her absence. This difference may have also been worth exploring in a therapeutic context.

Nevertheless, there were some limitations to this research. First, none of the children that we presented reported low social support or exceeded the threshold for ASD at the time of the recording, and we could not obtain reports from children under eight years. Therefore, the information obtained may be different for families presenting to a clinic with a traumatized child. Secondly, the recordings we obtained were short de-contextualized "snippets". These snippets are usually used to aggregate data across families, and lack context to protect the privacy of participants. Therefore, some clinical judgement was used to piece together a picture of the family, but we found that even these snapshots gave the observer a "sense" of the family.

In addition, we mimicked clinical integration of information without a clinical interview or direct observation of the family within the clinic, which are generally present in any therapeutic context with families. Furthermore, the time use and interaction frequency percentages provided by the EAR were interpreted with limited "normative" information. However, these interpretations would undergo natural calibration if these kind of data were to become more common in this context. Lastly, our method took a few hours per family. It has been suggested that it is only a matter of time before technological advances overcome the time associated with transcription and coding (Reblin et al., 2018). Nevertheless, both the practical (e.g. time to review recordings) and ethical concerns (e.g. privacy) of using such a recording device for therapy require further exploration prior to adoption within a clinical setting.

Finally, this article is both exploratory and descriptive, preventing strong generalizations from being made. However, we hope that these cases inspire research questions using naturalistic data with families, especially given that considering the influence of the family is common to many therapies (Josephson, 2008). We suggest that future research employs ecological momentary assessment methods like the EAR to explore family communication, support and strengths within a therapeutic context to better understand the needs and gaps within clinical practice for families.

# CHAPTER 9: PAPER 5: CLINICIANS' PERSPECTIVES ON INNOVATIVE NATURALISTIC OBSERVATIONS OF FAMILIES IN THERAPY

"To literally see and hear ourselves as others do is to achieve an aspect of reality vital to social adjustment" (Czajkoski, 1968, p. 521)

In Chapter 8, naturalistic observational audio recordings by the Electronically Activated Recorder (EAR; Mehl, 2017) were used, in conjunction with background and self-report data, to explore the cases of four families post-injury. Extending upon this, the present chapter sought to explore how naturalistic observational methods like the EAR might be adapted for use within psychological therapy for families. This chapter includes a paper surveying psychologists on their perspectives on their current use and perceived importance, utility, feasibility and ethics of naturalistic observation in therapy (see Appendices L - P for the ethical approval, consent and outline of the study). The case of "Anna" from Chapter 8 was adapted for use within this study. Shortly, as an introduction to this paper from Study 2, I will provide a brief review of naturalistic observational methods to date.

## 9.1. Historical Observational Methods

Observational methods have long been recognized as an important part of the assessment, formulation and treatment evaluation process with families. Family dynamics within the therapy room are frequently observed, as well as structured observations or roleplays. Some examples of recordings include video observation of couples during therapy (Alger & Hogan, 1967) and more recently, video recording has been used to provide feedback to parents of young children, which improved interactions and attitudes toward parenting, over and above what might be gained through talking therapy alone (Fukkink, 2008).

Naturalistic observational methods, like home visits or audio or video recording in the home, became important for behaviourists in the 1970s. For example, one study required

researchers to follow family members around their home with a clipboard and timer to directly observe family interactions (Steinglass, 1979). Similarly, an intermittent audio recording tape was used to evaluate a family intervention (Johnson, Christensen & Bellamy, 1976). Equally, some researchers were concerned that the promise of naturalistic methods might be overstated. Lipinski and Nelson (1974) argued that interval recordings were optimal for high frequency behaviours, but not behaviours with a low base rate. They also raised concerns about observer effects, demand characteristics, and reliability of coding methods.

These concerns coincided with the advent of cognitive behaviour therapy, which is recognised as the dominant evidence-based therapy within psychology. Inherent within this framework is the interrelation between thoughts, feelings, behaviour and physiology within a given situation, rather than behaviour alone (Westbrook, Kennerley, & Kirk, 2011). It is an active therapy in which out-of-session tasks are deemed essential to the generalizability of the therapy to real life.

Given this shift within psychology, attention moved from observational accounts of behaviour, to subjective reports of thoughts and feelings. Within Cognitive Behaviour Therapy (CBT), thought records and diaries are regularly completed to monitor and evaluate thoughts and feelings. These records are recommended to be completed while emotions are "hot" in order to capture the moment most accurately (Westbrook et al., 2011). Of course, in order to do this, clients must have a pen and paper on hand and be in a state to reflect and record their thoughts and feelings, which is not always feasible, even though, if homework tasks are completed, the therapy is highly efficacious (Kazantzis, Deane & Ronan, 2000).

#### 9.2. Technological Advances in Observational Methods

Given the swing toward self-report measures and considering client subjectivity, naturalistic observational methods became less popular (Dahl, 2017). Yet, the necessity for research methods to be rich in ecological validity did not disappear. With the advent of smart phones, Ecological Momentary Assessment methods have shown promise in improving the ecological validity of existing methods by requesting self-reports and other forms of data in the moment (Reblin et al., 2018). These measures can be completed at regular or random intervals, or following specific events, which can be particularly useful for low frequency events like particular topics of conversation (Ebner-Priemer & Trull, 2009). Within family therapy, Ecological Momentary Assessment methods can be used to request individual family members to report on a single event, thus exposing points for potential therapeutic intervention (Smyth & Heron, 2014).

However, if reports are not completed immediately, clients may suffer from recall bias, which may also be influenced by mental biases introduced through mental illness (Piasecki, Hufford, Solhan, & Trull, 2007). In the context of the family, these perspectives on "what happened" and "who said what" can be the focus of arguments. Thus, it appears that real time assessment data improves generalization of skills to everyday life, yet using self-report measures alone can be subject to recall bias and redundant conflict. While a therapy session can sit somewhat outside everyday life, offering the individual or family an opportunity to pause and reflect, completing a thought record enters into the moment, requiring interpretation in the here and now.

Alternatively, for patients with acquired brain injuries, a "wearable automatic camera" (SenseCam) has been used to take a visual diary of key events within an individual's day (Brindley, Bateman, & Gracey, 2011). In this *N*-of-1 study, such a visual resource enabled better recall of events compared to a traditional diary, especially in the context of significant memory problems. These images can be emotionally "hot", allowing more of a sense of immediacy in the therapy room and better recall of details. While for thought records, the salience of the information decays over time, images keep details fresh (Brindley et al., 2011).

Emotional salience is thought to be important for CBT and general behaviour change (Westbrook et al., 2011). This may be why behavioural experiments elicit more belief change than thought records – it is easier to generalize, and uses experiential learning (McManus, Van Doorn, & Yiend, 2012). The same might be said to be true for audio or video recordings, which take advantage of sensory information more likely to elicit emotional memories. Tone of voice and word use are important factors in an interaction that can be difficult to describe and certainly difficult to
capture within a photograph. However, recordings involving audio data may include these variables.

### 9.3. Use of the Electronically Activated Recorder in Clinical Settings

The EAR may overcome several of the issues with self-report measures outlined above (Mehl, 2017). This simple method automatically records audio snippets at regular intervals, making it an unobtrusive tool. It reduces the burden of manually recording daily events or the need to remember to complete a record. It could also serve as a potent reminder of salient interactions. Furthermore, it has shown adequate reliability and individuals appear to habituate to its presence within a few hours (Manson & Robbins, 2017).

Basic feasibility of using the EAR with clinical samples has been demonstrated, as it has been used in the context of family conflict (Tobin et al., 2014), couples with cancer (Robbins, López, Weihs, & Mehl, 2014), and individuals with personality disorders and depression (e.g. Brown, Tragesser, Tomko, Mehl & Trull, 2014; Minor, Davis, Marggraf, Luther, & Robbins, 2018). These and other EAR research studies have explored language, interactions, and time use, which may at different times be a focus of therapy. The method is virtually entirely passive on the part of the client/participant, which has particular advantages for children who are not required to maintain attention, provide retrospective reports or respond verbally to questionnaires.

In therapy, the EAR could be used to collect valuable naturalistic data, providing a snapshot of a client's day, with potential for key examples to be recorded. Furthermore, it might make it possible to literally hear what young children hear, when they are too young to provide verbal reports. It could be used to provide feedback to families that is readily generalizable, and allow for an alternate perspective based on real audio. Similar to single case design research (e.g. Cohen, Feinstein, Masuda, & Vowles, 2014), as we shift away from aggregated data to consider individuals, or even individual families, the EAR could be used to track the effectiveness of an intervention, which encourages evidence-based practice for clinicians and reduces subjectivity to some extent. Yet, application from research to clinical settings requires careful consideration. There are many potential ethical and practical issues to consider, like privacy, data management, legal issues, and time. Therefore, we need to explore these factors present in the zeitgeist of our technological era. The following paper (Mangelsdorf, Conroy, Mehl & Alisic, 2019) explores psychologists' perspectives on the adaptation of the EAR and naturalistic observation in general to psychological therapy with families.

### 9.4. Abstract

Objective: What happens in the home is a key topic of psychological therapy with families, yet direct observation of this behaviour is rarely feasible. Self-report measures can offer insights, however some aspects of "normal" family life can be difficult to articulate. The Electronically Activated Recorder (EAR; Mehl, 2017) is a naturalistic observational audio-recording app that has been used with families in research settings, yet it has never been adapted for therapy. The present study aimed to explore psychologists' perspectives on the use of naturalistic observational methods (especially the EAR) within therapy, as well as their current use of such methods.

Methods: Registered psychologists (N = 69) from seven English-speaking countries completed an online survey. Seventeen of these psychologists also listened to five audio snippets and completed an interview focusing on how the EAR recordings might add to their understanding of a fictitious clinical case, as well as any barriers to use of the EAR.

Results: Naturalistic observation was scarcely used in routine practice by these psychologists who work with children, parents and/or families. Barriers to use included that these methods might be impractical, ethically risky, invalid, unnecessary and potentially uncomfortable for clients and clinicians. However, clinicians also highlighted the potential benefits of these methods for informing formulations, hypotheses and treatment planning through a multimethod approach. The paper discussed management of ethical and practical issues.

Conclusions: The EAR represents a promising tool for therapy with families, however ethical and practical issues must be considered prior to its utilization in clinical practice.

# CLINICIANS' PERSPECTIVES ON INNOVATIVE NATURALISTIC OBSERVATIONS OF FAMILIES IN THERAPY

### 9.5. Background

Families access therapy for a variety of reasons, including stress, conflict, and mental health issues (Heafner, Silva, Tambling, & Anderson, 2016). Often, family members approach therapy with differing levels of willingness, openness and insight. For example, parents may differ in their perspectives on the necessity and perceived efficacy of therapy, and entrenched family patterns may hinder some members from sharing their perspective. Young children may be still developing higher order cognitive, metacognitive and verbal skills, and emotional literacy, which are necessary for articulation of internal states (De Young, Kenardy & Cobham, 2011b). Working with families is therefore complex, as differing needs, perspectives and skill levels are continuously balanced, in real time.

Psychologists are trained to use clinical interviewing, observations and self-report measures to obtain information from and about clients throughout the process of assessment and treatment (e.g. Australian Psychology Accreditation Council, 2010). Self-report measures and clinical interviewing are feasible where clients possess both verbal skills and insight. For young children, observations and parent report are commonly utilized to assess behaviour (Balaban, 2006). In addition, therapists can use observations of family interactions within the therapeutic space for indications of family dynamics at home.

However, it is well known that the method of collecting data may influence the data collected itself (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Both self-report measures and observations may be subject to the social desirability bias, where individuals consciously or unconsciously aim to portray themselves in a positive light (Oberzaucher, 2017). Parents may seek to protect a "good parent" self-image, while also aiming to communicate the severity of their family problems (Bornstein et al., 2015). This has implications for therapy, which relies upon the validity

of information provided for the accuracy and efficacy of formulation and treatment planning. In addition, the clinic environment itself may influence how families behave in idiosyncratic ways.

In contrast to observations within a clinic or laboratory, naturalistic observations are methods in which the family is observed directly or through audio or video recording. As early as the 1970s, methods of using naturalistic observation with families were put forward (Dahl, 2017). The rationale for these methods was that naturalistic observations gave the observer a sense of the family in situ, so that typical dynamics could emerge. At the time, these naturalistic methods were costly, time-consuming, and somewhat intrusive, with observers often physically present (e.g. Steinglass, 1979). However, these approaches were believed to provide an alternative perspective – that of the observer – which could increase validity and illuminate aspects of family life that may not otherwise be easily or readily reported (Oberzaucher, 2017; Richer, 2017). For this reason, a multi-informant, multi-method approach with families is considered best practice (Janssens, De Bruyn, Manders & Scholte, 2005).

More recently, with the advent of smart phone apps, there has been an influx of naturalistic data methods in research, which overcome several of the practical challenges presented by older recording methods, and may be minimally intrusive as smart phones are now part of everyday life (Miller, 2012; Repetti, Wang & Sears, 2013; Timmons et al., 2017). In this article, we consider a smart phone app, the Electronically Activated Recorder (EAR; AKA the "Android EAR" app, formerly, in the previous but now retired iOS implementation, the "iEar" app; Mehl, 2017). The EAR is a naturalistic observational tool used for validated intermittent ambient audio recording in research settings. It can automatically and imperceptibly record short, regular "snippets" of audio information, e.g. 30 second snippets every 5 minutes. The app is optimized to collect data for high frequency behaviours in an unobtrusive way. Past EAR studies found that, on average, participants reduce or cease talking about the recorder within the first 2 hours of wearing the device (Mehl & Holleran, 2007). The intermittent ambient audio sampling method therefore appears to be less

intrusive than continuous recording as the context of interactions is not always captured, and there is no observer present (Manson & Robbins, 2017).

Until now, EAR data have only been used as research data, quantified and aggregated across many families or individuals (Mehl, 2017). For example, the EAR has been used to explore parental depressive symptoms in daily life (Slatcher & Trentacosta, 2011), family conflict (Tobin et al., 2014), and naturally occurring conversations about a child's serious injury (Alisic et al., 2017). However, consideration of EAR data for individual families provides information that may be useful in clinical contexts, including for therapy (Mangelsdorf, Conroy, Mehl, Norton, & Alisic, 2018). The EAR could be used for investigation of antecedents and consequences of a behaviour/interaction (e.g. Tobin et al., 2014), assessment of family functioning (e.g. emotional tone, conflict, time spent together; Alisic et al., 2017), exploration of self-awareness (e.g. Vazire & Mehl, 2008; Sun & Vazire, 2019), and recording clinically-relevant behaviours that cannot be elicited in session (e.g. Slatcher & Trentacosta, 2011).

The possibilities for using the EAR in a therapeutic context with families have not yet been explored, however. While researchers can speculate on the EAR's potential use for psychological therapy, it is important that this does not fall into the gap between research and practice, where it has theoretical but not practical use (Weisz, Krumholz, Santucci, Thomassin, & Ng, 2015). Hearing the perspectives of clinicians in the field is critical to assist with identifying ethical and practical issues that are relevant to psychological practice. We were interested in determining what methods psychologists currently use within therapy with families, what value they may see in naturalistic methods, and how psychologists might creatively adapt the EAR for use in therapy.

The research questions of this study were as follows:

1. How and why do psychologists use naturalistic observation in therapy with families?

2. How could naturalistic observation (e.g. the EAR) be used in therapy with families?

### 9.6. Method

**9.6.1. Design.** The present study was a comprehensive, mixed-method study, including data from both surveys and interviews with psychologists. Ethical approval for this project was obtained from the Monash University Human Research Ethics Committee (number 9081; see Appendix L).

### 9.6.2. Participants.

*9.6.2.1. Eligibility and recruitment.* Psychologists recruited were required to meet the following inclusion criteria: a) holding current registration as a psychologist (including provisional registration) with the relevant national registration board, b) working with families (with at least one adult and one child under 18 years of age), children and young people under the age of 25 years, and/or parents. While the study was originally open to Australian psychologists only (56.52% of the sample), participants were subsequently also recruited from countries which met the English language requirements of the Psychology Board of Australia (Psychology Board of Australia, 2015): The United States or Canada (17.39%), United Kingdom (13.04%), South Africa (5.80%), New Zealand (5.80%), and the Republic of Ireland (1.45%). This was done to reach a wider range of psychologists, both to explore a potentially broader range of perspectives, and for more efficient recruitment.

During the recruitment period (November 2017 to May 2018 for Australian participants, March to May 2018 for participants from other countries), clinicians were invited to participate in the study via personal contacts at psychology clinics and universities, the Australian Psychology Society website, relevant Facebook groups and emails circulated to clinics and individuals where family work was evident. For example, we emailed clinicians and some clinics who, in their online listing, included keywords like "parenting", "family", "children", or "adolescents" in their list of client populations. Psychologists were not compensated for their participation. However, Australian participants were able to claim their time spent on the study as part of their Continuing Professional Development hours, if deemed relevant. One hundred and six psychologists commenced the survey; 3 declined consent, 5 were ineligible, and 29 completed less than 40% of the survey. For the description of results, we included participants whose surveys were at least 60% complete, that is, surveys that contained demographic and background information, with at least the section regarding naturalistic observation completed. This comprised 69 surveys that were at least 60% complete (including 57 fully completed surveys that included specific evaluation of the EAR). Twenty-two of these psychologists consented to be contacted about an interview, 17 of whom completed the interview.

### 9.6.3. Procedure.

*9.6.3.1. Survey.* Clinicians were invited to fill out an anonymous online Qualtrics survey and provided informed consent at the beginning of the survey (see Appendices M, N). The background survey questions requested psychologists to describe their current role, client group and therapeutic approach. The survey then provided brief examples of self-report (e.g. questionnaires, thought records, diaries, parent report) and observational methods (e.g. roleplays in session, interaction tasks, recordings) before clinicians were asked to provide a short description of their use of these methods in clinical practice with child or adult clients. We asked participants how they imagined that naturalistic observation (e.g. audio recordings, home visits) could add to their current clinical work if it were available, as well as the more general potential benefits and downsides of such approaches. In the final section, clinicians were asked to read information about the EAR, listen to a sample 30-second audio snippet and describe their initial impressions of the EAR in an open-ended way. They then rated its potential utility and feasibility for use in psychological therapy on a four-point Likert scale.

**9.6.3.2.** *Interview.* At the end of the survey, clinicians were asked to provide an email address and/or telephone number if they consented to be contacted about participating in an interview. If so, they subsequently provided written informed consent (see Appendix O) and participated either in person or via video call within a few weeks of completing their survey. This interview was audio recorded for transcription purposes. First, a case scenario was presented (see

Appendix P), about which interviewees were then asked a series of questions (e.g. "What are your hypotheses about this family?"). The scenario described a young mother being referred for outpatient psychological therapy for stress and anxiety following her four-year-old daughter's hospital visit due to an accidental injury. The scenario included the mother, her husband, the four-year-old, and her sibling attending the first psychology session and agreeing to an EAR recording at home, following this session. Five de-identified and slightly distorted EAR recordings were then presented in order to simulate this family's home recordings. Through a semi-structured interview, clinicians were then asked to describe their perspectives on the information gained from the EAR recordings that could potentially be used clinically (e.g. "What clinical information did you gain from the recording?"), as well as potential uses or barriers to use within therapy (e.g. "What would you do with this information? What questions would you ask the family?").

Recordings and transcripts that were used in both the survey and interviews were taken from the Ear for Recovery study (see Alisic et al., 2015, 2017). These families included children who had sustained a serious injury and were hospitalized for at least 24 hours at the Royal Children's Hospital Melbourne. In the Ear for Recovery study, the children wore a pocket-sized audio recorder (iPod touch), which contained the EAR app, for a two day period, as a measure of family communication. For the included families, we had relevant demographic, injury, questionnaire and EAR data, as well as their consent to use the data in future research.

**9.6.3.3.** *Analyses.* We used descriptive analyses to synthesize the quantitative survey data (with SPSS Statistics version 24). The interviews were transcribed verbatim into Microsoft Word and both the interviews and short-answer survey responses were coded using NVivo Pro versions 11 and 12 for Windows. Given the novelty of the EAR method and likely varied contexts and opinions of psychologists, we adopted an interpretive description approach to guide the qualitative analysis. Using this inductive approach, we were able to broadly explore the facets of naturalistic observation that clinicians deemed important and salient, with a view to derive clinically-relevant concepts (Thorne, Reimer Kirkham & O'Flynn-Magee, 2004).

Quotations provided below were edited for minor spelling and grammar errors, and participants were assigned a two-digit ID number. Quotations are specified for survey and interview responses by the presence of an "s" or "int" prior to the participant ID, respectively. For example, a quotation from participant 7's survey response would have the ID s07, while their interview would be represented by int07.

### 9.7. Results

**9.7.1. Sample characteristics.** Table 9.1 shows the background data for this sample of psychologists (N = 69), including their areas of specialist endorsement, practice settings, and therapeutic approaches, as well as their typical clients' age groups and presenting problems. The participants were predominantly clinical psychologists working in private practice, with adolescents, parents and/or children over 5 years, within a CBT framework. Chi-squared analyses ( $\alpha = .05$ ) indicated that those who completed the interview did not differ from the full sample of survey respondents in areas of endorsement, client age group, settings, presenting problems of clients, therapeutic approaches, therapeutic approach, or ratings on views about the EAR. The only exception was that the interviewed participants included significantly fewer psychologists who saw clients with neurodevelopmental disorders (n = 4, compared to n = 27 for the full sample),  $\chi^2 = 4.17$ , p = .041.

Table 9.1

## Background Information for Psychologists and their Clients

	n	%
Endorsement		
Clinical psychologists	40	58.0
None/provisional	19	27.5
Counselling psychologists	7	10.1
Clinical neuropsychologists	4	5.8
Educational and developmental psychologists	4	5.8
Health psychologists	1	1.4
Setting		
Private practice	47	68.1
Community outpatient	17	24.6
Hospital outpatient	9	13.0
School setting	7	10.1
Hospital inpatient	4	5.8
Forensic/legal setting	3	4.3
Clinical research	2	2.9
Supervision of psychology students	2	2.9
Crisis team	1	1.4
Disability support services	1	1.4
Non-government organization	1	1.4
Therapeutic Approaches		
Cognitive Behaviour Therapy	61	88.4
Acceptance and Commitment Therapy	34	49.3
Family Therapy	27	39.1
Other therapies	24	34.8
Psychodynamic approaches	18	26.1
Dialectical Behaviour Therapy	16	23.2
Mindfulness	7	10.1
Eye movement desensitization and reprocessing	3	4.3
Systemic therapy	3	4.3
Client Age Group		
Adolescents and young adults (aged 13 – 25 years)	63	91.3
Parents	58	84.1
Children (aged 5 – 12 years)	49	71.0
Non-parent adults	44	63.8
Couples	25	36.2
Infants and toddlers (aged 0 to 4 years)	23	33.3
Client Presenting Problems		
Mood disorders (depression, anxiety, bipolar)	57	82.6
Trauma-related disorders (e.g. PTSD, adjustment)	46	66.7
Disruptive, impulse control and conduct disorders	33	47.8
Obsessive-compulsive disorders (e.g. OCD, hoarding)	33	47.8
Neurodevelopmental disorders (e.g. autism, ADHD)	31	44.9
Personality disorders	29	42.0
Substance use/addictions	25	36.2
Feeding and eating disorders (e.g. anorexia nervosa)	18	26.1
Sleep-wake disorders (e.g. insomnia)	16	23.2
Somatic symptom disorders	15	21.7

### INNOVATIVE NATURALISTIC OBSERVATIONS OF FAMILIES

	n	%
Client Presenting Problems (cont.)		
Gender dysphoria	14	20.3
Dissociative disorders	10	14.5
Elimination disorders (e.g. enuresis)	10	14.5
Psychotic disorders (e.g. schizophrenia)	10	14.5
Sexual dysfunctions/paraphilia	7	10.1
Neurocognitive disorders (e.g. Alzheimer's disease)	5	7.2

*Note. N* = 69, presenting problem categories were taken from the *Diagnostic and Statistical Manual of Mental Disorders – Fifth Version* (American Psychiatric Association, 2013).

**9.7.2.** Current use of naturalistic observation. Figure 9.1 depicts the clinicians' frequency of use of self-report measures (not including clinical interviews), in-clinic observations and naturalistic observation (e.g. audio recordings, home visits) for child and adult clients. Most respondents reported never using naturalistic observation with either children or adults, self-report measures were used at least once in an episode of care by most respondents, and in-clinic observations were conducted every session by most. Those who did use naturalistic observation commonly reported doing school or home visits (27.54%, n = 19), and some audio or video recordings from home (7.25%, n = 5). Regarding self-report measures, participants most commonly used standardized questionnaires or screeners (75.36%, n = 52) and/or thought records or diaries (66.67%, n = 46). Lastly, the most common form of in-clinic observations was roleplays (63.77%, n = 44). There was a general trend towards psychologists being more likely to use observational methods with children than with adults.

Some clinicians reported using techniques that did not fit within the presented definitions (i.e. naturalistic observation being that conducted within a natural environment). For example, when asked to state which naturalistic observation methods they used, seven participants described inclinic observations (e.g. "*We do this via observing family interactions in the clinic*", s08). Similarly, regarding in-clinic observations, both structured (e.g. roleplays) and unstructured (e.g. "*All behaviour is observed*", s67) observations were reported, highlighting the range of interpretations of these descriptors. Finally, six participants included play, drawing and other projective testing as examples of self-report measures.







*Figure 9.1.* Frequency of use of data collection methods in clinical settings per child (striped) and adult (black) client, N = 68.

**9.7.3.** Perspectives on naturalistic observation. Initial impressions of the EAR. Across the survey responses, participants most commonly showed one of three responses; that the EAR might be "*useful*" (s54), "*interesting*" (s65), or "*intrusive*" (s14). When simply asked "How likely would you be to use the EAR in your clinical practice? (With training)", the most popular response on the survey was "*Unsure*" (35.1%), followed by "*Extremely Unlikely*" (24.6%; see Figure 9.2).



*Figure 9.2.* Responses to question "How likely would you be to use the EAR in your clinical practice? (With training)", N = 57.

To provide more detail, Figure 9.3 summarizes responses to several multiple-choice questions about the EAR. The survey results suggested that the respondents viewed naturalistic observation and use of the EAR as potentially useful for therapy, but had doubts about its feasibility and ethical considerations (see Figure 9.3).



*Figure 9.3.* Initial impressions of the (A) utility and (B) feasibility of using the EAR in therapy, N = 57.

The following sections integrate qualitative findings from the short-answer survey responses as well as the interviews.

**9.7.3.1.** *Potential downsides of naturalistic observation.* Considering the relatively low numbers of psychologists using naturalistic observation in their practice, we first consider the downsides of using naturalistic observation. Psychologists reported that naturalistic observations may be impractical, ethically risky, invalid, unnecessary and potentially uncomfortable for clients

and clinicians. For each of these issues, we start with participants' considerations regarding naturalistic observations in general, followed by their thoughts specific to the EAR.

*Naturalistic observations are impractical.* Some of the most common reported downsides of naturalistic observation were the time taken to plan and interpret observations, as well as any potential cost. Psychologists described trade-offs needing to be made between time, cost and benefit to the client, for example one psychologist wrote that they "*would have wanted to complete a home visit with one family, but the logistics and requirements to organize it outweighed using a play-assessment in the clinic*" (s01).

The policies of the work setting were also taken into account. In addition, private practice psychologists working independently were particularly wary of practical considerations, for example: "*currently in private practice as a contractor I never go off-site as there aren't any real procedures in place to assist with this, e.g., pricing, fees for travel time, etc.*" (s04).

Regarding the EAR, psychologists reported that it would be difficult to find time to review audio snippets both within and outside therapy sessions. One interviewee stated, "Who's going to spend the time? A therapeutic session is typically around fifty minutes to an hour and just setting up the device and explaining things, it's gonna take me a good chunk of the hour and going back and analyzing and going over it, is gonna take me some very useful, important time that I could otherwise be spending with the family, as opposed to the recording" (int22).

*Naturalistic observational data may not be valid, useful or necessary.* Several psychologists questioned whether naturalistic observations were really a better approximation of reality compared to self-report and in-clinic observations, especially due to observer effects. One participant wrote, "the observer can't be merely observing but likely has an unknown impact on the behaviour observed" (s34). Psychologists reported that it might be difficult to determine whether client behaviour was truly natural or affected by the knowledge that they were being observed. Clinicians also reported that naturalistic data could be unreliable and subject to situational factors.

Some psychologists further reported that self-report measures and in-clinic observation may be sufficient sources of information, for example, "*I do see how such observation could be beneficial, though I do not see it as critical*" (s57). One participant questioned, "*Is the objective reality always as important as the patient's subjective reality?*" (s60), thus implying that validity or accuracy may not always be a goal of therapy.

A few participants reflected on the potential real-time effects of being recorded. One participant tentatively suggested, "*it could help people to stay in control of their behaviour as they are aware they are being recorded?*" (s13), while another participant questioned whether these types of effects would be sustainable – "*We understand that clients come to us with problems. The EAR gives us the opportunity to 'police' them and I can't help but wonder if the idea that they are being recorded will positively alter behaviour - see Hawthorne experiment. This may be the only benefit, but will it be sustainable without 'Big Brother'?*" (s59).

Clinicians suggested that the short audio snippets recorded by the EAR would not be useful for all settings and they would not use it if they felt it was irrelevant. They also noted that the context of snippets may be hindered by the snippet length and the lack of visuals. Some reported that the recording quality needed improvement in order to minimize background noises and enhance the clinician's ability to distinguish sounds.

"Not having the visual there was a little bit frustrating because you could hear things, and you picture things in your mind, but you may not be accurate," (int39).

"The reason 30 second snippets are the default in EAR research is that it makes it extremely difficult to identify the interaction and context. These are critical for clinical utility," (s34).

There were a few participants who therefore wrote that they believed the EAR was suitable for research only - "seems more useful in sampling behaviour/interactions for research than therapeutic intervention," (s23).

*Naturalistic observation may be too confrontational for clients.* Psychologists noted that, for some clients, confronting certain patterns and trends within their life could carry guilt and shame.

Therefore, they noted the importance of the readiness of the client to enter into this process through their own reporting within therapy.

"Many clients are not yet ready to reveal or acknowledge their own contribution to maintaining a presenting complaint and that is valuable information in itself. The audio/video recordings may thus, make the client feel exposed prior to being ready and often these discomforts and boundaries can be observed in how the client presents in therapy, rendering the video/audio recording not as valuable, rather just as additive collateral to strengthen clinical hypothesis" (s52). In addition, it was suggested that using recording equipment may carry stigma with it and decrease openness with others present.

*Naturalistic observation poses an ethical risk.* Within the ethical considerations reported, psychologists were primarily concerned about privacy and confidentiality and difficulties in obtaining consent. For example, one participant stated that naturalistic observations may "be seen as an invasion of privacy" (s59). More specifically, home visits posed a potential physical risk for the clinician, as well as looser boundaries as clinicians are welcomed into an informal, home environment.

Psychologists highlighted the importance of informed consent if using EAR recordings within therapy. They suggested that consent could be gathered from all family members and that care should be taken to ensure no coercion, as one participant wrote, "*so I would be happy to recommend it, but would never push it on a family, and would want to make sure that everyone gives informed consent first*" (s14). They reported that it would be important to "*present a strong rationale for its use before suggesting it*" (s69) and ensure that its utility was balanced with ethical considerations, for example, "*I think you need to balance between using it as a source of information, and potentially being a little invasive. You know, you don't want to err too far onto the side of just listening to everything that they're doing*" (int38).

Psychologists noted that EAR data in particular could also be misused by clients intending to portray others in a certain light or simply share information inappropriately.

"And then there's the problem of legal issues coming up like the couple decide to divorce, and they call you to testify about child custody. You have data that one of them thinks is favorable so they tell their lawyer about it, then your data get subpoenaed" (int23).

Clinicians also highlighted the need for more trials in different settings, clear therapeutic outcomes and a clear process of using the EAR prior to its adoption within clinical settings.

"I wouldn't ask my clients to use a tech like this in therapy unless I had some empirical evidence of improved treatment efficacy," (s35).

"So, I think you'd need to publish some or collect some data on different settings," (int23).

*"If it is easy to use, and the result format gives clear guidelines, then it could be useful,"* (s29).

*Naturalistic observation places additional strain on the clinician.* Several clinicians also reported the additional strain naturalistic methods may place on the psychologist. For example, clinicians might need additional training for "*skills in recording observations accurately and systematically*" (s21), or might simply find that it is "*difficult to get client to agree and carry out*" (s65). Naturalistic methods were also reported to have a lack of control and structure, and the clinician would need to take care to pay attention to ethical considerations, boundaries, and "*taking care not to make assumptions*" (s56) based on naturalistic data.

*9.7.3.2. Potential benefits of naturalistic observation.* Despite the downsides outlined above, psychologists reported many potential benefits of naturalistic observation. These benefits appeared to relate mainly to the assessment and diagnosis process in three ways: through providing the clinician with a deeper and richer understanding of the client and their environment, through the use of a multi-method approach, and to provide evidence to test hypotheses. In addition, psychologists suggested that naturalistic observational methods might enhance treatment and that naturalistic observations might occur in a less stressful setting for clients. These themes will shortly be discussed in turn, again commencing with participants' considerations regarding naturalistic

observations in general, followed by thoughts specific to the EAR. The following quote summarizes these themes.

"[Naturalistic observations] provide a more comprehensive assessment process in which information is gathered across multiple contexts. This is likely to enhance formulation and may lead to hypothesis generation. Formulations may therefore be more reliable and treatment plans can be tailored to the individual's setting, i.e., if the clinician has observed the naturalistic setting, he or she may be able to provide more specific, targeted recommendations / treatment strategies." (s06).

Naturalistic observation enhances understanding of the client's context. Psychologists suggested that the clinician's understanding of the client would be enhanced in some general and specific ways, for example, by providing a "better sense of who the client and family are, better understanding of the context they live in" (s24) and the ability to "increase the quality and understanding of the client in therapy, allow an observation to be revisited for further depth and insight, enable greater understanding of roles and interactions in families, allow insight into the real world and context of where the client operates and appreciate the intensity of their situations" (s21). Another participant reflected, "Every time I have done a home visit (which I did sometimes when working for a hospital) I wondered why I didn't do this every time I met a family. Felt like I understood them so much more - their context. Helps with triangulation and formulation." (s24).

More specifically, clinicians highlighted that observing the home environment, routines and dynamics would broaden the perspective of the clinician and add to the formulation. This, in turn acknowledged the individual nature of each client's situation. *"From a therapy perspective, there is also the benefit of seeing how they interact with people in their home, respond to unexpected situations/people, a chance to understand their routines, orderliness/structure or chaos of the home environment and it increases the ease of introducing new routines directly in their environment"* (s13).

Regarding the EAR, psychologists suggested that it could be useful for "*measuring family dynamics*" (s05) and generally gathering information about the home context, for example "*using* 

snippets of family interactions to get objective data regarding family interactions, behaviour problems and strategies used" (s12).

*Naturalistic observations can complement self-reports.* Participants suggested that combining self-report and naturalistic observation might enrich assessment through observing clients within and outside therapy — "Information gathering can occur in more than one context, thereby enriching the assessment process" (s06). It was suggested that these different modes could be compared to assess and influence a client's level of self-awareness. "Obviously additional material in any format is useful, especially if it gives a client insight into hearing their own behaviour and observing the effect this has on their significant others" (s29).

Compared to reporting alone, respondents commonly described the "*potential for greater ecological validity*" (s06) of naturalistic observation; that they could see "*how things really are*" (s05). They felt that naturalistic observation was, simply, more "natural", and that this might help clients to feel more relaxed, and act more authentically than in therapy. One participant wrote that using naturalistic observation "*you can see things that the client/s might not know/can't/won't talk about*" (s08). Finally, naturalistic observation was considered by some to be "*potentially less biased*" (s35) than self-report measures, and was also described as "*objective rather than influenced by client's subjective view*" (s53).

The interview participants reported that in the case scenario, the EAR recordings added to the other clinical information by providing examples for discussion which may not have been otherwise brought up in therapy.

"...a lot of these sort of situations may or may not have been brought up in therapy, because I think often with these stressors that are present during the week, they feel incredibly stressful at the time, but then you can kind of forget about them and you don't really talk about them in therapy, even though they're actually quite important in showing, I suppose, where are those pressure points when you're arguing, when you're having arguments within the family and how they can really elevate your stress levels," (int42). The recordings also provided further information about the family's stress levels, which appeared to go beyond what had already been reported.

"You know first I read the case study and I was like "oh, this person's stressed" but when you hear the clips it's like 'oh'. It adds to how severe the stress might be within that family and how that's affecting the way they're interacting," (int36).

*Naturalistic observation provides evidence to test hypotheses.* Participants suggested that naturalistic observation "*provides great evidence-based information into their everyday lives*" (s29) and can "*help test out a greater number of hypotheses about the presenting problem and/or diagnosis so that it could better inform effective treatment*," (s14). Other participants wrote of the utility of seeing a person in multiple contexts and overcoming recall bias through direct observation to "*confirm hypotheses from the clinical setting*," (s57).

Hypothesis testing was an approach some interviewees applied to the case example, for example: "...what I observed is that the parents ... it kind of fits with a bit of a hypothesis that they aren't really working together, that there's a bit of a kind of criticism from each other to each other," (int16). An interviewee suggested that the data could be useful, "potentially very useful data, because without that, you're just guessing, as a clinician...[...] ... But I also think that it could be an incredibly efficient means of working out some of the patterns that might be going on," (int07).

*Naturalistic observation can enhance ongoing treatment and treatment planning.* Clinicians described the potential to "*develop better understanding so that interventions can be more tailored*," (s17). Some psychologists suggested that the comprehensive assessment offered by naturalistic observational techniques could inform treatment targets and therefore treatment planning as a whole. More specific interventions were suggested including using observations as "*opportunities to give immediate or delayed feedback*" (s33), discussion (e.g. "*They may provide useful information for us to discuss within the therapy space*," s38) and even real-time

interventions. It was suggested that this could potentially support generalization of therapy to everyday life.

Participants suggested using the EAR to "...*review the data with the family in session and use it as a tool to open up discussion*," (s69). One participant noted how powerful a real-life example could be in framing discussions — "I mean it's one thing to talk to parents about that in an educational way but to actually, gently take apart an example from their own life might be quite *impactful*," (int36).

Others suggested that clients may find it useful to both reflect and receive feedback on their interactions, for example "*it is also useful for later reflection with the carer or child regarding what I have noticed in their method of interacting or responding to certain situations, which can then be processed and explored in session*," (s15).

*Naturalistic observations may be less stressful for clients.* Participants mentioned that naturalistic observations, particularly home visits, may be more comfortable and less stressful for the client who may be more relaxed at home than in a therapeutic environment, allowing the clinician to "… see the dynamics of parent-child interactions within the home, where the child may be more comfortable and behave consistently with parent-report than in the clinic," (s01). Other potential benefits for clients were that the use of naturalistic observation could increase "client engagement" (s25), "help with willingness to try new behaviours" (s44) and potentially increase "client access to treatment" (s25).

*9.7.3.3. Ideas for use of the EAR in therapy.* Participants were asked to comment on management of both practical and ethical issues relating to use of the EAR within therapy. The suggestions related mainly to managing the scheduling of recordings, as well as informed consent and data management. These issues are explored in further detail below.

*Optimal scheduling of recordings.* Several participants suggested that it might be useful to schedule the EAR recordings around particular parts of the day, for example, "*I would potentially use it in a similar fashion to using a thought record - discuss with the client the periods of their day* 

which are associated with their presenting problems (e.g. work meetings cause anxiety which causes stuttering) and as such have them turn it on during those periods of time. Setting up some sort of diary or schedule for its use would be effective," (s15). One participant noted that it would be important to consider the most important times for recording so as to minimize the amount of data collected.

Several participants suggested having recordings at various parts of the day (e.g. "I'd probably want snapshots at various times of the day, so I wouldn't want to be getting it all in the morning, for example, and I think you'd want snapshots at various times of the day over ideally at least a couple of weeks", int06). Participants also reported they would suggest recordings at least on the weekend, or a mixture of weekend and weekday days (e.g. "...if you have school-aged children, for example, you'd want it to be on the weekend to see what the structure and routine is like at home but also what the stressors are like before school, - like who's making lunches, who's getting dressed, what the routine is, if there is one...", int26). Participants most commonly suggested that they could not know for sure as it depended on the family, for example, "It would probably depend on what the family think and what they think would give a good indication of what's going on for them as well. I'd probably wanna keep it open and negotiate with the family, if possible..." (int69).

Taking care with informed consent and data management. Psychologists highlighted the importance of informed consent, ideally from all family members, and that care should be taken to ensure no coercion, as one participant wrote, "so I would be happy to recommend it, but would never push it on a family, and would want to make sure that everyone gives informed consent first," (s14). They reported that it would be important to "present a strong rationale for its use before suggesting it," (s69) and ensure that the EAR's utility was balanced with ethical considerations, for example, "I think you need to balance between using it as a source of information, and potentially being a little invasive. You know, you don't want to err too far onto the side of just listening to everything that they're doing," (int38).

When asked how to approach the consent process, participants highlighted the need for the clinician to ensure that families were well-informed, including that the data management process, rationale, withdrawal rights, and confidentiality were well explained. One psychologist said that clinicians should "*Just be as open as possible*...*I'd probably wanna do both, have a conversation in the session, and then provide written information for the family to review and think about, have the opportunity to ask and answer questions," (int69).* 

Regarding data management, participants explored the need to ensure recordings could not be subpoenaed or shared beyond the therapeutic space — "...*the recordings are only for therapeutic use, you know that you're not providing it to them to sort of play to their mother-in-law to say 'oh, see what he said', sort of thing [laughs],*" (int38). Others highlighted the importance of the family having control over their data and having clear processes in place.

"...I'm sure, you know, there would be questions around like, 'can we delete um the audio recordings?', like 'how long-?', like 'where is it stored?', 'where does it go?', 'when it's deleted, is it actually deleted from like, servers?'...[...] ... it doesn't sound like this device is something or the app, it's not something that you can control in terms of turning on and off, around what snippets you can play and, I guess that you can give them control around what they can and cannot delete," (int42).

"Like I would wanna have my processes really down pat before I suggested something like this, like the storing of the information, how long am I gonna keep it for, all of that kind of thing," (int69).

Similarly, some interviewees suggested that consent should occur before and after the recordings, "Well, I think probably the only reasonable way to do it would be to show them the snippets, the recordings and say 'now, do you again consent to these?' And I would let them take out the ones that they didn't consent to," (int51). Interviewees also noted the importance of avoiding recording outsiders and gaining verbal consent with extended family, for example "...if the family's highly social, like has several people coming into their home at different times of the

week, I think I would try to avoid recording when they have outsiders in the house, other than relatives, like grandparents. I would ask them to get the verbal consent of the grandparents after they've explained what they're doing," (int23).

### 9.8. Discussion

The present study explored the perspectives on naturalistic observational techniques, especially the EAR, within the therapeutic context. We found that clinicians rarely used naturalistic observational techniques. When they did, it was often because this was routine within their setting. In summary, while naturalistic observational methods were considered potentially useful and informative by most clinicians, they raised concerns about the practical and ethical considerations of using such techniques, as well as the validity and necessity of the data, and the comfort level of the client(s) and clinician.

Considering and incorporating a new tool within psychological practice requires additional time, training and mental load for clinicians who may already be overwhelmed by present demands in practice. The majority of psychologists within the sample worked in private practice or outpatient settings, which may indicate a sample who lacked team support or processes in place to attempt home visits or audio recordings. Therefore, it is no surprise that psychologists may consider innovative methods an uncomfortable and uncertain prospect. The finding that a quarter of the sample were "extremely unlikely" to use the EAR in therapy, highlights that, for some, their resistance to such methods was strong, without necessarily knowing very much about the tool. More generally, the field of psychological assessment is one that has typically been resistant to change (Groth-Marnat, 2009).

In addition, some psychologists were unsure whether naturalistic data would truly approximate reality or yield useful data. Specifically, those who raised concerns about observer effects likely saw that the value of gaining a different perspective through naturalistic observation was dependent upon the validity of these observations. While observer effects cannot be eliminated, past research has suggested that naturalistic observational methods are unlikely to significantly alter entrenched family rhythms (Jacob, Tennenbaum, Seilhamer, Bargiel, & Sharon, 1994) and that particularly for the EAR, participants tend to habituate to its presence within a few hours (Manson & Robbins, 2017).

Yet, naturalistic methods may not always be indicated, and it is part of the skill of the therapist to discern their utility with each family. For some aspects of therapy, self-report measures may be a sufficient approximation, and it is therefore important to consider the characteristics of the client group and assessment questions in selecting methods. For example, young children or cognitively impaired individuals may find observational methods a useful adjunct to self-report measures (e.g. Brindley, Bateman, & Gracey, 2011), and aspects like warmth may be equally detected by self-report and observational methods (Janssens et al., 2005). Conversely, many parents may not be ready to acknowledge their contribution to the presenting problem, and exploring these issues can be a key part of the therapeutic process that may be hastened by naturalistic methods (Brown, 2008). Therefore, a multi-method approach to therapy is warranted (Janssens et al., 2005).

Psychologists' views on measurement techniques may also have stemmed from their training, client group or choice of treatment paradigm, which was CBT in most cases. Psychologists appeared to continue to think from these existing frameworks, for example there was a participant who considered using audio recordings much like a thought record. In fact, clinicians commonly described use of the EAR within therapy in terms that might be compatible with CBT, as relevant examples could be used for feedback and discussion within therapy, much like the use of video observation in cognitive therapy for social anxiety disorder (Warnock-Parkes et al., 2017).

While reports of methods currently used in therapeutic contexts were generally consistent with the presented definitions in each category, some psychologists did not clearly distinguish between different types of measures. For example, some clinicians reported their in-clinic observations as "naturalistic" observations, thus indicating that in-clinic behaviour was believed to be the same as or representative of behaviour in everyday, naturalistic settings. However, this assumption may be misleading (Dahl, 2017). It could be interesting to explore whether clinicians maintain sensitivity to how foreign the clinical setting may feel for clients and how much clients themselves can monitor or alter their behaviour while in therapy. In addition, there have been differences between reported and observed affect in everyday life for individuals diagnosed with Borderline Personality Disorder (Brown, Tragesser, Tomko, Mehl, & Trull, 2014), implying that the impact of the therapeutic setting needs to be accounted for. Triangulation between naturalistic observations and self-report measures may therefore provide added benefits above routine assessment methods (Alisic, Barrett, Bowles, Conroy, & Mehl, 2016; Mangelsdorf et al., 2018).

Regarding the practicalities of using the EAR in clinical settings, more research is needed, especially as these practical issues can often determine choice of method over and above clinical utility (Piasecki, Hufford, Solhan, & Trull, 2007). For example, questions raised about data management, recording quality and a more structured protocol require further exploration. These questions might inform further development of the EAR or other apps for use within clinical settings. Additionally, the psychologists' recommendations for more research and a stronger evidence-base behind naturalistic methods are encouraging, as research has indicated that psychologists are typically more likely to use clinical judgement and client feedback than research to inform their work (Gyani, Shafran, Rose & Lee, 2015).

The ethical issues raised by psychologists were akin to those that have been explored within research settings with families (e.g. Margolin et al., 2005). These considerations are not unique to the EAR method, as wearable video cameras have similar potential application to CBT and ethical considerations which are not "insurmountable" (Murzyn & Williams, 2018, p. 8). Rather, such ethical issues require careful consideration of methodology, rather than exclusion of observational methods altogether. These issues have been discussed elsewhere (e.g. Kelly et al., 2013; Robbins, 2017). As mentioned by one psychologist, a balance is required between ethical, practical and therapeutic factors within therapy. The costs and benefits must be analysed for each family.

Similarly, the interviewed participants who had more time to reflect on the process and elaborate on their views, did not advocate a "one size fits all" approach, but rather that each

family's needs and context needed to be taken into account. They considered that the individuality of each family would guide the rationale for use of the EAR, its frequency of use, as well as how it was discussed and explored in the clinic. If these methods can provide a greater context and quickly enhance the understanding of the clinician, this might have implications for the accuracy of formulations and the consequent efficiency of therapy.

A key focus for the research agenda, moving forward, might be how clients would feel about using naturalistic observational methods in therapy. While EAR research suggests basic feasibility for use with families (Alisic et al., 2017), it is unclear how these findings regarding tolerance for the method might compare with attitudes within the therapeutic space, when families are potentially more sensitive and vulnerable. There is some evidence to suggest that psychologists can overestimate the discomfort clients feel about recordings (Shepherd, Salkovskis, & Morris, 2009). As video feedback has been effective with families in therapy (Fukkink, 2008) and with adult clients with social anxiety disorder (Warnock-Parkes et al., 2017), it is possible that audio recording would be similarly received. In addition, because of a lack of direct comparison studies, it remains unclear whether naturalistic observations offer information over and above what can be gleaned via self-report measures and in-clinic observations in therapy, and if so, for which kinds of clients and which sorts of presenting concerns.

There were several limitations of this study. While the recruited psychologists were heterogeneous in terms of experiences and backgrounds, there was a bias toward Australian participants, possibly due to better contacts with local networks, a longer recruitment period and more visibility of the research team's institutions mentioned in the invitation email. Second, the survey was conducted at a time when the General Data Protection Regulation (GDPR) was instigated within Europe. For European participants and possibly others too, with the GDPR being prominent in the media, there may have been a higher than usual sensitivity to privacy issues and data management. Third, we asked psychologists who hardly ever use naturalistic observation to evaluate it, using their imagination. It is possible that interviewees perceived more of a benefit to

the EAR recordings than they might have in a typical therapeutic context, as they had not received non-verbal cues within the fictitious first session, only written information, which may have inflated the difference that the EAR made to their understanding of the family.

In summary, this study explored the use of, and perspectives on naturalistic observation and specifically on the potential utility of the EAR within psychological therapy with families. Most psychologists did not currently use naturalistic methods due to practical and ethical considerations, but could see their potential utility in providing a richer and more comprehensive assessment, which could inform treatment planning with families.

### **CHAPTER 10: INTEGRATED DISCUSSION**

This integrated discussion aimed to examine the findings of the thesis as a whole, as well as the strengths, limitations and potential clinical and research implications of the research. The chapter is organised according to each research question outlined at the beginning of the thesis (see Chapter 1) and will commence with a brief review of the aims of the research.

### 10.1. Review of Aims

The first aim of this thesis was to explore how parents and children interact after a serious injury and how the characteristics of these interactions might relate to child and parent traumatic stress and wellbeing. These aims were addressed by papers in Chapters 6 and 7, using data from the Ear for Recovery study. These relationships were further illustrated by case descriptions presented in Chapter 8.

The second aim of the thesis was to explore the current and potential use of naturalistic observations (including the EAR) within psychological therapy with families. Registered psychologists were surveyed and interviewed on this topic (Chapter 9). In addition, the case descriptions of families within Chapter 8 were examined for their potential clinical utility.

### **10.2. Interpretation of Findings**

**10.2.1. Quantity and tone of voice of post-injury parent-child interactions.** The present study offered insights into estimated proportions of spontaneous trauma talk within daily life for families, where they had not been asked to alter or focus their normal communications. These findings set a baseline for how much naturalistic injury talk occurs close to discharge from hospital, thus providing a context for any recommendations made about appropriate use of this time. On average, we found that children spoke with any conversation partner or group for about half their day (Chapter 6). It has been found in other studies, that elicited trauma talk tended to be longer than time spent talking about neutral topics, implying perhaps that parents spend more time processing a potentially traumatic event with their child compared to neutral events (Bauer et al., 2005; Sales et al., 2003). However in our study, across all conversations, there was a small, but significant average

proportion of interactions about the injury (11% of interactions; Chapter 6), equating to a "therapy hour" per day. To look at it another way, for most families, most conversations appeared unaffected by the injury. This is somewhat surprising given the salience of a recent hospitalisation, or may be an indicator of avoidance. However, it has also been suggested that families might spend more time talking about a traumatic event during structured observations as the trauma is clearly the focus of the study (Bauer, Burch, Van Abbema, & Ackil, 2007) and that perhaps life is more mundane than we recall (Mehl, Robbins & Deters, 2012).

Nevertheless, there was much variability within the Ear for Recovery sample, as the values of injury talk ranged from 0 to 65% of interactions (Chapter 6). Each family was unique, and in order to capture some of this variability and the rich, "fly-on-the-wall" data afforded by the EAR, we presented four cases descriptions of families with full data within Chapter 8. Our data may also suggest that parents were responsive to their child's needs, rather than striving for a particular amount of communication (Alisic, Boeije, Jongmans & Kleber, 2012).

Furthermore, it was important to consider *how* parents were talking about the injury, not just how long it was talked about. It appeared that when the injury was brought up, families spoke positively. Illustrating this, overall tone of voice was rated as more positive during injury-related communications, and included more talk about emotions, compared to other conversations (Chapter 6). Of course, it is difficult to know if even the positive valence of conversations was intended to avoid or dismiss difficult emotions associated with the event. Yet, taken together with the moderate correlation between maternal tone of voice and optimism (Chapter 7), it is possible that emotional tone conveyed something of the mother's positive expectations for recovery, which was especially evident in injury-related conversations. Although, further research would need to be conducted in larger samples to validate these preliminary findings.

**10.2.2. Relationships between parent-child interactions and parent and child wellbeing.** Longitudinally, the aforementioned naturalistic injury talk appeared to be a help, rather than a hindrance. This was suggested by a small correlation between direct conversations about the injury

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and fewer child emotional problems at three months post-injury (Chapter 6). In general, associations between interaction characteristics and child wellbeing were stronger 3 months post-injury, compared to 6 weeks, highlighting that these relationships may take some time to develop. Likewise, there did not appear to be a link between baseline child or parent traumatic stress symptoms, parent self-efficacy and interaction time or tone (Chapter 7), perhaps again because these relationships might develop over time. For example, structured observations have revealed significant associations between mothers' baseline trauma narratives and child trauma narratives six months later (Bauer et al., 2007). Therefore, it remains to be explored whether parent-child interactions would influence PTSS and trauma talk over time, as our follow-up measures were focused on general child wellbeing and we took recordings at one time point. It may also be important to consider individual trauma trajectories within exploration of these relationships (Hiller et al., 2016)

Additionally, it has been suggested that while the family context may be important for the development of child PTSS, parent anxiety may be more important than family functioning for the development of parent PTSS (Gewirtz, DeGarmo & Medhanie, 2011; Patiño-Fernández et al., 2008). In our study, father acute stress increased with days in hospital and mother acute stress increased with child injury severity (Chapter 7). Therefore, parents may have been more affected by the practical intrusion or perceived severity of the injury, rather than the consequent interactions with their child. Pre-existing stressors may also play a role, as for the one case ("Anna") where parent stress was evident within the recording, the family had several pre-existing stressors which may have lowered their ability to self-monitor around the child (Chapter 8).

Regarding the other three of the four cases (Chapter 8), parents reported trauma symptoms but did not demonstrate this distress clearly around their children in the recordings. One study suggested that trauma symptoms may bias parents toward perceiving their own parenting as harsher or deficient, while in observational studies this is not evident (Samuelson, Wilson, Padrón, Lee, & Gavron, 2017). This highlights the importance of the measurement method in exploring these subtle relationships. Similarly, we did not present any families that clearly fit the potentially harmful parent behaviour described by the relational model of PTSD (Scheeringa & Zeanah, 2001). However, our sample criteria also excluded those with a history of social issues (Chapter 5), thus potentially predisposing the sample toward families that were less likely to display seriously problematic behaviour. Therefore, it is possible that parents simply effectively shielded their children from their distress in most cases.

# **10.2.3.** Parent gender differences in interaction time, tone, traumatic stress and wellbeing. Within our sample, an average of half of the child's injury conversations involved the mother, compared to one quarter with the father. This difference was in line with overall parent gender differences in interaction time in this sample (Chapter 7), whereby mothers spent around

double the time interacting with their children than fathers did. However, the direction of this association is unclear as it is unknown whether parents or children initiate these conversations, or both. Nevertheless, recent research has suggested that mothers continue to have more caregiving responsibility within the home compared to fathers (Craig, 2006; Sperling & Repetti, 2018), which could have been amplified by additional injury-related care. It would be worth exploring such differences between parents, as compared to a control group in future studies.

On the other hand, Milkie et al. (2015) differentiated between two important parental functions - "engaged" time, where verbal interactions may occur and "accessible" time with children, where the parent may be present but not interacting. It is possible that due to a lack of visuals, there were times when the fathers were present and available, but silent. This may explain why in one study using naturalistic video recordings, mothers and fathers were observed in equal proportions with their children on the weekend (Sperling & Repetti, 2018). It is also possible that where parents take a team approach, their individual contributions may seem less relevant. Although, it has also been suggested that fathers offer a unique contribution to the family and may typically be more involved in play than caregiving (Lewis & Lamb, 2003), however this particular difference was not observed within our sample.

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Notably, fathers who spoke less during the recording were also less likely to return questionnaires (Chapter 7). This may be an indication of a general lack of engagement, or even avoidance. Although, we also did not differentiate between biological and step-parents within our sample, biological fathers are reported to be more involved (Pleck & Hofferth, 2008). Within the case descriptions which required full data per family (Chapter 8), one case depicted an equally involved father (see: "George"), another a family with a single mother (see: "Carmen"), and two families where fathers were substantially less present than the mother (see: "Anna" and "Holly"), which was most common in this sample.

There were also demographic differences for children — mothers of daughters spent significantly more time interacting together than mothers with sons, and older children spent less time with their parents overall (Chapter 7). These child developmental and parent gender differences were comparable to those found in a non-clinical sample of parents who completed time use surveys (Milkie et al., 2015). While time use surveys are more prone to subjective biases or memory failures than observational methods, these findings could still indicate that the injury did not greatly alter the typical gross proportions of time spent in various activities in the home, although we did not have pre-injury recordings with which to compare the findings for each family.

Regarding relationships between child and parent PTSS, child acute stress was associated with mother acute stress, while father acute stress was not significantly associated with either child or mother acute stress (Chapter 7). This may be explained by greater mother-child interactions and therefore a greater opportunity for shared processing, compared to fathers (Chapter 7). Similarly, in other studies, children have reported feeling closer to their mother than father (Lewis & Lamb, 2003). Parents coping in different ways could promote adaptive alternatives to children (Goldbeck, 2001) and provide children with support even when one parent is hindered by PTSS. Furthermore, apart from parents, the case descriptions (Chapter 8) showed that children were potentially influenced by peers, siblings, extended family and other adults. Therefore, the cumulative effect of

these interactions might offer support to the child (Bauer et al., 2007). It is also possible that other, unmeasured variables might contribute to these relationships.

Even though fathers seemed somewhat disconnected, there was still a small proportion who met criteria for ASD. We did not detect clear parent gender differences in acute stress, optimism or self-efficacy. This highlights that the acute period following a child hospitalisation is stressful for both parents. However this finding may also have been due to a lack of power as significantly more mothers returned questionnaires compared to fathers (Chapter 7). To add to this, there were larger numbers of mothers who exceeded the cut-off value for ASD, compared to fathers, which was in line with reports that mothers tend to report more emotional upset than fathers (Holt, Jensen, Dyb, & Wentzel-Larsen, 2017).

Furthermore, in Chapter 7, we noted the lack of differences in rated tone of voice between mothers and fathers. This highlighted that most interactions were neutral in tone within the family home, regardless of who was speaking. This finding contrasts another study that observed that mothers delivered more negative commands like "Stop shouting!" (Sperling & Repetti, 2018, p. 330) compared to fathers. In our study, such commands would likely have been rated with a negative tone. It is possible that such acute, emotional moments happened, but were averaged across a large number of snippets. This may have been even more significant for mothers who had a greater number of interaction snippets compared to fathers, and therefore a greater potential to dilute the influence of "hot" moments.

**10.2.4. Clinical information gained from the EAR.** Following our focused analysis on parent-child interactions after a serious injury, we sought to explore the broader implications of the EAR method within therapy with families. The case series (Chapter 8) highlighted some of the potential clinical utility of the information gained from the EAR, including a "snapshot" of daily life, family dynamics, and collection of information that otherwise may be difficult to obtain. These cases highlighted differences in the family context, including aspects which may have been so "normal" and unnoticed to those comfortable with their home context that they may have remained
unreported. The cases provided examples of parenting strengths, injury talk, and broader social supports. The cases also provided opportunities to compare reported and expressed emotion and trauma symptoms.

Within the Clinicians' Perspectives study (Chapter 9), interviewed clinicians were exposed to an adaptation of the "Anna" case from Chapter 8. It was worth noting the similarities and differences in how the recordings were interpreted in each chapter – in the case series (Chapter 8) the focus was on the impact of the injury, the family's pre-existing stress levels, and interpreting overall interaction figures. For the psychologists, their focus was on the stress levels of the mother, marital discord and risk of domestic violence, potentially demonstrating their predisposition toward considering urgent clinical matters (Chapter 9). Although, they were exposed to fewer snippets (5 in total) which may have biased their impressions, this number of recordings has been sufficient to inform accurate ratings of behaviour in a past study (Holleran, Mehl, & Levitt, 2009).

**10.2.5.** Psychologists' use of and perspectives on naturalistic observation in therapy. The psychologists within the Clinicians' Perspectives study noted the potential benefits of using naturalistic observational methods like the EAR in therapy. They suggested that these methods might aid in understanding the clients better, complementing existing self-report methods, testing hypotheses, sparking discussion within therapy and improving self-monitoring and self-awareness. However, it was found that psychologists rarely used naturalistic observation in their practice, and where they did, it was dependent on practicalities and routines within their setting. Some psychologists were hesitant to use these techniques due to such practicalities, doubts about the validity or necessity of the data, ethical issues, and the comfort of the client and clinician. These findings have been discussed in-depth in Chapter 9.

# 10.3. Strengths and Limitations of the Research

The present study was novel and innovative, through use and consideration of a naturalistic observational tool, the EAR (Mehl, 2017). The Ear for Recovery study was a rich, mixed methods study, with longitudinal data. While past studies used self-report measures (e.g. Milkie, Nomaguchi

& Denny, 2015), and structured observational tasks (e.g. Kichline, Kassam-Adams, Weiss, Herbers, & Marsac, 2017), including elicited narratives (e.g. Bauer et al., 2005; Sales, Fivush & Peterson, 2003) to explore family communication, the present research was able to describe family life postdischarge as it unfolded at home, offering insights into the quantity of interactions that would have been difficult to estimate using non-naturalistic methods. Particularly, these data set a baseline for future research on family interactions, providing preliminary normative data on time use, language and interactions. The findings of naturalistic, exploratory research may at times seem obvious, yet these investigations are important so as not to take our assumptions about families as facts (Dahl, 2017), and also to provide evidence when normalising families' experiences. We would not know how families talk about the injury naturalistically, without such methods. Another strength of the study was the inclusion of fathers, who are often omitted from research with children, whether through study design or lack of engagement with research (Phares, Lopez, Fields, Kamboukos, & Duhig, 2005).

Nevertheless, there were limitations to the present research. EAR recordings were obtained at one point in time so as not to overburden families or place additional costs on the research team. However, as a result we did not have pre-injury recordings to compare with, or a sense of the interactions that may have taken place while the child was still in hospital. We might have expected a higher rate of injury conversations at hospital while surrounded by medical staff and constant reminders of the event, and perhaps we missed hearing important parent-child interactions within this acute period.

Studying families within the injury context had advantages, as families could be accessed for recruitment through the hospital, and time could be calculated from a discrete trauma "event". However, it remains unclear how ongoing issues or repeated trauma exposure might have altered family dynamics. In addition, the dataset contained few details of prior traumatic events for parents or children, and a parental trauma history is particularly thought to influence parenting (Cunningham & Renk, 2018). Each injury occurred in a unique situation, and while all children and

parents were exposed directly or indirectly to the potentially traumatic nature of the child's injury, not all parents were present during the child's trauma, which can alter the meaning of the trauma for parents and potentially influence their distress (Holt, Cohen, Mannarino, & Jensen, 2014).

Furthermore, the sample was relatively homogenous, consisting of mostly Australian, English-speaking, two-parent families. As alternative family structures are becoming more common (Poveda, Jociles & Rivas, 2014), it is important to conduct research which represents the arrangement of families within society. Additionally, we did not explore differences between stepparents and biological parents, and there may be differences in interaction styles (e.g. Schrodt, Soliz & Braithwaite, 2008). We also did not collect baseline SDQ data (Chapter 6) or obtain sufficient follow-up acute stress scores (Chapter 7) to facilitate comparison across all three time-points. For the case series in Chapter 8, two of the three coders were undergraduate students who did not have clinical training in psychology. Therefore, their perspectives may have been limited to an undergraduate level of knowledge when evaluating the cases. This was managed by the inclusion of registered psychologists within the author team who also reviewed the case descriptions.

Finally, exploratory, non-experimental, cross-sectional research does not lead to knowledge about causal relationships, therefore many of the relationships found within this research require replication with larger samples and a control group. The small sample size and reduced power in the Ear for Recovery dataset was a significant limitation, which prevented predictive analyses like Multiple Regression from being performed. In addition, corrections were not applied for multiple comparisons, and significance thresholds were not adjusted due to the exploratory nature of the research (see Moran, 2003). It could be beneficial for future research to further explore the shape of the interaction data, considering alternative statistical approaches, including Poisson Regression, and other moderating variables. Particularly, future studies could explore child gender, ISS, the presence of a parent at the time of the injury, and presence of an ASD diagnosis as moderators of interaction characteristics and outcomes.

The Clinicians' Perspectives study included surveys and interviews from registered psychologists from seven English-speaking countries. The variability of psychologists' treatment modalities, levels of experience, and settings offered a range of perspectives on using naturalistic observations within psychological therapy. However, this study could have been improved upon by including trials of using naturalistic observational tools like the EAR within therapy, so that clinicians did not need to rely solely on their imagination. Further strengths and limitations of this study were explored in Chapter 9.

### **10.4.** Theoretical and Clinical Implications

**10.4.1. Theoretical implications.** The theoretical implications of the present body of research relate mainly to the theories linking serious injury, traumatic stress and parent-child interactions (i.e. Marsac, Kassam-Adams, Delahanty, Widaman, & Barakat, 2014; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Scheeringa & Zeanah, 2001). The following implications are presented with the caveat that further replication is required prior to strong conclusions being made. As outlined in Chapter 2, serious injury can act as a precipitant to traumatic stress symptoms. In our sample, the rates of children meeting criteria for ASD were comparable with larger studies within the injury context (Kassam-Adams et al., 2012) and several parents met the clinical criteria for ASD (Chapter 7). Thus, our study supported the idea that serious injury acts as a potentially traumatic event for both parents and children. Additionally, in support of the theorised role of the parent-child relationship in supporting child emotion regulation (Morris et al., 2007; Scheeringa & Zeanah, 2001), we found that child and parent PTSS were related, particularly for mothers, who spent significantly more time with children than fathers, in our sample. Therefore, our research also supports the idea that the relationships between child and parent PTSS might arise through parent-child interactions.

Somewhat surprisingly, within these parent-child interactions, trauma symptoms did not appear to be directly evident within the quantity or tone of interactions, or even in many cases the qualitative sense of the family's interactions. Therefore these aspects of interactions did not clearly

model what children might naturalistically observe of trauma symptoms (Morris et al., 2007). Although, optimism emerged as a construct that may at times be evident in tone of voice, thus highlighting new avenues for research into the influence of optimism on post-trauma parent-child interactions. More clinically, direct conversations about the injury event overall appeared to help rather than hinder children, and were associated with better emotional outcomes longitudinally. This is akin to the theory behind exposure-based therapies like trauma-focused cognitive behaviour therapy which lead families to directly approach the trauma in a supported way (Cohen, Deblinger, & Mannarino, 2018). Furthermore, the injury talk within our sample generally had more emotional content and positive tone of voice than other interactions, indicating that these facets might aid processing.

**10.4.2. Implications for clinical practice.** Regarding injury talk, a simple question remains: should clinicians encourage more injury talk following an injury? Our research does not support a particular amount of injury talk being beneficial, neither does it support the idea that parent-child interactions about the injury were unhelpful or damaging toward the child. Clinicians may therefore choose to enhance these existing interactions at home by providing parents with recommendations on what to expect, thus normalising injury talk post-discharge. Clinicians may also discuss the potential benefits of talking openly and supportively about difficult events, while providing children with an opportunity to express their thoughts and feelings (Goldwin et al., 2014). Of course, it appears to matter *how* families talk about the injury. While the injury talk within our sample appeared helpful, clinicians may need to pay attention to other factors like optimism. Perhaps families that are finding it difficult to speak positively about the future would be less likely to find injury talk helpful, and it might then be better to access resources outside the family.

This research also highlighted that while fathers appeared less engaged verbally in the home, many still reported significant traumatic stress regarding their child's injury and it remains important to engage men in therapeutic interventions. The EAR provided a way for fathers to participate passively, without needing to return questionnaires or attend a therapy session. Therefore, its use within therapy, particularly with fathers, requires further exploration. On the other hand, our research may suggest that because mothers are around more often, interventions with mothers alone may still be beneficial for the family.

Regarding use of the EAR within therapy, clinical significance must be balanced with practical demands (Dunn et al., 2011). We learned that naturalistic observation is rarely used within therapy, for a number of reasons, many of which may be overcome through technological advances, and a careful protocol. One study found that therapists were more concerned about recordings being distressing for clients to listen to than clients themselves (Shepherd et al., 2009). Therefore, it would be important to gain the perspectives of families within this process. It may also be beneficial for psychologists to maintain understanding of the impact of different assessment methods on the type of information they obtain, as well as how foreign a therapeutic environment can feel for clients.

Clinicians may feel unsure about these methods, as they feel observational methods make them distant and cold (Richer, 2017). Yet, for families it may well work both ways; they may perceive the benefits of being able to demonstrate to their therapist what family life is like or find it too intrusive, and this may alter their compliance with such methods. Given that video feedback has been used with families in therapy, it is possible that audio recording may seem even less intrusive (Fukkink, 2008). It is likely that perspectives will also differ across families, therefore it would also be important to determine which populations such methods might be best suited for.

**10.4.3. Implications for future research.** Adapting a research tool like the EAR for therapeutic settings requires further research and refinement. As it stands, it is difficult to suggest how families might receive the EAR in therapy. While the EAR has been used in research with individuals with personality disorders and depression (e.g. Brown, Tragesser, Tomko, Mehl & Trull, 2014; Minor, Davis, Marggraf, Luther, & Robbins, 2018), as well as families or couples in sensitive contexts (Robbins, López, Weihs, & Mehl, 2014; Tobin et al., 2014), we do not yet know

if families would have different perspectives on the EAR if its use was for therapeutic purposes (i.e. for the clients themselves) versus for research.

Moreover, families may have unique ideas of what information they would like to bring to therapy, and how a naturalistic observational tool could help them to communicate their daily struggles with their therapist. Families may be able to choose snippets that best represent their issues, or benefit from an increase in self-awareness through listening to recordings (e.g. Warnock-Parkes et al., 2017). In future studies, families currently in therapy could be asked to use the EAR, surveyed on their reasons for using or not using it, and then such a study could explore its impact on therapy from the perspectives of both the family and clinician. This could shift the present data on psychologists' perspectives from being purely hypothetical, to more empirical.

Furthermore, the data analysis phase of the Ear for Recovery study was extensive and required statistical knowledge, as well as some creativity (see Chapter 5). Prior to adaptation to therapy, the data analysis phase of using the EAR needs to be refined so that clinicians can more easily obtain the information that they need. We would need to identify important snippets and reduce mundane or redundant snippets. Furthermore, as was suggested by clinicians in our study and past research (e.g. Dunn et al., 2011), we would need to refine the method of use of the EAR to address both ethical and practical issues through a clear protocol. It is possible that newer developments in technology will only make the practical processes easier (Miller, 2012), but our data protection and legal management skills need to develop concurrently.

Furthermore, we need more work to identify just what the EAR is useful for in therapy – with whom and for what types of interactions, likely high frequency or highly salient interactions that could be easily identified based on tone, volume, number of words, or the time of day. We would need to trial use of the EAR with families in clinical contexts, for example to evaluate an intervention in conjunction with self-reported symptom reduction. We imagine this might be useful for young children or individuals with acquired brain injuries who may struggle with recall and reporting methods (e.g. Brindley, Bateman, & Gracey, 2011).

Regarding our more specific work with families post-injury, we suggest collecting comparison data in order to more easily classify and differentiate families amongst the variability that is present. For example, Scheeringa and Zeanah's (2001) relational model could be operationalised in daily life, so that "withdrawn" parenting could be more closely understood. With our existing EAR data, it would also be possible to explore a micro-analysis of word choice using Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, Boyd, & Francis, 2015) software, which was beyond the scope of the present investigation. This software can count words in certain predetermined categories. Using LIWC, we could explore proportions of emotion words and other aspects of language like tenses (as in Lagattuta & Wellman, 2002).

In addition, while we sampled family interactions, we did not consider the intentions of family members or how they felt about their interactions, unlike other EAR research that has combined EAR and Ecological Momentary Assessment methods (e.g. Sun & Vazire, 2019). It could be valuable to explore whether families in fact avoided talking about the injury at times, whether parents were intentional in their division of roles within the home and what their emotions were at given points, compared to their expression. It could also be interesting and informative to explore activity choice, which can be important in behavioural activation, and how this might be linked to interactions and emotions across a day.

Finally, there is a need to consider longitudinal trauma trajectories (as in Hiller et al., 2016) and how these might relate to parent-child interactions over time, therefore EAR recordings at multiple time points may be beneficial. Many of our findings would benefit from replication in larger samples, to explore relationships between tone of voice and optimism, the impact of siblings, family composition, culture and socio-economic status.

## **10.5.** Conclusion

This thesis included consideration of naturalistic, parent-child interactions after a child's serious injury, as well as the application of naturalistic observational methods like the EAR to therapeutic interventions with families. These data set a baseline for future studies in the fields of

trauma, family interactions, and Ecological Momentary Assessment methods. We found that the injury was spoken about in a small but significant proportion of interactions. Mothers were most commonly present with children, and the EAR method allowed both quantitative and qualitative analysis of these interactions. Psychologists rarely use naturalistic observational methods in practice, but were able to articulate some of the perceived benefits and obstacles that may inform future research within this area.

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#### **APPENDICES**

### **Study 1: Ear for Recovery**

Appendix A	Ethical approval certificate from Royal Children's Hospital (2013)
Appendix B	Ethics renewal certificate from Royal Children's Hospital (2016)
Appendix C	Ethical approval certificate from Monash University
Appendix D	Parent consent form
Appendix E	Child consent form
Appendix F	Parent questionnaire
Appendix G	Child questionnaire
Appendix H	Participant EAR diary and information sheet
Appendix I	Participant demographic questionnaire
Appendix J	Ear for Recovery coding spreadsheet
Appendix K	Ear for Recovery coding manual

### Study 2: Clinicians' Perspectives

Appendix L	Ethical approval certificate from Monash University
Appendix M	Participant explanatory statement
Appendix N	Participant survey and consent form
Appendix O	Participant interview consent form
Appendix P	Case scenario and interview questions

APPENDIX A: ETHICAL APPROVAL CERTIFICATE FROM RCH (2013)



The Royal Children's Hospital Melbourne 50 Flemington Road Parkville Victoria 3052 Australia TELEPHONE +61 3 9345 5522 www.rch.org.au

### RCH HUMAN RESEARCH ETHICS COMMITTEE APPROVAL

HREC REF. No:	33103 A			
PROJECT TITLE:	Ear for Recovery: An observational study on parent-child communication and psychological recovery after injury in children aged 3 to 16 years			
DOCUMENTS APPROVED:	PGIS v3 dated 11 July 2013 PIS v3 dated 11 July 2013 PGIS (control) v3 dated 11 July 2013 PIS (control) v3 dated 11 July 2013 Information Sheet v3 dated 11 July 2013 Child Questionnaire (Injury) v2 dated 18 June 2013 Parent Questionnaire (Injury) v2 dated 18 June 2013 Parent Questionnaire (Control) v1 dated 15 May 2013 Child Questionnaire (Control T1) v3 dated 11 July 2013 Child Questionnaire (Control T3) v1 dated 14 May 2013 Child phone interview (6 week) v1 dated 10 May 2013 Child phone interview (3 month) v1 dated 10 May 2013 EAR evaluation v1 dated 13 May 2013 Comparison Group letter v2 dated 18 June 2013 Study response slip v2 dated 18 June 2013 EAR information and diary v2 dated 17 June 2013 Demographics and contact details (injury group) v1 dated 10 May 2013 Flyer v2 dated 18 June 2013 Flyer v2 dated 18 June 2013 Protocol v4 dated 19 July 2013			
PRINCIPAL INVESTIGATOR:	Eva Alisic			
DATE OF ORIGINAL APPROV	/AL: 23 July 2013			
DURATION:	36 months			
DATE OF APPROVAL EXPIRY	7: 23 July 2016			
SIGNED:	– 23 July 2013			
CONDITIONS: The annual reporting of this study must specifically include a summary of any third party issues and Researchers must provide evidence that the study team has effectively dealt with any such issue.				
	ED SUBJECT TO THE FOLLOWING CONDITIONS:			

#### APPENDIX A: ETHICAL APPROVAL CERTIFICATE FROM RCH (2013)



The Royal Children's Hospital Melbourne 50 Flemington Road Parkville Victoria 3052 Australia TELEPHONE +61 3 9345 5522 www.rch.org.au

- 1. Must comply with the <u>Investigator's Responsibilities in Research Procedure</u> and other Campus Research Policies and Procedures
- 2. Any proposed change in the protocol or approved documents or the addition of documents must be submitted to the Human Research Ethics Committee (HREC) for approval prior to implementation, including:
  - flyers, brochures, advertising material Increase in recruitment target
  - The Principal Investigator must notify Research Development & Ethics of:
  - Any serious adverse effects of the study on participants and steps taken to deal with them.
    - Any unforeseen events (e.g. protocol violations or complaints).
      - Investigators withdrawing from or joining the project.
- 4. A progress report must be submitted annually and at the conclusion of the project.
- 5. RCH HREC approval must remain current for the entire duration of the project. If the project is not completed in the allocated time a renewal request must be submitted to the Research Development & Ethics. Investigators undertaking projects without current HREC approval risk their indemnity, funding and publication rights.

#### **CLINICAL TRIAĽŚ**

3.

- 6. Must comply with Good Clinical Practice (GCP)
- 7. Must report all internal (occurring in RCH participants) Serious Adverse Events (SAE) to the sponsor and the RCH HREC within 72 hours of occurrence.
- 8. Must report all Suspected Unexpected Serious Adverse Reactions (SUSARS) to the Therapeutic Goods Administration (TGA) (for sponsored studies the sponsor may take this responsibility).

# APPENDIX B: ETHICS RENEWAL CERTIFICATE FROM RCH (2016) ETHICS APPROVAL

29 June 2016



Dr E Alisic Emergency Research Murdoch Childrens Research Institute

Dear Dr Alisic

# Project Title: Ear for Recovery: An observational study on parent-child communication and psychological recovery after injury in children aged 3 to 16 years

#### **RCH HREC Reference Number: 33103D**

I am pleased to advise that your request for an extension has received ethical approval from The Royal Children's Hospital Melbourne Human Research Ethics Committee (HREC).

The HREC confirms that your proposal meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). This HREC is organised and operates in accordance with the National Health and Medical Research Council's (NHRMC) National Statement on Ethical Conduct in Human Research (2007), and all subsequent updates, and in accordance with the Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95), the Health Privacy Principles described in the Health Records Act 2001 (Vic) and Section 95A of the Privacy Act 1988 (and subsequent Guidelines).

#### HREC Approval Date: 29 June 2016*

Please note the HREC are no longer issuing pre-determined approval periods. Ethical approval is now ongoing, subject to the submission of an annual report on the anniversary of approval.

#### Participating Sites:

Ethical approval for this project applies at the following sites:

Site I	Name
•	The Royal Children's Hospital Melbourne
•	Murdoch Childrens Research Institute

#### **Approved Documents:**

The following documents have been reviewed and approved:

Document	Version	Date
Annual Report and Renewal		28 June 2016

#### **Conditions of Ethics Approval:**

- You are required to submit to the HREC:
  - An Annual Progress Report (that covers all sites listed on approval) for the duration of the project. This report is due on the anniversary of HREC approval. Continuation of ethics approval is contingent on submission of an annual report, due within one month of the approval anniversary. Failure to comply with this requirement may result in suspension of the project by the HREC.
    - A comprehensive Final Report upon completion of the project.
- Submit to the reviewing HREC for approval any proposed amendments to the project including any
  proposed changes to the Protocol, Participant Information and Consent Form/s and the Investigator
  Brochure.
- Notify the reviewing HREC of any adverse events that have a material impact on the conduct of the research in accordance with the NHMRC Position Statement: *Monitoring and reporting of safety for clinical trials involving therapeutic products May 2009*.

#### APPENDIX B: ETHICS RENEWAL CERTIFICATE FROM RCH (2016)

Notify the reviewing HREC of your inability to continue as Coordinating Principal Investigator.

 Notify the reviewing HREC of the failure to commence the study within 12 months of the HREC approval date or if a decision is taken to end the study at any of the sites prior to the expected date of completion.

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- Notify the reviewing HREC of any matters which may impact the conduct of the project.
- If your project involves radiation, you are legally obliged to conduct your research in accordance with the Australian Radiation Protection and Nuclear Safety Agency Code of Practice 'Exposure of Humans to Ionizing Radiation for Research Purposes' Radiation Protection series Publication No.8 (May 2005)(ARPANSA Code).
- The HREC, authorising institution and/or their delegate/s may conduct an audit of the project at any time.

Yours sincerely



#### **Kelly Hoffman**

Research Governance Manager Research Ethics and Governance The Royal Children's Hospital Melbourne Phone : (03) 9345 5044 Email : <u>rch.ethics@rch.org.au</u> Web : <u>www.rch.org.au</u> APPENDIX C: ETHICAL APPROVAL CERTIFICATE FROM MONASH UNIVERSITY13



#### Monash University Human Research Ethics Committee (MUHREC) Research Office

#### **Human Ethics Certificate of Approval**

This is to certify that the project below was considered by the Chair of the Monash University Human Research Ethics Committee. The Chair was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number:	CF13/2515 - 2013001322		
Project Title:	Ear for recovery: An observational study on parent-child communication and psychological recovery after injury in children aged 3 to 16 years		
Chief Investigator:	Dr Eva Alisic		
Approved:	From: 4 September 2013	To: 4 September 2018	

# Terms of approval - Failure to comply with the terms below is in breach of your approval and the Australian Code for the Responsible Conduct of Research.

- 1. Approval is only valid whilst you hold a position at Monash University and approval at the primary HREC is current.
- 2. Future correspondence: Please quote the project number and project title above in any further correspondence.
- 3. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
- 4. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.



Professor Nip Thomson Chair, MUHREC

cc: Prof Roderick McClure, Prof Vicki Anderson, Dr Franz Babl, Dr Rowena Conroy, Ms Helen Jowett, Dr Matthias Mehl, Dr Silvia Bressen



# Information statement and consent form

#### PARENT/GUARDIAN INFORMATION STATEMENT AND CONSENT FORM

HREC Project Number:	33103		
Research Project Title:	Ear for Recovery		
Principal Researcher:	Dr. Eva Alisic, Hon	orary Fellow, Murdoch (	Childrens Research Institute
Version Number:	5	Version Date:	01/10/2014

Thank you for taking the time to read this **Information Statement and Consent form**. This document is 5 pages long. Please make sure you have all the pages.

You and your child are invited to participate in a research project that is explained below.

#### What is an Information Statement?

These pages tell you about the research project. It explains to you clearly and openly all the steps and procedures of the project. The information is to help you to decide whether or not you would like your child to take part in the research.

Please read this Information Statement carefully. You can ask us questions about anything in it. You may want to talk about the project with your family, friends or health care worker.

Participation in this research project is voluntary. If you do not want your child to take part, you do not have to. You can withdraw your child from the project at any time without explanation and this will not affect their access to the best available treatment options and care from The Royal Children's Hospital Melbourne.

Once you have understood what the project is about, if you would like your child to take part please sign the consent form at the end of this information statement. You will be given a copy of this information and consent form to keep.





#### 1. What is the research project about?

After injury many children have some stress reactions like bad dreams or trying to avoid thinking about what happened. These are normal reactions and for most children they will decrease naturally over time. However, some children may develop long-term emotional difficulties.

Many researchers have studied the risk factors for having these difficulties but there is not much knowledge on protective, or success factors. We want to know what helps children to recover successfully so we can actively support this.

Earlier research has suggested that support from friends and parents plays an important role. We aim to have a closer look at this support by asking a large group of children and parents questions about this support and their wellbeing, and by recording families' daily life for a short period of time.

#### 2. Who is funding this research project?

This project is funded by the Netherlands Organisation for Scientific Research (NWO).

#### 3. Why is my child being asked to be in this research project?

We are asking you and your child because your child is aged between 3-16 years and has been admitted to The Royal Children's Hospital after an injury.

#### 4. What do we need to do to be in this research project?

This study has four parts:

1. Wearing an iPod-recorder for 2 days after your child is discharged from the hospital

Within 4 weeks after discharge, we would like your child to wear a special iPod recorder for two days in a row. The iPod does not record all the time: it randomly records snippets of sounds (e.g. voices) for 30 seconds at a time for about 10% of the total time (90% of the time it does not record; you will not know when it records). The iPod cannot be used to listen to music or play games and your child does not need to wear it to bed or at moments you do not want something to be recorded. Your child cannot wear the iPod to school. They will need to wear the iPod visibly, with a coloured sticker to show participation in the study. The research team will plan with you to come to your home, or a public place that is convenient for you, to give you the iPod and to collect it again after the recording. We hope the recording will help us learn more about the positive and negative impact an injury has on children after they get home from hospital.

2. Questionnaire

In this part of the study, we will ask you to complete a pen and paper questionnaire at your convenience, shortly before or after the recording. We will ask you about your stress reactions to what has happened, how you deal with them, and about how your child has reacted to the injury. The questions will take you 20 minutes to complete. If your child is old enough and able to answer questions, we also ask your child about their stress reactions, how they deal with them, and the support they experience from family and friends. You will also be asked to fill in a simple diary, indicating what your child was doing during the weekend, and who they were with. The questions will take your child 15 minutes to complete. If you wish, we can do the questionnaire as an interview.

3. A telephone interview six weeks after your child has been injured

After 6 weeks, we would like to complete a telephone interview with you and with your child if they are able to participate. We will ask your child about wellbeing, stress symptoms, and what they thought of the study. This will take about 25 minutes. We will also ask you about your child's stress symptoms and for your feedback on the study, which should take about 10 minutes.

4. A telephone interview three months after your child has been injured.

After three months, we would like to complete a telephone interview with you and with your child if they are able to participate. We will ask your child about wellbeing, stress symptoms, and what they thought of the study. This will take about 25 minutes. We will also ask you about your child's stress symptoms and for your feedback on the study, which should take about 10 minutes.

As part of this study, we will access your child's hospital medical record to collect information on your child's

#### injury, including the severity and cause of the injury.

Your child will be informed that they will be participating in the study and what that means for them. If your child is able to consent, we will obtain consent from them as well.

#### OPTIONAL CONSENT

We would like you to consider giving your permission for us to contact you about future research projects that may be suitable for your child. Giving your consent for this means you are happy to receive information about future research, it does not oblige you to taking part. Please tick the appropriate box on the consent form if you agree to this or not.

#### 5. What are my child's alternatives to taking part in this project?

You and your child do not have to take part in this project if you do not want to.

If you take part and change your mind, you and your child can stop at any time without telling us why. If you withdraw from the project we will use the information that is already collected from you, unless you tell us not to.

Your decision will not affect any treatment or care your child gets, or your family's relationship with The Royal Children's Hospital.

#### 6. What are the possible benefits for my child?

There are no direct benefits for your child. To thank you for taking the time to participate in our project we will provide your family with \$50 in vouchers after completion of the study.

#### 7. What are the benefits for other people in the future?

This study will provide information on how parents support children after injury. We will use this information to develop tips for families on how to best care for their children after they have been in an accident.

#### 8. What are the possible risks, side-effects and/or discomforts?

We do not anticipate there to be any major risks in this study. It is possible that some of the questions may cause distress for some children. If your child feels anxious about any of the questions, they do not need to answer them. We can stop the questionnaire or interview at any time and give your child a break. You and your child can decide whether to continue with the questions or not. We can help find appropriate services for your child if you would like us to.

We do not expect your child to feel any discomfort from wearing the iPod for two days.

#### 9. What are the possible inconveniences?

The inconveniences of the study include the time to fill out the questionnaires, wear an iPod and complete the telephone interviews.

#### 10. What will be done to make sure my child's information is confidential?

Any information we collect for this research project that can identify you will be treated as confidential. We can disclose the information only with your permission, except as required by law, e.g., if your child's safety may be compromised.

The following people may access information collected as part of this research project:

• the research team involved with this project, who are based across The Royal Children's Hospital, The University of Arizona, and Monash University. The de-identified data may be shared with members of the research team at these locations via password-protected hardware or password-protected online data transfer.

• the RCH Human Research Ethics Committee

The questionnaires, the recordings and the interviews will be re-identifiable. This means that we will remove your child's name and give the information a special code number. Only the research team can match your

child's name to their code number, if it is necessary to do so. This information will be stored securely in the Emergency Department office at The Royal Children's Hospital Melbourne (RCH) / Murdoch Childrens Research Institute or at the Monash Injury Research Institute (Monash University).

The information from which your child's name is removed will be stored on password-protected hardware of the research team. This information (i.e. the recordings, questionnaires, interview information and injury information) will be stored in a databank. This means that in the future, other research projects can be conducted using this information. These projects may have aims that we cannot yet foresee and/or that are unrelated (e.g., there may be researchers wanting to study noise levels in families' homes). We are therefore asking for 'unspecified' consent for future research of the data. Your information will remain confidential and research projects will need to be approved by a research ethics committee.

We will keep the information at least until the youngest participant turns 25 years old.

In accordance with relevant Victorian privacy laws, you have the right to access and correct the information we collect and store about your child. Please contact us if you would like to access the information.

When we write or talk about the results of this project, information will be provided in such a way that you and your child cannot be identified.

**11. Will we be informed of the results when the research project is finished?** We will send you a summary after the study has been completed.

If you would like more information about the project or if you need to speak to a member of the research team in an emergency please contact:

Name: Dr. Eva Alisic

**Contact telephone:** 0416 542 039

If you have any concerns about the project or the way it is being conducted, and would like to speak to someone independent of the project, please contact:

Director, Research Development & Ethics, The Royal Children's Hospital Melbourne on telephone: (03) 9345 5044.

#### **CONSENT FORM**

HREC Project Number:	33103		
Research Project Title:	Ear for Recovery		
Version Number:	5	Version Date:	01/10/2014

- I voluntarily consent for me and my child to take part in this research project.
- I believe I understand the purpose, extent and possible risks of my own and my child's involvement in this project.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this project has been approved by The Royal Children's Hospital Melbourne Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I understand I will receive a copy of this Parent/Guardian Information Statement and Consent Form.

#### OPTIONAL CONSENT

I do not consent to be contacted about future research projects.
------------------------------------------------------------------

Child's Name

Parent/Guardian Name

Parent/Guardian Signature

Parent/Guardian Name

Parent/Guardian Signature

Date

Date

Date

<u>I have explained the project to the parent/guardian</u> who has signed above, and believe that they understand the purpose, extent and possible risks of their child's involvement in this project.

Research Team Member Name	Research Team Member Signature
Note: All parties sig	ning the Consent Form must date their own signature.



### Information statement and consent form

#### PARTICIPANT INFORMATION STATEMENT AND CONSENT FORM

HREC Project Number:	33103		
Research Project Title:	Ear for Recovery		
Principal Researcher:	Dr. Eva Alisic, Hor	norary Fellow, Murdoch (	Childrens Research Institute
Version Number:	4	Version Date:	10/03/2014

Thank you for taking the time to read this **Information Statement and Consent form**. This document is 5 pages long. Please make sure you have all the pages.

You are invited to participate in a research project that is explained below.

#### What is an Information Statement?

These pages tell you about the research project. It explains to you clearly and openly all the steps and procedures of the project. The information is to help you to decide whether or not you would like to take part in the research.

Please read this Information Statement carefully. You can ask us questions about anything in it. You may want to talk about the project with your family, friends or health care worker.

Participation in this research project is voluntary. If you don't want to take part, you don't have to. You can withdraw from the project at any time without explanation and this will not affect your access to the best available treatment options and care from The Royal Children's Hospital Melbourne.

Once you have understood what the project is about, if you would like to take part please sign the consent form at the end of this information statement. You will be given a copy of this information and consent form to keep.





#### 1. What is the research project about?

After injury many young people have some stress reactions like bad dreams or trying to avoid thinking about what happened. These are normal reactions and for most youths they will decrease naturally over time. However, some youths may develop long-term emotional difficulties.

Many researchers have studied the risk factors for having these difficulties but there is not much knowledge on protective, or success factors. We want to know what helps young people to recover successfully so we can actively support this.

Earlier research has suggested that support from friends and parents plays an important role. We aim to have a closer look at this support by asking a large group of young people and parents questions about this support and their wellbeing, and by recording families' daily life for a short period of time.

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#### 4. What do I need to do to be in this research project?

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2. Questionnaire

In this part of the study, we will ask you and your parents to complete a pen and paper questionnaire at your convenience, shortly before or after the recording. We will ask you about your stress reactions to what has happened and about the support you experience. The questions will take you 20 minutes to complete. If you prefer, we can do the questions as an interview.

3. A telephone interview 6 weeks after you have been injured

After 6 weeks we would like to complete a telephone interview with you. We will ask about wellbeing, stress symptoms, and what you thought of the study. This will take about 25 minutes. We will also interview your parents and ask for their feedback on your wellbeing and on the study.

4. A telephone interview 3 months after you have been injured

After 3 months we would like to complete a telephone interview with you. We will ask about wellbeing, stress symptoms, and what you thought of the study. This will take about 25 minutes. We will also interview your parents and ask for their feedback on your wellbeing and on the study.

As part of this study, we will access your hospital medical record to collect information on your injury, including the severity and cause of the injury.

#### OPTIONAL CONSENT

We would like you to consider giving your permission for us to contact you about future research projects that may be suitable. Giving your consent for this means you are happy to receive information about future research, it does not oblige you to take part. Please tick the appropriate box on the consent form if you agree to this or not.

#### 5. What are my alternatives to taking part in this project?

You do not have to take part in this project if you do not want to.

If you take part and change your mind, you can stop at any time without telling us why. If you withdraw from the project we will use the information that is already collected from you, unless you tell us not to.

Your decision will not affect any treatment or care you get, or your family's relationship with The Royal Children's Hospital.

#### 6. What are the possible benefits for me?

There are no direct benefits for you. To thank you for taking the time to participate in our project we will provide your family with \$50 in vouchers after completion of the study.

#### 7. What are the benefits for other people in the future?

This study will provide information on how parents support children after injury. We will use this information to develop tips for families on how to best care for their children after they have been in an accident.

#### 8. What are the possible risks, side-effects and/or discomforts?

We do not expect any major risks in this study. It is possible that some of the questions may cause distress for some young people. If you feel anxious about any of the questions, you do not need to answer them. We can stop the questionnaire or interview at any time and give you a break. You can decide whether to continue with the questions or not. We can help find appropriate services if you would like us to.

We do not expect you to feel any discomfort from wearing the iPod.

#### 9. What are the possible inconveniences?

The inconveniences of the study include the time to fill out the questionnaires, wear an iPod and complete the telephone interviews.

#### 10. What will be done to make sure my information is confidential?

Any information we collect for this research project that can identify you will be treated as confidential. We can disclose the information only with your permission, except as required by law, for example if you are in danger.

The following people may access information collected as part of this research project:

• the research team involved with this project, who are based across The Royal Children's Hospital, The University of Arizona, and Monash University. The de-identified data may be shared with members of the research team at these locations via password-protected hardware or password-protected online data transfer.

#### • the RCH Human Research Ethics Committee

The questionnaires, the recordings and the interviews will be re-identifiable. This means that we will remove your name and give the information a special code number. Only the research team can match your name to your code number, if it is necessary to do so. This information will be stored securely in the Emergency Department offices at The Royal Children's Hospital Melbourne (RCH) and Murdoch Childrens Research Institute.

The information from which your name is removed will be stored on password-protected hardware of the research team. This information (i.e. the recordings, questionnaires, interview information and injury information) will be stored in a databank. This means that in the future, other research projects can be conducted using this information. These projects may have aims that we cannot yet foresee and/or that are unrelated (e.g., there may be researchers wanting to study noise levels in families' homes). We are therefore asking for 'unspecified' consent for future research of the data. Your information will remain confidential and

#### APPENDIX E: CHILD CONSENT FORM

research projects will need to be approved by a research ethics committee.

We will keep the information at least until the youngest participant turns 25 years old.

In accordance with relevant Victorian privacy laws, you have the right to access and correct the information we collect and store about you. Please contact us if you would like to access the information.

When we write or talk about the results of this project, information will be provided in such a way that you cannot be identified.

# **11. Will I be informed of the results when the research project is finished?** We will send you a summary after the study has been completed.

If you would like more information about the project or if you need to speak to a member of the research team in an emergency please contact:

Name: Dr. Eva Alisic

Contact telephone: 0416 542 039

If you have any concerns about the project or the way it is being conducted, and would like to speak to someone independent of the project, please contact:

Director, Research Development & Ethics, The Royal Children's Hospital Melbourne on telephone: (03) 9345 5044.

#### CONSENT FORM

HREC Project Number:	33103		
Research Project Title:	Ear for Recovery		
Version Number:	4	Version Date:	10/03/2014

- I voluntarily consent to take part in this research project.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this project has been approved by The Royal Children's Hospital Melbourne Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I understand I will receive a copy of this Participant Information Statement and Consent Form.

#### OPTIONAL CONSENT

I do I do not	consent to be contacted about future research projects.
---------------	---------------------------------------------------------

Participant Name

Participant Signature

Date

<u>I have explained the project to the participant</u> who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Research Team Member Name

Research Team Member Signature

Date

Note: All parties signing the Consent Form must date their own signature.



Participant ID: _____

1. Before this injury, has your child ever been exposed to a traumatic event such as a car crash, a disaster, the loss of a sibling, or violence?

O No O Yes

2. Have you witnessed or been involved in the event in which your child was injured?

O No O Yes

3. Did the event bring up memories of one or more earlier traumatic event(s) you have experienced?

O No O Yes

4. Has your child received any mental health care services in the past 3 years?

O No, 0 sessions O Yes, 1-5 sessions O Yes, more than 5 sessions

5. Have you received any mental health care services in the past 3 years?

O No, 0 sessions O Yes, 1-5 sessions O Yes, more than 5 sessions



6. Please indicate on this line with an **x** how (un)happy you feel at the moment:

Very unhappy	/	Very happy	

7. Please indicate on this line with an **x** how upset your child was directly after the injury happened:

Verv upse	t 1	Not upset at all

8. Please indicate on this line with an **x** how upset your child currently is about the injury or the event that caused it:

Very upset	 Not upset at al	

9. Please indicate on this line with an **x** how confident you are that your family will be able to deal with (the consequences of) your child's injury:

Not confident at all	 Very confider	۱t



The following questions are about how you have felt since the event in which your child was injured. Circle one number next to each question to indicate how you have felt.

		Not at all	Mildly	Medium	Quite a bit	Very much
1	During or after the event, did you ever feel numb or distant from your emotions?	1	2	3	4	5
2	During or after the event, did you ever feel in a daze?	1	2	3	4	5
3	During or after the event, did things around you ever feel unreal or dreamlike?	1	2	3	4	5
4	During or after the event, did you ever feel distant from your normal self or like you were watching it happen from the outside?	1	2	3	4	5
5	Have you been unable to recall important aspects of the event?	1	2	3	4	5
6	Have memories of the event kept entering your mind?	1	2	3	4	5
7	Have you had bad dreams or nightmares about the event?	1	2	3	4	5
8	Have you felt as if the event was about to happen again?	1	2	3	4	5
9	Do you feel very upset when you are reminded of the event?	1	2	3	4	5
10	Have you tried not to think about the event?	1	2	3	4	5
11	Have you tried not to talk about the event?	1	2	3	4	5
12	Have you tried to avoid situations or people that remind you of the event?	1	2	3	4	5
13	Have you tried not to feel upset or distressed about the event?	1	2	3	4	5
14	Have you had trouble sleeping since the event?	1	2	3	4	5

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Ear for Recovery– Parent questionnaire_Injury Group

### APPENDIX F: PARENT QUESTIONNAIRE



15	Have you felt more irritable since the event?	1	2	3	4	5
16	Have you had difficulty concentrating since the event?	1	2	3	4	5
17	Have you become more alert to danger since the event?	1	2	3	4	5
18	Have you become jumpy since the event?	1	2	3	4	5
19	When you are reminded of the event, do you sweat or tremble or does your heart beat fast?	1	2	3	4	5

The next few questions are about your life orientation in general:

		Disagree a lot	Disagree a little	Neither agree nor disagree	Agree a little	Agree a lot
1	In uncertain times, I usually expect the best.	1	2	3	4	5
2	It's easy for me to relax.	1	2	3	4	5
3	If something can go wrong for me, it will.	1	2	3	4	5
4	I'm always optimistic about my future.	1	2	3	4	5
5	I enjoy my friends a lot.	1	2	3	4	5
6	It's important for me to keep busy.	1	2	3	4	5
7	I hardly ever expect things to go my way.	1	2	3	4	5
8	I don't get upset too easily.	1	2	3	4	5
9	I rarely count on good things happening to me.	1	2	3	4	5
10	Overall, I expect more good things to happen to me than bad.	1	2	3	4	5



The following questions relate to your confidence in coping with potentially difficult situations. Please rate your confidence levels for each of the situations discussed below by writing the appropriate number.

Not a	ıt all					Totally
confi	dent					confident
1	2	3	4	5	6	7
How co	onfident are you that	you can				Confidence
						(1-7)
1.	Keep distressing ima	ges from ov	verwhelming	you		
2.	Control upsetting the	oughts abou	t your child b	eing injured		
3.	Handle times of unce	ertainty abo	ut your child'	s health		
4.	Remain calm when f	aced with u	psetting sight	s/sounds		
5.	Keep your emotions	in check				
6.	Be optimistic about y	our child's	recovery			
7.	Cope with emotional	stress of ha	aving a injured	d child		
8.	Deal with medical pr	oblems/issu	ues effectively	7		
9.	Help youe child cope	e when in pa	ain/upset			
10.	Understand informat	ion about y	our child's he	alth/treatments	5	
11.	Make complex decis	ions about y	your child's he	ealth care		
12.	Express your though	ts and needs	s to the medic	al health team		
13.	Be strong for your ch	nild				
14.	Accept help from oth	ers while y	our child is in	jured		
15.	Support your child's	coping/adju	ustment while	returning		
	back to normal life a	t home				

Please check whether you have filled out all questions.

#### Thank you very much.



Participant ID:

Date:

Please read every question carefully. What answer comes to your mind first? Choose the box that fits your answer best and cross it. Choose only one answer.

Remember: This is not a test so there are no wrong answers. It is important that you answer all the questions. The first questions are about the support and help you get from other people.

			(Disagree)				(Agree)	
		Very strongly disagree	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Very strongly agree
1	There is a special person who is around when I am in need.	0	0	0	0	ο	0	0
2	There is a special person with whom I can share my joys and sorrows.	0	0	0	0	0	0	0
3	My family really tries to help me.	0	0	0	0	0	0	0
4	I get the emotional help and support I need from my family.	ο	ο	0	0	0	0	0
5	I have a special person who is a real source of comfort to me.	ο	0	0	0	0	0	0
6	My friends really try to help me.	0	0	0	0	0	0	0
7	l can count on my friends when things go wrong.	0	0	0	0	0	0	0
8	I can talk about my problems with my family.	0	0	0	0	0	0	0
9	I have friends with whom I can share my joys and sorrows.	0	0	0	0	0	0	0
10	There is a special person in my life who cares about my feelings.	0	0	0	0	0	0	0
11	My family is willing to help me make decisions.	0	0	0	0	0	0	0
12	I can talk about my problems with my friends.	0	0	0	0	0	0	0



Below is a list of comments that people made after stressful events. How frequently were these comments true for you since your injury happened?

		Not at all	Rarely	Some times	Often
1.	Do you think about it even when you don't mean to?	[]	[]	[]	[]
2.	Do you try to remove it from your memory?	[]	[]	[]	[]
3.	Do you have difficulties paying attention or concentrating?	[]	[]	[]	[]
4.	Do you have waves of strong feelings about it?	[]	[]	[]	[]
5.	Do you startle more easily or feel more nervous than you did before it happened?	[]	[]	[]	[]
6.	Do you stay away from reminders of it (e.g. places or situations)?	[]	[]	[]	[]
7.	Do you try not to talk about it?	[]	[]	[]	[]
8.	Do pictures about it pop into your mind?	[]	[]	[]	[]
9.	Do other things keep making you think about it?	[]	[]	[]	[]
10.	Do you try not to think about it?	[]	[]	[]	[]
11.	Do you get easily irritable?	[]	[]	[]	[]
12.	Are you alert and watchful even when there is no obvious need to be?	[]	[]	[]	[]
13.	Do you have sleep problems?	[]	[]	[]	[]



The following are also a list of problems that children sometimes have after experiencing an upsetting event. Some of these problems may overlap with the earlier questions. Please answer them all.

After each item, please circle how often that problem has bothered you since the event.

The repsonses you can choose from are: Not at all Once in a while Half the time, Almost always.

		Not at all	Once in a while	Half the time	Almost always
1.	Having upsetting thoughts or images about the event that came into your head when you didn't want them to	0	1	2	3
2.	Having bad dreams or nightmares	0	1	2	3
3.	Acting or feeling as if the event was happening again (hearing something or seeing a picture about it and feeling as if I am there again)	0	1	2	3
4.	Feeling upset when you think about it or hear about the event (for example, feeling scared, angry, sad, guilty, etc.)	0	1	2	3
5.	Having feelings in your body when you think about or hear about the event (for example, breaking out into a sweat, heart beating fast)	0	1	2	3
6.	Trying not to think about, talk about, or have feelings about the event	0	1	2	3
7.	Trying to avoid activities, people, or places that remind you of the traumatic event	0	1	2	3
8.	Not being able to remember an important part of the upsetting event	0	1	2	3
9.	Having much less interest or doing things you used to do	0	1	2	3



10. Not feeling close to people around you	0	1	2	3
<ol> <li>Not being able to have strong feelings (for example, being unable to cry or unable to feel happy)</li> </ol>	0	1	2	3
<ol> <li>Feeling as if your future plans or hopes will not come true (for example, you will not have a job or getting married or having kids)</li> </ol>	0	1	2	3
13. Having trouble falling or staying asleep	0	1	2	3
14. Feeling irritable or having fits of anger	0	1	2	3
15. Having trouble concentrating (for example, losing track of a story on the television, forgetting what you read, not paying attention in class)	0	1	2	3
<ol> <li>Being overly careful (for example, checking to see who is around you and what is around you)</li> </ol>	0	1	2	3
<ol> <li>Being jumpy or easily startled (for example, when someone walks up behind you)</li> </ol>	0	1	2	3
<ol> <li>Having bad thoughts about yourself, other people, or the world (for example, "I can't do anything right", "All people are bad", "The world is a scary place")</li> </ol>	0	1	2	3
<ol> <li>Feeling that what happened is your fault (for example, "I should have known better", "I shouldn't have done that")</li> </ol>	0	1	2	3
20. Doing things that might hurt yourself (for example, taking drugs, running away)	0	1	2	3
21. Feeling very scared, angry, guilty, or ashamed	0	1	2	3



We also want to ask you 3 questions about feeling happy. Please put an  $\mathbf{x}$  on the line where it fits with your answer.



How happy have you been in the week before your injury?

How happy do you think you will be in 1 month (41/2 weeks) from now?



Please check whether you have filled out every question.

Thank you very much!

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#### iEAR Information Sheet for Participants

The Electronically Activated Recorder for the iPod Touch (iEAR) is designed to monitor sounds that surround a person during the day. It consists of a microcomputer in a protective case and a small external microphone. The iEAR is programmed to come on at random intervals and record for 30 seconds. <u>The iEAR is programmed to record only 10% of your day</u>. 90% of the time the iEAR is off and does not record. <u>The iEAR is also programmed not to record between 10pm and 7am</u>. The iEAR has been tested for hundreds of hours and has been proven to work reliably. It is very easy to handle. After reading this information carefully you will know what is necessary to work the iEAR, and to ensure optimal recording quality.

#### How to wear the iEAR

We put the iEAR in a protective case. <u>Please do not take the iEAR out of its safety</u> <u>case during the recording and do not touch any buttons</u>. To make the monitoring as comfortable as possible, your child can either put this case in one of their pockets microphone up, or attach it to their belt or waistline. If they prefer, your child can also wear the iEAR in a soft waistband that we provide.

#### How to handle the Microphone

The iEAR microphone is designed to pick up your voice, your breathing, and ambient noises in your environment. To ensure appropriate sound quality, however, it is critical that you make sure that the microphone is not covered by parts of your clothing or in a pocket.

#### How to take care of the iEAR

The iEAR is an electronic device and thus should be handled carefully (e.g., avoid dropping it, keep it out of hot places, etc.). <u>Please make sure to keep the iEAR on the charger until the first day of recording and to recharge the iEAR during the night.</u>

#### How much iEAR monitoring is necessary?

We would ask you to allow for as much iEAR monitoring as possible. It is very critical for the success of the project to capture the day without missing periods. Thus, we would ask your child to <u>carry it on them during all of their waking hours as much as possible</u>. We highly appreciate your participation in this study and guarantee to ensure a maximum of privacy. We also <u>guarantee confidentiality of the recordings</u>. We are aware that the quality of the study depends on your collaboration with wearing the iEAR. We are committed to doing everything possible to make your child feel comfortable about wearing the iEAR as much as possible.

*If you have any questions concerning the iEAR, do not hesitate to contact us at 0416542039. Thank you very much for your collaboration!*
### iEAR Event Diary

Please te	Il us about your child's MAJOR activities using the time grids	iEA	R	Which caregivers	
Time	What was your child doing? With whom?	Yes	No	were present?	
12:00 am	$\mathbf{J}$ Dlatting in the gauden	1		<b>)</b> Dad	
01:00 pm	J Playing in the garden				
02:00 pm				<b>N</b> o one	
03:00 pm	JReading a book				
04:00 pm	(ata)		—		
05:00 pm	(etc.)	ι			

Saturda	y	iEA	R	Which caregivers were present?
Time	What was your child doing? With whom?	Yes	No	were present.
07:00 am	• • •			
08:00 am				
09:00 am				
10:00 am				
11:00 am				
12:00 am				
01:00 pm				
02:00 pm				
03:00 pm				
04:00 pm				
05:00 pm				
06:00 pm				
07:00 pm				
08:00 pm				
09:00 pm				
10:00 pm				
11:00 pm				
Sunday		iEA	R	Which caregivers were present?
Sunday Time	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday Time 07:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
<b>Sunday</b> <b>Time</b> 07:00 am 08:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
<b>Sunday</b> <b>Time</b> 07:00 am 08:00 am 09:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday Time 07:00 am 08:00 am 09:00 am 10:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
<b>Sunday</b> <b>Time</b> 07:00 am 08:00 am 09:00 am 10:00 am 11:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
<b>Sunday</b> <b>Time</b> 07:00 am 08:00 am 09:00 am 10:00 am 11:00 am 12:00 am	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday Time 07:00 am 08:00 am 09:00 am 10:00 am 11:00 am 12:00 am 01:00 pm	What was your child doing? With whom?	iEA Yes	RNo	Which caregivers were present?
Sunday Time 07:00 am 08:00 am 10:00 am 11:00 am 12:00 am 01:00 pm 02:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday Time 07:00 am 08:00 am 10:00 am 11:00 am 12:00 am 01:00 pm 02:00 pm 03:00 pm	What was your child doing? With whom?	iEA Yes	R	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           12:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm	What was your child doing? With whom?	iEA Yes	R	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           12:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm           06:00 pm	What was your child doing? With whom?	iEA Yes	R	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           12:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm           06:00 pm           07:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm           06:00 pm           07:00 pm           08:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm           06:00 pm           07:00 pm           08:00 pm           09:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?
Sunday           Time           07:00 am           08:00 am           09:00 am           10:00 am           11:00 am           01:00 pm           02:00 pm           03:00 pm           04:00 pm           05:00 pm           06:00 pm           07:00 pm           08:00 pm           09:00 pm	What was your child doing? With whom?	iEA Yes	R No	Which caregivers were present?

### APPENDIX I: PARTICIPANT DEMOGRAPHIC QUESTIONNAIRE

	Our Values Unity, Respect, Integrity, Excelorere
Participant ID:	Date:
1. Name of the child:	
2. Birthdate of the child:	//
3. Birthcountry of the child:	
4. Gender of the child:	o male o female
5. Family situation:	
6. Siblings at home:	
7. Name of primary caregiver 1:	
8. Gender of p.c. 1:	o male o female
9. Name of primary caregiver 2:	
10. Gender of p.c. 2:	o male o female
11. Address of the family:	
12. Telephone number(s):	T:
	M:
13. Does the family speak English ir	n daily life? o yes o no
14. From the Trauma Registry	
15. Date of the injury:	//
16. Mechanism of the injury:	
17. Description of the injury:	
18. Injury Severity Score:	

# APPENDIX J: EAR FOR RECOVERY CODING SPREADSHEET

		File Name Transcript		sm			Talking				
Coder	File Name			oble	Ear	With	<u>r antin</u>	<u>9</u>			
			Int	ŗ,		others?	Gender	Talk	Phone	Self	Mother
			_								
								_			
				_							
											<u> </u>

### APPENDIX J: EAR FOR RECOVERY CODING SPREADSHEET

With Whom? (Partner)					Activity										
Father	Sibling	Friend	Other (adult)	Other (youth)	Pet	Radio/ Music	TV on	Gaming	Computer (not gaming)	Play (dolls, trucks, cards etc)	Socialize (only)	Meal	Shop	Travel	Sleep
-															

### APPENDIX J: EAR FOR RECOVERY CODING SPREADSHEET

				Mood/h	ealth of	child			Topic of Conversation			Tone negative 1		
Other	laugh	sing	cry	whinge/	mad /	gasp	sigh	groan about	About emotions/	child rearing: setting	Injury	Overall	Child's expression	
(describe)			-	whine	argue			pain	feelings?	boundaries?	related ?			

<u>-2-3-4-5-6-7</u>	very postive)		
Mother's expression	Father's expression	Other partner's expression	Bemerke
			Remarks

# **Ear for Recovery Coding Manual**

Confidentiality	. 2
Adverse events	. 2
Terminology	. 2
Materials you will need	2
TRANSCRIBING	. 3
General rules	. 3
Naming conventions	3
Indicating who is speaking:	. 3
When a name is mentioned in a transcript:	4
Nonfluencies – ums and ahs	4
Assent – yeah, yep, uhuh	. 5
Fillers – I mean, you know, like	. 5
When you can't understand the speech	. 5
CODING	. 6
When the child is sleeping	. 6
Coder Number	. 6
File Name	. 6
Interesting	. 6
Problems	. 6
EAR	. 6
Talking	. 7
Activity	. 7
Mood of child	. 8
Topic of conversation	. 9
About emotions/feelings?	. 9
Child rearing, setting limits	. 9
Injury related?	. 9
Tone of conversation	. 9
Remarks	. 9
De-identifying snippets	10
To delete names from audio snippets:	10
Saving your coding:	10
ROLES	11
Transcriber 1	11
Transcriber 2	11
Coder 1	11
Coder 2	12

# Confidentiality

All audio and written materials collected from participants are confidential. Please do not discuss the contents of the materials with anyone outside the research team, and ensure that you delete all participant materials from your personal computer after you have finished coding them. No copies of audio, questionnaires or transcripts and coding sheets should be kept on personal computers once they are finished.

### **Adverse events**

If you are concerned about something you hear during coding and transcribing, speak to Eva (eva.alisic@monash.edu) or Anna (<u>anna.barrett@monash.edu</u>) about it. For example, in the unlikely event that you hear something that indicates a serious and immediate danger to someone in the recording, report this immediately to Eva or Anna. If you would like to debrief about anything to do with the transcribing and coding process, Eva and Anna are also available for this.

# Terminology

"Transcribing" refers to the process of writing out what is said in each audio snippet "Coding" refers to the process of assigning ratings (numbers) based on what you hear in each snippet "Deidentifying" refers to silencing sections of the audio which contain identifying information like names "Naming convention" refers to how we indicate who is speaking, or how we transcribe when a name is said

# Materials you will need

Make sure you are comfortable and have **a good set of headphones** that block out outside noise. Please **take a break** when you need one - coding can be tedious and overwhelming which can lead to more mistakes. 2 - 4 hours of transcribing/coding shifts are ideal.

It is recommended that you use a **sound editing program**: either 'WavePad Sound Editor' or 'Audacity' for listening to snippets. They are free, and have a number of tools that can be used such as increasing the volume of a snippet and reducing play speed.

You should have several documents at hand when transcribing and coding:

- The child's **diary**, if available
- The coding manual
- The coding cheatsheet

# TRANSCRIBING

### **General rules**

- Each snippet is of **30 seconds** duration.
- **Before you start transcribing, listen through as many snippets as possible**. This will help familiarise you with the voices of different people recorded.
- Transcribe everything you hear people say (except for TV/radio sounds)
- **Do not insert your own remarks**, such as [subject laughs], [shaky voice], [whispers], in the transcription column. For important notes, you can use the final excel column 'remarks'.
- **Each new speaker should be transcribed on a new line within the cell** in Excel, you can do this by hitting Alt+Enter. However, it may be easier to transcribe each snippet into a Word document first, then <u>double click</u> in the Excel cell and paste it there.
- **Do not use any abbreviations or symbols** when transcribing the snippets. For example, do not write w/ for *with*, @ for *at*, *or* & for *and*.
- Any **numbers should be written in full** e.g. four, not 4. Ten percent, not 10%

### Naming conventions

**Indicating who is speaking:** Each person speaking in a transcript should be indicated, on a new line, using the following abbreviations:

C:	Child (the participant)
M:	Mother (or primary female caregiver)
F:	Father (or primary male caregiver)
SM:	Stepmother (or live-in partner of father)
SF:	Stepfather (or live-in partner of mother)
GM1:	Grandmother 1
GF1:	Grandfather 1
B1:	Oldest brother
B2:	Second oldest brother
S1:	Oldest sister
S2:	Second oldest sister
YM1:	Young male 1 (for example a friend of the child's)
YF1:	Young female 1
AM1:	Adult male 1 (for example, a visiting friend of the parents')
AF1:	Adult female 1
Note o	n other family members: If you know any of the YM, YF, AM or
AF part	cicipants are family (e.g. Aunts, cousins) place an EF (extended
familv)	before the code. For example a young female cousin would be
FFYF1)	

When a name is mentioned in a transcript: Highlight in yellow any snippet where a name is mentioned. Do not write down any personal names in the transcription (except for publicly known people). Replace any names with the appropriate identifying word (given below).

	When	
	indicating	
	who is	Name to use
Person	speaking	within transcript
Child (the participant)	C:	[Ch1ld]
Mother (or primary female caregiver)	M:	[M0ther]
Father (or primary male caregiver)	F:	[F4ther]
Stepmother (or live-in partner of father)	SM:	[St3pmother]
Stepfather (or live-in partner of mother)	SF:	[St3pfather]
Grandmother1	GM1:	[Gr4ndmother1]
Grandfather1	GF1:	[Gr4ndfather1]
Oldest brother	B1:	[Br0ther1]
Second oldest brother	B2:	[Br0ther2]
Oldest sister	S1:	[S1ster1]
Second oldest sister	S2:	[S1ster2]
Young male 1 (e.g. child's friend)	YM1:	[YOungmale1]
Young female 1 (e.g. child's friend)	YF1:	[YOungfemale1]
Adult male 1 (e.g. family friend)	AM1:	[4dultmale1]
Adult female 1 (e.g. family friend)	AF1:	[4dultfemale1]
Extended family young female 1 (e.g. cousin)	EFYF1:	[EFyOungfemale1]
Extended family young male 1 (e.g. cousin)	EFYM1:	[EFyOungmale1]
Extended family adult male 1 (e.g. uncle)	EFAM1:	[EF4dultmale1]
Extended family adult female 1 (e.g. aunt)	EFAF1:	[EF4dultfemale1]
The name of any pet		[P3t]
Any other name mentioned in transcript, <b>if</b> th $\alpha$ t person		
mentioned is not heard within any snippet		[n4me]

- Try to **differentiate between siblings** if there is more than one.
- Don't leave a space between the person speaking and the colon. E.g. M: not M :
- Make sure to **highlight any snippets that include a name** so the sound file can be edited later.

### Nonfluencies - ums and ahs

Non-words are referred to as nonfluencies. LIWC recognizes the following nonfluencies:

• er, hm*, sigh, uh, um, umm*, well, zz*

The * means LIWC will recognize anything starting with the letters before the *. For example, in the case of umm*, LICW will code anything starting with the letters "umm" as a non-fluency, such as "ummmmah"

**Stuttering** can be accommodated by altering the stuttering part of a phrase to a nonfluency marker. For example, "The, the bo-, the boat went into the water" could be changed to "Um, the boat went into the water." The transcriber will have to decide how many um's would be appropriate.

### Assent - yeah, yep, uhuh

The LIWC dictionary also contains many different words used to mean assent or agreement, such as yep, yeah, uhuh. While it is not necessary to consult the dictionary too often, it's worth familiarising yourself with these words – then use the one that most closely matches what you are hearing:

LIWC recognises the following "assent" words:						
absolutely	hah	rofl				
agree	haha*	uhhu*				
ah	heh*	uhuh				
alright*	hm*	yah				
aok	huh	yay				
aw	lol	yea				
awesome	mm*	yeah				
cool	ok	yep*				
duh	okay	yes				
ha	okey*	yup				

### Fillers - I mean, you know, like...

Everyday speech is littered with "meaningless" fillers. Unfortunately, these fillers use some of the most important words in the LIWC dictionaries. Watch out for the following:

You know.	Change to one word: <b>youknow</b> . "We went, youknow, to the store"
	E.g. "we went, you know, to the store and, you know, bought gum."
l mean.	Change to one word: Imean.
	E.g. "we went, I mean, to the store…"
I don't know.	Change to: Idontknow.
	E.g. "we went, I don't know, to the store…"
Like.	Be careful with like because sometimes it is used appropriately. As a
	nonfluency, change it to: <b>rrlike</b> .
	E.g. "We went, like, to like the store and like we like bought like gum."

Note that all words starting with "rr" will be coded as a filler.

### When you can't understand the speech

When you can't understand a work or a series of words, write "xxx" in its place.

# **CODING**

### **Coder Number**

You will be allocated a specific 'coder number' that you need to enter in the first column for each sound file you transcribe & code.

### When the child is sleeping

If the child is asleep but you can here others talking, transcribe what you hear and code as "Sleep" in activities, but do not code anything else (e.g. do not code "With Others" or "Emotional Tone")

### **File Name**

The File name is the name of the snippet. For example, 002F15_24_01_13_09.00.00_1.wav Please copy and paste the name of the snippet directly from the file name.

### Interesting

If the conversation is related to the injury or anything else that is of special interest, mark this column with a "1". Examples of interesting topics include conversations about the child's injury, feelings after the incident, or injury-related places such as the hospital. Other interesting snippets may include discussions about emotions, or snippets with strong emotional content. If it is not deemed interesting, do not mark this column.

No entry = Nothing of particular interest

1 = Interesting

Examples: the snippet is about the child's injury, people's feeling post-injury, or places related to the injury such as the hospital, or is about other emotions, has markedly emotional content, or contains an interesting parent-child interaction.

### **Problems**

This column relates to problems with the recording. This category should only be coded if you consider the snippet unusable. <u>NOTE: ANY SNIPPET MARKED PROBLEM WILL BE DELETED.</u> If you mark the snippet as a problem, do not code it – it will be deleted.

No entry = Everything ok with the recording

1 = Insufficient acoustic information (silence – this only refers to times when you think the iPod is not functioning, NOT when there is simply nothing happening around the child)

2 = Bad recording quality

3= The person is not wearing the EAR

Note: "3 = The person is not wearing the EAR" should <u>not</u> be coded for when the child is sleeping.

### EAR

If the snippet refers to the iEAR application or the iEAR study, mark this column with a "1".

# Talking

This section relates to who the child is speaking with. Mark a "1" in the column corresponding to who the child is speaking with. For example, if the snippet involves a conversation between the child and their mother, mark "Parent" with a 1.

With others	<ul> <li>1 = Child is by him/herself – mark this regardless of whether the child speaks in the snippet;</li> <li>2 = Child is interacting with ONE other person; dyadic interaction</li> <li>3 = Child is interacting with A GROUP OF people (more than one person)</li> <li>4 = Child is nearby people but not engaged in any sort of social interaction. This includes any time when you can hear what other people are saying (e.g. even if they are in the next room)</li> <li><i>I f you know from preceding snippets that the child is involved in the interaction but you do not hear him/her speak, mark the category as a 2 or 3</i></li> </ul>
Gender	<ul> <li>Only code this if you coded 2 or 3 in the 'with others' column.</li> <li>1 = Male interaction partner (s) only</li> <li>2 = Female interaction partner (s) only</li> <li>3 = Both male and female interaction partners</li> <li>If you really cannot tell the gender of others in the recording, leave this blank</li> </ul>
Talk	1 = Child speaks in the snippet (must be words, not just sounds)
On the phone	1 = Child is on the phone, or on Skype
With Whom	Mark a 1 corresponding to who the child is speaking with. This should be filled out any time the "With others" is rated 2 or 3. Parent = parent or caregiver. If parents are divorced and the child lives with mother and new partner of mother, the new partner would also be counted under 'parent'. If child lives with mother who has a new partner but who does not live with mother, then the partner would be counted as 'other-adult'

# Activity

This section relates to what the child is doing. Sometimes it isn't obvious so take your best guess according to the preceding snippets and the child's diary.

Most of the categories are mutually exclusive; however "Radio/Music" and "TV on" can be marked with a "1" in conjunction with another activity, such as preparing/having a meal ("Meal"). If there is more than one activity heard in the snippet, just mark the predominant one. The only exception to this rule is "socialize (only)", which should only be coded if there are no other activities present as well as talking.

Radio/music	1 = You can hear the radio on or music playing
TV on	1 = Child is watching TV, or it is on in the background
Socialize	1 = When the child is talking/socializing and <b>not doing anything else</b>
(only)	e.g. if they are also gaming, do not code as socialising
Other (describe)	For example, if you're not sure what the child is doing you can write 'unknown'
Gaming	1 = Child is playing an electronic game (e.g. on a phone, iPad or computer)
Computer (not	1 = Child is using a computer for something other than gaming. (N.B. if child is using
gaming)	computer to watch a video, code as TV on rather than computer)
Play (dolls, trucks, cards etc)	1 = The child is playing a structured game (e.g. cards, board games), or is engaged in an imaginative game (e.g. "I'll be the mummy and you be the baby")
Meal	1= Child is eating a joint meal (this is aimed at capturing the family meal or another social meal, not just any time the child is eating)
Shop	1 = Child is at a shop
Travel	1 = Child is on the way somewhere outside the house, e.g. in a car, by bike or by foot.
Sleep	1 = Child is asleep. If the child is asleep, <u>do not code anything else.</u>

# **Mood of child**

This section relates to any mood states of the <u>child</u> that might arise in the snippet. The mood states are not mutually exclusive; it is possible to mark more than one at a time. For example, the child may sing and laugh in the same snippet so both should be marked with a "1".

Laugh	1 = Child laughing; if you cannot figure out who is laughing, be liberal, just assume it was the child who was laughing
Sing	1 = Child singing or whistling
Cry	1 = Child crying
Whinge/whine	1 = Child is whinging or whining. This refers to the tone of voice – if the tone is whingey or whiney, code as 1, regardless of whether it seems like the child has a "good reason" for the complaint.
Mad/Argue	1 = Child is arguing with, yelling at, screaming at, shouting at, mad at another person
Gasp	1 = Child gasps
Sighing	1 = Child sighs
Groan about pain	1 = Child groans about pain or makes a pained noise

### **Topic of conversation**

This section refers to the conversation subject matter, or theme. It is possible to mark more than one at a time. This should be coded anytime conversation is taking place, even if the child isn't speaking (e.g. **including when "With Others" is 4**)

### About emotions/feelings?

Any person shares his/her own personal emotions or feelings. This can include talking about his or her parent's divorce, or their hopes and dreams for the future, or people they like or don't like.

e.g. "I feel so upset"; "I am worried about my grades in class"; "I have a crush on x"

### Child rearing, setting limits

Any interaction related to child rearing; talk about house rules, things that the child should/should-not do, setting boundaries for a child. Basically, this is any time a parent is in some way telling a child how they should behave. This includes telling them to do things like chores

e.g. "No, you're not allowed to do that. I've told you before that's against the rules."

e.g. "Put your dirty clothes in the washing basket please"

### **Injury related?**

Topic of conversation is about his/her injury or its consequences. Separated into two categories:

1 = Conversation is clearly about the injury or the event that caused the injury. e.g. going to the doctor, their plaster cast, things they can't do anymore, memories of the event, descriptions of the wound, complaining about pain, changing the dressing.

2 = Conversation is about things that are probably related: Conversations that would not have taken place if the child had not been injured. e.g. parent talks about helping to dress their 15 year old child.

### **Tone of conversation**

This section requires you to make a judgement/evaluation about the conversation. It has three parts (parent, child, and other). When making a judgement about the conversation, take into account the tone, actual speech, and "feeling" of the conversation. The rating is made on a Likert scale of 1 (very negative) to 7 (very positive), with 4 being Neutral. This should be coded even when the child is not actively involved in the conversation (e.g. when "With others" is 4). You will need to rate the overall tone, and when relevant the child's, mother's, father's, and/or other partner's expression.

**Example of negative:** Mean, sarcastic, depressed, disapproving, sad, unsupportive. **Example of positive:** Cheerful, upbeat, loving, excited, supportive.

### **Remarks**

Please make a remark about any information that you think is important or interesting.

Sometimes the snippet does not to relate to any of the coding categories. This is OK. The Coding Template has been designed to have as few categories as possible. Just leave a remark if this happens.

# **De-identifying snippets**

It is part of the second transcriber's role to de-identify snippets with identifying information in them. Identifying information includes names, addresses, phone numbers, school name, etc. Names of public figures (e.g. Tony Abbot) on the other hand do not need to be deidentified.

We need to make sure that identifying information doesn't appear either in the transcript or in the audio recordings. In the transcript, we use codes to achieve this. In the audio recordings, we delete a section of audio whenever identifying information is mentioned.

### To delete names from audio snippets:

Using 'Wavepad Sound editor' – available to download for free.

- Highlight area you want to replace with silence (this includes names, phone numbers, addresses)
- Right click  $\rightarrow$  Silence selected region (or just do Ctrl + 0)

Using Audacity, also available for free

- Highlight the area you want to replace with silence
- Click the "Silence selection" button (see picture below)



**Saving your coding:** The name of the document should follow this convention – Participant number, Gender, Age of participant

For example, the transcription and coding document of participant number 19, who is an 8 year old girl, would be called 019F08.

# ROLES

On any given set of sound files, you could be assigned one or more of four possible roles:

### Transcriber 1

You will receive:

- A set of audio files
- A blank transcription and coding template
- A diary, if we have one

Your role is to:

- Transcribe all the audio snippets
- Do not code
- Highlight any identifying snippets
- Adhere to the naming conventions described in the TRANSCRIBING section
- Save the file as xxxxxx_T1 (e.g. 01F06_T1)

# Transcriber 2

You will receive:

- A set of audio files
- A transcription and coding template with a transcription already filled in
- A diary, if we have one

Your role is to:

- Check the accuracy of transcription for all audio snippets
  - Spelling and formatting (e.g. naming conventions)
  - Non-fluencies and fillers correctly formatted
  - All snippets with identifying information are highlighted
- Make any changes you see fit. After this, the transcription will be considered final.
- Don't code
- As a final check for fillers, do a "Find" for "like", "you know", "I don't know", "I mean". Don't just do a Find and Replace, as some of them may be used correctly.
- Remove identifying information from the audio snippets (see instructions in manual)
- Save the coding template as xxxxxx_T2

# Coder 1

You will receive

- A set of audio files
- A transcription and coding template with a transcription already filled in
- A diary, if we have one

Your role is to:

- Code all the audio snippets
- The transcription is now considered final. Even if you think something in it isn't correct, don't change it, and code as though the transcription is correct
- Make sure you listen to all the snippets, even the ones where there is no talking. There could still be sighs, laughs etc.
- Save the coding template as xxxxxx_C1

# Coder 2

You will receive

- A set of audio files
- A transcription and coding template with a transcription already filled in
- A diary, if we have one

Your role is to:

- Code all the audio snippets
- The transcription is now considered final. Even if you think something in it isn't correct, don't change it, and code as though the transcription is correct
- Make sure you listen to all the snippets, even the ones where there is no talking. There could still be sighs, laughs etc.
- Save the coding template as xxxxxx_C2



### Monash University Human Research Ethics Committee

### **Approval Certificate**

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: 9081

Project Title: Naturalistic observations of families in therapy: Clinicians' perspectives

Chief Investigator: Dr Eva Alisic

**Expiry Date:** 31/10/2022

# Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.

- 1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
- 2. Approval is only valid whilst you hold a position at Monash University.
- 3. It is responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
- You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
- 5. The Explanatory Statement must be on Monash letterhead and the Monash University complaints clause must include your project number.
- 6. Amendments to approved projects including changes to personnel must not commence without written approval from MHUREC.
- 7. Annual Report continued approval of this project is dependent on the submission of an Annual Report.
- 8. Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
- 9. Monitoring project may be subject to an audit or any other form of monitoring by MUHREC at any time.
- 10. Retention and storage of data The Chief Investigator is responsible for the storage and retention of the original data pertaining to the project for a minimum period of five years.

Thank you for your assistance.

Professor Nip Thomson

Chair, MUHREC

CC: Ms Shaminka Gunaratnam, A/Prof. Matthias Mehl, Dr Rowena Conroy

### List of approved documents:

Document Type	File Name	Date	Version
Explanatory Statement	explanatory-statement-9081	18/10/2017	1.0
Consent Form	consent-form-9081interview	18/10/2017	1.0
Consent Form	QualtricsSurvey_Consent_9081	18/10/2017	1.0
Questionnaires / Surveys	QualtricsSurvey_Consent_9081	18/10/2017	1.0
Supporting Documentation	Interview Questions_9081	18/10/2017	1.0
Supporting Documentation	Example_Recruitment_Email_9081	18/10/2017	1.0



### **EXPLANATORY STATEMENT**

### **Registered Psychologists**

Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives

Dr Eva Alisic	
Monash University Accident Research Centre	I
email: Eva.Alisic@monash.edu	(

**Dr Rowena Conroy** Royal Children's Hospital Melbourne email: Rowena.Conroy@rch.org.au A/Prof. Matthias Mehl University of Arizona email: mehl@email.arizona.edu

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone number or email addresses listed above.

### Why were you chosen for this research?

You have been invited because you are a registered psychologist working with families, children, youth, and/or parents.

### What does the research involve?

Our goal is to explore clinicians' perspectives on naturalistic observation in therapy, as well as the use of a validated audio recording app. (Naturalistic observation is observing someone in their natural environment. This could include home visits, and listening to audio or watching video recording in daily life, rather than observation in a clinic.)

For this project, you will fill out an online survey. Questions will cover your current theoretical approach and methods in clinical practice with families. We will also ask you to read several paragraphs of information about the audio recording app and provide your perspective on the utility and feasibility of using it in therapy. The survey typically takes around 10-15 minutes to complete. You will require headphones/speakers to listen to an example audio file. Please note that you may return to an incomplete response on the same computer within 1 week of commencing the survey.

If you are willing, we would like to invite you to an optional hour-long interview to be arranged at a convenient time and place. This interview would include listening to some audio snippets and reading some case information before answering questions about the case, as well as the utility and feasibility of using the EAR in psychological therapy. The interview would be audio recorded to enable transcription of responses.

### Consenting to participate in the project and withdrawing from the research

The consent process for the survey involves clicking "yes" at the bottom of this screen. You are able to withdraw from the survey at any stage by simply exiting the page. However, it is not possible to withdraw data once you have submitted your response, given it is an anonymous survey.

For the interview, you can provide written informed consent at the beginning of the interview and withdraw your participation and/or data at any time.

### Possible benefits and risks to participants

There are no perceived benefits for clinicians participating in the study. However, the study may benefit clinicians and families in the future if the EAR is deemed useful as an observational tool for psychological therapy.

### Confidentiality

Survey data will be anonymous. Clinicians may choose to provide their email address at the close of the survey, and while this will be stored with their survey data on Qualtrics, all further analyses of survey data will not be linked to their name or organisation. Written consent forms and email addresses will be stored separate to the survey data at the close of the study. Interview responses will also be stored in a de-identified fashion. Publications and presentations of the data may contain de-identified quotations, but will otherwise present a summary of results, rather than individual responses.

### Storage of data

Online survey data will be stored on the Qualtrics website via a password protected Monash Qualtrics account. Scanned consent forms, interview transcripts and audio recordings of interviews will be stored on the password protected Monash share drive. Any paper files kept in a locked cabinet at the Monash University Accident Research Centre. All investigators on the project will have access to the files. At the close of the study, data will be archived for 10 years.

### Results

The research findings will be disseminated via journal articles, conference presentations, a doctoral thesis and social media. You will be able to access results via open-access publications and conference presentations.

### Complaints

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC), using project number 9081:

Executive Officer Monash University Human Research Ethics Committee (MUHREC) Room 111, Chancellery Building E, 24 Sports Walk, Clayton Campus Research Office Monash University Victoria 3800 AustraliaTel: +61 3 9905 2052 Email: muhrec@monash.edu Fax: +61 3 9905 3831

Thank you,

Shaminka Gunaratnam Doctor of Psychology (Clinical) candidate and Provisional Psychologist Student of Dr Eva Alisic

# Participant Information & Consent EXPLANATORY STATEMENT Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives Dr Eva Alisic Monash University Accident

Research Centre email: Eva.Alisic@monash.edu **Dr Rowena Conroy** Royal Children's Hospital, Melbourne email: Rowena.Conroy@rch.org.au

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone number or email addresses listed above.

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If you are willing, we would like to invite you to an optional half-hour interview to be arranged at a convenient time and place. This interview would include listening to some audio snippets and reading some case information before answering questions about the case, as well as the utility and feasibility of using the EAR in psychological therapy. The interview would be audio recorded to enable transcription of responses.

### Consenting to participate in the project and withdrawing from the research

The consent process for the survey involves clicking "yes" at the bottom of this screen. You are able to withdraw from the survey at any stage by simply exiting the page. However, it is not possible to withdraw data once you have submitted your response, given it is an anonymous survey. For the interview, you can provide written informed consent at the beginning of the interview and withdraw your participation and/or data at any time.

# Possible benefits and risks to participants

There are no perceived benefits for clinicians participating in the study. However, the study may benefit clinicians and families in the future if the EAR is deemed useful as an observational tool for psychological therapy.

# Confidentiality

Survey data will be anonymous. Clinicians may choose to provide their email address at the close of the survey, and while this will be stored with their survey data on Qualtrics, all further analyses of survey data will not be linked to their name or organisation. Written consent forms and email addresses will be stored separate to the survey data at the close of the study. Interview responses will also be stored in a de-identified fashion. Publications and presentations of the data may contain de-identified quotations, but will otherwise present a summary of results, rather than individual responses.

### Storage of data

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# Complaints

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC), using project number 9081:

Executive Officer Monash University Human Research Ethics Committee (MUHREC) Room 111, Chancellery Building E, 24 Sports Walk, Clayton Campus Research Office Monash University

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	Victoria 3800 Australia		
Tel: +61 3 9905 2052	Email: muhrec@monash.edu 9905 3831	Fax: +61 3	
 Thank you,			

Shaminka Gunaratnam Doctor of Psychology (Clinical) candidate and Provisional Psychologist Monash University, Australia

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:

- Completing an online survey about my current theoretical approach and methods in clinical practice with families and my opinion on the utility and feasibility of using an audio recording app for therapy
- Reading information about naturalistic observation and the audio recording app
- Listening to an example audio file

0	Yes
$\cap$	No

# Background

I am registered/licensed as a psychologist through...

Qualtrics Survey S	Software
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O AHPRA (Australia)

### APPENDIX N: PARTICIPANT SURVEY AND CONSENT FORM

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ate and Provincial P	sychology	

O A licensing board listed with the Association of State and Provincial Psychology Boards (US/Canada)		
O HCPC (United Kingdom)		
O New Zealand Psychologists' Board (N	New Zealand)	
O CORU (Ireland)		
O HPCSA (South Africa)		
O N/A - not registered with any of the al	bove	
If you have an area of endorsement,	please select it below.	
None None	Clinical Neuropsychology	
Clinical Psychology	Forensic Psychology	
Health Psychology	Counselling Psychology	
Educational and Developmental	Other	
Psychology		
<ul> <li>Which groups do you see in your practice? (Tick all that apply).</li> <li>Infants &amp; toddlers (0-4)</li> <li>Children (5-12)</li> <li>Adolescents &amp; young adults (13 - 25)</li> </ul>		
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<ul> <li>Crisis team</li> <li>School</li> <li>Other</li> </ul>
In one or two sentences, please describe your role(s).
In your work with families, what are the main presenting problems of your clients? (Tick all that apply).
Neurodevelopmental disorders (e.g. autism, ADHD)
Psychotic disorders (e.g. schizophrenia)
Mood disorders (depression, anxiety, bipolar)
Obsessive-compulsive disorders (e.g. OCD, hoarding)
Trauma-related disorders (e.g. PTSD, adjustment)
Dissociative disorders
Somatic symptom disorders
Feeding and eating disorders (e.g. anorexia nervosa)
Elimination disorders (e.g. enuresis)
Sleep-wake disorders (e.g. insomnia)
Sexual dysfunctions/paraphilias
Gender dysphoria
Disruptive, impulse control and conduct disorders
Substance use/addictions
Neurocognitive disorders (e.g. Alzheimer's disease)
Personality disorders
In your clinical work, which theoretical approach(es) do you typically use?

(Tick all that apply).

CBT
ACT
DBT
Family therapy
Psychodynamic approaches
Other

In therapy, self-report measures and observational measures can provide us with a picture of what is going on. Please read the following information.

# Self-report

Every clinician asks their client how things have been and what the issues are (i.e. clinical interview). Sometimes we do this in a more structured way (i.e. questionnaires), and sometimes we ask for written records over time (e.g. thought records, diaries).

# **Observation**

Observation provides the observer's perspective on what is happening. It is routine for clinicians to observe dynamics between family members within the therapy space (i.e. laboratory/in-clinic observation), or during a roleplay or interaction tasks (i.e. structured interaction tasks). Observation can also be conducted within a natural environment, such as the home or school, either by directly being there, or having access to audio or visual recordings (i.e. naturalistic observation).

In the following questions, we would like to know how you generally obtain information from your clients.



	Never	once	per client	sessions	session
Self-report (e.g. questionnaires, thought records, diaries)	0	0	0	Ο	0
Observation within the clinic (e.g. roleplays in session, interaction tasks)	0	0	0	0	0
Naturalistic observation at home (e.g. audio	0	0	0	0	0

recordings, home visits)	Never	At least once	Twice to three times per client	Every few sessions	Every session		
In the following question, we would like to know how you generally obtain information from your <i>child or adolescent</i> clients (apart from clinical interview of child).							
How often do you us	e the follow	ving metho	ds during an	episode of	care?		
	Never	At least once	Twice to three times per client	Every few sessions	Every session		
Self-report (e.g. questionnaires, thought records, diaries, parent- report)	0	0	0	0	0		
Observation within the clinic (e.g. roleplays in session, interaction tasks, play therapy)	0	0	0	0	0		
Naturalistic observation at home or school (e.g. audio recordings, home visits)	0	0	0	0	0		
Please tell us which suse. (e.g. questionna	self-report aires, thoug	techniques ght records,	(apart from diaries)	clinical inte	rview) you		

Please tell us how you use observation within the clinic setting. (e.g. roleplays in session, interaction tasks)

Please tell us how you use naturalistic observation in practice. (e.g. audio recordings, home visits) What are some *benefits* of naturalistic observation in general therapy work? What are some *downsides* of naturalistic observation in general therapy work? How might naturalistic observation (e.g. audio recordings, home visits, etc.) add to your current clinical work? (Please explain.) **EAR Explanation** Please read the following information.

The App

https://monash.az1.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview 9/02/2018

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The Electronically Activated Recorder (EAR) is available as a free app called iEAR. Instead of recording continuously or when prompted, the iEAR can be programmed to passively record short snippets of audio information at designated intervals, for example, recording 30 second audio snippets every 5 minutes. These "snippets" may capture any sounds within the range of the device's microphone, including conversations, laughter, traffic, and other sounds. It takes a sample of the environment by capturing all the sounds around a person while it is recording.

	Carrier ᅙ	9:08 AM	7 🖦	Done	Settings	
iEAR	UserID					
	Duration	0:30	_	GENERAL SETT	INGS	
	Interval	12:00		Blackout Per	riod	
	Start			Low Battery	Warning	
	Thu 6 Feb 9:07 AM			GPS Enabled	d	$\bigcirc$
	Stop			Privacy Button: OFF		
	Thu 6 Feb 9:07 AM					
	Daily Black	but		Ran	domization: OFF	
	12:00 A	M 6:00 A	M	Rese	t Default Settings	
				MANAGE RECO	RDED FILES	
					Share Files	
	s	start	¢ [¢]		Delete Files	
	Recordings:	:) Matthias R. Mehl, Universit	y of Arizona	C	reate Log Files	

# **Recording Method**

The EAR uses an interval recording method, which can be compared to continuous recording, or asking someone to record segments of their day.

For example, in the diagram below,

A - orange lines represent interactions across a day from 7am to 10pm B - continuous recording would capture all interactions, plus periods of silence, and would provide a lot of data

C - asking individuals to turn on a recording device might capture meaningful conversations, but would enter into the interaction, and some may be missed

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D - the EAR would automatically record at intervals, so that parts of the whole day are recorded, it is less intrusive (i.e. not listening to whole conversations) and reduces the amount of data to work with. In research, participants have tended to habituate to the device in about 2 hours.



Here is an example of a 30 second snippet of an interaction between a mother and child. Voices have been distorted to prevent recognition and identifying information silenced.

Click here for example snippet, please wait until file loads in separate tab.

# Application to Therapy

The EAR has been used as a research tool with many different populations over the last 17 years, including university students, pre-schoolers, families and cancer patients. Research questions have included "Do women talk more than men?", "How do parents and children interact post-trauma?", and many other questions, spanning social, health, and clinical psychology. The EAR's evolution into an app has made it much more accessible by the general public. We are interested in its potential for use in therapy. Clinicians and/or families could potentially gain clinical information from these recordings.

Possibilities include:

- Exploration of the antecedents and consequences of a behaviour/interaction

- Assessment of family functioning, including emotional tone, conflict, time spent together

- Exploration of self-awareness by listening to recordings
- Recording a behaviour/interaction that cannot be elicited in session (e.g. a stutter)

# **Potential Use**

The EAR is restricted mainly by the battery life of the device it is running on. It could be worn in the evening, weekends only, during school, during dinner, for example. For research purposes, a two day period has tended to optimise data collection and compliance. Families and/or clinicians could review snippets for relevant content. The iEAR could be kept in a particular room of the house or worn by a particular person or multiple family member. For teenagers especially, it might be agreed that the teenage client would choose relevant snippets to bring to therapy.

For ethical considerations, we have past research to guide us. In family research, it has been possible to restrict recording time to when the family is at home/in the car and to gain verbal consent from any visitors to the home. Elsewhere, consent for recording has been assumed by participants wearing a "recording" sticker and being encouraged to freely mention the EAR in their interactions with non-family members. Files have been de-identified and identifiable copies destroyed.

Knowing that there can be a gap between researcher's perceptions of a device's utility for clinical practice, and the day-to-day practicality of use, we want to know what you think.

# **EAR Evaluation**

What are your initial impressions of the EAR?

If you think the EAR might be useful, how could you imagine using it?

https://monash.az1.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview 9/02/2018

Please describe any	/ concerns you	I have about the	he EAR.	
How likely would yo training)	u be to use the	e EAR in your	clinical practice	e? (with
			Somewhat	Extremely
Extremely likely Som	ewhat likely	Onsure	Unlikely	O
What might stop you	u from using th	e EAR in clini	cal practice?	
Please select the de	gree to which	you agree/dis	agree with the	following
statements.				
	Strongly DISAGREE	Somewhat DISAGREE	Somewhat AGREE	Strongly AGREE
The EAR could be useful in clinical practice.	0	0	Ο	0
Families could	•			•
hearing their natural interactions.	0	0	0	0
Using the EAR sounds time- consuming.	0	0	0	0
The EAR reveals what a family is truly like.	0	0	0	0

	Strongly DISAGREE Strongly DISAGREE	Somewhat DISAGREE Somewhat DISAGREE	Somewhat AGREE Somewhat AGREE	Strongly AGREE Strongly AGREE	^	
The ethical concerns of using the EAR outweigh its benefits.	0	0	0	0		
The EAR could open up conversation in therapy.	0	0	0	0		
I have reservations about using the EAR in practice.	0	0	0	0		
The EAR might raise self- awareness in families.	0	0	0	0		
	Strongly DISAGREE	Somewhat DISAGREE	Somewhat AGREE	Strongly AGREE		
Families would be unlikely to use the EAR.	0	0	0	0		
The EAR would be too high tech for me to use in practice.	0	0	0	0		
The EAR might be too high tech for families to use.	0	0	0	0		
Naturalistic observation is more reliable than self- report.	0	0	Ο	0		
Any other comments?						
					~	
Consent (optional)				>		
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# APPENDIX N: PARTICIPANT SURVEY AND CONSENT FORM

I consent to be contacted about taking part in an optional interview.
<ul> <li>Yes, contact information (email/phone):</li> <li>No</li> </ul>

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# **CONSENT FORM**

#### **Registered Psychologists**

Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives

Chief Investigator: Dr Eva Alisic

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:	Yes	No
Providing my opinion on the potential use of an audio recording app in psychological therapy		
Reading case information and listening to audio files		
Audio recording during the interview		

Name of Participant

Participant Signature	Date

### INTERVIEW

Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives

### Instructions for interviewer

Obtain written informed consent.

Begin audio recording.

Present case scenario, part one.

Ask:

- What are your hypotheses about this family?
- What would you like to know?
- What would you hope the recording might tell you?

Present case scenario, part two and play audio files. Explain what "snippets" are and how transcripts are presented (e.g. C = child).

Ask:

- What clinical information did you gain from the recording?
- What would you do with this information? What questions would you ask the family?
- Over what time period would you suggest recording to get a good sense of the family? (e.g. number of hours, days, etc.)
- What are your thoughts on the clinician choosing snippets to play/discuss versus the family choosing snippets to play/discuss in therapy?
- How would you approach the consent process?
- Would your clients use this?

Invite any other comments.

- Contact for future studies?
- Willing to pass on study details to colleagues?

Cease audio recording.

# CASE SCENARIO, PART ONE

#### Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives

#### Please read the following information.

Imagine you are a psychologist working with families in a pediatric hospital.

Anna is a 4 year old girl who sustained a serious injury after a fall at a play centre. Anna spent 2 days in hospital. During the hospital stay, Anna's mother, Carolyn, showed signs of heightened stress. As a result, Carolyn was referred to you by the hospital for management of anxiety. As part of routine care, you arrange an initial session with the entire family (Carolyn, Anna, Anna's father, Jim, and Anna's younger brother, Oliver) in the week following discharge. In the waiting room, Carolyn and Jim complete self-report measures of family functioning, acute stress, optimism and self-efficacy (see Table 1).

#### Table 1

#### Self-Report Measures

Construct	Carolyn (Anna's mother)	Jim (Anna's father)
Family functioning	Very low satisfaction	Very low satisfaction
Acute stress	high	low
Optimism	low	low
Self-efficacy	moderate	moderate

In this first session, Anna appears shy at first, hiding behind Carolyn. She quietly draws a picture in the corner of the room while you talk to Carolyn and Jim. Oliver sleeps in his pram. Carolyn tells you matter-of-factly about the financial and health struggles the family has been dealing with in the lead up to Anna's injury. She reports that her daughter's injury was the "last straw" and tears well up in her eyes. Jim doesn't say much throughout the session, but sighs occasionally. Anna shyly shows you her picture towards the end of the session.

At the end of the session, you thank Carolyn for being so open about her struggles and invite Jim to comment. He says "she covered it all". You acknowledge how stress can accumulate, with a child's serious injury on top of pre-existing medical and financial issues. You summarise that they both reported low levels of satisfaction with their family and say that this can be common in times of stress. You ask Jim and Carolyn if they would be willing to explore this in further sessions and they both agree. You mention that getting a sense of what their family life is like can inform treatment planning. The family agrees for Anna to wear an iPod recorder (with iEAR app) on the weekend between sessions.

# CASE SCENARIO, PART TWO

Project: Naturalistic Observations of Families in Therapy: Clinicians' Perspectives

The following week, you listen to several snippets from the family.

Please listen to the audio files and refer to the information below, as needed. Note, names have been removed for privacy.

Legend: M = mother, C = child, F = father; xxx = unintelligible speech;*Ben and Holly is a children's television show

1.

- M: Alright, stand up! Quick! Socks on. I was going to show you how to wear this thing on.
- M: In a minute!
- C: It won't hurt.
- M: [Brother's name]!
- C: I just did a little scratch.
- M: Oh look. Who's this?
- C: It's Ben!
- M: Ben and Holly*!
- C: It's Ben and his bed. And that's

2.

- C: No. Do you like Haha Harry? Do you?
- M: [Child's name], Daddy.
- F: Mum's not being very nice. Tell mummy she needs to take a chill pill.

C: No.

- F: Yeah.
- C: No!

### 3.

M: You big sook. It's so unfair, where's the block? [Brother's name], go and play with the blocks. Oi! No blocks? [Brother's name], here.

F: xxx bloody xxx for.

M: Because he's a sook and he can. Does he need a reason.

## 4.

M: Now pick up all the other toys on the way. One of you should be sitting on the chair properly, shouldn't you? You stupid twit.

# 5.

F: Just leave all of that stuff for now.

### M: What?

F: Just leave all that stuff for now? Just relax for a bit.

M: Fine.