The mind-body connection: The relationship between perceived parenting style, interoception, experiential avoidance and alexithymia

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This thesis is submitted in partial fulfilment of the Honours degree of Bachelor of Psychological Science (Honours)

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September 2020

Word count: 9,425

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Abstract

Alexithymia, or the inability to understand and describe emotions, is suggested to underly a range of psychological disorders, including depression and substance abuse. Adverse childhood experiences, including perceived adverse parenting, are considered a precursor to the development of alexithymia, although processes underlying this association are not well understood. The extent to which one can detect and recognise bodily sensations, known as interoception, along with the tendency to avoid distressing emotional experiences, or experiential avoidance (EA), show empirical links with and are theorised to be explanatory factors for the relationship between adverse parenting experiences and alexithymia. The current study therefore aimed to test these relationships and proposed a model in which interoception and EA sequentially mediate the relationship between adverse parenting and alexithymia. A convenience sample of 233 Australian adults completed an online survey comprised of a sociodemographic questionnaire and validated measures of perceived parenting, interoception, EA and alexithymia. Results from the serial mediation analyses found that interoception and EA partially mediated the relationship between adverse parenting and alexithymia. Furthermore, the positive and negative relationships between the variables in the mediation model reflected the relationships found in the correlation analysis. The findings from the current study suggest interoception and experiential avoidance are therapeutic targets that may assist in reducing the impact of adverse parenting on alexithymia, a factor associated with psychopathology in adulthood.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

September 2020

Contribution Statement

In writing this thesis, my supervisor and I collaborated to generate research questions of interest and design the appropriate methodology. With guidance from my supervisor, I completed the ethics application, constructed the online survey, and generated the social media advertisements. I was responsible for all participant recruitment and my supervisor provided all participation incentives. I conducted the literature search and data analysis and personally wrote up all aspects of the thesis.

Acknowledgements

A special thanks to my supervisor, Dr Amanda Taylor. From our initial meeting to the final due date, your wisdom and calmness has guided me every step along the way. I'm grateful for your enthusiasm and dedication to the topic and the outcome of this thesis.

A simple thank you doesn't seem enough for my parents who have provided me every opportunity in life to pursue my dreams and have supported me through every endeavour. Your constant reassurance of "you've got this!" was a beacon of positivity. And finally, to my friends and family, your encouragement and patience has been beyond measure.

Chapter 1: Introduction

1.1 Overview

Adverse childhood experiences are associated with problematic outcomes in adulthood, including the development of alexithymia, which has been linked to a range of psychopathologies (Janik McErlean & Lim, 2019). The processes by which adverse parenting experiences may show links with alexithymia, however, is not well understood. Identifying modifiable factors that can ameliorate the impact of problems during childhood on alexithymia is therefore important. Factors linked to the mind-body connection have been associated with improved psychopathology, and impairments in this connection have also been linked with problematic parent-child attachment, which has been associated with adverse parenting practices and styles (Oldroyd, Pasupathi, & Wainryb, 2019). Understanding which aspects of the mind-body connection that are particularly important for understanding this relationship has not been previously explored. The current study intends to address this by investigating how mind-body connection related variables, namely interoception and experiential avoidance, may contribute to the relationship between problematic parenting and alexithymia. A model is proposed for the path from adverse parenting to alexithymia in which interoception and experiential avoidance mediate the relationship. A better understanding of these relationships will assist in identifying therapeutic targets to reduce the impact of adverse parenting on the development of alexithymia and subsequent psychopathology in adulthood.

1.2 Alexithymia

Stable deficits in perceiving emotional states was originally described as ‘alexithymia’ by M.D. Professor Emeritus of Psychiatry at Harvard Medical School, Peter Sifneos in 1973 (Bagby, Parker, & Taylor, 1994; Sifneos, 1973). Alexithymia shows associations with emotional disorders, arising from difficulties in identifying emotions within oneself and distinguishing them from non-affective states, as well as difficulty expressing emotions verbally (Celikbas et al., 2020; Mason, Tyson, Jones, & Potts, 2005; Panayiotou, Leonidou, Constantinou, & Michaelides, 2020). Alexithymia is significantly linked to reduced emotional awareness and emotional regulation as well as increased aggression and negative emotions (Janik McErlean & Lim, 2019; Panayiotou et al., 2015). Alexithymia has been more closely associated with the male gender, older age, unmarried status and a low level of education suggesting these demographic factors are important covariates (Honkalampi et al., 2004; Kauhanen, Kaplan, Julkunen, Wilson, & Salonen, 1993).

Research suggests alexithymia is a transdiagnostic construct associated with poor psychological outcomes, predisposing people to a range of psychiatric disorders, including depression, anxiety, post-traumatic stress disorder, obsessive-compulsive disorder, schizophrenia and somatic diseases such as diabetes (Aaron, Blain, Snodgress, & Park, 2020; Bilotta, Giacomantonio, Leone, Mancini, & Coriale, 2016; Duarte & Pinto-Gouveia, 2017; Kooiman et al., 2004; Murphy, Brewer, Catmur, & Bird, 2017; Zamariola, Vlemincx, Luminet, & Corneille, 2018). The association of alexithymia with psychopathology is attributed to the difficulty of alexithymic individuals to identify and describe their emotions and differentiate physical sensations associated with emotion from the symptoms of physical illness (Mason et al., 2005; Panayiotou et al., 2015). Although initially considered a stable personality trait, it is now widely

accepted that alexithymia can decrease in response to therapy and interventions that teach highly alexithymic individuals how to deeply process emotions more effectively (de Haan et al., 2012; Panayiotou et al., 2015). Thus, it is important to identify process factors that may contribute to its development and act as therapeutic targets.

Emotions are considered to develop in parallel to cognitive functions in infants, with young children initially experiencing emotions on a physical level and with the help of their parents, they learn to sense, identify and name emotions increasingly on a verbal and mental level, developing a mind-body connection (Kooiman et al., 2004). When children are subjected to insensitive or harsh caregiving, where emotional expression is constrained and effective management of emotions is not learnt, they may experience difficulty with understanding and communicating emotions, resorting to maladaptive strategies, including a tendency to suppress emotions (Janik McErlean & Lim, 2019).

1.3 Perceived Parenting Style

Parents are responsible for a child's initial adaptation to the world, they foster their physical development and play a critical role in their children's behavioural, emotional, personality and cognitive development (Bornstein & Zlotnik, 2008; Reitman, Rhode, Hupp, & Altobello, 2002). From their parents and their family unit, a child acquires their initial attitude to the world, they learn how to communicate, acquire basic norms and beliefs and eventually form their attitudes and ethics (Ebrahimi, Amiri, Mohamadlou, & Rezapur, 2017). Thus, the relationship between parents and their children is a prime research focus in child and clinical development psychology, including a focus on how parents differ in stable ways from one another, including the construct of parenting 'style' (Reitman et al., 2002). Parenting style refers to the kind of care, physical and emotional, dispensed by the parents or caretakers to a child,

creating an emotional climate in which they communicate their overall feelings about the child through body language, temper, tone of voice, emotional displays and quality of attention (Bornstein & Zlotnik, 2008; Zimmermann, Eisemann, & Fleck, 2008). Parenting styles emerge as early as the first year of a child's life and while styles and practices may differ between parents, the style of an individual parent is considered a trait due to its stability across time and consistency in interaction patterns (Bornstein & Zlotnik, 2008).

Research has identified that certain dimensions underly parenting 'styles'; the characteristics of warmth, rejection and overprotection (Baker & Hoerger, 2012; Temel & Atalay, 2018). Parental warmth is defined as a parent's responsiveness to a child's behavioural and emotional needs, providing support, encouragement, and motivation to their child (Branjerdporn, Meredith, Strong, & Green, 2019; Temel & Atalay, 2018). Parental warmth is thought to play a protective role for children by buffering the negative impact of various risk factors and therefore reducing the probability of psychological disorders such as depression and anxiety (Temel & Atalay, 2018). Parental rejection, on the other hand, is considered a negative aspect of parenting and is characterised by criticism, disapproval and neglect of a child's physical and emotional needs, with children perceiving their parent or caretaker to be criticising, humiliating, unaffectionate, hostile and aggressive (Temel & Atalay, 2018). Overprotective parenting involves intrusive behaviours toward a child due to excessive fear for the child's safety and wellbeing, a behaviour consistently associated with negative child outcomes (Temel & Atalay, 2018). Parental rejection, control and non-physical punishment have been found to predict psychopathology in children whereas children who perceive higher acceptance, affection and warmth from parents exhibit fewer symptoms of disorders (Wei & Kendall, 2014). Low levels of parental warmth and high levels of rejection have been consistently linked to

psychopathology in adulthood, while the effect of overprotection appears to be associated with the expression of the dimensions of warmth and overprotection (Temel & Atalay, 2018; Thorberg, Young, Sullivan, & Lyvers, 2011; Wei & Kendall, 2014).

Important to the current study is an understanding of the concept of perceived parenting style, defined as a person's perception of the way their parents treated them, which may be independent of how the parents perceived their parenting style (Temel & Atalay, 2018). Importantly, when measured in adulthood, perceived parenting styles characterised by warmth, acceptance, non-punitive discipline and affection have been significantly associated with a better quality of life, higher self-esteem and life-satisfaction as well as less anxiety, depressive and externalising symptoms in adolescence and adulthood (Milevsky, Schlechter, Netter, & Keehn, 2007; Wei & Kendall, 2014; Zimmermann et al., 2008).

As it is suggested that culture can influence the expression of emotions and parenting due to unique socialisation patterns and traditions, ethnicity was included as a covariate of the current study (Bornstein & Zlotnik, 2008; Le, Berenbaum, & Raghavan, 2002). Furthermore, divorce has been found to affect parenting styles, and being a parent or caregiver is thought to affect the retrospective reporting of parenting, therefore the family unit composition and whether a participant had dependent children were included as covariates of the present study (Bornstein & Zlotnik, 2008).

The relationship between parenting style and alexithymia has been the subject of numerous studies due to the intrinsic link between the development of emotions in childhood and the subsequent development of alexithymia in certain individuals. In healthy samples, studies have found the retrospectively reported absence of supportive role models for the healthy expression of emotion and parenting involving rejection, low warmth and neglect are

significantly related to alexithymia that persists into adulthood, with Fukunishi, Nakagawa, Nakamura, Kikuchi, and Takubo (1997) finding similar results in several cultures (Aust, Härtwig, Heuser, & Bajbouj, 2013; Berenbaum & James, 1994; Janik McErlean & Lim, 2019). Similarly, in studies of psychiatric outpatients, adverse childhood experiences such as harsh discipline, unhappiness in the home and lower parental care were associated with long-lasting alexithymic features (De Panfilis, Rabbaglio, Rossi, Zita, & Maggini, 2003; Honkalampi et al., 2004).

While these studies present evidence on the link between the childhood environment and perceived parenting styles with alexithymia, empirical support for the relationship is not unequivocal. In a study of adult clinical outpatients, Kooiman, Spinhoven, Trijsburg, and Rooijmans (1998) found perceived parental attitude to not be predictive of alexithymia and Mason et al. (2005) found only a weak association between perceived parental attitudes and alexithymia in a similar population. In a subsequent study considering the parenting style of the mother and father individually, Kooiman et al. (2004) found a perceived lack of affection shown by each parent is associated with the degree of alexithymia, although concluded the associations were not particularly strong. Thus, it is necessary to investigate the processes by which the parenting dimensions of warmth and rejection may show associations with alexithymia.

1.4 Interoception

Interoception generally refers to an individual's ability to detect, understand and track internal bodily cues, and has received considerable research interest over recent years due to associations identified with a range of mental health conditions, along with its promise for mind-body interventions (Garfinkel, Seth, Barrett, Suzuki, & Critchley, 2015; Mehling, Acree, Stewart, Silas, & Jones, 2018). The internal process by which the nervous system senses,

interprets and integrates signals from within the body, interoception provides a mapping of the body's internal landscape across conscious and unconscious levels (Mehling et al., 2018). Physiological mechanisms acting as interoceptive stimuli include heart rate, respiration, blood pressure, temperature, satiety, blood sugar, gastrointestinal activity, and fullness of bladder (Domschke, Stevens, Pfleiderer, & Gerlach, 2010; Khalsa et al., 2018). Such interoceptive stimuli can be interpreted by an individual as affective states such as anxiety, anger or fear, or as non-affective interoceptive states such hunger, nausea or fatigue (Brewer, Cook, & Bird, 2016; Garfinkel & Critchley, 2013). It is suggested that females tend to notice bodily sensations more often and that interoceptive ability declines with age, thus gender and age are considered important variables in the study of interoception (Grabauskaite, Baranauskas, & Griskova-Bulanova, 2017; Murphy, Brewer, et al., 2017).

Interoceptive ability is considered a positive predictor of the success of emotion awareness and regulation with the conscious perception of one's bodily state enabling an individual to attribute emotions to physiological arousal and accordingly regulate a reasonable emotional response (Garfinkel, Critchley, & Pollatos, 2017; Löffler, Foell, & Bekrater-Bodmann, 2018; Price & Hooven, 2018). Given physiological and subjective emotional states are interdependent, it then follows that individual differences in interoception can predict differences in the expression of emotions and that detection of bodily signals can shape emotional and affective experience (Garfinkel & Critchley, 2013; Garfinkel et al., 2016). Interoception is thus considered one of the initial mechanisms underlying the mind-body connection and theory of mind, allowing an individual to use their internal sensations to influence their cognitive and affective functions and also to distinguish between one's own perspective and that of others (Löffler et al., 2018).

Interoception is considered a multidimensional construct, consisting of at least two independent dimensions, the subjective-phenomenological aspect known as interoceptive sensibility (IS) and the ability to detect internal sensory events such as a heartbeat, with this dimension known as interoceptive accuracy (IAcc) (Ferentzi, Horvath, & Koteles, 2019; Garfinkel et al., 2015). For the purpose of the current study, IS is used to conceptualise interoception due to objective measures of IAcc such as the heartbeat tracking task enduring scrutiny for limited reliability and low psychometric value (Zamariola, Maurage, Luminet, & Corneille, 2018). Furthermore, subjective measures of interoception have been found to more closely relate to everyday experiences of emotions and shown to be associated with subjective measures of psychological functioning (e.g., wellbeing) (Ferentzi et al., 2019).

Studies suggest that the influence of interoception on cognitive and affective functions contributes to disordered psychological phenomena such as depression, anxiety, bipolar disorder, borderline personality disorder, autism spectrum disorder, eating disorders, obesity, and diabetes (Herbert, Herbert, & Pollatos, 2011; Murphy, Brewer, et al., 2017; Zamariola, Luminet, Mierop, & Corneille, 2019; Zamariola, Maurage, et al., 2018). ‘Atypical interoception’, encompassing both atypically high or low interoceptive ability has thus been recognised for its effect on efficient psychological functioning and role in psychopathology (Murphy, Brewer, et al., 2017; Zamariola et al., 2019). Due to the relationship of atypical interoception with mental disorders of diverse etiology, it has been proposed that atypical interoception may represent the ‘p-factor’, or general factor, underlying susceptibility to psychopathology (Löffler et al., 2018; Murphy, Brewer, et al., 2017; Zamariola, Vlemincx, et al., 2018).

Murphy, Catmur, and Bird (2017) claim that alexithymia is in fact a multidomain, multidimensional failure of interoception. As interoception likely precedes the mentalising of

emotional wording, alexithymia is considered a resulting deficit due to impaired interoception (Löffler et al., 2018; Maister, Tang, & Tsakiris, 2017). There have been repeated and consistent findings demonstrating an association between interoception and alexithymia (Murphy, Catmur, et al., 2017; Shah, Hall, Catmur, & Bird, 2016). In contrast, Zamariola, Maurage, et al. (2018) found no association between alexithymia and interoception, albeit measured using the heartbeat counting task. Subsequently, Zamariola, Vlemincx, et. al (2018) have suggested that while there is a theoretical and conceptual link between interoception and alexithymia, empirical evidence of the association is inconsistent. Only two studies using validated measures have investigated the relationship between alexithymia and IS, finding evidence of a significant negative association between the two constructs (Brewer et al., 2016; Muir, Madill, & Brown, 2017). Thus, while there are promising findings with regards to this relationship, further investigation is needed, particularly for understanding the processes by which interoception may contribute to the development of alexithymia.

Given that alexithymia is associated with parenting style and is suggested to be related to interoception, the relationship between interoception and parenting style is a topic that requires consideration. Interestingly, Oldroyd et al. (2019) suggest that while there is extensive research advancing the knowledge of interoception, there is limited literature on how interoception develops. These authors proposed that if a child's bodily experiences are denied, devalued, ignored or punished by parents, a child will find ways to avoid feeling them and very likely develop a distorted sense of interoception (Oldroyd et al., 2019). Oldroyd et al. (2019) therefore contend that for a child to know their own body, they need to see it reflected in a sensitive caregiver and that the promotion of interoception arises from a parent noticing what their child is experiencing, drawing attention to the feeling and labelling it. They suggest further research is

needed to examine social factors as antecedents of interoception and to establish how, in addition to attachment, parenting could account for variations in interoceptive functioning (Oldroyd et al., 2019). Similarly, in their study of interoception psychopathology, Murphy, Brewer, et al. (2017) suggest the need for future research on how childhood adversity influences interoception. While there are also suggested biological factors underpinning the development of interoception, limited and further research suggested implies a need for studies on the social antecedents to interoception, including parenting style.

1.5 Experiential Avoidance

Experiential avoidance (EA) is broadly defined as a learned tendency to avoid distressing thoughts, feelings, memories, bodily sensations and other internal experiences, altering their form and frequency as well as contact with triggers of these experiences, even when doing so creates harm in the long run (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Panayiotou et al., 2015). EA is thus an attempt to suppress, inhibit or control the frequency or severity of emotions, thoughts and memories, resulting in a maladaptive coping style that is linked to a wide range of psychopathology (Duarte & Pinto-Gouveia, 2017). EA is broader than the generally used terms of "emotional" or "cognitive" avoidance as it goes beyond avoidance coping to incorporate a behavioural component aimed at altering, reducing and avoiding negative states as well as motivational and emotional components of distress intolerance, compounded by beliefs that emotional experiences are harmful (Bilotta et al., 2016). EA has been recognised amongst most systems of therapy, with avoidance of painful feelings or fear of unwanted emotions found to be at the heart of many psychological problems, suggesting that dysfunction occurs when emotions are interrupted before they are allowed to enter awareness (Hayes et al., 1996).

Results of a meta-analysis indicate that EA is negatively associated with quality of life, perceived health and positive emotional experiences and positively associated with a range of psychopathology, such as depression, anxiety, somatisation, post-traumatic stress disorder, social phobia, dissociative experiences and alcohol dependence (Berrocal, Pennato, & Bernini, 2009). With EA associated with numerous mental disorders, third-wave cognitive behaviour therapies such as Acceptance and Commitment Therapy have been successful in decreasing its effect and demonstrating EA to be a modifiable factor connected to a range of psychopathologies (Celikbas et al., 2020; Tyndall et al., 2019).

Experiential avoidance is associated with attachment insecurity, suggesting that early adverse childhood experiences are related to the development of EA (Castilho et al., 2017; Quickert & Macdonald, 2020). Furthermore, it is suggested that when parents actively validate their children's negative emotions or punish them for displays of distress, children come to view negative feelings as unacceptable and harmful, reacting to them with avoidance (Udachina & Bentall, 2014). This suggests a theoretical relationship between adverse parenting and EA can be assumed.

Across studies of both clinical and community samples, alexithymia and EA have been found to have a significant positive correlation, with EA found to have a mediating role in the relationship between alexithymia, perceived stress and risk of psychiatric disorder (Celikbas et al., 2020; Duarte & Pinto-Gouveia, 2017; Panayiotou et al., 2015; Zakiei et al., 2017). The associations between alexithymia and EA in these studies suggest a person who experiences overwhelmingly intense or unpleasant emotions, as a learned coping strategy will blunt and avoid those emotions which interferes with the process of learning to identify and describe emotions (Celikbas et al., 2020; Venta, Hart, & Sharp, 2013). EA is then reinforced over time

due to the immediate relief it provides from experiencing negative affect, even though it could intensify or sustain the feelings in the long term and increase fear of internal experiences, resulting in the amplification of alexithymia in an individual (Panayiotou et al., 2020).

It has been proposed that EA can arise early in children's development, interfering with their ability to learn and use emotional language, inhibiting behavioural choices and limiting effective social communication (Venta et al., 2013). Panayiotou et al. (2020) further suggest that avoidance of internal experiences may be related to the inaccurate perception of interoceptive cues and poorly integrated somatosensory information, suggesting interoception, EA and alexithymia are intrinsically related. While the relationship between these three factors is presently theoretical, studies have demonstrated they are conceptually distinct variables, with only moderate correlations found between the variables (Celikbas et al., 2020; Duarte & Pinto-Gouveia, 2017; Murphy, Catmur, et al., 2017; Panayiotou et al., 2015; Shah et al., 2016). The order of occurrence of the factors in the mind-body connection is also only a theoretical conception (Panayiotou et al., 2020). Based on previous research, the current study postulates that interoception precedes alexithymia (Löffler et al., 2018; Murphy, Catmur, et al., 2017). The assertion that EA occurs after the development of interoception is based on the suggestion that interoception precedes the mentalising of emotions, thus one must experience bodily cues before being able to mentally assess them as distressing and actively suppress and avoid them (Löffler et al., 2018; Maister et al., 2017). Further, it is suggested that EA is a learned coping strategy to deal with distressing emotions and thus interferes with the ability to identify and describe emotions, as such, if one purposely avoids emotions they do not understand, they do not learn what they are (Celikbas et al., 2020; Venta et al., 2013). Based on these assertions, the current study proposes interoception precedes the development of EA, with alexithymia representing a

deficit in emotional awareness and communication, resulting from impaired interoception and repeated experiential avoidance.

1.6 Current Study

Past research has shown that adverse parenting styles low in warmth and high in rejection can lead to alexithymia, and further, that alexithymia is linked to a range of mental health concerns such as depression, anxiety and obsessive-compulsive disorder (Aaron et al., 2020; Aust et al., 2013; Bilotta et al., 2016; Duarte & Pinto-Gouveia, 2017; Honkalampi et al., 2004; Janik McErlean & Lim, 2019). To elucidate this relationship, an empirical investigation of the antecedents of alexithymia is needed to assist in understanding its development. The current study, therefore, aims to examine the relationship between the perceived parenting subscales of warmth and rejection and the mind-body connection factors of interoception, EA and alexithymia. It is intended that the findings from the current study may assist in identifying modifiable factors that can be addressed as therapeutic targets to reduce the impact of adverse parenting experiences on alexithymia in adulthood and ameliorate the effect on resulting psychopathology in adulthood.

Hypothesis 1: Parental warmth will positively correlate with interoception and negatively correlate with alexithymia and experiential avoidance.

Hypothesis 2: Parental Rejection will negatively correlate with interoception and positively correlate with alexithymia and experiential avoidance.

Hypothesis 3: Alexithymia will negatively correlate with interoception and positively correlate with experiential avoidance, and interoception will negatively correlate with experiential avoidance.

Hypothesis 4: There will be a total path from adverse parenting (low warmth, high rejection) to alexithymia and that interoception and experiential avoidance will individually and sequentially mediate this relationship, while accounting for known covariates (age, gender, education level, ethnicity, marital status, family unit composition and dependent children).

The final hypothesis is proposed in the following model:

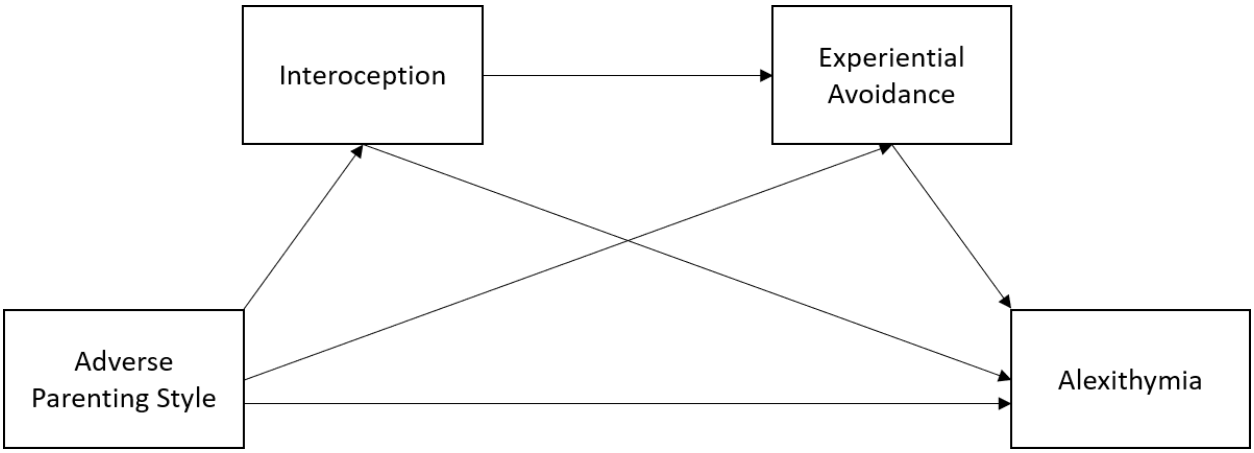

Figure 1. The proposed mediation model

Chapter 2: Method

2.1 Participants

Participants of the current study (N = 313, M_{age} = 25) were a convenience sample of adults aged 18 years and over living in Australia who were required to be proficient in English. Of the participants, 153 (49%) were students drawn from the University of Adelaide (UoA) SONA Research Participant System (RPS) pool of first-year psychology students, and 160 (51%) self-selected from the Australian population. The first-year university students were offered course credit for their participation. The remaining participants were recruited via social media advertising (Appendix A) and the UoA's Unified system and were offered the opportunity to enter a prize draw to win a $50 voucher.

The study was granted approval by the *University of Adelaide Human Research Ethics Subcommittee*, approval number 20/20.

2.2 Power Analysis

An a priori power analysis was conducted using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). For a linear multiple regression analysis based on an alpha of .05, power of .80 and a small to medium effect size of .1, a sample size of 185 was determined to be sufficient to give the current study adequate statistical power.

2.3 Measures

The current study was completed as part of a larger study investigating associations between perceived parenting style and psychological outcomes. However, only measures relevant to the current study are described and reported below.

2.3.1 Demographic Information

Demographic questions included participant age, gender, education level, ethnicity and marital status. To understand their family unit composition, participants were asked who they were raised by and whether they had children. If the participant answered No to the latter, they were also asked if they had ever been the primary caregiver to a child, to which a yes response was included as a yes to the overall question.

2.3.2 Perceived Parenting Style

Perceived parenting style was assessed using the short form of the EMBU (Swedish acronym for Egna Minnen Beträffande Uppfostran [My memories of upbringing]) (Arrindell et al., 1999). The s-EMBU measures an adult's perception of their parent/s or primary caregiver's rearing behaviour during childhood in a self-report questionnaire (Arrindell et al., 1999). The s-EMBU is an abbreviated, yet reliable, valid and functionally equivalent twenty-three item alternative to the original eighty-one item EMBU and was used to reduce study response length for participants (Arrindell et al., 2005). The measure contains three subscales, namely rejection, warmth and (over)protection. Items (e.g., "My parents praised me") are rated on a four-point Likert scale from 1 (no, never) to 4 (yes, most of the time). The s-EMBU yields a value for each subscale, with results interpreted as the higher the value, the greater the experience of that factor during childhood (Arrindell et al., 1999). Although the s-EMBU can be administered to measure the maternal or paternal perceived parenting style, the current study requested participants complete the measure in relation to their primary caregiver(s). For the current study, only the subscales of warmth and rejection were used.

The s-EMBU has been validated for Australian university students, with the measure showing good construct validity and internal consistency for each subscale, $\alpha < .8$; (Arrindell et

al., 2005; Arrindell et al., 1999). Similarly, the current study presented good internal consistency; $\alpha = .89$ and $\alpha = .86$ for the warmth and rejection subscales, respectively.

2.3.3 Interoception

Interoception was assessed with the Multidimensional Assessment of Interoceptive Awareness, Version 2 (MAIA-2). The MAIA-2 is a state-trait questionnaire designed to measure the five dimensions of bodily awareness by self-report, with the MAIA-2 showing improved internal consistency relative to the original MAIA (Mehling et al., 2018). The MAIA-2 is composed of thirty-seven items on a six-point Likert scale with responses ranging from 0 (never) to 5 (always) for items such as "I feel my body is a safe place". The total score is calculated by reverse-coding all negatively worded items then summing all thirty-seven items to result in a score ranging from 0 – 185 (Muir et al., 2017). Higher total scores indicate higher levels of positive interoceptive awareness. The MAIA-2 includes eight subscales however only the total score for the MAIA-2 was used to measure interoceptive sensibility for the current study. As suggested by Muir et al. (2017), no one dimension of the MAIA-2 is responsible for reported effects of interoception as individuals with high levels of interoceptive awareness are generally able to use information from their body to evaluate their emotional state, regulate distress and effectively utilise emotional regulation strategies, suggesting the MAIA-2 total score is a sufficient individual measure of interoceptive awareness.

The MAIA-2 has been used in numerous studies worldwide, demonstrating good internal consistency for the total score ($\alpha = .85$) (Muir et al., 2017), comparable to that of the current study ($\alpha = .90$).

2.3.4 Experiential Avoidance

EA was assessed with the Brief Experiential Avoidance Questionnaire (BEAQ). The BEAQ is considered an appropriate instrument for measuring EA with good construct validity (Vázquez-Morejón, Rubio, Rodríguez, & Morejón, 2019).

The BEAQ is a 15 item self-report measure, with items (e.g., "I feel disconnected from my emotions") rated on a six-point Likert scale from 1 (strongly disagree) to 6 (strongly agree) (Gámez et al., 2014). Scores for each item are summed, with a total score ranging from 15 to 90 points, higher scores indicate a greater degree of EA in the participant (Vázquez-Morejón et al., 2019).

The BEAQ has good internal consistency, with a Cronbach's alpha of $\alpha = .80$ to .89 for various samples (Vázquez-Morejón et al., 2019), with the current study finding comparable good internal consistency with a Cronbach's alpha of $\alpha = .87$.

2.3.5 Alexithymia

The Toronto Alexithymia Scale (TAS-20), a twenty item self-report questionnaire was used to assess participants levels of alexithymia (Bagby et al., 1994). The measure returns an alexithymia total score (TAS-TS) as well as three subscale scores for difficulty identifying feelings, difficulty describing feelings and externally oriented thinking (Thorberg et al., 2011). Measured on a five-point Likert scale of 1 (completely disagree) to 5 (completely agree) for items such as "I don't know what's going on inside me", five of the items are reverse scored with a higher TAS-TS indicating higher levels of alexithymia (Panayiotou et al., 2015). For the current study, the TAS-TS was used as a broad indication of alexithymia in participants.

The TAS-20 is a reliable and valid instrument to measure alexithymia, with strong construct validity and adequate to excellent internal reliability across sample sizes and language

translations, α = .8 (Bagby, Parker, & Taylor, 2020). In the current study, there was similarly good internal consistency (α = .88).

2.4 Procedure

The study was conducted online via Qualtrics for a two-month duration from mid-April to mid-June 2020. First-year psychology students accessed the survey via the RPS and other participants through a link provided in social media posts and the UoA Unified system. Before commencing the survey, participants were provided with an information sheet (Appendix B) and were required to provide informed consent (Appendix C). Following the completion of demographic data (Appendix D), participants were administered the measures (Appendix E) in randomised order to eliminate order bias in responses. Contact details for mental health support services were provided following completion of the measures, students were encouraged to contact these services if they had experienced discomfort while completing the measures. Participants were given the option to provide their initials and phone number to be contacted by a member of the research team who is a registered psychologist should their responses to the measures in the study have indicated a possible need for psychological support. Email addresses and phone numbers provided for the prize draw were removed from the dataset to ensure anonymity for participants.

Chapter 3: Results

3.1 Data Analysis

Statistical analyses were conducted using the statistical package R v1.2 and SPSS version 27.0 (R Core Team, 2016; IBM Corp., 2020). Pearson's bivariate correlations were performed to examine the relationships between parental warmth and rejection and the mind-body factors of interoception, EA and alexithymia. To test the mediation hypothesis and proposed model, serial mediation analyses using the PROCESS macro for SPSS were performed with 5000 bootstrapped samples and bias-corrected 95% confidence intervals (Hayes, 2013).

The data were screened to remove participants who did not complete the key measures (N = 80). An independent-samples t-test was used to ascertain any demographic differences between these participants and those that completed the measures (N = 233). No systematic differences were found between the groups when comparing the mean values of age, gender, education, ethnicity, marital status, family unit composition and dependent children ($p > .05$). Thus, following the exclusion of participants with incomplete responses, the final sample was N = 233.

Inspection of boxplots identified six univariate outliers, although the 5% trimmed mean for each variable showed very minimal deviation from the overall mean. To identify multivariate outliers, Mahalanobis Distance, Cook's Distance and leverage points tests were conducted. From this analysis, seventeen potentially influential points were identified. Inspection of the identified responses established them to be genuine respondents. Furthermore, reliability analyses, normality checks and bivariate correlations with and without the inclusion of the influential points demonstrated they did not significantly affect the results; therefore, all participant responses were retained for the final analyses.

Shapiro-Wilk tests were conducted to test the assumption of a normal distribution for each measure. The perceived parental warmth and rejection subscales of the s-EMBU along with the TAS returned a significant statistic ($p < .05$), thus the null hypothesis of a normal distribution for these variables was rejected (Navarro, 2015). To further validate normality, the skewness and kurtosis of the measures were evaluated. The skewness and kurtosis values for the rejection subscale of the s-EMBU and TAS were within the range of -1 and +1 and visual inspection of Q-Q plots and histograms for each measure confirmed the assumption of normality for all measures, except the parental warmth subscale of the s-EMBU, which showed significant negative skew and a flat distribution (Tabachnick & Fidell, 2013). As normality could not be confirmed for the parental warmth subscale, the data for the scale was transformed to a normal distribution using square root heuristic transformation. Bivariate correlations and mediation analyses were performed using both the original data and the transformed data for the parental warmth subscale, however, as there were no significant differences shown in the outcomes of the analysis between transformed and non-transformed data, the original datum was retained for ease of interpretation.

As the current study used the nonparametric resampling procedure of bootstrapping to $N = 5000$ sample replicates, the indirect effects for the mediation models could be estimated without assuming normality of the sampling distribution (Hayes, 2013). For the unstandardised coefficients of the indirect effects to be considered significant, the 95% confidence interval must not contain zero (Hayes, 2013).

3.2 Descriptive Statistics

Table 1 summarises the demographic information for the study participants and Table 2 outlines the descriptive statistics for each measure and relevant subscales.

Pearson's bivariate correlations showed statistically significant associations between age and the s-EMBU parental warmth subscale (r = -.17, p = .011) and alexithymia (r = -.21, p = .001). Kruskal-Wallis tests were used to assess significant differences in the continuous dependent variables by the categorical independent variables of the demographics. Results indicated differences in education level and marital status across the parental warmth subscale (χ^2 (5, 233) = 13.67, $p < .05$; χ^2 (4, 233) = 10.81, $p < .05$, respectively), as well as differences in marital status across the perceived parental rejection subscale, EA and alexithymia (χ^2 (4, 233) = 15.07, $p < .05$, χ^2 (4, 233) = 11.79, $p < .05$, χ^2 (4, 233) = 19.93, $p < .001$, respectively). A difference in dependent children was also found across the interoception and alexithymia measures (χ^2 (1, 233) = 5.48, $p < .05$, χ^2 (1, 233) = 9.89, $p < .05$, respectively).

Post hoc comparisons using the Dunn Test with Bonferroni correction indicated that for perceived parental warmth, there were significantly different mean scores for participants with a high school education (M = 17.3, SD = 4.5) and those degree qualified (M = 15.1, SD = 4.5), as well as single (M = 16.6 , SD = 4.9) and separated/divorced participants (M = 12.3, SD = 3). Further post-hoc tests found for perceived parental rejection, separated/divorced participants (M = 18.2, SD = 5.9) had significantly different mean scores to married/defacto (M = 12.4, SD = 5.1) and 'other' participants (M = 10.6, SD = 5). For alexithymia, means were significantly different for single (M = 52.4, SD = 12.8) and married/defacto participants (M = 45, SD = 11.9) and for EA, no difference between means for marital status was found. For whether a participant had dependent children, there was a significant difference between means in the measures for interoception (Yes (M = 103.7, SD = 22.7), No (M = 93.4, SD = 23.4)) and alexithymia (Yes (M = 43.2, SD = 10.6), No (M = 51.1, SD = 13)).

Table 1

Descriptive Statistics for Participants (N = 233), including: Age Group, Gender, Education Level, Ethnicity, Marital Status, Family Unit Composition and Dependent Children

Variable and Subcategory	***N***	**%**
Age Group		
18-29	193	82.9
30-39	15	6.4
40-49	15	6.4
50-59	6	2.6
60+	4	1.7
Gender		
Female	182	78.1
Male	45	19.3
Other	5	2.2
Prefer not to specify	1	0.4
Education		
Primary school	1	0.4
High school	143	61.4
Technical qualification (e.g. Certificate III)	26	11.2
Degree or diploma (e.g. Bachelor's degree)	53	22.7
Postgraduate degree (e.g. Masters degree)	8	3.4
Other	0	0
Prefer not to specify	2	0.9
Ethnicity		
Caucasian (Australian, European, American)	172	73.8
Aboriginal and/or Torres Strait Islander	0	0
Asian	46	19.8
African	2	0.9
Hispanic/Latino	1	0.4
Middle Eastern	4	1.7

Table 1 Continued

Variable and Subcategory	***N***	**%**
Pacific Islander	0	0
Other	7	3
Prefer not to specify	1	0.4
Marital Status		
Single	159	68.2
Married/Defacto	48	20.6
Widowed	2	0.9
Separated/Divorced	9	3.9
Other	15	6.4
Prefer not to specify	0	0
Family Unit Composition		
Both parents (in same home)	179	76.8
Both parents (in separate homes)	20	8.5
Mother only	27	11.6
Father only	2	0.9
Other primary caregiver	2	0.9
Prefer not to specify	3	1.3
Dependent children		
No children	200	85.8
Children/Primary caregiver	33	14.2

Note. *N* = sample size; % = percentage of sample.

Table 2

Descriptive Statistics for the S-EMBU Warmth and Rejection Subscales and Total Scores for the Multidimensional Assessment of Interoceptive Awareness-2, Brief Experiential Avoidance Questionnaire, and the 20-Item Toronto Alexithymia Scale

Variable	Mean	*SD*	Min	Max
s-EMBU Warmth	16.71	4.79	6	24
s-EMBU Rejection	12.73	4.87	7	27
MAIA-TS	94.9	23.51	17	164
BEAQ-TS	50.76	13.33	15	82
TAS-TS	49.99	12.95	22	85

Note. s-EMBU Warmth = s-EMBU perceived parenting warmth subscale, s-EMBU Rejection = s-EMBU perceived parenting rejection subscale, MAIA-TS = the Multidimensional Assessment of Interoceptive Awareness-2 total score, BEAQ-TS = Brief Experiential Avoidance Questionnaire total score, TAS-TS = 20-item Toronto Alexithymia Scale total score, *SD* = Standard Deviation, Min = Minimum, Max = Maximum.

3.3 Correlations

As demonstrated in Table 3, the perceived parental warmth subscale had a weak negative relationship with EA and alexithymia and a weak positive association with interoception. Conversely, the rejection subscale had a weak negative relationship with interoception and weak positive relationships with EA and alexithymia. Furthermore, interoception showed a moderate negative relationship with EA and alexithymia while EA showed a moderate positive association

with alexithymia. The perceived parental warmth and rejection subscales shared a weak negative relationship.

Table 3

Pearson's Bivariate Correlation Matrix of the S-EMBU Warmth and Rejection Subscales and Total Scores for the Multidimensional Assessment of Interoceptive Awareness-2, Brief Experiential Avoidance Questionnaire, and the 20-Item Toronto Alexithymia Scale

Variable	1	2	3	4	5
1 s-EMBU Warmth	1				
2 s-EMBU Rejection	-.61**	1			
3 MAIA-TS	.38**	-.32**	1		
4 BEAQ-TS	-.22**	.29**	-.46**	1	
5 TAS-TS	-.32**	.31**	-.47**	.57**	1

Note. s-EMBU Warmth = s-EMBU perceived parenting warmth subscale, s-EMBU Rejection = s-EMBU perceived parenting rejection subscale, MAIA-TS = the Multidimensional Assessment of Interoceptive Awareness-2 total score, BEAQ-TS = Brief Experiential Avoidance Questionnaire total score, TAS-TS = 20-item Toronto Alexithymia Scale total score.

**$p < .001$, two tailed.

3.4 Serial Mediation Analysis

Serial multiple mediation analysis was performed using the PROCESS macro version 3.5 to determine whether interoception and EA individually and sequentially mediated the relationship between the perceived parenting style subscales of warmth and rejection, and alexithymia (Hayes, 2013). The covariates age, gender, education level, ethnicity, marital status, family unit composition and dependent children were controlled for in the models. Figures 2 and 3 depict a visual representation of the models, including unstandardised regression coefficients for model parameters (see Appendix F for complete proofs).

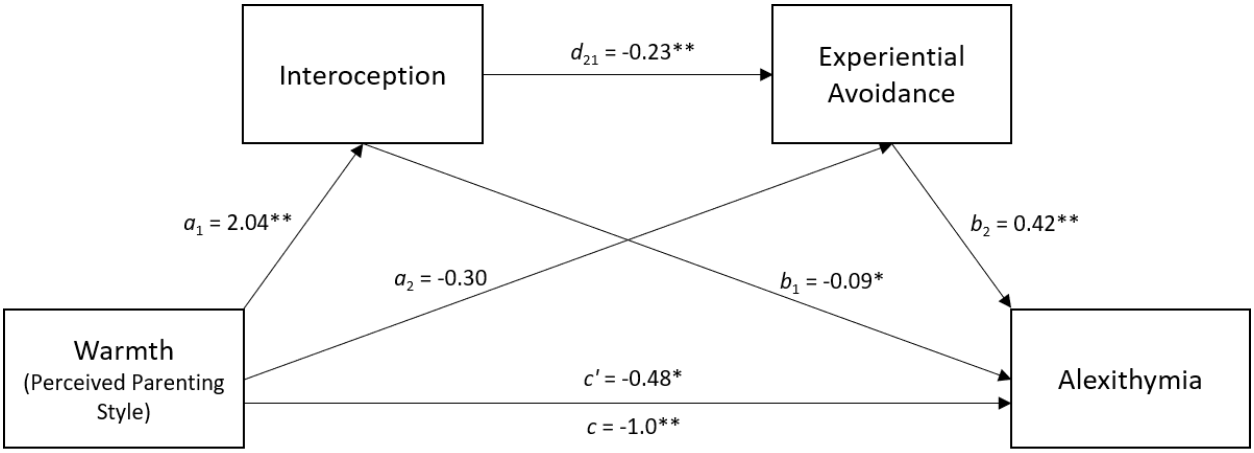

Figure 2. Serial multiple mediation analysis of the relationship between the warmth subscale of perceived parenting style and alexithymia as mediated by interoception and experiential avoidance

* $p < .05$, two tailed. ** $p < .001$, two tailed.

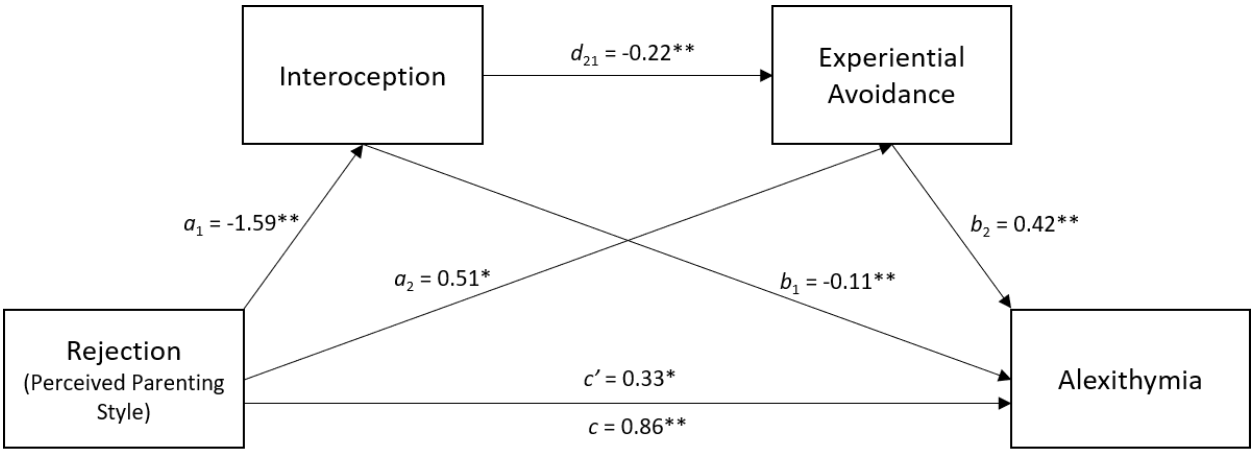

Figure 3. Serial multiple mediation analysis of the relationship between the rejection subscale of perceived parenting style and alexithymia as mediated by interoception and experiential avoidance

* $p < .05$, two tailed. ** $p < .001$, two tailed.

As per Figure 2, the total effect of parental warmth on alexithymia was significant (b = -1, $t(224)$ = -5.91, $p < .001$). There was an association between parental warmth and the mediator interoception (b = 2.04, $t(224)$ = 6.69, $p < .001$), a negative effect of interoception on EA was shown (b = -0.23, $t(223)$ = -6.19, $p < .001$) and both interoception and EA predicted alexithymia (b = -0.09, $t(222)$ = -2.73, $p < .05$ and b = 0.42, $t(222)$ = 7.47, $p < .001$, respectively). Finally, elevated parental warmth reduced alexithymia sequentially through high interoceptive ability and subsequently through lower EA. As per Table 4, there was evidence of an indirect effect of parental warmth on alexithymia through interoception as an individual mediator, with a standardised indirect effect of -0.069 (95% CI = -0.134, -0.018). The completely standardised total indirect effect of parental warmth on alexithymia via interoception and subsequently EA was -0.072 (95% CI = -.114, -.037), though the direct effect of parental warmth on alexithymia remained significant (unstandardised c' = -0.48, $p < .05$) when controlling for the mediators.

As depicted in Figure 3, the total effect of parental rejection on alexithymia was significant (b = 0.86, t(224) = 5.26, p < .001). There was an association between parental rejection and the mediators interoception and EA (b = -1.59, t(224) = -5.23, p < .001 and b = 0.51, t(223) = 3.02, p < .05, respectively) and a negative effect of interoception on EA was shown (b = -0.22, t(223) = -6.20, p < .001). Both interoception and EA predicted alexithymia (b = -0.11, t(222) = -3.34, p < .001 and b = 0.42, t(222) = 7.18, p < .001, respectively). Importantly, high parental rejection increased alexithymia sequentially via lower interoception and subsequently via higher EA. As per Table 4, there was evidence of an indirect effect of rejection on alexithymia through interoception and EA as an individual mediators, with standardised indirect effects of 0.065 and 0.079 respectively (95% CI = 0.024, 0.118 and 95% CI = 0.027, 0.140, respectively). The completely standardised total indirect effect of rejection on alexithymia via interoception and EA was .054 (95% CI = .026, .086) and there was evidence of a direct effect, independent of mediators, between rejection and alexithymia (unstandardised c' = 0.33, p < .05).

The influence of covariates was controlled for in the analysis, with no covariates found to be significant predictors in the total models for parental warmth and rejection (see Appendix F for complete proofs). The total models for parental warmth and rejection, including covariates explained 44% and 43% of the variance in alexithymia, respectively.

Table 4

Indirect Effects for the Associations Between the Warmth and Rejection Perceived Parenting Style Subscales and Alexithymia as Mediated by Interoception and Experiential Avoidance

Indirect Path	**Unstandardised Effect**	**Standardised Effect**	**SE**	**Unstandardised 95% CI**
Warmth → Interoception → Alexithymia	-0.19	-0.069	0.08	-0.37 - -0.05
Warmth → EA → Alexithymia	-0.13	-0.048	0.08	-0.29 - 0.02
Warmth → Interoception → EA → Alexithymia	-0.20	-0.072	0.06	-0.32 - -0.10
Rejection → Interoception → Alexithymia	0.17	0.065	0.06	0.06 - 0.32
Rejection → EA → Alexithymia	0.21	0.079	0.08	0.07 - 0.37
Rejection → Interoception → EA → Alexithymia	0.14	0.054	0.04	0.07 - 0.23

Note. Warmth = perceived parenting warmth subscale, Rejection = perceived parenting rejection subscale, Interoception = Interoceptive Sensibility, EA = Experiential Avoidance, *SE* = Standard Error, 95% CI = 95% confidence interval

* $p < .05$, two tailed, ** $p < .001$, two tailed.

Chapter 4: Discussion

4.1 Overview

Adverse parenting has been found to predict psychopathology in adulthood, and alexithymia has been consistently associated with problematic parenting and poor mental health outcomes. Thus, the current study examined the relationship between these two constructs, with interoception and EA as mediators due to their association with adverse parenting and empirical link with alexithymia (Duarte & Pinto-Gouveia, 2017; Janik McErlean & Lim, 2019; Murphy, Catmur, et al., 2017). The study aimed to elucidate the processes by which the mind-body variables interoception and EA may be associated with adverse parenting and alexithymia to clarify how they contribute to or prevent psychological conditions and thus may be considered as therapeutic targets.

Results from the current study supported the hypotheses, demonstrating that parental warmth was positively correlated with interoception and negatively with alexithymia and EA. Conversely, parental rejection was negatively correlated with interoception and positively with alexithymia and EA. As expected, parental warmth and rejection were negatively correlated. In examining the relationships between the mind-body factors, it was found that alexithymia negatively correlated with interoception and positively with EA, while interoception and EA were negatively correlated. Results from the mediation analyses further confirmed the direction of these relationships (i.e. positive or negative) and most importantly found that interoception and EA respectively and sequentially mediated the relationship between adverse parenting and alexithymia.

4.2 Relationship between Adverse Parenting and Mind-Body Factors

Results support the hypotheses and literature suggesting that parental rejection is related to deficits in the mind-body constructs of interoception, EA and alexithymia while parental warmth influences favourable emotional development, contributing to better life outcomes such as life satisfaction and higher self-esteem (Branjerdporn et al., 2019; Milevsky et al., 2007; Wei & Kendall, 2014). Importantly, the results support the suggestion that parenting style is important for the development of emotional awareness and regulation skills, with role models for the healthy expression of emotions contributing to the development of skills in identifying physiological cues and understanding emotions (Kooiman et al., 2004).

Furthermore, the relationship between parenting style and interoception contributes to the literature on the aetiology of interoception, supporting the assertion of Oldroyd et al. (2019) that for a child to know their own body, they need to see it reflected in a caregiver and that, parenting styles, as a social factor, could account for variations in interoceptive functioning. Importantly, the current study is the first to hypothesise and demonstrate a relationship between adverse parenting and EA, suggesting adverse parenting could contribute to maladaptive coping styles such as the suppression and avoidance of distressing emotions and negative internal experience (Duarte & Pinto-Gouveia, 2017).

4.3 Relationship between the Mind-Body Factors

The hypothesis on the relationships between the mind-body variables of interoception, EA and alexithymia was supported and thus suggests that these variables could underly the mind-body connection, influencing an individuals ability to use their bodily cues to affect their cognitive and affective functions (Löffler et al., 2018). This implies that the ability to sense

bodily cues and link them to emotions is related to the suppression and avoidance of distressing emotions and experience, both of which are related to the ability to identify and describe emotions, mentally and verbally. It can be suggested that a deficit in one of the constructs could affect the others, demonstrating an intrinsic link and connection between the mind-body variables. These findings contribute to empirical evidence of the relationships between interoception, EA and alexithymia, of which there had previously been limited and contrasting research. Furthermore, the relationship between interoception, EA and alexithymia, and their link to mental disorders suggests each of these constructs, individually and collectively could be processes underlying a range of psychopathology (Bilotta et al., 2016; Duarte & Pinto-Gouveia, 2017; Hayes, Hofmann, & Ciarrochi, 2020; Khalsa et al., 2018).

4.4 Interoception and Experiential Avoidance as mediators between Adverse Parenting and Alexithymia

Serial mediation analyses demonstrated a total path from adverse parenting to alexithymia and that interoception and EA individually and sequentially mediated the relationship, while accounting for covariates (age, gender, education level, ethnicity, marital status, family unit composition, and dependent children). Although previous studies have explored the relationship between adverse parenting and alexithymia, the current study is the first to our knowledge to propose a model in which interoception and EA mediate the relationship. With a number of antecedents to alexithymia being identified in research, it was important to understand which mind-body connection variables could be process factors contributing to the relationship between adverse parenting and alexithymia and thus be therapeutic targets (De Panfilis et al., 2003).

The model demonstrated that adverse parenting styles with low warmth and high rejection can predict a deficit in interoceptive abilities and high EA, contributing to elevated alexithymia. This is supported by evidence from literature that adverse parenting results in problematic outcomes such as alexithymia, and that parenting style is crucial to a child's ability to recognise, accept and identify emotions (Ebrahimi et al., 2017; Löffler et al., 2018). Furthermore, the significant indirect effect for the total path in the parental warmth model supports evidence that warmth provided by parents enables their children to develop more adaptive and effective emotional regulation skills. On the other hand, the significant total path in the parental rejection model suggests high levels of rejection could have the opposite effect, resulting in limited interoceptive abilities, maladaptive emotional regulation strategies such as EA and the stunted expression of emotion in the form of alexithymia (De Panfilis et al., 2003; Honkalampi et al., 2004; Oldroyd et al., 2019; Temel & Atalay, 2018). Of note, in the parental warmth model, interoception was a significant individual mediator between adverse parenting and alexithymia, and thus a therapeutic target, however, EA was not. This suggests that EA only has an effect on the relationship between adverse parenting and alexithymia when preceded by interoception, supporting the temporal order of the mind-body factors applied in the current study (Janik McErlean & Lim, 2019; Temel & Atalay, 2018). For the rejection model, both the individual mediation paths for interoception and EA exerted stronger indirect effects on the relationship between parenting and alexithymia than the total indirect effect including both mediators. Although, the difference is small and thus suggests that both interoception and EA may be important therapeutic targets to reduce the impact of adverse parenting on the development of alexithymia.

The validation of the model proposed lends support for the ordering of the mind-body factors proposed in the study. As suggested, interoception may thus be considered as one of the initial mechanisms underlying the mind-body connection, preceding the mentalising of emotions, such that one needs to experience bodily cues before being able to mentally assess them as distressing (Löffler et al., 2018; Maister et al., 2017). The suppression and avoidance of overwhelming, intense or unpleasant internal experiences can thus be considered a result of the inaccurate perception of interoceptive cues (Panayiotou et al., 2020). This learned coping strategy of EA can interfere with the process of learning to identify and describe emotions, resulting in alexithymia. Thus as suggested, it is not that alexithymic individuals lack the ability to process emotion, rather they may have not learned to do so functionally (Panayiotou et al., 2015).

Furthermore, as per the Process-Based Therapy (PBT) approach proposed by Hayes et al. (2020), it is suggested that as mediators, interoception and EA represent core processes that underly alexithymia. In addition, given their association with mental disorders such as anxiety, depression and obsessive-compulsive disorder, it could be suggested that interoception and EA, along with alexithymia are mind-body processes that underly a range of psychopathology (Duarte & Pinto-Gouveia, 2017; Janik McErlean & Lim, 2019; Murphy, Brewer, et al., 2017). This suggests that interoception and EA could be targeted as processes of change for the treatment of alexithymia and various psychological problems as opposed to syndrome specific treatment protocols (Hayes et al., 2020). It is suggested that by targeting these functionally important processes of pathology with interventions, the focus would be on building human prosperity, not just eliminating specific psychopathology (Hayes et al., 2020). Thus, the current study has identified two core processes that as therapeutic targets could ameliorate the effects of

adverse parenting on the development of alexithymia, and potentially reduce symptoms of a range of psychopathologies.

The mediation model further substantiates suggestions that alexithymia may not be a stable personality trait, but rather may represent a disturbance in cognitive processing and emotional regulation that occurs as a result of a dissociation between physiological aspects of emotions, due to interoception, and the conscious experience of affective states due to ongoing experiential avoidance (Panayiotou et al., 2020). Furthermore, as the current study demonstrates that variance in alexithymia can occur as a result of adverse parenting, interoception and EA, thus the aforementioned predictors can be considered as antecedents to alexithymia. However, as the proportion of variance in alexithymia explained by the predictors, including covariates, is less than fifty percent in both models, it can be assumed other causal associations are operating in the relationship between adverse parenting and alexithymia. While the covariates in the model were not found to be predictive of alexithymia for this population, their influence on the constructs should be considered for future studies of diverse populations given their influence in other research.

The mediation model also supports the suggestion that parenting style could be a social antecedent of interoception and may contribute to interoceptive functioning, previously a theoretical assumption with limited empirical evidence (Oldroyd et al., 2019).

4.5 Implications

The findings of the current study have important theoretical and clinical implications. The current study has identified interoception and EA as therapeutic targets that can be addressed to reduce the impact of adverse parenting experiences on alexithymia in adulthood and ameliorate the effect on resulting psychopathology. Identifying the mind-body connection

variables of interoception and EA as processes underlying alexithymia has important implications for its effective treatment as it suggests individuals may benefit from a mind-body therapeutic approach. For example, therapy focused on increasing interoceptive abilities could use approaches such as Mindful Awareness in Body-Oriented Therapy (MABT), which aims to help identify, access, and appraise internal bodily signals, building interoceptive awareness to enhance sensory awareness of emotional experience (Price & Hooven, 2018). Therapies such as MABT could be integrated with other approaches such Acceptance and Commitment Therapy (ACT), which aims to decrease experiential avoidance and grow psychological flexibility, contributing to effective communication between the body and mind (Tyndall et al., 2019). With a focus on mind-body therapies, individuals may better be able to recognise and express their emotions and integrate them with cognition to adaptively guide behaviour, reducing alexithymia (Duquette, 2020). Furthermore, as alexithymia is considered a transdiagnostic factor linked to poor psychological outcomes, such as depression, a reduction in alexithymia through the treatment of the underlying processes of interoception and EA could not only ameliorate the effects of adverse parenting but potentially reduce symptoms across a range of mental disorders, however, the latter conjecture is currently theoretical (Aaron et al., 2020).

Findings of the current study also have important implications for parenting programs suggesting they should focus on educating parents on the importance of helping their children to recognise, accept and communicate their emotions while also working to be positive role models for the display of emotions to help with healthy functioning later in life (Janik McErlean & Lim, 2019).

4.6 Strengths and Limitations

A strength of the current study is its achievement of the sample size specified in an a priori power analysis. The larger sample size of the study enabled improved accuracy, a smaller margin of error and the ability to detect statistically significant results from the sample (Andrade, 2020). Furthermore, well-validated measures of the key constructs were used which had good internal consistency within the study, and the use of Hayes (2013) PROCESS to test the mediation model produced highly reliable results due to the multiple iterations to which the data is subjected (Panayiotou et al., 2015).

Several limitations should be considered when interpreting the results of the current study. Convenience sampling may have contributed to selection bias, with most of the sample being white, young, female psychology students, limiting the generalisability of the results to the general population and affecting the studies external validity. Furthermore, as the models were not tested in a clinical population, results cannot be generalised to a clinical population. The high number of Caucasian participants also limits the generalisability to non-Caucasian dominant cultures and countries, with further testing across ethnicities and cultures needed given the different norms for parenting and expression of emotion (Bornstein & Zlotnik, 2008). Furthermore, there are general bias factors associated with self-report measures, such as memory, mood, disposition, and social desirability, however, the latter was limited due to the anonymity the online survey provided (Branjerdporn et al., 2019).

The experience of alexithymia itself may represent a limitation of the current study as it may influence a participants ability to answer the self-report items on the TAS-20 and s-EMBU that require introspection, emotional awareness and the ability to verbally express emotions (Aust et al., 2013). There is also the suggestion that alexithymic persons perceive parental care in

a less positive light which can lead to an inaccurate interpretation of their childhood environment (Aust et al., 2013; Kooiman et al., 2004). The use of the more comprehensive, clinician-administered Toronto Structured Interview for Alexithymia may help overcome some of these limitations in studies where time permits (Bagby et al., 2020).

A further limitation related to the measure of parenting style is the retrospective recall of experiences of being parented, as responses may be susceptible to inaccurate or incomplete recollection. Research does suggest, however, that self-report measures of parent-child relationships accurately reflect the behaviour of the parents and that perceived parenting style, as opposed to parent-reported style, is more closely related to psychological outcomes subjectively measured in adulthood (Baker & Hoerger, 2012; Udachina & Bentall, 2014).

A further limitation is the cross-sectional nature of the study due to convenience sampling, which means that causation cannot be empirically substantiated. Future longitudinal studies are needed to confirm the causal relationships between the constructs in the model (Venta et al., 2013).

An additional limitation is the empirical evidence of other antecedents to alexithymia, especially given predictors in the model accounted for less than fifty percent of the variance in alexithymia. Other constructs such as attachment style, psychological inflexibility and childhood sexual abuse, to name a few, are suggested to have a causal relationship with alexithymia (Aust et al., 2013; Duarte & Pinto-Gouveia, 2017; Oldroyd et al., 2019). Thus, it is likely that other factors not accounted for in the current study may contribute to or mediate the relationship between adverse parenting and alexithymia, as such further research is needed to provide insight into this complex relationship (Janik McErlean & Lim, 2019). Furthermore, it is suggested that genetic and biological factors may contribute to the etiology of alexithymia and interoception,

thus future studies may consider measuring the construct in participant's parents to account for inheritability of alexithymia and interoception as a covariate (Celikbas et al., 2020; Oldroyd et al., 2019; Willemsen, Roseeuw, & Vanderlinden, 2008).

Also considered a limitation of the study is the research being conducted during the COVID-19 pandemic. During this time, people have been asked to pay closer attention to their bodies to monitor for symptoms of COVID. Being more aware of their bodily cues during COVID could affect participants perception of their interoceptive capabilities and thus their response to the interoception measure used within the study. The current study may benefit from being replicated when the pandemic has subsided to validate the outcomes.

A final limitation is that during data collection, the current study did not screen for mental disorders and chronic conditions that might impact participants performance (Ferentzi et al., 2019). As several studies indicate that anxiety is associated with enhanced interoceptive sensibility, anxiety amongst participants could have impacted results and thus should be measured in future studies (Domschke et al., 2010; Garfinkel et al., 2016; Zamariola et al., 2019).

4.7 Future Research

Future studies may consider using the proposed mediation model for the overprotection dimension of parenting style to determine if it is a predictor for the development of alexithymia, with the results providing insight as to whether it is individually a factor of adverse parenting style and the direction of the relationship with alexithymia, both of which are currently unclear from the literature. Furthermore, the model could be extended to include the subscales of interoception and alexithymia to determine if there are more complex relationships that can further explain why interoception and alexithymia develop in response to adverse parenting,

contributing to more targeted therapeutic intervention. The mediation model could also be further extended by setting the mind-body variables of interoception, EA and alexithymia as predictor variables as per the order proposed by the present study, and including specific mental disorders such as depression as the outcome variable. By examining the relationship of adverse parenting and the mind-body variables with specific psychopathologies, it may be determined for which specific mental disorders the mind-body variables maybe be underlying processes, further contributing to determining effective mind-body interventions for specific disorders.

Furthermore, future studies could consider other adverse parenting practices and behaviours, such as hostile-aggressive, coercive or inconsistent parenting, comparing their effect to the current study to further substantiate how adverse parenting styles and behaviours affect the mind-body factors (Gardner, 1989; Stover, Urdahl, & Easton, 2012; Zhang, Palmer, Zhang, & Gewirtz, 2020). Future studies may also consider measuring both maternal and paternal parenting styles to determine if either has a greater effect in the proposed mediation model to help understand whether the optimal parenting style of one parent can buffer the effects of an adverse style from the other in the development of the interoception, EA and alexithymia (Kooiman et al., 2004).

4.8 Conclusion

In summary, the present study suggests interoception and EA, which are known to be modifiable skills, may be processes that underly alexithymia and thus can be addressed as therapeutic targets to ameliorate the effects of adverse parenting. The study proposes that therapy including a mind-body connection focus may be helpful for addressing the effect of adverse parenting and contribute to better outcomes for individuals including improved quality of life, life-satisfaction, self-esteem (Milevsky et al., 2007). The study further suggests that

interoception, EA and alexithymia may be processes that underly a range of psychopathology, although this is currently a theoretical assertion. The current study provides further empirical evidence on the relationships between interoception, EA and alexithymia, contributing support to alexithymia being a modifiable construct.

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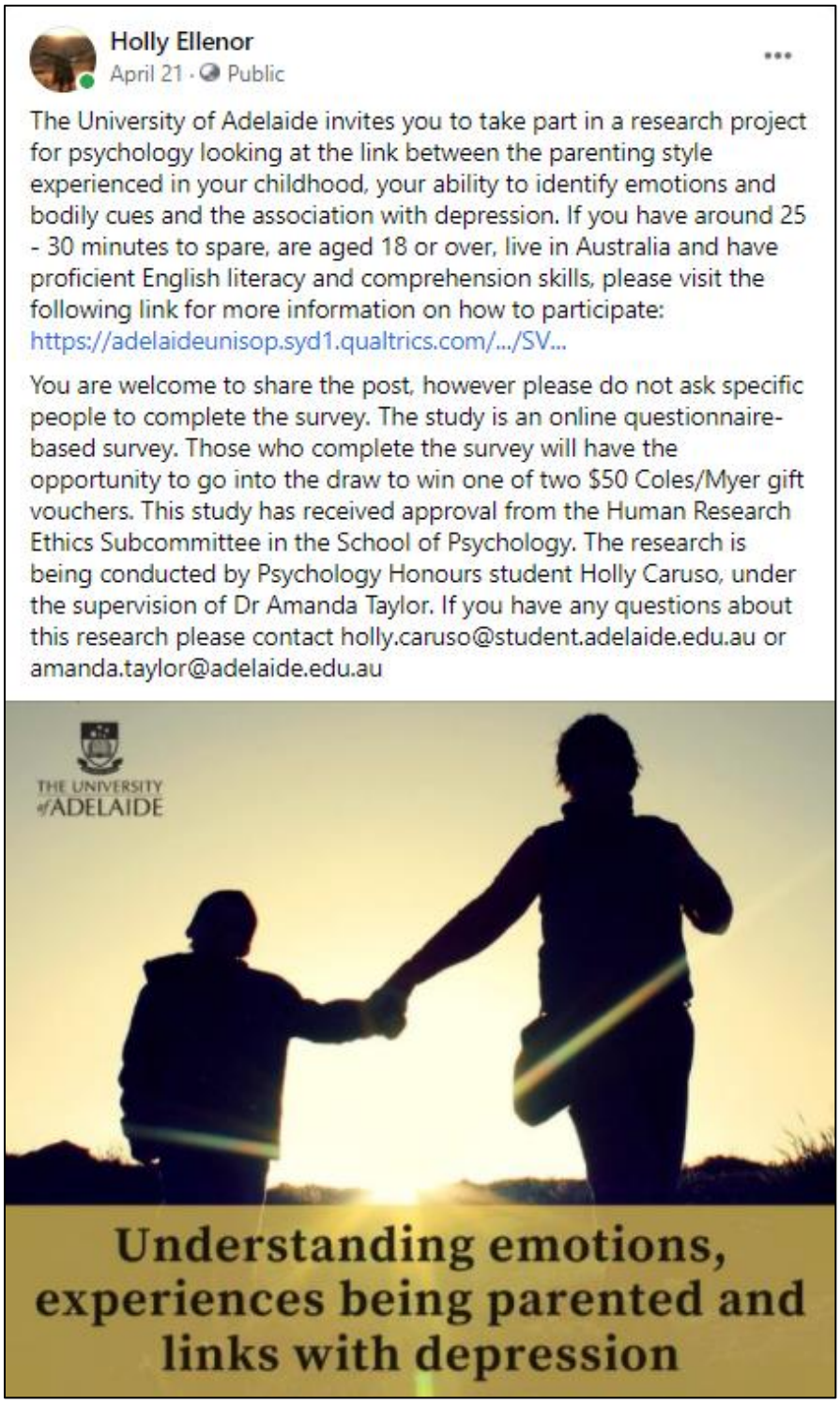
Appendices

Appendix A: Social Media Post



Appendix B: Participant Information Sheet

THE UNIVERSITY of ADELAIDE

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: The mind-body connection: the relationship between perceived parenting style, interoception, experiential avoidance and alexithymia, and their link to depression
HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER: 20/20
PRINCIPAL INVESTIGATOR: Dr Amanda Taylor
STUDENT RESEARCHER: Holly Caruso
STUDENT'S DEGREE: Bachelor of Psychological Science (Honours)

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?

The present study aims to explore the relationship between the parenting style experienced in childhood and a person's ability to describe their emotions and bodily state, and depression.

The survey contains a number of measures relating to the identification of emotions, recognising bodily cues, experiences of being parented, depression, anxiety and stress.

Who is undertaking the project?
This project is being conducted by Holly Caruso. This research will form the basis of the thesis component for an Honours Degree of Bachelor of Psychological Science at the University of Adelaide under the supervision of Dr. Amanda Taylor.

Why am I being invited to participate?
Adults over the age of 18 who are fluent in English and currently living in South Australia are eligible to participate in this study.

What am I being invited to do?
We are seeking your consent to complete a questionnaire-based online survey. The survey may be completed at your convenience and at a location of your choosing.

How much time will my involvement in the project take?
The survey is expected to take no more than one 30-minute session to complete, with no follow up participation required at the completion and submission of the survey. Subjects drawn from the first-year undergraduate psychology cohort will receive one (1) course credit for their participation to contribute to their research participation requirements in Psych 1A or 1B.

Are there any risks associated with participating in this project?
There are no foreseeable risks, side effects, emotional distress, or inconveniences expected to arise from the study either immediately or following participation. However, if you at any point you begin to feel upset or uncomfortable while completing the survey, you should cease working on it. The contact details of the primary researcher (Dr. Amanda Taylor) and the student researcher, along with various mental health support services will be included at the end of the survey.

What are the potential benefits of the research project?
We hope the results produced from this study will contribute to knowledge seeking to understand interoceptive awareness and related psychological outcomes. Outcomes of this research have the potential to inform or contribute to future research and interventions.

Will I directly benefit from my involvement in this research project?
While there are no direct anticipated benefits from participation in this research project, after completing the survey participants will have the opportunity to enter a draw to win one of two $50 Coles-Myer vouchers. Please note that students who participate in the study for course credit are not able to enter the draw, although they may opt to enter the draw instead of receiving course credit. At the end of the survey you will also have the option to provide your phone number to receive feedback on your results should they indicate a need for psychological support.

Can I withdraw from the project?
Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time without consequence until the submission of the survey. Should you no longer wish to participate, the survey can be exited simply by closing the web browser. Course credit for first year psychology participants can only be provided to those who have submitted their survey.

What will happen to my information?
This study will not be using any identifying information in its findings or in any subsequent publications, ensuring your confidentiality. Additionally, the data collected from this study will not be made accessible to any persons other than the researchers as per the University requirements, except as required by law. Information obtained from this survey will be securely stored at the University of Adelaide.

Who do I contact if I have questions about the project?
If you have any questions about the research, please contact Dr. Amanda Taylor via email: amanda.taylor@adelaide.edu.au.

What if I have a complaint or any concerns?
The study has been approved by the Human Research Ethics Subcommittee in the School of Psychology and will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research 2007 (Updated 2018). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the convener of the Subcommittee for Human Research in the School of Psychology, Dr. Paul Delfabbro, paul.delfabbro@adelaide.edu.au.
Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?
Please continue to the following page, where you will be directed to a consent form. After you have given your consent, you will be directed through to the online survey.

Appendix C: Participant Consent Form

THE UNIVERSITY of ADELAIDE

Human Research Ethics Committee (HREC)

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title:	The mind-body connection: the relationship between perceived parenting style, interoception, experiential avoidance and alexithymia, and their link to depression
Ethics Approval Number:	**20/20**

2. I have had the project, so far as it affects me, and the potential risks and burdens fully explained to my satisfaction by the research worker. I have had the opportunity to ask any questions I may have about the project and my participation. My consent is given freely.

3. Although I understand the purpose of the research project is to improve the quality of health/medical care, it has also been explained that my involvement may not be of any benefit to me.

4. I agree to participate in the activities as outlined in the participant information sheet.

5. I understand that as my participation is anonymous, I can withdraw any time up until submission of the survey/completion of the survey. I am aware that if I decide to withdraw this will not affect medical advice in the management of my health, now or in the future.

6. I have been informed that the information gained in the project may be published in in a journal article, thesis, and conference presentation.

7. I have been informed that in the published materials I will not be identified and my personal results will not be divulged.

8. I agree to my information being used for future research purposes as follows:
   - Research undertaken by these same researcher(s) Yes ☐ No ☐
   - Related research undertaken by any researcher(s) Yes ☐ No ☐
   - Research undertaken by any researcher(s) Yes ☐ No ☐

9. I understand my information will only be disclosed according to the consent provided, except where disclosure is required by law.

10. I am aware that I should keep a copy of this Consent Form, when completed, and the participant Information Sheet.

Appendix D: Demographic Survey Questions

If you are a first year University of Adelaide School of Psychology student, please provide the following information for course credit:

Enter your 5-digit Research Participation System ID:

Enter your University student ID (e.g., a1234567):

What is your gender?

- ○ Female
- ○ Male
- ○ Other
- ○ Prefer not to specify

What is your age? (in whole years)

What is the highest level of education you have achieved?

- ○ Primary school
- ○ High school
- ○ Technical qualification (e.g. Certificate III)
- ○ Degree or diploma (e.g. Bachelors degree, Honours, Graduate diploma)
- ○ Postgraduate degree (e.g. Masters, Doctorate)
- ○ Other (please specify):
- ○ Prefer not to specify

What is your marital status?

- ○ Single
- ○ Married
- ○ Widowed
- ○ Defacto
- ○ Separated
- ○ Divorced
- ○ Other
- ○ Prefer not to specify

Were you raised by:

- ○ Both parents (in same home)
- ○ Both parents (in separate homes)
- ○ Mother only
- ○ Father only
- ○ Other primary caregiver
- ○ Prefer not to specify

Do you have biological, adopted, foster, or stepchildren?

- ○ No
- ○ No, but I am (or my partner is) pregnant
- ○ No, but I/we are in the process of adopting/fostering
- ○ Yes, one child
- ○ Yes, two children
- ○ Yes, three children
- ○ Yes, four or more children

Are you currently or have you been a primary caregiver to a child?

- ○ Yes
- ○ No

Appendix E: Survey Measures

My Memories of Upbringing Scale (s-EMBU) (Arrindell et al., 1999)

INSTRUCTIONS: Read through each question carefully and consider which one of the possible answers applies to you.

	No, never	**Yes, but seldom**	**Yes, often**	**Yes, most of the time**
1. My parent(s) got angry with me without letting me know the reason.	1	2	3	4
2. My parent(s) praised me.	1	2	3	4
3. I wished my parent(s) would worry less about what I was doing.	1	2	3	4
4. My parent(s) used physical punishment to discipline me.	1	2	3	4
5. When I came home, I had to account for what I had been doing to my parent(s).	1	2	3	4
6. My parent(s) tried to make my adolescence stimulating, interesting and instructive (ex. giving me good books, arranging for me to go to camps, taking me to sports/club activities).	1	2	3	4
7. My parent(s) criticised me and told me how lazy and useless I was in front of others.	1	2	3	4
8. My parent(s) forbade me to do things other adolescents were allowed to do because they were afraid that something might happen to me.	1	2	3	4
9. My parent(s) tried to encourage me to become the best.	1	2	3	4
10. When I behaved badly, my parent(s) tried to make me feel guilty (for instance by looking sad).	1	2	3	4
11. My parent(s) got overly anxious that something might happen to me.	1	2	3	4
12. My parent(s) tried to comfort and encourage me if things went badly for me.	1	2	3	4
13. I was treated as the ‘black sheep’ or ‘scapegoat’ of the family.	1	2	3	4

14. My parent(s) used words and gestures to show that they liked me.	1	2	3	4
15. My parent(s) liked my brother(s) and/or sister(s) more than they liked me.	1	2	3	4
16. My parent(s) treated me in such a way that I felt ashamed.	1	2	3	4
17. I was allowed to go wherever I liked without my parent(s) caring too much.	1	2	3	4
18. My parent(s) interfered with everything I did.	1	2	3	4
19. Warmth and tenderness existed between my parent(s) and me.	1	2	3	4
20. My parent(s) put strict limits for what I was and was not allowed to do, to which they then adhered rigorously.	1	2	3	4
21. My parent(s) punished me hard, even for small offenses.	1	2	3	4
22. My parent(s) wanted to decide how I should dress or how I should look.	1	2	3	4
23. My parent(s) were proud when I succeeded in something I had undertaken.	1	2	3	4

The Multidimensional Assessment of Interoceptive Awareness 2 (Mehling et al., 2018)

Below you will find a list of statements. Please indicate how often each statement applies to you generally in daily life.

	Circle one number on each line					
	Never					Always
1. When I am tense I notice where the tension is located in my body.	0	1	2	3	4	5
2. I notice when I am uncomfortable in my body.	0	1	2	3	4	5
3. I notice where in my body I am comfortable.	0	1	2	3	4	5
4. I notice changes in my breathing, such as whether it slows down or speeds up.	0	1	2	3	4	5
5. I ignore physical tension or discomfort until they become more severe.	0	1	2	3	4	5
6. I distract myself from sensations of discomfort.	0	1	2	3	4	5
7. When I feel pain or discomfort, I try to power through it.	0	1	2	3	4	5
8. I try to ignore pain	0	1	2	3	4	5
9. I push feelings of discomfort away by focusing on something	0	1	2	3	4	5
10. When I feel unpleasant body sensations, I occupy myself with something else so I don't have to feel them.	0	1	2	3	4	5
11. When I feel physical pain, I become upset.	0	1	2	3	4	5
12. I start to worry that something is wrong if I feel any discomfort.	0	1	2	3	4	5
13. I can notice an unpleasant body sensation without worrying about it.	0	1	2	3	4	5
14. I can stay calm and not worry when I have feelings of discomfort or pain.	0	1	2	3	4	5
15. When I am in discomfort or pain I can't get it out of my mind	0	1	2	3	4	5
16. I can pay attention to my breath without being distracted by things happening around me.	0	1	2	3	4	5
17. I can maintain awareness of my inner bodily sensations even when there is a lot going on around me.	0	1	2	3	4	5
18. When I am in conversation with someone, I can pay attention to my posture.	0	1	2	3	4	5

How often does each statement apply to you generally in daily life? Circle one number on each line	Never					Always
19. I can return awareness to my body if I am distracted.	0	1	2	3	4	5
20. I can refocus my attention from thinking to sensing my body.	0	1	2	3	4	5
21. I can maintain awareness of my whole body even when a part of me is in pain or discomfort.	0	1	2	3	4	5
22. I am able to consciously focus on my body as a whole.	0	1	2	3	4	5
23. I notice how my body changes when I am angry.	0	1	2	3	4	5
24. When something is wrong in my life I can feel it in my body.	0	1	2	3	4	5
25. I notice that my body feels different after a peaceful experience.	0	1	2	3	4	5
26. I notice that my breathing becomes free and easy when I feel comfortable.	0	1	2	3	4	5
27. I notice how my body changes when I feel happy / joyful.	0	1	2	3	4	5
28. When I feel overwhelmed I can find a calm place inside.	0	1	2	3	4	5
29. When I bring awareness to my body I feel a sense of calm.	0	1	2	3	4	5
30. I can use my breath to reduce tension.	0	1	2	3	4	5
31. When I am caught up in thoughts, I can calm my mind by focusing on my body/breathing.	0	1	2	3	4	5
32. I listen for information from my body about my emotional state.	0	1	2	3	4	5
33. When I am upset, I take time to explore how my body feels.	0	1	2	3	4	5
34. I listen to my body to inform me about what to do.	0	1	2	3	4	5
35. I am at home in my body.	0	1	2	3	4	5
36. I feel my body is a safe place.	0	1	2	3	4	5
37. I trust my body sensations.	0	1	2	3	4	5

Brief Experiential Avoidance Questionnaire (BEAQ) (Gámez et al., 2014)

Brief Experiential Avoidance Questionnaire

Please indicate the extent to which you agree or disagree with each of the following statements

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1.	The key to a good life is never feeling any pain	1	2	3	4	5	6
2.	I'm quick to leave any situation that makes me feel uneasy	1	2	3	4	5	6
3.	When unpleasant memories come to me, I try to put them out of my mind	1	2	3	4	5	6
4.	I feel disconnected from my emotions	1	2	3	4	5	6
5.	I won't do something until I absolutely have to	1	2	3	4	5	6
6.	Fear or anxiety won't stop me from doing something important	1	2	3	4	5	6
7.	I would give up a lot not to feel bad	1	2	3	4	5	6
8.	I rarely do something if there is a chance that it will upset me	1	2	3	4	5	6
9.	It's hard for me to know what I'm feeling	1	2	3	4	5	6
10.	I try to put off unpleasant tasks for as long as possible	1	2	3	4	5	6
11.	I go out of my way to avoid uncomfortable situations	1	2	3	4	5	6
12.	One of my big goals is to be free from painful emotions	1	2	3	4	5	6
13.	I work hard to keep out upsetting feelings	1	2	3	4	5	6
14.	If I have any doubts about doing something, I just won't do it	1	2	3	4	5	6
15.	Pain always leads to suffering	1	2	3	4	5	6

The Toronto Alexithymia Scale-20 (TAS-20) (Bagby et al., 1994)

Please answer the following questions, using the scale provided:

(1) Completely disagree
(2) Disagree
(3) Neutral
(4) Agree
(5) Completely agree

1.	I am often confused about what emotion I am feeling.	1 – 2 – 3 – 4 – 5
2.	It is difficult for me to find the right words for my feelings.	1 – 2 – 3 – 4 – 5
3.	I have physical sensations that even doctors don't understand.	1 – 2 – 3 – 4 – 5
4.	I am able to describe my feelings easily.	1 – 2 – 3 – 4 – 5
5.	I prefer to analyze problems rather than just describe them.	1 – 2 – 3 – 4 – 5
6.	When I am upset, I don't know if I am sad, frightened, or angry.	1 – 2 – 3 – 4 – 5
7.	I am often puzzled by sensations in my body.	1 – 2 – 3 – 4 – 5
8.	I prefer to just let things happen rather than to understand why they turned out that way.	1 – 2 – 3 – 4 – 5
9.	I have feelings that I can't quite identify.	1 – 2 – 3 – 4 – 5
10.	Being in touch with emotions is essential.	1 – 2 – 3 – 4 – 5
11.	I find it hard to describe how I feel about people.	1 – 2 – 3 – 4 – 5
12.	People tell me to describe my feelings more.	1 – 2 – 3 – 4 – 5
13.	I don't know what's going on inside me.	1 – 2 – 3 – 4 – 5
14.	I often don't know why I am angry.	1 – 2 – 3 – 4 – 5
15.	I prefer talking to people about their daily activities rather than their feelings.	1 – 2 – 3 – 4 – 5
16.	I prefer to watch "light" entertainment shows rather than psychological dramas.	1 – 2 – 3 – 4 – 5
17.	It is difficult for me to reveal my innermost feelings, even to close friends.	1 – 2 – 3 – 4 – 5
18.	I can feel close to someone, even in moments of silence.	1 – 2 – 3 – 4 – 5
19.	I find examination of my feelings useful in solving personal problems.	1 – 2 – 3 – 4 – 5
20.	Looking for hidden meanings in movies or plays distracts from their enjoyment.	1 – 2 – 3 – 4 – 5

Appendix F: Serial Multiple Mediation Tables

Mediation Analysis for the Parental Warmth (PW) Subscale of Perceived Parenting (S-EMBU) and Alexithymia (TAS-20), with Mediators of Interoception (IS) And Experiential Avoidance (EA), Controlling for Covariates (Age, Gender, Education Level, Ethnicity, Marital Status, Family Unit Composition and Dependent Children)

		M_1 (IS)				**M_2 (EA)**				***Y* (Alexithymia)**		
Variable		**Coefficient**	***SE***	***p***		**Coefficient**	***SE***	***p***		**Coefficient**	***SE***	***p***
X(PW)	a_1	2.07	0.31	<.001	a_2	-0.30	0.18	.098	c'	-0.48	0.16	.002
M_1		-	-	-	d_{21}	-0.23	0.04	<.001	b_1	-0.09	0.03	.007
M_2		-	-	-		-	-	-	b_2	0.42	0.06	<.001
C_1 (age)		0.13	0.21	.518		-0.10	0.12	.395		-0.13	0.10	.195
C_2 (gender)		3.99	2.84	.175		-3.97	1.57	.012		2.19	1.35	.105
C_3 (education)		-1.96	1.60	.220		0.03	0.88	.969		-0.17	0.74	.817
C_4 (ethnicity)		-0.08	0.81	.905		-0.26	0.45	.557		0.14	0.38	.716
C_5 (marital status)		2.17	1.32	.101		-1.56	0.73	.033		-0.79	0.62	.206
C_6 (family unit)		-0.14	1.50	.924		0.25	0.82	.758		0.67	0.69	.334
C_7 (dependent children)		11.13	5.59	.048		-0.24	3.09	.938		-2.11	2.61	.420
		$R^2 = .207$				$R^2 = .264$				$R^2 = .445$		
		$F(8, 224) = 7.32$, $p < .001$				$F(9, 223) = 8.87$, $p < .001$				$F(10, 222) = 17.76$, $p < .001$		

Note. Coefficients are represented as unstandardised regression coefficients

Mediation Analysis for the Parental Rejection (PR) Subscale of Perceived Parenting (S-EMBU) and Alexithymia, with Mediators of Interoception (IS) And Experiential Avoidance (EA), Controlling for Covariates (Age, Gender, Education Level, Ethnicity, Marital Status, Family Unit Composition and Dependent Children)

		M_1 (IS)				**M_2 (EA)**				***Y* (Alexithymia)**		
Variable		**Coefficient**	***SE***	***p***		**Coefficient**	***SE***	***p***		**Coefficient**	***SE***	***p***
X(PR)	a_1	-1.59	0.30	<.001	a_2	0.51	0.17	.003	c'	0.33	0.15	.027
M_1		-	-	-	d_{21}	-0.22	0.03	<.001	b_1	-0.11	0.03	.001
M_2		-	-	-		-	-	-	b_2	0.42	0.06	<.001
C_1 (age)		0.03	0.22	.906		-0.08	0.11	.461		-0.10	0.10	.304
C_2 (gender)		2.17	2.93	.459		-3.92	1.53	.011		2.65	1.34	.050
C_3 (education)		-1.76	1.66	.288		-0.13	0.87	.879		-0.24	0.75	.753
C_4 (ethnicity)		-0.78	0.84	.353		-0.12	0.44	.790		0.29	0.38	.452
C_5 (marital status)		1.97	1.36	.151		-1.52	0.72	.035		-0.72	0.63	.252
C_6 (family unit)		-0.44	1.55	.774		0.17	0.81	.833		0.75	0.70	.288
C_7 (dependent children)		10.74	5.78	.065		-0.44	3.04	.886		-1.84	2.64	.487
		$R^2 = .153$				$R^2 = .284$				$R^2 = .434$		
		$F(8, 224) = 5.04$, $p < .001$				$F(9, 223) = 9.81$, $p < .001$				$F(10, 222) = 16.99$, $p < .001$		

Note. Coefficients are represented as unstandardised regression coefficients