

**THE ROLE OF ALEXITHYMIA IN TRAUMA THERAPY OUTCOME:
EXAMINING IMPROVEMENTS IN PTSD, DISSOCIATION, AND INTERPERSONAL
PROBLEMS**

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A DISSERTATION SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

GRADUATE PROGRAM IN PSYCHOLOGY

YORK UNIVERSITY,
TORONTO, ONTARIO

MAY 2017

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Abstract

Alexithymia is a personality trait that reflects deficits in the cognitive processing and regulation of emotion (Taylor & Bagby, 2012). It has been closely linked to childhood trauma and reported by individuals presenting with other trauma-related conditions such as PTSD, dissociation, and interpersonal problems (Powers et al., 2015). Addressing the emotional deficits associated with alexithymia is fundamental to resolving issues of childhood trauma and therefore, is at the core of many trauma therapy models (Herman, 1992; Cloitre, Koenen, Cohen, & Han, 2002). The current study aims to build upon this foundation by examining the role of alexithymia in the presentations of treatment-seeking women with histories of child abuse, prior to and following trauma therapy. It will also examine the relationship between alexithymia and emotion regulation and between alexithymia and PTSD, dissociation, and interpersonal problems. Data were collected from 167 participants, 51 of which completed an 8-week, stage-one, day treatment program utilizing primarily group therapy for women with histories of severe childhood abuse. Results indicated a significant association between improvement in alexithymia and improvement in PTSD, dissociation, and interpersonal problems. Findings also suggested that alexithymia and emotion regulation difficulties overlap with respect to difficulty understanding feelings. The important clinical implications of attending to the deficits and issues related to alexithymia at initial stages of therapy with survivors of childhood abuse will be discussed.

Acknowledgements

The completion of this dissertation would not have been possible without the support and encouragement of a number of people. First, I would like to thank my supervisors Dr. Robert Muller and Dr. Catherine Classen for your guidance and mentorship throughout this process. It has been a tremendous privilege and enriching learning experience to work under your supervision since the beginning of my graduate studies at York University. I would also like to thank my committee members Dr. Robert Cribbie for your guidance and support with my statistical analyses and Dr. Lynne Angus for your thoughtfulness and valuable input throughout the completion of my dissertation. Finally, I would like to thank Dr. Mary Desrocher for generously stepping in as my committee member during the final stages of my dissertation and supporting me during my oral examination.

I would like to express my immense gratitude to the women who participated in this research. I would also like to thank the clinicians of WRAP – Women Recovering from Abuse Program at Women’s College Hospital for providing me with their knowledge and support during my clinical training in WRAP.

I would like to thank my friends in my research lab for their ongoing support and input throughout this entire process. For their friendship and advice, I want to thank Kristin Thornback, Leah Keating, and Susan Rosenkranz.

Most importantly, I would like to thank my family. I want to thank Luiz my husband for your love, patience, and for standing by my side every step of the way. I also want to thank my little girls Claire and Olivia, whose existence has inspired me and given me the strength to continue going after my dreams. I would not have come this far without you.

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Introduction

Complex trauma has been considered detrimental to emotional development when occurring in early childhood since this is a period of development in which basic self-definition and self-regulation capacities are being developed (Courtois & Ford, 2009). The term “complex trauma” was originally used by Herman (1992) to describe multiple and/or chronic interpersonal traumatic experiences that occur within family and other intimate relationships, and that often begin in early childhood and take place over extended periods of time. These so-called *caregiver-related* traumas (see Edwards, Freyd, Dube, Anda, & Felitti, 2012) may profoundly disrupt the attachment relationships with caregivers, thus compromising other important developmental competencies (Cook et al., 2005).

A growing body of research has suggested that alexithymia may be a result of complex or multiple trauma experiences in childhood (Cloitre, Scarvalone, & Difede, 1997; Frewen et al., 2008a; Sondergaard & Theorell, 2004; Svenja et al., 2014; Zeitlin, McNally, & Cassiday, 1993). Alexithymia has been positively correlated with other common trauma-related problems such as posttraumatic stress disorder (PTSD; e.g., Frewen et al., 2008), dissociation, (Elzinga, Bermond, & van Dyck, 2002), and interpersonal problems (e.g., Humphreys, Wood, & Parker, 2009). Alexithymia has been conceptualized as a personality trait and reflects deficits in the cognitive processing and regulation of emotions, which is also closely associated with trauma (Taylor, 2000). Its main features can be defined as: difficulty identifying and describing subjective feelings; difficulty distinguishing between feelings and the bodily sensations of emotional arousal; constricted imaginal capacities; and an externally oriented cognitive style (Nemiah, Freyberger, & Sifneos, 1976).

Since effective emotion regulation skills involve the ability to identify and label emotions as well as accurately interpret bodily sensations of emotional arousal (Berking et al., 2011; Gratz & Roemer, 2004), alexithymia is an important concept in the field of emotional development and emotion regulation. Early attachment with caregivers has been considered a key factor in children's emotional development (e.g., Bowlby, 1969; Calkins, 2004; Fonagy et al., 1995; Schore, 1994, 2001). Parental behaviours such as sensitive responsiveness to their children's emotional cues and ability to appraise their children's feelings accurately are thought to foster secure attachment and emotion regulation capacities in children (Cassidy, 1994; Thompson, 1994; Waters et al., 2010). In the context of child maltreatment, children with rejecting parents that failed to acknowledge and label their children's emotional expressions are likely to have later emotion regulation problems (Shields, Cicchetti, & Ryan, 1994). There is growing evidence showing that alexithymia is associated with certain parenting behaviours implicated in the development of insecure attachment, which may ultimately lead to impaired emotion regulation skills (Fonagy & Target, 1997; Geregely & Watson, 1996; Kooiman et al., 2004; Schimmenti & Caretti, 2016). Furthermore, childhood maltreatment is thought to play an etiological role in alexithymia by altering brain processes involved in emotion processing and regulation (Bagby & Taylor, 1997; Hund & Espelage, 2006; Krystal, 1988; Sifneos, 1996).

The relationship between alexithymia and psychotherapy outcome has been reported in the literature. Specifically, alexithymia has been associated with poorer outcomes of interventions for various problems, including depression (Ogrodniczuk, Piper, & Joyce, 2004), alcoholism (Cleland, Magura, Foote, Rosenblum, & Kosanke, 2005), eating disorders (Speranza, Loas, Wallier, & Corcos, 2007), and cancer pain (Tulipani et al., 2010). Despite its association with negative treatment outcomes, a growing body of research suggests that alexithymia may

improve following group and individual treatments (Classen, Muller, Field, Clark, & Stern, in press; Grabe et al., 2008; Ogrodniczuk, Sochting, Piper, & Joyce, 2012). Moreover, improvements in alexithymia following treatment have been associated with positive outcomes for health problems (Beresnevaite, 2000), depressive symptoms (Spek et al., 2008), pain perception (Tulipani et al., 2010), and interpersonal problems (Ogrodniczuk et al., 2012). In spite of its association with trauma and psychotherapy outcomes, research on alexithymia in the context of trauma therapy outcomes is scarce.

Challenges conducting therapy with alexithymic clients due to their inability to identify and verbalize their internal and emotional experiences have been reported in the literature (e.g., Taylor & Bagby, 2013). Alexithymic individuals display a decreased capacity to form mental representations of emotions, which impinges on their ability to process and communicate their emotional experiences (Taylor & Bagby, 2013). Their style of speaking and thinking was initially described as strictly factual and literal and lacking emotional descriptions (Nemiah and Sifneos, 1970). Although at times they had words to describe some of their feelings (e.g., angry or sad), they failed to describe inner states that corresponded to these words (Nemiah, et al., 1976). They also tend to focus on the somatic aspects of emotional arousal and may often misinterpret their body sensations (e.g., Taylor, Bagby, & Parker, 1997). More recent psychotherapy studies have described these clients as cold and detached, which has been thought to elicit negative reactions in the therapist (Ogrodniczuk et al., 2005; Ogrodniczuk et al., 2011). Research with a non-clinical sample has shown that alexithymic individuals tend to report higher negative affective experiences than controls and that their affective subjective experiences does not match their physiological activity, which may lead to increased maladaptive self-regulation (Connelly & Deney, 2007). In fact, alexithymic individuals have been found to rely on

maladaptive emotion regulation strategies such as suppression of emotions (Shepherd & Wild, 2014).

Strategies to facilitate the therapeutic process and enhance alexithymic clients' awareness of their feelings have been proposed by clinicians and researchers (e.g., Krystal, 1988; Taylor & Bagby, 2013). Similarly, addressing deficits in emotion processing and regulation resulting from early childhood maltreatment is fundamental to resolving issues of childhood abuse and, therefore, is at the core of many trauma therapy models (Herman, 1992; Cloitre, Koenen, Cohen, & Han, 2002; Duarte-Giles et al., 2007; Paivio & Kunzle, 2007; Paivio & Pascual-Leone, 2010). The current study will examine the relationship between alexithymia and PTSD, dissociation, and interpersonal problems. This will address a significant gap in the trauma literature because, although many studies have reported on the relationship between alexithymia and therapy outcome, this relationship has never been examined in the context of trauma therapy. The current study will also add to the existing literature by addressing gaps with respect to the nature of the relationship between alexithymia and emotion regulation as well as the role of emotion regulation on the relation between alexithymia and other trauma-related problems (i.e., PTSD, dissociation and interpersonal problems) with a sample of treatment-seeking women with histories of childhood abuse. Despite the close link between alexithymia and emotion regulation problems reported in the literature, very little is known about the extent to which these two constructs overlap.

Complex Trauma

Keeping in mind the close link between alexithymia and childhood abuse, it is important to examine the literature on complex trauma and the impairments that it entails. The term “complex trauma” was originally used by Herman (1992) to describe multiple and/or chronic

interpersonal traumatic experiences that occur within family and other intimate relationships and that often begin in early childhood and take place over extended periods of time. These so-called *caregiver-related* traumas (see Edwards, Freyd, Dube, Anda, & Felitti, 2012) may profoundly disrupt the attachment relationships with caregivers, thus compromising other important developmental competencies such as: affect regulation, behavioural control, cognition, help-seeking behaviours, interpersonal, and self-concept (Cook et al., 2005). Complex trauma occurring in childhood is detrimental to development since it occurs during a period of development in which basic self-definition and self-regulation capacities are being developed (Courtois & Ford, 2009).

Along with the notion of complex trauma, the term “Complex PTSD” (CPTSD; Herman, 1992), or Disorders of Extreme Stress Not Otherwise Specified (DESNOS; Pelcovitz et al., 1997), was proposed to describe a syndrome identified in survivors of multiple or chronic and prolonged childhood abuse. Although comorbid with the diagnosis of PTSD (Roth et al., 1997), this alternative conceptualization seemed to better describe the complex reactions and symptoms presented by childhood abuse survivors (Ford, 1999). The CPTSD/DESNOS conceptualization encompasses impairments in the following domains: 1) alterations in the regulation of affect; 2) alterations in consciousness and attention (e.g., dissociation); 3) alterations in self-perceptions (e.g., intense feelings of shame and guilt); 4) alterations in perception of the perpetrator (e.g., idealizing the abuser); 5) alterations in relationship with others (e.g., mistrust and difficulty establishing and maintaining intimate relationships); 6) somatization and/or medical problems (e.g., somatic symptoms and complaints); 7) alterations in systems of meaning (e.g., feelings of hopelessness about their suffering and recovery; Herman, 1992). DSM-5 (American Psychiatric Association, 2013) has modified the PTSD diagnosis so that it captures almost all of the domains

covered by CPTSD. That is, it includes dissociative reactions and negative alterations in cognitions and mood and alterations in arousal and reactivity. However, it does not include interpersonal difficulties and distorted perceptions of the perpetrator. The International Classification of Diseases (ICD-11), still to be released, is expected to include a CPTSD diagnosis that is described by persistent and pervasive impairments in the areas of affective, self, and relational functioning in addition to the core PTSD symptoms (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013; Friedman Wolf et al., 2015).

A considerable number of youth are exposed to severe, prolonged trauma, and multiple traumatic experiences. Twenty-two percent of children reported four or more types of victimization experiences in the United States (Finkelhor, Ormrod, & Turner, 2007) and more than 85,000 cases of child abuse and/or neglect were substantiated in Canada in 2008 (Trocmé et al., 2010). A study with an American adult community sample showed a prevalence of childhood maltreatment in between 30-40% of the sample, with 13% having experienced multiple forms of maltreatment (Scher, Forde, McQuaid, & Stein, 2004). Similarly, a study with a Canadian sample of children aged 4 through 16 years demonstrated an incidence of physical abuse in 28.2-33.7% and of sexual abuse in 8.3-22.1% of the sample (MacMillan, Tanaka, Duku, Vaillancourt, & Boyle, 2013).

The Adverse Childhood Experiences (ACE) study, a groundbreaking study conducted by Felitti and colleagues (1998) with a community sample of over 17,000 adults in the United States, demonstrated a relationship between adverse childhood experiences and a variety of lifelong negative consequences. The ACE study established that the risk of risky health behaviours, chronic health conditions, low life potential, and early death increased as the number of adverse childhood experiences increased. Maltreated children appear to be at higher risk than

their non-maltreated peers for neurobiological changes, insecure or disorganized attachments, difficulties with peer relationships, and academic failure (Cicchetti & Toth, 2005). A study following 1,200 youth for 25 years identified child sexual abuse and child physical abuse as significant predictors of anxiety, depression, substance use, antisocial behaviors, and suicidal ideation (Fergusson, Boden, & Horwood, 2008). While child sexual abuse has been identified alone as a strong risk factor for a number of severe negative outcomes, child sexual abuse combined with other adverse childhood experiences have been found to further increase the risk of internalizing and externalizing disorders (e.g., Putnam, Harris, & Putnam, 2013). Furthermore, adults reporting a history of child sexual abuse were two to three times more likely to experience other co-occurring types of maltreatment in childhood (i.e., emotional or physical abuse and/or neglect; Dong, Anda, Dube, Giles, & Felitti, 2003).

Evidence that the sequelae of child maltreatment often continue into adulthood is noteworthy. Adult survivors of childhood sexual abuse are at significant risk of developing a wide range of physical and mental health problems, including psychotic symptomatology, depression, anxiety, posttraumatic stress, obsessive-compulsive symptoms, dissociation, eating disorders, somatization, personality disorders, low self-esteem, interpersonal problems, suicidal and self-injurious ideation and behaviour, risky sexual behaviours, hostility, anger, perpetration of sexual abuse, somatic symptoms, and revictimization (e.g., Maniglio, 2009; Oddone Paolucci, Genuis, & Violato, 2001). When combined with other key adversities (e.g., domestic violence, single or no parent, criminal victimization, economic hardship), child sexual abuse placed females at greater risk of co-occurring internalizing and externalizing disorders such as anxiety, depression, and conduct disorders (Putnam et al., 2013). Child physical and emotional abuse and neglect are also associated with impairments in adulthood that include depression, anxiety,

somatization, drug and alcohol abuse, and more frequent suicide attempts than their non-abused counterparts (e.g., Hillberg, Hamilton-Giachritsis, & Dixon, 2011; McCauley, Kern, Kolodner, Dill, & Schroeder, 1997; Widom, DuMont, & Czaja, 2007). Physical health symptoms in adulthood, including lower general health, gastrointestinal, gynecologic, pain and cardiopulmonary symptoms, and obesity (Irish, Kobayashi, & Delahanty, 2010), and personality disorder characteristics (Gibb, Wheeler, Alloy, & Abramson, 2001) have also been reported in connection with child maltreatment.

Complex trauma has been associated with profound impairments in multiple areas of development and functioning (Cook et al., 2005; Curtis & Ford, 2009), including emotion processing deficits such as alexithymia (e.g., Joukamma et al., 2008; Taylor et al., 1997). As such, investigating alexithymia may shed light on important processes implicated in the impaired self-regulation capacities reported by individuals with histories of multiple and chronic child abuse.

Alexithymia

Alexithymia was a term coined by Sifneos (1973) from the Greek (*a* = lack, *lexis* = word, *thymos* = emotion) to characterize individuals unable to use words to describe feelings. Its main features were originally defined as: difficulty identifying and describing subjective feelings; difficulty distinguishing between feelings and the bodily sensations of emotional arousal; constricted imaginal capacities; and an externally oriented cognitive style (Nemiah, Freyberger, & Sifneos, 1976).

Alexithymia has been conceptualized as a personality trait and reflects deficits in the cognitive processing and regulation of emotions (Taylor, 2000). Alexithymic individuals display a decreased capacity to form mental representations of emotions which, in turn, impinges on

their ability to process and communicate their emotional experiences (Taylor et al., 1997). As a result of these deficits, alexithymic individuals have been thought to focus on the somatic aspects of emotional arousal, which may lead to misinterpretation of body sensations and ultimately inability to employ adaptive emotion regulation strategies (Taylor et al., 1997)

The alexithymia construct has its roots in the concept of *pensee operateire* postulated by the French psychoanalysts Pierre Marty and Michel de M'Uzan (1963) in their description of psychosomatic patients. *Pensee operateire* refers to a style of speaking and thinking that is strictly factual and literal and that lacks emotional descriptions. Similar impairments were observed by Nemiah and Sifneos (1970) in patients with psychosomatic disorders. Systematic investigations of these patients revealed that they demonstrated severe difficulties verbalizing emotions and although they seemed able to describe feelings such as “sad”, “angry,” and “nervous,” they were unable to articulate descriptions of these internal states (Nemiah et al., 1976). They also showed reduced ability to locate affect-related responses in their bodies and awareness of somatic sensations accompanying feelings, so that somatic experiences were identical with their somatic illness (Nemiah et al., 1976). Rather than describing internal states and aspects of their fantasy life when prompted, these patients' accounts were limited to descriptions of external events. Although they were able to describe themselves as angry or sad, for example, they failed to describe inner states that corresponded to these words (Nemiah, et al., 1976).

Krystal (1988) observed profound affective impairments and a high incidence of somatization and addictions among holocaust survivors. Similar to previous reports of psychosomatic patients, holocaust survivors and other patients struggling with addiction and psychosomatic symptoms also seemed to encounter difficulties finding words to describe their

emotions and to connect with other people (Krystal, 1988). It was hypothesized that the process of surrendering to an inevitable danger may have led these individuals to block their affective and pain responses, which resulted in what Minkowski (1964) defined as “affective anesthesia.”

Since the study of alexithymia emerged within psychoanalytic circles, it was initially examined in the context of ego defense mechanisms to cope with affective stress (Hogan, 1995; Knapp, 1981; McDougall, 1982; Parker, Taylor, & Bagby, 1998). Some adopted the view that ego defenses should be organized into hierarchical categories according to their adaptive levels. Vaillant (1992) proposed four categories: psychotic, immature, neurotic, and mature (from least to most adaptive). Studies with both clinical and non-clinical samples indicated that alexithymia was negatively correlated with mature and more adaptive ego defenses and positively correlated with immature ego defenses (Parker, Taylor, & Bagby, 1988; Wise, Mann, & Epstein, 1991). For example, alexithymic individuals were found to rely on defenses such as splitting, denial, and somatization to cope with distress (Parker et al., 1988). Krystal (1988) proposed an alternative view of alexithymia as a defense to the extent that a regression or an arrest in affective and cognitive development occurs as a response to trauma.

Initial reports on alexithymia did not provide specific conclusions about whether alexithymia was a categorical or a dimensional construct. However, later clinical observations by Krystal (1983) indicated that alexithymia could be manifested in different intensities and be conceptualized as a personality trait with some potential for change. Later studies with both clinical and non-clinical samples showed evidence supporting the conceptualization of alexithymia as a dimensional construct better assessed by measures that yield continuous scores (Mattila et al., 2010; Parker, Keefer, Taylor, & Bagby, 2008). Both studies revealed taxometric results with English-speaking Canadian (Parker et al., 2008) and Finnish samples (Mattila et al.,

2010) in which the dimension latent structure of alexithymia was observed in both women and men. These results suggest that gender differences are quantitative (not typological) and dispute previous assertions about the presence of alexithymia subtypes (see Mattila et al., 2010).

Initially observed exclusively in psychosomatic patients (Krystal, 1988; Nemiah & Sifneos, 1970; Sifneos, 1973) and holocaust survivors and patients struggling with substance use (Krystal, 1988,1991), the prevalence of alexithymia has also been extensively investigated in other psychiatric samples. Alexithymia has been linked to various psychiatric disorders such as posttraumatic stress disorder (PTSD; e.g., Frewen et al., 2008), dissociation, (e.g., Elzinga, Bermond, & van Dyck, 2002), depression (e.g., Honkalampi, Hintikka, Laukkanen, Lehtonen, & Viinamaki, 2001), anxiety (e.g., Marchesi, Brusamonti, & Magini, 2000), eating disorders (e.g., Carano et al., 2006), substance use disorders (e.g., Pinard, Negrete, Annable, & Audete, 1996), and personality disorders (e.g., Joyce, Fujiwara, Cristall, Ruddy, & Ogrodniczuk, 2013). Furthermore, alexithymia has been associated with insecure attachment (Koelen, Eurelings-Bontekoe, Stuke, & Luyten, 2015), interpersonal distress (Humphreys, Wood, & Parker, 2009), emotion regulation difficulties (Pollatos & Gramann, 2012), and self-harm behaviours (Paivio & McCulloch, 2004).

Etiology of alexithymia.

Etiological studies have identified genetic (Jorgensen, Zachariae, Skytthe, & Kyvik, 2007; Valera & Berenbaum, 2001) and environmental factors (Taylor, Bagby, & Parker, 1997) involved in the development of alexithymia. Studies about the genetic factors of alexithymia yielded mixed results. For example, a large population-based twin study revealed that the development of all dimensions of alexithymia were mainly influenced by genetic and non-shared environmental factors as opposed to shared environmental factors (Jorgensen et al., 2007).

Conversely, another twin study indicated that the identifying feelings and describing feelings dimensions of alexithymia are largely influenced by family environmental factors (e.g., parent-child relationships, experience of warmth and hostility in the home, and perceived closeness and openness among family members; Valera & Berenbaum, 2001). A study with a university sample also demonstrated the important role of family environment factors in the development of alexithymia (Kench & Irwin, 2000). Specifically, the predictive role of expressiveness among family members (i.e., how much family members were allowed and encouraged to express feelings and opinions to each other) to alexithymia was demonstrated (Kench & Irwin, 2000).

Trauma has been also identified as an important environmental factor associated with alexithymia. The link between alexithymia and childhood trauma has been well documented in the literature with both clinical and community samples (Bermond, Bierman, Cladder, Moormann, & Vorst, 2010; Berenbaum, 1996; Bermond, Moorman, Albach, & van Dijke, 2008; Goldsmith & Freyd, 2005; McLean, Toner, Jackson, Desrocher, & Stuckless, 2006; Svenja, Brahler, Matthias, Friedrich, & Glaesmer, 2014; Zlontnick, Mattia, & Zimmerman, 2001). Individuals with a history of child abuse reported more difficulties identifying feelings than their non-abused counterparts (Berenbaum, 1996). Moreover, not only has the type of trauma experienced been thought to impact the development of alexithymia (Frewen, Dozois, Neufeld, & Lanius, 2008), but also the number of traumatic experiences (Declercq et al., 2010; Frewen et al., 2008a; Fukunishi, Sasaki, Chishima, Anze, & Saijo, 1996; Sondergaard & Theorell, 2004; Spitzer et al., 2007; Yehuda et al., 1997). A growing body of research has suggested that alexithymia may be a result of complex or multiple trauma experiences in childhood (Cloitre, Scarvalone, & Difede, 1997; Frewen et al., 2008a; Sondergaard & Theorell, 2004; Svenja et al., 2014; Zeitlin, McNally, & Cassiday, 1993).

Alexithymia and early attachment.

Early attachment with caregivers has been considered a key factor in child's emotional development (e.g., Bowlby, 1969; Calkins, 2004; Fonagy et al., 1995; Schore, 1994, 2001). Attachment can be defined as an emotional bond, based on the need for safety, especially under stressful circumstances (Bowlby, 1969). Attachments are formed in response to real-life experiences with caregivers and other people, and they develop into cognitive and emotional representations (internal working models) of others, of oneself in relation to others, and of relationships in general (Bowlby, 1988). Thus, emotion shapes the felt security or insecurity in interactions between mother and infant and this, in turn, becomes internalized as an internal working model of relationships in general (Sroufe & Fleeson, 1986). Overall, securely attached individuals have a positive view of self and others and are able to reach out to others at times of stress, expressing their distress and expecting support. In contrast, insecurely attached individuals tend to have a negative view of self and others and may express a preoccupation about others emotional availability at times of stress, with excessive care seeking behaviours (i.e., preoccupied/anxious attachment), or a denial of their emotional needs accompanied by mistrust of others and fear of intimacy (i.e., dismissing/avoidant attachment; see Ainsworth, Blehar, Waters, & Wall, 1978 and Main & Solomon, 1990 for reviews of infant attachment classifications; see Daniel, 2006 for a review of adult attachment classifications). Unresolved (disorganized) clients present higher levels of disorganization, distress, depression, dissociation, and difficulties with impulse control (Alexander & Anderson, 1994). Unresolved individuals with a history of trauma often have highly dysregulated emotions, dissociative behaviors, and disjointed interactional patterns (Pearlman & Courtois, 2005).

Parental behaviours such as sensitive responsiveness and ability to appraise their children's feelings accurately are thought to foster secure attachment and emotion regulation capacities in children (Cassidy 1994; Thompson 1994; Waters et al., 2010). It has been suggested that secure child-parent dyads enjoy more open and shared communication, especially about difficult topics (Bretherton 1993). As such, a number of studies have claimed the importance of both content and quality of parent-child conversations to the development of understanding and regulation of emotions in preschoolers (see review by Thompson, 2006). For example, a study with young children demonstrated that children were less likely to avoid talking about negative emotions when they were securely attached, when the mother was observed to accept and validate the child's point of view, and when the child had a previous solid understanding of negative emotions (Waters et al., 2010).

There is growing evidence showing that alexithymia is associated with maladaptive parenting behaviours implicated in the development of insecure attachment, which may ultimately lead to impaired emotion regulation skills (Fonagy & Target, 1997; Geregely & Watson, 1996; Kooiman et al., 2004; Schimmenti & Caretti, 2016). In the context of child maltreatment, children with rejecting parents that failed to acknowledge and label their children's emotional expressions were likely to have later emotion regulation problems (Shields, Cicchetti, & Ryan, 1994). Additionally, an association among insecure attachment, alexithymia, and negative affectivity, as well as the mediating role of alexithymia in the relationship between avoidant attachment and physical symptoms were detected in a sample of female young adults (Wearden, Cook, & Vaughan-Jones, 2003).

Drawing on attachment, Freud's, and Lacan's theories, Vanheule and colleagues (2011) conceptualized alexithymia as "difficulty in processing and regulating affective arousal by means

of mental representations” (pp. 95). In typically developing children, this ability develops as a result of caregivers’ mirroring of the child’s internal states of arousal along with the caregivers’ assistance modulating these states (Fonagy et al., 2002; Holmes, 2001). Mentalization emerges from this mirroring process and when mirroring fails, emotional experiences are not symbolized and remained ‘unmentalized’ and unintegrated into the autobiographical narrative (Fonagy et al., 2002).

More recently, alexithymic individuals have been described as having a low mentalization capacity (Fonagy, Bateman, & Luyten, 2012; Moriguchi, 2006). The concept of mentalization was introduced by Fonagy and colleagues (2002) to describe one’s capacity to be aware of and to think about feelings and other mental states in oneself and others. Since alexithymia is specifically concerned with deficits in the cognitive processing of feelings, this aspect of mentalization has been defined as *mentalized affectivity* (Fonagy et al., 2002). These mentalization deficits characterizing alexithymia have been consistently linked to parents’ failure of care (Bucci, 1997; Krystal, 1997; Vanheule, Verhaeghe, & Desmet, 2011).

The symbolization deficits present in alexithymic individuals can also be conceptualized within the multiple code theory framework (Bucci, 1997). This theory proposes that emotions are represented verbally and non-verbally, with non-verbal and verbal structures becoming connected by referential links during development. Repeated parental unresponsiveness and child trauma disrupts the organization of emotion schemas, thus impinging on the development of emotional meanings and referential connections. As a result, verbal and nonverbal components within these emotional schemas are dissociated and symbols for somatic states are not developed. This occurs as a response to danger and its resulting arousal and may be particularly severe when the parent is the source of threat (Bucci, 1997).

Neurobiology of alexithymia.

Childhood maltreatment is thought to play an etiological role in alexithymia by altering brain processes involved in emotion processing and regulation (Bagby & Taylor, 1997; Hund & Espelage, 2006; Krystal, 1988; Sifneos, 1996). Initial studies of the neural correlates of alexithymia suggested that a potentially impaired communication between the neocortex and limbic system, often identified in association with psychosomatic disorders, could explain the emotional deficits that these patients presented (MacLean, 1949). This impaired communication would prevent the neocortex from processing and symbolically encoding experiences of emotional arousal with language by the neocortex (MacLean, 1949).

Dysfunction in areas of the limbic systems such as the anterior cingulate cortex (ACC), insula, and amygdala has been associated with alexithymia (see van der Velde et al., 2013 for a review). While the ACC is involved in the conscious experience of emotion (Lane, Ahern, Schwartz, & Kasniak, 1997), the insula's role is to integrate bodily states into subjective feeling states (Craig, 2009). The amygdala is a subcortical brain area responsible for the perception of emotions, the storage of memories of emotional events and is also involved in identification of emotional meaning. The ventral part of the ACC is connected with the amygdala, hypothalamus, and anterior insula, and is involved in assessing the salience of emotion and motivational information (Bermond et al., 2006; Kano & Fukudo, 2013; Larsen et al., 2003; Moriguchi & Komaki, 2013). A more recent study with individuals diagnosed with PTSD showed that alexithymia symptoms predicted brain activation during traumatic script-driven imagery (Lanius, Bluhm, & Frewen, 2011). More elevated alexithymia scores were associated with reduced activation within the ventromedial prefrontal cortex and the anterior insula, which are brain areas associated with embodied self-awareness (i.e., sensing, feeling and acting) and subjective

emotional experience. Greater alexithymia severity was also associated with reduced brain activation in the right inferior frontal gyrus, the area that responds to emotion regulation tasks (Lanius, Bluhm, & Frewen, 2011). Additionally, lower levels of alexithymia have been found to be correlated with better ability to regulate amygdala activation by contemplating positive autobiographical memories via neurofeedback training (Zotey et al., 2011).

Other theorists have largely focused on specific brain areas involved in emotion processing. Given the importance of the right hemisphere in the perception of emotions and regulation of emotional responses, some neural findings have suggested that the presence of a right hemisphere deficit or a left hemisphere preference are connected with alexithymia (Bermond et al., 2005; Buchanan, Waterhouse, & West, 1980). Alternatively, others have highlighted that alexithymia is connected with the presence of interhemispheric transfer deficits (Zeitlin, Lane, O'Leary, & Schrift, 1989) via the corpus callosum (see Larsen, Brand, Bermond, & Hijman, 2003). Within this framework, impaired communication between the non-verbal and verbal hemispheres would explain the processing deficits reported by alexithymic individuals. This communication problem between hemispheres is consistent with what has been defined as Type II alexithymia by Bermond (1995), which is thought to be associated with child trauma. According to the author, Type II alexithymia is characterized by hyperactivity of the left hemisphere, in the form of diminished functioning of the orbito-prefrontal cortex and of the right hemisphere. As a result, Type II alexithymic individuals demonstrate an impaired capacity for emotional arousal (Bermond, 1995, 1997). In contrast, Type I alexithymic individuals experience difficulties with the cognitive aspects of emotions and, therefore, may become emotionally aroused (Bermond, 1995, 1997).

Research has also provided insight with respect to hypothalamus-pituitary-adrenal (HPA)

system and brain activity levels in relation to alexithymia. A mismatch between physiological arousal and awareness of emotions associated with arousal was observed in alexithymic individuals during stressful situations (Papciak, Feurstein, & Spiegel, 1985). While hyperactivation of the HPA system is expected in the presence of stress, hypothalamus-pituitary-adrenal (HPA) system hypoactivity has been identified among alexithymic individuals through measurements of cortisol awakening response (CAR) levels (Hartwig, Aust, & Heuser, 2013). The low baseline cortisol levels obtained may be an adaptation mechanism to prolonged stress (Hartwig, Aust, & Heuser, 2013).

Measuring alexithymia.

The Toronto Alexithymia Scale (TAS-20) has been most widely and frequently used measure of alexithymia by researchers and clinicians (Bagby, Parker, & Taylor, 1994; Bagby, Taylor, & Parker, 1994). Following attempts, over the course of three decades, to develop measures that could reliably measure the construct of alexithymia, the TAS-20 was in fact the first well-validated measure, with sound psychometric properties (Bagby, Parker, & Taylor, 1994). The initial version of this measure contained 26 questions and assessed for limited daydreaming. A new revised version of the measure contained 20 questions assessing difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking (Taylor, Ryan, & Bagby, 1985). The daydreaming subscale was eliminated based on evidence about its negative correlation with the ability to distinguish feelings from bodily sensations dimension and its items' low item-total correlations with the total TAS (see Parker, Bagby, Taylor, Endler, & Schmitz, 1993). Criticism of the TAS-20 has been concerned with the fact that highly alexithymic individuals may not be able to provide reliable and accurate self-reports of their own deficits in emotional awareness (Lane, Ahern, Schwartz, & Kaszniak, 1997; Waller & Scheidt,

2004). Despite questions regarding the TAS-20 sensitivity to negative affectivity and alexithymia potential overlap with the depression construct, there is robust evidence showing that alexithymia, as measured by the TAS-20, and depression are correlated but distinct constructs (Lipsanen, Saarijarvi, & Lauerma, 2004; Marchesi, Brusamonti, & Maggini, 2000; Parker, Bagby, & Taylor, 1991; Ramirez et al., 2001).

Another self-report instrument is the Bermond-Vorst Alexithymia Questionnaire (BVAQ; Vorst & Bermond, 2001). In addition to assessing the factors that correspond to the three dimensions on the TAS-20, the BVAQ also assesses the presence of constricted imaginal processes (i.e., *fantasizing* factor), and the degree of emotional arousal in response to emotion-eliciting events (i.e., *emotionalizing* factor). Some researchers claim that the *emotionalizing* factor is a correlate of alexithymia and more consistent with Eysenck's (1967) neuroticism personality trait (Taylor, Bagby, & Luminet, 2000). A later study with a non-clinical sample showed a negative correlation between the BVAQ's Emotionalizing dimension and the Eysenck Neuroticism scale, suggesting that participants reporting high scores on neuroticism reported less difficulty with respect to emotional responsiveness.

Drawing on recommendations for employing a multi-method measurement approach to mitigate potential limitations of self-report measures (Eid & Diener, 2006), the Toronto Structured Interview for Alexithymia (TSIA) was developed (Bagby et al., 2006). The TSIA consists of 24 questions, on the four core dimensions of alexithymia (i.e., difficulty identifying feelings, difficulty describing feelings, externally oriented thinking, and limited imaginal processes), that are scored by a trained interviewer. In addition to the three dimensions of the TAS-20, the TSIA also assesses imaginal processes. The TSIA has been found to correlate significantly with the TAS-20 in both clinical and non-clinical samples (Bagby et al. 2006;

Caretti et al. 2011). Other non-self-report alternatives are the modified version of the Beth Israel Hospital Psychosomatic Questionnaire (M-BIQ; Bagby, Taylor et al., 1994) and the Observer Alexithymia Scale (OAS; Haviland, Warren, & Riggs, 2000). A study on the convergence of the TAS-20, the TSIA, the M-BIQ, and the OAS with a clinical sample revealed that all these measures were significantly correlated (Meganck, Inslegers, Vanheule, & Desmet, 2011). The TAS-20 was moderately correlated with the TSIA ($r = .47$) and the BIQ ($r = .48$). The highest correlation obtained was between TSIA and BIQ ($r = .76$). Nevertheless, results from factor analyses rejected the view that these measures reflect a single construct and suggested that researchers' and clinicians' reports are most valuable in assessing the construct of alexithymia. Taken together, these findings suggest the need for a multi-method approach to assessment (Meganck et al., 2011).

Emotion Regulation

Emotion has been defined in different ways in the literature as proposed by the structuralist, constructivist, and functionalist models. The structuralist model defines emotions as categorical and distinct identifiable patterns of physiological, cognitive, subjective, and expressive activity, which are organized neurobiologically (Thompson, 2011). Based on the assumption that there are a limited number of basic emotions (Ekman, 1992), different modalities of emotion expression will be closely related for each distinct emotion. The constructivist model proposes that emotions reflect the process of making sense of internal physiological states that emerge in a certain situations and are context-dependent (Gendron & Barrett, 2009). However, this approach does not make a distinction between emotions and cognitions in a meaningful way with respect to the importance of appraisal (Gendron & Barrett, 2009). Finally, the functionalist approach explains that emotions are functional in changing or

maintaining relations between an individual and their environment in ways that help the individual to attain their goals. There is an emphasis on the importance of emotional expression as a social signal, and on the motivational qualities of emotions. The functionalist approach to emotion regulation does not define different attempts at emotion regulation as ‘good’ or ‘bad’ (Thompson, 2011).

When defining the concept of affect, Nemiah and colleagues (1976) made a distinction between its neurophysiological and motor-expressive component (i.e., emotion) and its cognitive-experiential and subjective component (i.e., feeling). According to the authors, before emotions can be consciously experienced as feelings, they need to be mentally represented. Nemiah (1977) later described aspects of the process of transforming raw emotions into feelings through a variety of forms to mentally represent, describe, and express them such as words, images, and activation of memories. Awareness of feelings in combination with other experiences elicited by these feelings (e.g., thoughts, memories) were thought to assist in the regulation of emotional arousal (Nemiah, 1977).

Emotion regulation can be defined as a set of processes that recognize, monitor and modulate emotional responses in order to achieve goals in the context of life events and experiences (Gratz & Roemer, 2004; Thompson, 1994). This is consistent with the functionalist approach that defines emotion as a marker of an individual’s goals and their attainment (Thompson, 2011). Within this conceptualization, emotion regulation processes may both inhibit and enhance arousal in pursuit of a goal. Moreover, emotion regulation efforts are more likely to change the qualitative experience of any given emotion, rather than changing or eliminating the emotion, and both internal resources and external influences can assist to regulate emotions (Thompson, 1994; Thompson & Calkins, 1996). Thus, adaptive emotion regulation involves the

ability to modulate arousal in the service of inhibiting inappropriate or impulsive behaviours and maintaining behaviours consistent with desired goals despite the presence of negative emotions (Linehan, 1993). In other words, a major objective of emotion regulation is to change emotional responding. Additionally, the ability to recognize and monitor a full array of emotions is as important to adaptive emotion regulation as is the ability to modify them (Thompson & Calkins, 1996). Emotional awareness has been described as a cognitive process in which awareness of emotions undergoes five levels of structural transformation alongside a cognitive-developmental sequence (Lane & Schwartz, 1987). These levels of transformation of awareness are defined as: bodily sensations, the body in action, individual feelings, blends of feelings, and blends of blends of feelings (Lane & Schwartz, 1987).

Based on a framework that acknowledges the importance of the ability to both recognize and modify emotions, emotion regulation can be conceptualized as having four main components: 1) awareness and understanding of emotions; 2) acceptance of emotions; 3) ability to control impulsive behaviours and behave according to desired goals when experiencing negative emotions; 4) ability to flexibly use strategies to regulate emotion that are appropriate to the situation in order to meet personal goals and situational demands (Gratz & Roemer, 2004).

Emotion regulation has both explicit and implicit aspects. Explicit emotion regulation entails a certain level of conscious effort and monitoring and can be more easily identified. Reappraisal and suppression are two explicit strategies normally employed to down-regulate emotions (Gross, 2002). Reappraisal has been associated with reduction in negative emotion experience and expression, and increased positive emotion experience and expression. Suppression has been associated with little impact on negative emotion, decrease of positive emotion, and increased sympathetic nervous system activation (see Gross, 2002 for a review).

In contrast, implicit emotion regulation processes are automatic, take place outside one's awareness, and do not involve explicit monitoring (Gross, 1998). The importance of implicit emotion regulation to adaptive processes and emotional processing has been recognized by emotion regulation researchers and theorists (e.g., Gyurak, Gross, & Etkin, 2011; Koole & Rothermund, 2011; Powers, Etkin, Gyurak, Bradley, & Jovanovic, 2015). In the context of child trauma, significant deficits in implicit emotion regulation have been linked to moderate-to-severe childhood abuse (Powers et al., 2015). These deficits were manifested in the form of lower emotional conflict regulation scores based on participants' difficulty identifying a correct facial expression when shown with a distracter word.

Emotion regulation has been described as a systemic process in which affective, social, and physiological processes interact and guide responses to stress in an integrated way (Thompson, Lewis, & Calkins, 2008). Multiple brain structures interact with one another while emotional responses are organized in the face of constant shifts in perception of emotions (see Lewis, 2005). Higher (e.g., pre-cortex) and lower levels (e.g., hypothalamus, amygdala) of the neuroaxis interact in a way that they mutually regulate each others' activities as part of the emotion regulation process (Lewis & Todd, 2007). While higher levels rely on cognitive activity to regulate, lower levels regulate by directing cognition to physical and emotional needs and emotional cues (see Thompson, Lewis, & Calkins, 2008).

Since emotion regulation abilities begin to form early in development, emotion regulation has been a major topic in infant and developmental research. Attachment theory proposes that emotion regulation and relational capacities emerge as part of a symbolic representational system that develops through the relationship with attachment figures (Fonagy, Gergely, Jurist, & Target, 2002). Evidence about the importance of caregivers' responsiveness to their child's

emotional needs to the development of emotion regulation capacities is incontestable. At the extreme of failure to attune to the needs of the child, child abuse has been found to disrupt significantly affect regulation processes (van der Kolk & Fisler, 1994). Individuals who experienced childhood abuse are more likely to develop more severe emotion regulation problems than those without a history of childhood abuse (Burns, Jackson, & Harding, 2010; van der Kolk et al., 1996; Zlotnick, 1997). Emotion regulation difficulties are thought to be involved in the etiology of psychiatric pathology (Bradley, 2000; Schore, 2001), and may actually be one mechanism through which psychopathology develops (e.g., Alink, Cicchetti, Kim, & Rogosch, 2009; Shields & Cicchetti, 1998). Deficits in emotion regulation have been associated with psychiatric disorders, including PTSD (Aldao et al., 2010), borderline personality disorder (Gratz et al., 2006), generalized anxiety disorder (Roemer et al., 2009), mood disorders (Campbell-Sills, Barlow, Brown, & Hofmann, 2006), alcohol abuse (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Sher & Grekin, 2007), and substance abuse (Fox, Hong, & Sinha, 2008; Gratz and Tull, 2010).

Alexithymia and emotion regulation.

Emotion regulation problems have been also reported in association with alexithymia. Individuals reporting high levels of alexithymia also report more maladaptive styles of emotion regulation and less adaptive regulation behaviors (Parker, Taylor, & Bagby, 1998). Specifically, deficits in the realm of reappraisal of negative emotions seem to be linked to alexithymia (Pollatos & Gramann, 2012; Swart, Kortekaas, & Aleman, 2009). Cognitive reappraisal of negative emotions refers to the ability to reinterpret the meaning of an emotion-triggering situation so that no longer elicits negative emotions (John & Gross, 2003; Urry, 2009). For example, when a person is anxious prior to an oral presentation, it may be helpful to remind

himself that he is prepared and that the audience is interested in learning what he has to share. Highly alexithymic individuals when confronted with stress show greater propensity to experience negative affects without necessarily displaying the expected accompanying physiological indices of negative emotion (Connelly & Denney, 2007) and appear to rely primarily on suppression of emotions as a way to self-regulate (Shepherd & Wild, 2014), which has been regarded as consuming more internal resources and being less effective than re-appraisal (Richards & Gross, 1999).

Avoidance is another key factor associated with both alexithymia and suppression of emotions as a self-regulation strategy. For example, a study of inpatient adolescents treated for severe behaviours and substance use as well as psychiatric disorders (two and three comorbid diagnoses on average) revealed that high levels of alexithymia were associated with high levels of avoidance and deficits in emotion regulation (Venta, Hart, & Sharp, 2012). In addition, results suggested that difficulty using language to identify and describe emotional states was linked to difficulties in emotion regulation; however, this relationship was mediated by avoidance of negative internal experiences such as emotion, thoughts, and bodily sensations associated with aversive events (Venta et al., 2012). Similarly, alexithymia was highly prevalent in an adult psychiatric outpatient sample, attending an intensive group-oriented and partial hospitalization program, and associated with attachment avoidance, suppression of emotional expression, immature defenses, and severe borderline personality disorder (Joyce, et al., 2013).

Another way to manage negative feelings and alleviate tension when more adaptive self-regulation capacities are absent is through self-injurious behaviours (Wheeler & Broad, 1994). Research with both clinical and community samples indicates a close association between alexithymia and self-harm behaviours. Treatment seeking women survivors of childhood abuse

reporting self-harm behaviours, also reported significantly higher levels of alexithymia, emotion regulation difficulties, dissociation, and greater number of previous suicide attempts than women with no history of self-harm (Bedi, Muller, & Classen, 2014). Additionally, alexithymia was found to mediate the relationship between childhood maltreatment and self-injury behaviours in a sample of college women (Paivio & McCulloch, 2004).

Given the significant relationship between alexithymia and emotion regulation difficulties, some authors have wondered if the two are indeed unique constructs. Pandey and colleagues (2011) demonstrated the alexithymia and emotion regulation difficulties represented two largely independent factors with a pattern of cross loading of one dimension of each measure on both factors. The authors concluded that the overlap between alexithymia and emotion regulation difficulties pertains to deficits in understanding emotions. Their findings also suggested that emotion regulation difficulties mediate the effect of alexithymia on mental health problems such as depression, anxiety, somatic complaints, and social dysfunction. That is, although alexithymia is positively associated with mental health problems, this relationship was no longer significant after controlling for the contribution of emotion regulation difficulties (Pandey et al., 2011). This is, in part, consistent with prior assertions that alexithymia, the capacity to symbolize and name emotional experiences, interferes with processes of regulating negative emotions, which is ultimately detrimental to health-related outcome (Kauhanen, Kaplan, Cohen, Julkunen, & Salones, 1996; Taylor, 2000). A study with a non-clinical population using experimental stressor tasks (i.e., the Stroop task and a conversation task) revealed discordance between the subjective experience of negative affects and physiological levels of emotional state (i.e., heart rate and skin conductance). While highly alexithymic participants reported significantly higher subjective negative affects than the control group, their

physiological indices did not differ from those observed in the control group (Connelly & Deney, 2007). These findings support the view that the mismatch between physiological and subjective experiences to stressors may lead to increased maladaptive self-regulation behaviours and/or somatization, thus compromising health outcomes (Connelly & Deney, 2007).

PTSD

Posttraumatic stress disorder (PTSD) is a condition that may develop following exposure to a traumatic experience. The PTSD diagnosis was first proposed in the DSM-III to describe post-war related psychological reactions observed in post-war veterans (American Psychiatric Association, 1980). The most recent diagnostic criteria according to DSM-V postulates that PTSD symptoms are subdivided into four categories: re-experiencing, avoidance, negative cognitions and mood, and arousal (American Psychiatric Association, 2013). The literature has shown that 48%–85% of survivors of childhood abuse present a lifetime prevalence of PTSD symptoms (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Roth, Newman, Pelcovitz, van der Kolk, & Mandel, 1997), and that PTSD and DESNOS have a 92% comorbidity rate (Ford, 1999).

PTSD should be understood in the context of neurological responses that are activated as a result of experiences of extreme fear and helplessness that are encoded in the brain during the traumatic experience (Nemeroff, 2006; Pinel, 2009; Sweatt, 2009). From an epigenetics perspective, this imprinting is a process through which experiences alter the physical make up of the brain (Sweatt, 2009). Therefore, these neurological changes stemming from trauma prompt individuals to perceive the environment as if the threat still existed and symptoms such as hypervigilance, nightmares, panic attacks, and somatic complaints emerge (Johnson, 2012). Fear conditioning, which is associated with amygdala activation (Pinel, 2009), is believed to be a

result of epigenetic processes in which changes in gene expression may occur in response to experience and environmental stimuli (Sweatt, 2009).

Fear conditioning and the interactions among the amygdala, prefrontal cortex, and hippocampus are key to the development of PTSD symptoms (Nemeroff et al., 2006; Shin, 2009). LeDoux (1996) explained that in the presence of fear, two information-processing systems are initiated: in the “low road” mode, information processed by the thalamus bypasses cortex assessment and is sent directly to the amygdala for a quick survival response; the “high” road mode allows for cortical assessment of information. This type of “hijacking” of the sensory cortex will continue to happen whenever threats are perceived, even in the absence of real danger.

Alexithymia and PTSD.

Connections between PTSD and alexithymia have been established in the research literature. A meta-analytic review by Frewen and colleagues (2008) revealed that alexithymia was associated with more severe PTSD symptoms, with the strongest relationships being between alexithymia and the numbing and hyperarousal dimensions of PTSD. Consistent with these findings, a study with a non-clinical sample demonstrated that alexithymia was a significant predictor of hyperarousal and numbing. This relationship was significant for both alexithymia total scores and difficulty identifying feelings scores (Declercq, Vanheule, & Deheegher, 2010). Other studies examining each of the alexithymia subdimensions in relation to PTSD have yielded mixed results. While research on combat veterans found the externally oriented thinking factor of alexithymia to be related to PTSD, research of refugees (Sondergaard & Theorell, 2004) showed an association between the difficulty identifying feelings factor of alexithymia and PTSD.

PTSD has been associated with deficits in overall emotion regulation and specific dimensions that include: acceptance of emotions, engagement in goal-directed behaviours, access to emotion regulation strategies, control of impulsive behaviours in the presence of negative emotions, and clarity of emotions (Ehring & Quack, 2010; Tull, Barrett, McMillan, & Roemer, 2007; Weiss et al., 2012; Weiss, Tull, Lavender, & Gratz, 2013). Alexithymic patients with elevated PTSD symptomatology experience intense affective states (Taylor, Bagby, & Parker, 1997). They seem unable to use verbal cognitive processing to modulate their emotions and instead rely mostly on suppression emotion regulation strategies (Boden et al., 2013). Unable to identify and monitor internal emotional states, these individuals will likely be more dysregulated and experience a loss of executive control when exposed to intense emotional experiences and reminders of past trauma (Frewen & Lanius, 2006). Neuroimaging findings showing a relative absence of response in brain regions involved in emotion processing and regulation provide further evidence that alexithymia is implicated in affect regulation (see Lanius, Bluhm, & Frewen, 2011).

Dissociation

Dissociation is a complex psychophysiological phenomenon that can be observed as a continuum of behaviour or an extreme deviation from normality (Scheidt et al., 1999, 1995). The most frequent manifestations of dissociation encompass severe disturbance of memory integration, identity, and perception. In addition to these *psychological dissociation* variables (Nijenhuis, Spinhoven, Van Dyck, Van der Hart & Vanderlinden, 1998), the term *somatoform dissociation* was proposed to describe body-based dissociative phenomena such as kinesthetic anesthesia, analgesia, and motor inhibition (Nijenhuis, 2000).

First described in the works of Janet (1889) on hysteria, dissociation was later

conceptualized by Freud (1926) as a defense mechanism precipitated by trauma and employed to manage anxiety. Currently, dissociation can be conceptualized as a division of personality that develops when the individual is unable to integrate aspects of a traumatic experience (Nijenhuis & van der Hart, 2011). It is defined as a coping mechanism employed to alleviate painful emotions stemming from a traumatic event that involves a disconnection of the knowledge of the trauma from the intolerable feelings elicited by the traumatic event (Grabe, Rainermann, Spitzer, Gansicke, & Freyberger et al., 2000; Irwin & Melbin-Helberg, 1997).

The theory of structural dissociation describes a division of one's personality into multiple parts that results from complex trauma. According to this theory, while one may have "apparently normal" parts (ANPs) of the self that engage in normative functioning (i.e., the tasks of daily living), the "emotional" parts (EPs) of the self contain sensorimotor experiences and painful emotions associated with the traumatic experience. Based on this theory, dissociation has been described as primary, secondary, and tertiary (van der Kolk, van der Hart, & Marmar, 1996). Primary dissociation corresponds to the intrusion into consciousness of fragmented sensory components of the traumatic experience (e.g., images, sounds, smells, kinesthetic sensations). These experiences may overlap with PTSD symptoms and are normally associated with experiences of physiological arousal (Orr, McNally, & Rosen, 2004). This process reflects a division of the personality into a single ANP and a single EP. Given the overwhelming nature of trauma, further division of the EP may take place, which is consistent with the definition of secondary dissociation. Secondary dissociation refers to experiences of "leaving" the body and "watching" the trauma as an outsider. This psychological distancing from the body is thought to minimize distress by keeping emotions and feelings about the trauma at distance. A more severe form of dissociation may occur, which is characterized by divisions in the ANP or development

of new ANPs, in addition to the division of the EPs. This process is defined as tertiary dissociation. It refers to the multiple splits that may occur in face of severe and chronic trauma and result in multiple internal states or identities with their unique affective, cognitive, and behavioural forms. This is also consistent with Dissociative Identity Disorder (DID).

A high incidence of childhood abuse has been reported among individuals with a dissociative disorder (Chu, Frey, Ganzel, & Matthews, 1999; Foote, Smolin, Kaplan, Legatt, & Lipschitz, 2006; Irwin & Melbin-Helberg, 1997). In the presence of chronic and severe childhood trauma, dissociation can develop into an automatic maladaptive defensive mechanism response to stress (Carlson, Yates, & Sroufe, 2009; Putnam, 1997; Terr, 1991) that involves compartmentalization and detachment responses (Brown, 2006). Unable to escape physically from chronic abuse, the individual flees into a state of disengagement from both their external reality as well as their internal world (Arnold & Fisch, 2011; Terr, 1991; van der Kolk, van der Hart, & Marmar, 1996). When abuse occurs within attachment relationships, the child may resort to strategies to repair relational ruptures and reestablish a connection with caregivers. This often occurs in the form of extreme disengagement and stillness, also known as the feigned death (or submit EP; van der Hart, Nijenhuis, & Steele, 2006), and represents a primary regulatory process with survival and energy conservation purposes (Schimmenti & Caretti, 2016). The deficits in symbolization of affective states frequently associated with dissociation have been also been manifested in the form of developmental delays in the play of traumatized children (Alessandri, 1991).

Emotional neglect in particular has emerged as a strong predictor of dissociation in studies with adolescents and adults (Dutra, Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2009; Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997; Schimmenti & Caretti, 2016). A

longitudinal study with late adolescents revealed that caregiver's emotional unavailability and infants' disorganized attachment during the first two years of life predicted adolescents' dissociation symptoms (Ogawa et al., 1997). Surprisingly, reports of child sexual abuse and physical abuse did not add to the prediction and emotional neglect remained the single predictor of dissociation. Similar results were obtained in another longitudinal study in which lack of parental responsiveness and disrupted communication were found to predict dissociation, with only verbal abuse adding to prediction (Dutra et al., 2009). Findings from a study with a non-clinical sample of adults supported the view that emotional neglect in childhood predicts mentalization and affect regulation impairments, with these two factors interacting to produce increased dissociation symptoms (Schimmenti, 2016). Specifically, emotional neglect and dissociation were negatively related to theory of mind and positively related to alexithymia, and these in turn were negatively and positively associated with dissociation, respectively.

As childhood trauma impacts development of emotion regulation and is directly linked to dissociative processes, evidence suggests that deficits in emotion regulation are also implicated in dissociative processes (Sundermann & Deprince, 2015). Emotion regulation difficulties were found to predict dissociation symptoms in a sample of female adolescents with history of exposure to violence (Sundermann & Deprince, 2015). Similarly, a large study with an adult non-clinical sample revealed that PTSD and affect dysregulation together predicted dissociative symptoms and that a trauma history alone may not be sufficiently predictive of later dissociation symptoms (Briere, 2006).

Alexithymia and dissociation.

A relationship between alexithymia and dissociation in clinical and non-clinical samples has also been proposed in the literature (Berenbaum & James, 1994; Elzinga, Bermond, & van

Dyck, 2002; Grabe et al., 2000; Irwin & Melbin-Helberg, 1997). The difficulty identifying feelings dimension of alexithymia, in particular, was found to significantly predict dissociative tendencies. This is consistent with clinical observations that children who resort to dissociation following trauma tend to have difficulty describing feelings (Terr, 1991). Moreover, neural findings linking alexithymia to the phenomenon of secondary dissociation (e.g., experience of “leaving” the body and “observing” the traumatic event as an outsider; van de Kolk et al., 1996) showed that brain activity associated with secondary dissociative experiences is consistent with a disturbed perception of bodily states (Frewen & Lanius, 2006). It was suggested that when one resorts to secondary dissociative states as an automatic response to chronic abuse, processes related to self-awareness and perception of external reality may be compromised (Frewen & Lanius, 2006).

A recent study by Powers and colleagues (2015) showed an association among dissociation, PTSD, emotion dysregulation, and alexithymia. Specifically, PTSD, difficulty with emotion regulation strategies and lack of clarity of emotions were found to predict dissociative symptoms. Furthermore, the study demonstrated a partial mediator role of emotion dysregulation on the relationship between PTSD and dissociation, which raises the question as to whether emotion dysregulation could be a risk factor for the development of dissociation symptoms especially in the presence of PTSD symptoms.

Alexithymia and Interpersonal Problems

Research has suggested that the profound deficits in emotion processing and regulation reported by alexithymic individuals may contribute to the development of interpersonal difficulties (Pollatos & Gramann, 2012; Spitzer et al., 2005). Alexithymia has been linked to a *cold* and *socially avoidant* interpersonal style (Spitzer et al., 2005) and an avoidant attachment

style (Montebarocci, et al., 2004; Scheidt et al., 1999; Wearden, Cook, & Vaughan-Jones, 2003). Alexithymia has also been found to mediate the relationship between avoidant attachment and physical symptoms (Wearden, Cook, & Vaughan-Jones, 2003).

Alexithymic individuals tend to avoid close relationships, to develop superficial relational bonds (Vanheule et al., 2007), and to report poor intimate relationship quality (Humphreys, Wood, & Parker, 2009). Their social interactions are marked by avoidance and hostility (Spitzer et al., 2005) and they report discomfort with closeness and relationships as secondary (Montebarocci, et al., 2004). Given the association between alexithymia and insecure attachment, especially avoidant attachment, and that the relational deficits observed in alexithymic individuals are consistent with the interpersonal style characteristic of individuals with avoidant attachment, it is expected that alexithymic clients will face similar challenges navigating therapeutic relationships. That is, in therapy, avoidant clients have been found to experience difficulties in the realm of intimacy, self-disclosure, and emotional and interpersonal responsibility (Alexander & Anderson, 1994; Muller, 2009, 2010; Pearlman & Courtois, 2005; Saunders & Edelson, 1999). In the context of trauma group therapy, avoidant clients, in comparison to unresolved, perceived their relationship with their therapist more negatively, as well as more conflict and less engagement among group members (Zorzella, Muller, & Classen, 2014). These findings are indicative of the avoidant clients' difficulties navigating interpersonal relationships, which is very much consistent with the relational difficulties reported by alexithymic individuals.

In addition to their difficulties identifying their own emotional states, alexithymic individuals also struggle to understand others' emotions (Grynberg et al., 2012; Moriguchi et al., 2007; Moriguchi et al., 2009; Prkachin, Prkachin, & Casey, 2009), which can be detrimental to

their ability to establish and maintain relationships. Research has shown that high levels of alexithymia were linked to problems identifying facial expressions (Prkachin et al. 2009) and detecting changes in facial expressions of emotions (Vermeulen et al. 2008). Moreover, deficits in perspective taking and empathic concern have been identified in the literature (Goerlich-Dobre, Lamm, Pripfl Habel, & Votinov, 2015; Grynberg et al., 2012). In line with these findings, neuroimaging research has shown an association between the left amygdala and both alexithymia and capacity for empathy (Goerlich-Dobre et al., 2015).

In sum, alexithymia has been closely associated with complex trauma in childhood (Cloitre, Scarvalone, & Difede, 1997; Frewen et al., 2008a; Sondergaard & Theorell, 2004; Svenja et al., 2014; Zeitlin, McNally, & Cassiday, 1993). As a result of their difficulty identifying and labeling emotions and interpreting bodily sensations of emotional arousal (Berking et al., 2011; Gratz & Roemer, 2004), alexithymic individuals tend to experience more negative affects (Connely & Denney, 2007) and appear to struggle to regulate their emotions (Shepherd & Wild, 2014). Additionally, they report greater PTSD (e.g., Frewen et al., 2008) and dissociation symptoms (e.g., Elzinga, Bermond, & van Dyck, 2002), as well as difficulties establishing intimate relationships and understanding others' emotional experiences (Spitzer et al., 2005). Challenges conducting therapy with alexithymic clients have been reported in the literature (e.g., Krystal, 1988; Taylor & Bagby, 2013); however little is known about alexithymia in the context of trauma therapy.

Alexithymia and Psychotherapy

Treatment of alexithymia.

Some of the challenges of conducting therapy with alexithymic clients have been

discussed in the literature. It has been reported that highly alexithymic individuals do not respond well to traditional psychoanalytic treatment (Kelman, 1952; Krystal, 1988; McDougall, 1982; Ruesch, 1948) due to their inability to identify and verbalize their internal and emotional experiences. Some basic strategies to facilitate the therapeutic process and enhance alexithymic clients' awareness of their feelings have been proposed by clinicians and researchers.

Taylor & Bagby (2013) prescribe supportive interventions, rather than interpretive, to enhance affect awareness and strengthen symbolization of unmentalized emotions stemming from trauma. Along the lines of strategies previously proposed in the literature (Krystal, 1988; Vanheule, Verhaeghe, & Desmet, 2011), the authors recommend that interventions should direct attention to clients' body sensations and other non-verbal expressions of emotions, and teach them how to recognize a range of affects. In addition to attending to body-related experiences and non-verbal expressions, Vanheule and colleagues (2011) recommend that clients develop a narrative about body-related experiences of distress and that therapists label and discuss in-session non-verbal expressions as meaningful reactions to stressful situations. Incorporation of non-verbal cues into treatment (e.g., art therapy) has been also recommended to facilitate expression of internal states. As such, clients can learn to express in words what they have created in non-verbal forms in art therapy (Moorman, Bermond, & Albach, 2004).

Interventions aiming at helping clients recognize signs of arousal as they correlate with emotions and find words to describe such emotions have been proposed as part of Metacognitive Interpersonal Therapy (MIT; Dimaggio, Montano, Popolo, & Salvatore, 2015). As pointed out by Taylor & Bagby (2013), there are some preliminary findings suggesting that treatments that integrate similar strategies are effective in reducing alexithymia levels (Beresnevaite 2000; Grabe et al. 2008; Melin, Thulesius, & Persson 2010; Taylor 2012; Tulipani et al. 2010).

The process of symbolizing emotions in therapy with alexithymic clients can be intense and painful, as intense trauma-related emotions may be reactivated as a result, which can bring turmoil to the therapeutic relationship (Taylor & Bagby, 2013). Keeping in mind the common relational difficulties commonly reported by trauma survivors (Courtois, 2008) and highly alexithymic individuals, monitoring and discussing the therapeutic relationship becomes an important part of the clinical work with these clients. Attending to the nature of the therapeutic relationship is thought to enhance the client's capacity to think about relationships and feelings within relationships (Vanheule et al., 2007).

Increasing empirical evidence has supported the suitability of group therapy to treat alexithymic clients, as well as its effectiveness reducing alexithymia traits (Beresnevaite, 2000; Classen, Muller, Field, Clark, & Stern, in press; Grabe et al., 2008; Ogrodniczuk, Sochting, Piper, & Joyce, 2012; Rufer et al., 2010; Rufer et al., 2004). In group therapy, alexithymic clients witness others having similar struggles and watch and learn from others with more successful interpersonal skills (Swiller, 1988). Being encouraged to observe, reflect on, and communicate their internal states and to learn from others going through the same process in group therapy is believed to contribute to post-treatment improvements in alexithymia (Ogrodniczuk et al., 2012). In combination with group therapy, individual intervention is thought to offer opportunities for clients to further their cognitive and affective processing (Swiller, 1988).

Alexithymia and psychotherapy outcome.

The relationship between alexithymia and treatment outcome has been reported in the literature. A recent review by Ogrodniczuk and colleagues (2011) outlined a negative association between alexithymia and outcome in both psychodynamic and supportive therapy in individual and group contexts. Specifically, alexithymia has been associated with poorer outcomes of

interventions for various psychiatric problems, including depression (Ogrodniczuk, Piper, & Joyce, 2004), alcoholism (Cleland, Magura, Foote, Rosenblum, & Kosanke, 2005), eating disorders (Speranza, Loas, Wallier, & Corcos, 2007), and cancer pain (Tulipani et al., 2010). Moreover, the relationship between alexithymia and negative outcome in a study of group therapy for complicated grief, was found to be mediated by therapeutic alliance difficulties (Ogrodniczuk et al., 2005; Ogrodniczuk, Piper, & Joyce, 2008).

Alexithymic clients' interpersonal style and the reactions that it elicits from therapists may be at the core of their therapeutic alliance difficulties (Ogrodniczuk et al., 2005; Ogrodniczuk, Piper, & Joyce, 2011). Highly alexithymic clients may seem cold and detached, which is thought to elicit negative reactions in the therapist (Ogrodniczuk et al., 2005; Ogrodniczuk et al., 2011). Feelings of frustration, boredom, and dullness have been reported by therapists treating alexithymic clients (Krystal, 1988; Ogrodniczuk et al., 2011). Clients' expression of positive emotion was found to mediate the relationship between alexithymia and therapists' reactions (Ogrodniczuk et al., 2005). Specifically, the greater the difficulty communicating feelings and the tendency engaging in externally oriented thinking, the less clients expressed positive emotions, which in turn elicited greater negative reactions in the therapist (Ogrodniczuk et al., 2005).

Despite its association with negative outcomes, a growing body of research suggests that alexithymia improves following group treatment approaches (Classen et al., in press; Ogrodniczuk, Sochting, Piper, & Joyce, 2012). A study with an adult inpatient sample, receiving intensive short-term group psychodynamic and individual therapies with a focus on the verbalization of emotional and interpersonal problems, reported significant improvements in alexithymia following treatment (Grabe et al., 2008). Another study with a psychiatric outpatient

sample, receiving intensive group-based treatment targeting the development of skills necessary for identifying and communicating affective states, showed reductions in post-treatment alexithymia scores (Ogrodniczuk et al., 2012). Similarly, findings from trauma therapy research showed that women survivors, receiving an outpatient short-term intensive group-based therapy with weekly individual sessions focusing on affect regulation and stabilization, reported significant alexithymia improvements following treatment (Classen et al., in press).

Research has also linked improvements in alexithymia following group treatment with other positive outcomes. In a study with post-myocardial infarction patients, reduction in alexithymia scores following group therapy aiming to improve their ability to direct attention to inner experiences and communicate feelings was associated with fewer cardiac events after treatment and at 2-year follow up (Beresnevaite, 2000). Another study with an outpatient psychiatric sample demonstrated that, following group therapy targeting deficits with respect to identifying and communicating affective states, reductions in alexithymia were associated with improvements in interpersonal functioning (Ogrodniczuk et al., 2012). Similarly, improvements in alexithymia following individual treatment were also associated with positive outcomes. For example, improvements following cognitive behavioural therapy with patients with subthreshold depression were associated with a reduction in depressive symptoms after treatment (Spek et al., 2008). Another study with oncology patients revealed that following psychological intervention targeting alexithymia and cancer pain, reductions in pain perception could be attributed by reductions in alexithymia and psychological intervention as independent factors (Tulipani et al., 2010). These findings are promising in that they suggest that by developing a greater capacity to be aware of one's own feelings and to communicate these feelings to others, these individuals were able to improve their psychological functioning. It is also noteworthy that two of these

studies employed group psychotherapy (Beresnevaite, 2000; Ogrodniczuk et al., 2012), suggesting the effectiveness of group-based approaches to address interpersonal problems (Ogrodniczuk et al., 2012) and health problems (Beresnevaite, 2000) in alexithymic individuals.

Although alexithymia is strongly associated with severe childhood interpersonal trauma, research on alexithymia in the context of trauma treatments is limited. To my knowledge, only one study examined alexithymia in the context of trauma treatment outcomes (Classen et al., in press) and no studies to date have investigated the extent to which alexithymia is associated with other outcomes in trauma therapy. Considering the complexity and multiplicity of difficulties presented by clients with complex trauma, multimodal and transtheoretical treatment approaches have been recommended to treat this population (Courtois, 2008). Treatment strategies aim to help clients manage their symptoms and difficulties and to address their developmental, attachment, and relational deficits within the context of a safe therapeutic relationship (Ford & Kidd, 1998; Pearlman & Courtois, 2005). Examining alexithymia in the context of complex trauma treatment may be an important step towards increasing our understanding about the nature of some of the deficits that these clients present with as well as providing further evidence on interventions that could best address these deficits in trauma therapy.

Treatment of Complex Trauma and Alexithymia

Given the severity and complexity of the problems often presented by survivors of childhood abuse, a staged therapy approach to treat complex trauma has been endorsed and adopted by clinician-researchers (Cloitre et al., 2010; Courtois, 2013; Ford, Courtois, Steele, van der Hart, & Nijenhuis, 2005; Herman, 1992). Within the approach proposed by Herman (1992), the initial stage of treatment should be dedicated to developing a strong therapeutic alliance and stabilization, with typical topics including the development of safety, affect

regulation skills, and education about the effects of trauma. The emotion regulation and coping skills developed in stage one lay the foundation for the next stages of therapy. The middle stage of treatment should be devoted to processing one's traumatic experiences in detail once the client has acquired enough stability and affect modulation skills. In the final stage, emphasis should be placed on consolidating a life that is less impacted by the effects of trauma.

Despite strong consensus regarding the use a stage approach to treating complex trauma (Cloitre et al., 2012; Cloitre et al., 2011; Courtois, Ford, & Cloitre, 2009), the need for a stabilization phase as a prerequisite for discussing the traumatic experiences directly remains a controversy in the field. A recent review by De Jongh and colleagues (2016) points out that there is weak evidence supporting the recommendation for a stabilization stage that precedes discussing the trauma directly. However, the authors acknowledge the heterogeneity of the samples studied and the lack of consistency in terms of procedures to assess complex trauma in these samples.

While the need for a stage approach remains controversial, emotion regulation difficulties has been widely recognized as a key deficit associated with childhood abuse. Thus, addressing the emotional processing and regulation deficits associated with early childhood maltreatment is fundamental to resolving issues of childhood abuse and, therefore, is at the core of many trauma therapy models (Herman, 1992; Cloitre, Koenen, Cohen, & Han, 2002; Duarte-Giles et al., 2007; Ogden, Minton, & Pain, 2006; Paivio & Kunzle, 2007; Paivio & Pascual-Leone, 2010). The development of adaptive self-soothing strategies is often the primary focus early in therapy and serves as the foundation for trauma-exposure and processing at later stages of therapy (Herman, 1992; Cloitre et al., 2002). A number of trauma therapy approaches and techniques that invariably focus on helping survivors to develop more effective self-soothing skills have been

proposed in the literature (see Courtois & Ford, 2009 for a description of best practices and evidence-based approaches to treat complex trauma). Emotion Focused Therapy for Trauma (EFTT; Paivio & Kunzle, 2007; Paivio & Pascual-Leone, 2010) and Skills Training in Affective and Interpersonal Regulation (STAIR; Cloitre, Koenen, Cohen, & Han, 2002) are good examples of empirically validated manualized treatment models that aim to address emotional processing and regulation deficits resulting from childhood abuse. Another model devoted to addressing these deficits by integrating somatic awareness into treatment is Sensorimotor Psychotherapy (SP; Ogden et al., 2006). Finally, a large body of research has demonstrated the effectiveness of delivering interventions in a group format in addressing the effects of childhood abuse through different theoretical models.

Emotion Focused Therapy for Trauma (EFTT). EFTT is an experiential therapy modality and its distinctive feature is the focus on the process of exploring and symbolizing current subjective experience (emotions and meanings) as a mechanism of change (Paivio & Kunzle, 2007; Paivio & Pascual-Leone, 2010). EFTT techniques involve access to maladaptive feelings (e.g., shame, fear) stemming from the traumatic experience as well as previously inhibited adaptive emotions (e.g., anger, sadness) as a way to get in touch with information associated with these emotions (Paivio, Jarry, Chagigiorgis, Hall, & Ralston, 2009). EFTT employs a “bottom-up” approach in which directing client attention to internal states is the foundation of its intervention principles (Paivio & Pascual-Leone, 2010). Clients with a history of complex trauma have often structured their sense of self around maladaptive emotions. Part of EFTT interventions is to help clients access thoughts, feelings, and body experiences associated with a maladaptive sense of self while they simultaneously access adaptive resources that will help them restructure their sense of self (Paivio & Pascual-Leone, 2010). EFTT interventions

also address somatic components of emotional experience since emotions always have a bodily experience associated with them and some preverbal experiences are embodied and might not easily verbally articulated. Therefore, attending to bodily and somatic experiences may be an entry point to explore meaning and symbolize internal experience (Paivio & Pascual-Leone, 2010).

Consistent with other exposure-based interventions and based on the premise that healing can only occur once emotions have been expressed and processed and past experiences have been resolved (Greenberg & Paivio, 1997), EFTT places emphasis on addressing and working through past unresolved issues with attachment figures (Paivio et al., 2009). Two EFTT studies indicated significant post-treatment improvements in PTSD, depression, anxiety, self-esteem, and interpersonal problems (Paivio et al., 2009), as well as general symptom distress, trauma-related intrusion and avoidance, and interpersonal problems (Paivio & Nieuwenhuis, 2001). However, it is important to note that EFTT was not developed to address PTSD directly and a minority of clients in these samples met criteria for PTSD.

Skills Training in Affective and Interpersonal Regulation (STAIR). STAIR is a stage-based cognitive behavioural therapy model that addresses the development of emotion regulation and interpersonal skills with individuals with histories with childhood abuse and is divided into two stages (Cloitre et al., 2002). In stage 1, the goals are to directly address emotional and interpersonal regulation problems and prepare clients for exposure-based interventions in stage 2. Among the topics addressed in this skills training phase are: labeling feelings; managing anxiety and anger; and identifying trauma-related interpersonal schemas that are re-enacted in day-to-day life. Stage 2 targets emotional processing of the trauma through a prolonged exposure intervention that aims at ameliorating PTSD symptoms. A study with

women diagnosed with PTSD related to childhood sexual abuse and/or physical abuse showed significant improvements in PTSD, emotion regulation difficulties, and interpersonal problems following STAIR (Cloitre et al., 2002). Findings also revealed that a positive therapeutic alliance and improvement in affect regulation in stage 1 were predictive of a decrease in PTSD symptoms in stage 2 (Cloitre et al., 2002). A more recent STAIR study with women with PTSD related to childhood abuse concluded that those who received skills training stage followed by exposure stage interventions reported greater improvements with respect to PTSD and interpersonal functioning than those who received either stage alone (Cloitre et al., 2010). Taken together, these findings support the view that stage-based trauma therapy approaches are recommended to treat complex trauma survivors.

Sensorimotor Psychotherapy (SP). Empirically validated body-based interventions for PTSD are scarce (see Foa, Keane, Friedman, & Cohen, 2009), and many current models do not address clients' problems connecting with their bodies or encourage clients to learn ways to utilize their bodies as a resource to cope with dysregulation. Based on the principle that trauma experiences are stored in the brain as implicit memories in the form of somatic responses of which the individual is unaware, Ogden and colleagues (2006) propose sensorimotor psychotherapy for the treatment of trauma.

Similar to some of the EFTT interventions, SP employs "bottom-up" techniques that rely on bodily experiences as the entry point for intervention (Ogden et al., 2006). Trauma survivors often fluctuate between states of hyper- and hypo-arousal and SP interventions help them bring their arousal within the "window of tolerance" (Siegel, 1999), or in other words into a state of optimal arousal where they can access their frontal cortex (i.e., think) at the same time as they are processing trauma-based states. In SP, meaning making and self-understanding emerge from

close observation and processing of sensorimotor experiences. Through mindful self-observation, body-based exercises, and verbalization of in-session experiences, clients are able to integrate somatic, affective, and cognitive aspects of their traumatic experiences in a state of optimal arousal. Findings from a pilot study of a stage 1, 20-session group intervention for trauma informed by SP principles with 10 women with childhood or adulthood interpersonal trauma histories are promising and revealed significant improvements on self-report measures of body awareness, dissociation symptoms, and capacity and receptivity to being soothed following intervention (Langmuir, Kirsh, & Classen, 2012).

Group interventions for childhood abuse. A wide range of group therapy approaches to treat child abuse survivors have been proposed in the literature and considered beneficial to survivors' recovery (Cloitre et al., 2002; Lubin, Loris, Burt, & Johnson, 1998, Rosenkranz & Muller, 2011; Talbot et al., 1999; Wolsdorf & Zlotnick, 2001; Zlotnick, 1997). Groups are thought to increase members' sense of belonging, thus decreasing their sense of isolation, shame, and guilt (Cahill, Llewlyn, & Pearson, 1991; Yalom, 2005). They also learn from witnessing one another work through their problems (Yalom, 2005). Through relational experiences with other group members, clients may feel more hopeful and validated and less mistrusting of others (Draucker, 1999; Lubin et al., 1998). Within therapy, clients can develop new relationships that provide them with corrective emotional experiences that in turn culminate with a re-organization of internal working models and an increased capacity to feel safe with others (Bowlby, 1988; Alexander & French, 1946; Hartman & Zimberoff, 2004; Hazan & Shaver, 1987).

Groups focusing on the establishment of safety and stability and the development of emotion regulation skills, also known as stage 1 (see Herman, 1992), have been particularly successful in the treatment of childhood abuse survivors. For example, a randomized control

treatment study with women with a history of childhood abuse undertaking a stage one group-based treatment approach, focusing on safety and self-care, showed that improvements following the group program were superior to those reported following a treatment as usual condition (Talbot et al., 1999). Another example is the study of an affect management, cognitive behavioural therapy based group to treat survivors of childhood sexual abuse (Wolsdorf & Zlotnick, 2001). As a result of working on their distorted thinking about current difficulties and trauma-related affects, using emotional reasoning to interpret reality, and developing skills to manage and cope with stress, clients significantly improved in PTSD, depression, and dissociation symptoms. Finally, intensive groups have been considered more effective in the treatment of trauma than longer and less intensive groups (Lau & Kristensen, 2007).

Alexander, Neimeyer, Follette, Moore, and Harter (1989) highlight the importance of implementing process oriented group treatments with child sexual abuse survivors since they allow for more realistic interpersonal experiences within which problematic relational issues can reemerge. Having opportunities to revisit and change old and problematic relational patterns stemming from early trauma are invaluable to the recovery process. For example, positive outcomes in terms of anxiety, interpersonal functioning, and well being were observed following a cognitive analytic approach (Calvert, Kellett, & Hagan, 2015; Hagan & Gregory, 2001). This is a relational-based group intervention, based on the model proposed by Ryle (1995), combining psychoanalytic and cognitive models in which maladaptive patterns of relating are identified and reformulated within interactions with others within the group setting (Hepple, 2012). A review of interpersonal-psychodynamic group therapy outcomes suggested that this is an effective therapy approach to treat survivors of childhood sexual abuse with respect to reducing psychiatric symptoms and improving interpersonal functioning (Callahan, Price, & Hilsenroth, 2004).

Group therapy has been broadly used to treat survivors of child sexual abuse and findings from randomized controlled studies have suggested that this treatment modality improves common trauma-related problems such as PTSD symptoms, dissociation, affect dysregulation, psychological distress, interpersonal skills, and HIV risk behaviours (Alexander, Neimeyer, Follette, Moore, & Harter, 1989; Classen et al., 2011; Lau & Kristensen, 2007; Sikkema et al., 2004, 2007; Thurston, & Butler, 2004; Stalker & Fry, 1999; Wyatt et al., 2004; Zlotnick et al., 1997).

Despite strong evidence about the effectiveness of group therapy to address childhood abuse-related problems, a meta-analytic review by Taylor & Harvey (2010) raised the issue that individual interventions are more efficacious than group interventions in the treatment of PTSD. Nevertheless, this finding should be interpreted with caution given the heterogeneity of the samples studied and the current lack of evidence with respect to samples of childhood abuse survivors. A more recent meta-analytic review of treatments for PTSD included the type of the treatment delivery as a potential moderator in the analyses (Ehring et al., 2014). Results indicated that group treatments combining individual and group sessions produced larger effect sizes than treatments involving group interventions alone (Ehring et al., 2014).

Treatment group: Women Recovering from Abuse Program (WRAP).

WRAP was developed to address the needs of women with histories of chronic childhood abuse. WRAP is a *Stage 1* based trauma treatment program (Herman, 1992) that addresses issues of safety, affect regulation, self-care, stabilization, skill building, education, and support. Its primary focus is on helping women develop safe and healthier strategies to manage affect, distressing cognitions, mood, dissociation and somatic symptoms, as well as enhance

interpersonal capabilities often damaged as a result of interpersonal trauma (Duarte-Giles et al., 2007).

WRAP is a multimodal treatment approach that combines various therapy modalities such as interpersonal, psycho-educational, cognitive-behavioral, psychodynamic, creative, and somatic oriented therapies to help reduce the impact of chronic interpersonal trauma. Since emotion-processing deficits are a common trauma-related problem, one of the program premises is to help clients improve their emotion regulation skills. For example, one of the groups specifically encourages clients to attend to internal somatic states by learning to identify and express emotions and track bodily sensations. Through psychoeducation and experiential activities, clients learn new strategies to self-regulate, self-soothe, and experience pleasure (Duarte-Giles et al., 2007). Although only one group specifically targets issues of affect dysregulation as a primary goal, the development of skills in emotion processing and arousal regulation are woven throughout the program. In addition to the attending the groups, clients also receive individual therapy sessions once a week for the duration of the program.

A qualitative study examining the treatment experiences of WRAP participants interviewed 7 women and identified three main outcome themes in their interviews: *Breaking Trauma-Based Patterns, Doing Therapy, and The Healing Journey as a Continuous Process* (Parker, Fourt, Langmuir, Dalton, & Classen, 2007). Specific themes reported by clients included: using learned techniques to ground themselves when experiencing emotional dysregulation, and experiencing greater self-awareness of behavioural patterns stemming from emotion regulation difficulties, greater capacity to express thoughts and experience emotions, and greater confidence to develop new relationships (Parker et al., 2007). Women attending

WRAP also reported significant improvements in alexithymia, emotion regulation, PTSD, dissociation, and interpersonal problems following treatment (Classen et al., in press).

While clients reported significant improvements in various common trauma-related problems after completion of WRAP, the associations among these variables as they changed over the course of treatment are unclear. Furthermore, the impact that clients' levels of alexithymia throughout treatment may have had on outcomes in these outcomes still needs to be examined.

The Current Study

Childhood trauma has been associated with profound emotional processing deficits including alexithymia, which have also been reported by individuals presenting with other trauma-related conditions such as PTSD, dissociation, and interpersonal problems. Accordingly, the current study will investigate the role of alexithymia in the presentations of a treatment-seeking sample of women with histories of child abuse, prior to and following a trauma group therapy program.

Of particular clinical importance, the current study examined the relationship between improvement in alexithymia and improvement in PTSD, dissociation, and interpersonal problems. This addresses a significant gap in the complex trauma literature because, although many studies have reported on the relationship between alexithymia and therapy outcome, it is still unclear to what extent improvement in alexithymia scores is associated with positive outcome in the context of trauma therapy. The current study also adds to the existing literature with respect to the nature of the relationship between alexithymia and emotion regulation as well

as the role of emotion regulation on the relation between alexithymia and other trauma-related problems such as PTSD, dissociation and interpersonal problems.

The sample of the study will be 167 women self-referred to WRAP, a Stage 1, intensive, primarily group-based treatment program. Participants filled out self-report measures assessing alexithymia, emotion regulation, PTSD symptoms, dissociation symptoms, and interpersonal problems at baseline, following Building Resources Group (BRG), and following WRAP. Alexithymia was assessed using the Toronto Alexithymia Scales (TAS; Bagby, Parker, & Taylor, 1994); emotion regulation was examined using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004); PTSD was assessed using the Post-Traumatic Stress Disorder Checklist (PCL; Weathers et al., 1993); dissociation was assessed using the Dissociative Experience Scale (DES; Bernstein & Putnam, 1986); and interpersonal problems were assessed using the Inventory of Interpersonal Problems (IIP-32; Barkham, Hardy, & Startup, 1996). In order to provide descriptive information regarding the sample before intervention as well as to examine the relationship between alexithymia and PTSD, dissociation, and interpersonal problem throughout the program, both cross-sectional and longitudinal analyses were conducted on these data.

Research Questions and Hypotheses

Research Question 1. What is the relationship between alexithymia, PTSD, dissociation, and interpersonal problems at baseline and over the course of treatment?

Specifically:

Research Question 1a. Is alexithymia associated with PTSD symptoms, dissociation symptoms, and interpersonal problems at baseline?

Hypothesis 1a. A positive correlation is expected between alexithymia and: a) PTSD symptoms, b) dissociation symptoms and c) interpersonal problems.

Rationale 1a. A number of studies have established a strong positive association between alexithymia and other trauma-related problems such as PTSD, dissociation and interpersonal problems. These studies have specifically reported that alexithymia is strongly associated with PTSD symptoms such as hyperarousal and numbing (Frewen et al., 2008) and socially avoidant and cold interpersonal styles that contribute to the development of interpersonal difficulties (Pollatos & Gramann, 2012; Spitzer et al., 2005). Moreover, the emotion processing deficits reported by alexithymic individuals have been found to predict dissociative tendencies (Berenbaum & James, 1994; Elzinga, Bermond, & van Dyck, 2002; Grabe et al., 2000; Irwin & Melbin-Helberg, 1997).

Research Question 1b. Do alexithymia scores at baseline predict improvement in PTSD symptoms, dissociation symptoms and interpersonal problems at post-treatment?

Hypothesis 1b. It is expected that baseline alexithymia is inversely correlated with change in PTSD symptoms, dissociation symptoms, and interpersonal problems (i.e., the lower the alexithymia scores, the greater the improvement in PTSD, dissociation, and interpersonal problems).

Rationale 1b. Previous research demonstrated a strong connection between alexithymia and poor outcome in various therapeutic approaches and modalities (Ogrodniczuk et al., 2011). Given that the difficulty accessing feelings and internal experiences of alexithymia has been linked to higher scores on measures of PTSD (Frewen et al., 2008), dissociation (Irwin & Melbin-Helberg, 1997) and interpersonal problems (Spitzer et al., 2005), as well as to less positive therapy outcome in an outpatient sample (McCallum et al., 2003), it is expected that

high levels of alexithymia will be associated with less positive treatment outcome in a trauma sample.

Research Question 1c. Will change in alexithymia scores over the course of treatment be positively associated with change in PTSD symptoms, dissociation symptoms and interpersonal problems over the course of treatment?

Hypothesis 1c. It is expected that change in alexithymia scores will be positively correlated with change in PTSD symptoms, dissociation symptoms, and interpersonal problems over the course of treatment.

Rationale 1c. Based on previous findings that alexithymia may improve following treatment (Classen et al., in press; Grabe et al., 2008) and that reduction in alexithymia scores is associated with positive outcomes in a variety of samples (Beresnevaite, 2000; Ogrodniczuk et al., 2012; Spek et al., 2008; Tulipani et al., 2010), it is expected that participants reporting improvement in alexithymia will also report improvement in PTSD symptoms, dissociation symptoms, and interpersonal problems at the end of therapy.

Research Question 2. To what extent do alexithymia and emotion regulation difficulties constructs overlap at baseline? This question is partly exploratory since not much research has been done on the topic.

Hypothesis 2. Measures of alexithymia and emotion regulation are expected to be highly correlated with respect to the difficulty in understanding feelings construct.

Rationale 2. Although findings about the nature of the relationship between alexithymia and emotion regulation are scarce, some preliminary findings have identified an overlap pertaining to the area of difficulty in emotional understanding (Pandey et al., 2011).

Research Question 3. Will emotion regulation mediate the association between alexithymia and: a) PTSD, b) dissociation, and c) interpersonal problems over the course of treatment (i.e., by examining these measures at baseline, post-BRG, and post-WRAP)?

Hypothesis 3. It is expected that alexithymia scores at baseline will affect post-BRG emotion regulation scores, which, in turn, will affect post-WRAP scores in PTSD, dissociation, and interpersonal problems (Figure 3). That is, alexithymia at baseline will predict emotion regulation at post-BRG, which will predict PTSD, dissociation, and interpersonal problems at post-WRAP.

Rationale 3. The literature has consistently linked alexithymia to a variety of mental health difficulties (e.g. Taylor et al., 1997; Frewen et al., 2008) but little is known about the factors that may cause this relationship. A recent study with a non-clinical sample examining the association between alexithymia and psychopathology suggested that this relationship is likely mediated by emotion regulation problems (Pandey et al., 2011). While the study showed that alexithymic individuals reported greater mental health problems, this positive association was no longer significant after controlling for emotion regulation difficulties. It was suggested that these individuals are not able to regulate their emotions by thinking about them and implementing strategies to change them, which, in turn, contributes to their mental health problems (Pandey et al., 2011).

Method

Data were collected as part of WRAP – Women Recovering from Abuse Program research project conducted in Toronto, Ontario at the Women’s College Hospital in collaboration with York University. WRAP was designed to address the trauma-related difficulties commonly

experienced by women with a history of childhood abuse. The program aimed to examine the efficacy of a multimodal treatment approach with this population, as well as to understand the role of attachment style in treatment outcome.

Treatment Program Structure and Process

WRAP was delivered over the course of 8 weeks, and clients attended 2 to 3 groups daily, for 4 half days a week, and weekly individual therapy sessions. It combined seven types of groups as follows: 1) Community Forum (psychodynamic and interpersonal group to address individual and group issues and facilitate interpersonal learning); 2) Inside/Outside (addresses affect regulation skills through psychoeducation and bodily sensation awareness); 3) CBT Skills (addresses negative cognitions and aims to develop less destructive ways of thinking and behaving); 4) Own Your Power (explores questions regarding the impact of childhood trauma on clients' sense of power); 5) Trauma Education (presents and discusses information related to the impact of trauma on clients' current daily functioning); 6) Art Therapy (invites clients' expression of themselves in a non-verbal way); 7) Leisure (helps clients learn how to play, bring closure to the week and prepare for the 3-day break). In addition to the groups, clients meet with their individual therapist once a week with the purpose of supporting clients to reflect on their experience in WRAP and work through issues that arise in group sessions. Three follow-up sessions are also offered upon completion of WRAP to address issues relating to terminating treatment and re-integrating into daily life.

WRAP adopts a multi-phase assessment process that starts with a phone screen to ensure that potential participants meet the program requirements and are not in crisis. This is followed by a thorough bio-psycho-social assessment to ascertain readiness for group work as well as to identify needs and expectations for the therapy. Suitable candidates join the Building Resources

Group (BRG), a group that offers further preparation and assessment of clients' readiness for intensive group therapy. BRG adopts a psychoeducational and relational treatment approach in which women learn about group work, evaluate their willingness to start in WRAP, and develop some resources to deal with the impact of trauma.

The WRAP intake model is continuous and slow-open, in which 1 or 2 new clients may be starting treatment at the beginning of each week, and 1 or 2 clients may be finishing treatment at the end of each week. This model is thought to facilitate the transmission of knowledge, through mentorship between senior and new members. Furthermore, it ensures that groups have a sufficient number of participants.

Therapists

Therapy in WRAP was provided by 11 female therapists from the fields of psychology, social work, psychiatry, occupational therapy, art therapy, and nursing. They were predominantly experienced Masters level clinicians with clinical training in trauma. Therapists meet once a week for peer supervision to discuss clients' progress and response to treatment in WRAP and clients' progress in BRG and readiness to begin WRAP. They also discuss how to address impasses related to clients' transference and therapists' countertransference issues. In addition to peer supervision, therapists meet for 15 minutes prior to and following group sessions to update one another on themes that emerged in groups and to ensure that there is continuity between group sessions. Utilizing a trauma-informed approach (see Clark, Classen, Fourn, & Shetty, 2015), clinicians in WRAP address clients' trauma symptoms as coping strategies to deal with overwhelming affects and place great emphasis on working collaboratively as a way to promote empowerment.

Recruitment

A total of 507 women self-referred to WRAP from December 2005 to December 2007. Fifty-eight percent (n=293) met criteria for the program and were invited to participate in the research study while they were placed on a waitlist for the program. Ninety-four percent (n = 276) expressed interest in participating in the research study. These women were contacted by a research assistant who explained the purpose of the research, what was involved in each research assessment, and the compensation. Participants were invited to attend up to seven research sessions over the course of a year. This would include up to 4 research assessments prior to beginning the WRAP, 2 assessments following completion of WRAP and a final 6-month follow-up assessment.

Participants were informed that all research sessions would take place at Women's College Hospital with a research assistant and would involve interview style assessments (which would be audiotaped), as well as paper and pencil questionnaires. They were also informed that each assessment would take between one hour and two and a half hours. Each potential participant was informed that participation (or non-participation) in the research would have no effect on the treatment they would receive at Women's College Hospital, and that all information collected would remain confidential.

A total of 180 women agreed to participate in the research study and a research assessment was scheduled. After completion of research and clinical assessment sessions, a total of 80 out of 180 (44.4%) completed the Building Resources Group (a preparatory group attended before entry to WRAP) and finally entered WRAP. A total of 119 of 180 (66.1%) dropped out of the program at some stage. Fourteen of 180 (7.8%) did not attend any appointments, 47 of 180 (26.1%) dropped out after attending the clinical interviews, 40 of 180 (22.2%) dropped out after attending the *Building Resources Group (BRG)*, and 19 of 180 (10.6%) dropped out after

attending group therapy sessions. A total of 51 participants completed WRAP.

Procedure

Inclusion criteria for the program specified that women must be at least 18 years old, have a history of childhood trauma or neglect and be considered appropriate for group-based treatment at the time of the assessment. Exclusion criteria for the program included levels of medical instability, eating disorders, addiction, and suicidal ideation that would interfere with their participation in the program.

Eligible participants were informed that all research sessions would take place at Women's College Hospital with a research assistant and would involve audiotaped interviews and paper and pencil questionnaires. They were also informed that each assessment would take between one hour and two and a half hours. Each potential participant was informed that participation (or non-participation) in the research would have no effect on the treatment they would receive at Women's College Hospital, and that all information collected would remain confidential.

Data collection occurred at various time points as follows: during research sessions prior to the clinical assessment sessions, following BRG, and following completion of WRAP. During the first research assessment, participants were required to sign a detailed consent form (outlining the purpose, procedure, risks and benefits, compensation, refusal to participate and confidentiality of the research) developed for the study. Any questions concerning confidentiality or anonymity were answered. At the end of the second research assessment, participants were given \$20.00 and were also reimbursed for travel expenses incurred (in the form of TTC tokens). All study procedures were approved by the Sunnybrook and Women's College Research Ethics Board and the York University Ethics Review Committee.

The demographic and trauma history measures were given to participants at the first and second research sessions respectively. The alexithymia, emotion regulation, PTSD, dissociation, and interpersonal problems measures were administered at three time points: baseline, post-BRG (i.e., pre-WRAP), and post-WRAP (Figure 1)

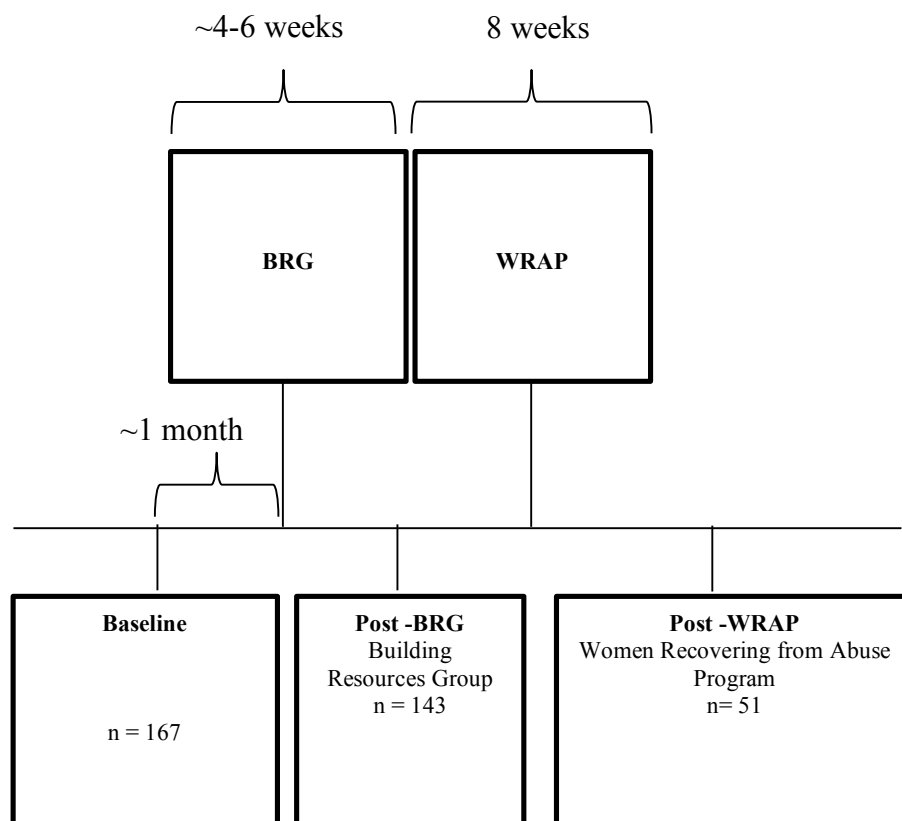


Figure 1. Sample sizes for each research assessment point.

Participants

Participants were 167 treatment-seeking women with a history of childhood abuse, entering the Women Recovering from Abuse Program (WRAP) at Women's College Hospital in Toronto, Canada. They ranged in age from 19 to 72, with a mean age of 39.95 (SD =11.11). In terms of participants' demographics, 64% identified themselves as Caucasian, 7% as Black, 6% as Asian, 4% as Latin American, 4% as First Nations, 1% as South Asian, and 14% identified

themselves as “other.” Thirty-six percent of participants identified themselves as single, while 33% reported being married or in a committed relationship. The remaining 28% of participants were separated, divorced, or widowed. The average yearly income was under \$20,000 (42%). The percentage of women who held full-time jobs was 25%. Fourteen percent held part-time jobs, 33% were unemployed, and 31% were on medical leave or temporary disability (Table 1).

Measures

Demographic Questionnaire. A demographic questionnaire was administered to obtain general background information with respect to participants’ age, gender, ethnicity, socioeconomic status, education level, current occupation, and marital status.

Childhood Trauma Questionnaire Short Form (CTQ-SF; Bernstein & Fink, 1998). The CTQ-SF is composed of 28 items that assess childhood trauma retrospectively. The CTQ-SF contains 5 dimensions of trauma experiences: Emotional abuse (e.g., “people in my family said hurtful and insulting things to me”), physical abuse (e.g., “I was punished with a belt, board, cord, or some other hard object”), and sexual abuse (e.g., “someone tried to touch me in a sexual way or make me touch them”), as well as emotional and physical neglect (e.g., “people in my family didn't seem to know or care what I was doing” and “there wasn't enough food in the house for everything”). Individuals rate each statement on a 5-point scale (ranging from 1 = never true to 5 = very often true). Internal consistency of the scales ranged from .66 to .92. Criterion validity was demonstrated on a variety of samples, with the questionnaire scores significantly predicting observational scores of therapists (regression coefficients between .24 and .27; Bernstein et al., 2003).

Toronto Alexithymia Scales (TAS-20; Bagby, Parker, & Taylor, 1994). The TAS-20 is composed of 20 items that assess alexithymia according to three domains: difficulty identifying

feelings and distinguishing them from bodily sensations (e.g., “I am often confused about what emotion I am feeling”), difficulty expressing feelings (e.g., “It is difficult for me to find the right words for my feelings”), and externally oriented thinking (e.g., “I prefer talking to people about their daily activities rather than their feelings”). Individuals are asked to rate each statement on a 5-point scale (ranging from 1 = strongly agree to 5 = strongly disagree). Good test-retest reliability and excellent internal consistency, with alpha coefficients ranging from .74 to .77 for the full scale, have been reported (Bagby, Parker, & Taylor, 1994). A cut-off score of 61 or higher is recommended to assess for alexithymia. Scores ranging between 52 and 60 might suggest possible alexithymia, and below 51 might suggest no alexithymia (Taylor, Bagby, & Parker, 1997).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). The DERS is composed of 36 items that measure difficulties in regulating emotions across six domains: nonacceptance of emotional responses; difficulties engaging in goal directed behavior; impulse control difficulties; lack of emotional awareness; limited access to emotion regulation strategies; lack of emotional clarity. Individuals are asked to rate each item on a 5-point scale ranging from 1 = almost never to 5 = almost always. A good internal consistency (alpha = .93) and high test-retest reliability ($r = .88$) have been demonstrated for this measure (Gratz & Roemer, 2004).

Post-Traumatic Stress Disorder Checklist (PCL; Weathers et al., 1993). The PCL is a 17-item inventory that assesses specific symptoms of PTSD according to three domains: reexperiencing, avoidance/numbing, and arousal. The respondent is asked to rate how much a particular PTSD symptom presented in each statement has bothered them on a 5-point scale (ranging from 1= not at all to 5= extremely). Psychometric evaluations of the PCL have demonstrated its excellent internal consistency, with alpha coefficients ranging from .94 to .97

(Blanchard et al., 1996; Weathers et al., 1993), and good test-retest reliability ($r = .96$; Weathers et al., 1993).

Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986). The DES is a 28-item instrument used to measure the frequency of experiences of dissociation. Individuals are asked to indicate the percentage of time that they have experienced dissociative episodes on a scale of 0% to 100%. Items include phenomena considered key to the concept of dissociation such as: amnesia, gaps in the continuity of awareness, depersonalization, derealization, absorption, and identity alteration. The measure yields three subscale scores (i.e., amnesia, depersonalization-derealization, and absorption), and a total score. Good test-retest reliability, with coefficients ranging from .79 to .86 and strong construct validity have been demonstrated for this measure (Bernstein & Putnam, 1986; Frischholz et al., 1990).

Inventory of Interpersonal Problems (IIP-32; Barkham, Hardy, & Startup, 1996). The IIP-32 is a 32-item measure of interpersonal distress and is composed of eight scales: domineering, vindictive, cold, socially avoidant, nonassertive, exploitable, overly nurturant, and intrusive. Individuals are asked to rate each item on a 5-point scale ranging from 0 = not at all to 4 = extremely. The overall internal consistency of the IIP-32 is high ($\alpha = .86$) and the reliability is acceptable to excellent with coefficients for the subscales ranging from .68 to .90.

Minnesota Multiphasic Personality Inventory (MCMI-III; Millon, 1994; Millon, Millon, Davis, & Grossman, 2006). The MCMI-III is a self-report measure of adult personality and psychopathology composed of 175 true-false questions. It yields 4 personality scales, 10 clinical syndrome scales, and 5 correction scales. The *Major Depression* and the *Dysthymia* syndrome scales were used to measure depression symptomatology. The MCMI-III has been used to assess a wide range of problems in a variety of clinical settings (Craig, 2008). The

MCMI-III scales' alpha coefficients ranged between .66 and .90 (Millon, 1994) and show a median stability of .80 for clinical syndrome scales and of .78 for personality disorder scales (Craig, 1999).

Results

Data Analyses

To assess the relationships between alexithymia and PTSD, dissociation, and interpersonal problems simultaneously, as proposed in Research Question 1, a structural equation modeling analysis was conducted. This allowed for both cross-sectional and longitudinal analyses of these variables concurrently. To answer Research Question 2, exploratory factor analysis was applied to all nine scales composing the alexithymia and emotion regulation problems measures to determine the extent to which these constructs overlap. Finally, a cross-lagged panel model for longitudinal data based on a structural equation modeling was used to determine the extent to which emotion regulation difficulties mediated the association between alexithymia and PTSD, dissociation, and interpersonal problems, as proposed in Research Question 3.

Preliminary analyses were also conducted and included: missing data analysis; examination of outliers and normality and internal consistency of variables; a one-way ANOVA to assess unhypothesized relationships between demographic variables and study variables; Pearson correlations among variables; t tests comparing treatment completers and non-completers with respect to study variables. A frequency analysis of the sample in terms of alexithymia levels at baseline and post-treatment was also conducted.

Preliminary Analyses

Alexithymia, emotion regulation difficulties, PTSD, dissociation, and interpersonal problems variables were first screened for missing data. Little's (1988) missing completely at random test was not significant, $\chi^2(144) = 150.70, p = .33$, indicating that missing data on these variables were completely at random. These variables were also inspected for normality, homoscedasticity, as well as univariate and multivariate outliers, at all of the three time points (i.e., baseline, post-BRG, and post-WRAP). While examination of alexithymia, emotion regulation difficulties, PTSD, and interpersonal problems variables revealed that they were normally distributed, examination of the dissociation variable revealed a positive skew. A square root transformation was applied, which was found to improve normality and reduce the impact of univariate outliers for this variable. Examination of squared Mahalanobis distances revealed one multivariate outlier. Results were not altered upon removal of this outlier, thus this case was kept in the analyses. Examination of bivariate plots, at each time point, revealed that the assumptions of linearity and homoscedasticity were met. The internal consistency for the variables was examined using Cronbach alpha coefficients. Alpha reliabilities were good to excellent, ranging from .80 to .97. The mean, standard deviations, and alpha coefficients for each variable are outlined in Table 2.

A one-way ANOVA was conducted to determine whether there were any unhypothesized relationships between the demographic variables and the alexithymia, emotion dysregulation, PTSD, dissociation, and interpersonal problems variables. The demographic variables included were age, ethnicity, education, and income. Results did not reveal significant effects of age on alexithymia [$F(5,157) = .90, p = .23, \eta^2 = .03$], emotion dysregulation difficulties [$F(5,157) = .23, p = .54, \eta^2 = .01$], PTSD [$F(5,157) = .65, p = .79, \eta^2 = .02$], dissociation [$F(5,159) = .61, p = .24, \eta^2 = .02$], and interpersonal problems [$F(5,149) = .77, p = .26, \eta^2 = .02$]. No significant effects of

ethnicity on alexithymia [$F(8,160) = 1.60, p = .70, \eta^2 = .08$], emotion dysregulation difficulties [$F(8, 160) = 1.47, p = .73, \eta^2 = .07$], PTSD [$F(8,160) = 1.24, p = .70, \eta^2 = .06$], dissociation [$F(8,162) = 1.67, p = .52, \eta^2 = .08$], and interpersonal problems [$F(8,152) = .52, p = .14, \eta^2 = .03$] were found. Similarly, alexithymia [$F(8,160) = .35, p = .64, \eta^2 = .02$], emotion dysregulation difficulties [$F(8,160) = .47, p = .20, \eta^2 = .02$], PTSD [$F(8,160) = .88, p = .74, \eta^2 = .04$], dissociation [$F(8, 162) = .40, p = .98, \eta^2 = .02$], and interpersonal problems [$F(8, 152) = .51, p = .80, \eta^2 = .03$] did not vary as a function of education. Finally, no significant effects of income on alexithymia [$F(7,160) = 1.02, p = .75, \eta^2 = .04$], emotion dysregulation difficulties [$F(7, 160) = 1.18, p = .42, \eta^2 = .05$], PTSD [$F(7, 160) = 3.06, p = .89, \eta^2 = .12$], dissociation [$F(7,162) = .82, p = .85, \eta^2 = .03$], and interpersonal problems [$F(7, 152) = 1.11, p = .30, \eta^2 = .05$] were detected.

Given the previous debate in the literature regarding the potential overlap between alexithymia and depression, Pearson correlations between alexithymia and two depression variables (i.e., major depression and dysthymia scales) were conducted. Although the major depression and dysthymia were highly correlated ($r = .80, p < .01$), alexithymia was not significantly correlated with major depression ($r = .10, ns$) or dysthymia scores ($r = .03, ns$).

Participants who completed therapy ($n = 51$) were compared to those who withdrew from the program ($n = 113$) with respect to alexithymia [$t(159) = .29, ns, r^2 = .02$], emotion dysregulation difficulties [$t(159) = .68, ns, r^2 = .06$], PTSD [$t(159) = .69, ns, r^2 = .06$], dissociation [$t(161) = .84, ns, r^2 = .07$], and interpersonal problems [$t(151) = .55, ns, r^2 = .05$] using independent t tests, but no significant differences were found. The means and standard deviations are presented in Table 3.

Sample Description

Overall, participants reported high levels of childhood abuse. The majority of participants

(92%) reported at least one act of major physical abuse during childhood. One hundred percent of participants endorsed at least one act of both psychological abuse and neglect, and 92% endorsed at least one act of sexual abuse.

In terms of 167 participants' alexithymia scores at the time of assessment (baseline), 42.9% were reporting high levels of alexithymia, 28.6% were reporting possible alexithymia, and 28.6% were reporting non-alexithymia according to cut off scores proposed by Taylor and colleagues (1997). Of the 51 participants who completed WRAP, 38% were reporting high levels of alexithymia, 34% were reporting possible alexithymia, and 28% were reporting non-alexithymia at baseline. By comparison, 26% of the participants reported high levels of alexithymia, 24% reported possible alexithymia and 50% reported non-alexithymia at post-treatment (see Table 4).

Intercorrelations analyses revealed an overall significant positive correlation between alexithymia and emotion regulation difficulties, PTSD, dissociation, and interpersonal problems, with significant correlations ranging from .28 to .81 (see Table 6). A previous study conducted with the sample of the current study revealed post-treatment improvements with respect to alexithymia, emotion regulation difficulties, PTSD, dissociation and interpersonal problems (Classen et al., in press; see Table 2 for the descriptive statistics and reliabilities of these variables at all of the three time points).

Research Question 1: 1a. Will alexithymia scores at baseline predict PTSD symptoms, dissociation symptoms, and interpersonal problems at baseline? 1b. Will alexithymia scores at baseline be associated with changes in PTSD symptoms, dissociation symptoms and interpersonal problems from baseline to post-treatment? 1c. Will change in alexithymia

scores throughout treatment be associated with change in PTSD symptoms, dissociation symptoms and interpersonal problems throughout treatment?

To assess the relationships between alexithymia and a) PTSD, b) dissociation, and c) interpersonal problems simultaneously, a structural equation modeling analysis was conducted. This allowed for both cross-sectional and longitudinal analyses of these variables concurrently with the software Amos v.21 with maximum likelihood estimation. The hypothesized model is presented in Figure 2, and follows the standard parameterization for a latent curve model that uses a latent difference score based approach (Mun, von Eye, & White, 2009). Considering the nature, intensity, and length of treatment occurring between Time 1 and 2 and between Time 2 and 3, a latent difference score approach was considered most appropriate since it allows for two or more linear trajectories that would be otherwise a potentially intractable nonlinear function (Bollen & Curran, 2006; Raudenbush & Bryk, 2002). By allowing different time points to be selected as the intercept (time referent or anchor point), this approach enables more meaningful interpretation of change occurring between various time points over the course of treatment.

The analyses were conducted in two steps. In step one, the *intercept* latent variable (time referent or anchor time) represented the baseline scores, the slope 1 latent variable represented change in scores from Time 1 to 2 (i.e., period corresponding to BRG), and the slope 2 latent variable represented change in scores from Time 1 to 3 (i.e., period corresponding to both BRG and WRAP together) of the variables of interest (i.e., alexithymia, PTSD, dissociation, and interpersonal problems). In step two, the slope 1 latent variable represented change in scores from Time 2 to 3 (i.e., period corresponding to WRAP) and the slope 2 latent variable represented change in scores from Time 1 to 3. This was obtained by utilizing the scores at Time 3 (i.e., post-WRAP) as the intercept latent variable. The slope regression coefficients were then

set to -1 to so the change was measured from earlier time points to later time points, not vice versa. For model identification purposes, the residual variance for all variables at the non-referent time points were fixed to zero (Mara et al., 2012; Mun et al., 2009).

Model Fit

Model fit was assessed by three measures: the comparative fit index (CFI), the root mean square of approximation (RMSEA), and the normed chi-square (chi-square/degrees of freedom ratio). Chi-square test results were not used to assess model fit since they have been considered sensitive to sample size. In order to mitigate the impact of sample size, the normed chi-square was used (Tabachnick & Fidell, 2007). The CFI compares the fit of a target model to the fit of an independent model (i.e., in which variables are assumed to be uncorrelated); the RMSEA indicates how well the model fits the population covariance matrix and favours parsimony regarding number of parameters; the normed chi-square represents the difference between the actual and predicted covariance matrices and takes into consideration the degrees of freedom within the model.

In both step one and step two, taking all the variables into account at once, the measurement model fit the data well (Step 1: $\chi^2(39, N = 164) = 58.01, p = .03, CFI = .97, RMSEA = .05, \text{normed chi-square} = 1.49$; Step 2: $\chi^2(43, N = 164) = 64.19, p = .02, CFI = .97, RMSEA = .05, \text{normed chi-square} = 1.49$) since the recommended cut-offs for these measures are: a CFI value of .95 and above, a RMSEA value of less than .06, and a normed chi-square of less than 2 (Hooper, Coughlan, & Mullen, 2008).

Alexithymia and PTSD. A positive association between alexithymia and PTSD at baseline and between changes in alexithymia and changes in PTSD were hypothesized and supported by my findings. However, the hypothesis that alexithymia at baseline and changes in

PTSD over the course of treatment would be negatively associated was not supported by my findings.

Alexithymia scores at baseline were significantly associated with PTSD scores at baseline ($b = .51, p < .001$). Twenty-six percent of the variance in PTSD at baseline ($R^2 = .26$) can be accounted for by alexithymia at baseline. While alexithymia pre-treatment was not associated with changes in PTSD symptoms between pre-treatment and post-WRAP (Time 1 and 3), improvement in alexithymia between pre-treatment and post-WRAP was significantly associated with improvement in PTSD during the same period ($b = .70, p < .001$). Sixty-three percent of the variance in change in PTSD between pre-treatment and post-WRAP ($R^2 = .63$) can be accounted for by change in alexithymia between pre-treatment and post-WRAP. Improvement in alexithymia between pre-treatment and post-BRG (Time 1 and 2) was significantly associated with improvement in PTSD during the same period ($b = .35, p = .014$). Ten percent of the variance in change in PTSD between pre-treatment and post-BRG ($R^2 = .10$) can be accounted for by change in alexithymia between pre-treatment and post-BRG. Finally, improvement in alexithymia between post-BRG (i.e., pre-WRAP) and post-WRAP (Time 2 and 3) was significantly associated with improvement in PTSD during the same period ($b = .69, p < .001$). Fifty-seven percent of the variance in change in PTSD between pre- and post-WRAP ($R^2 = .57$) can be accounted for by change in alexithymia between pre- and post-WRAP (see Table 7).

Alexithymia and dissociation. A positive association between alexithymia and dissociation at baseline and between changes in alexithymia and changes in dissociation were hypothesized and supported by my findings. However, the hypothesis that alexithymia at baseline and changes in dissociation over the course of treatment would be negatively associated was not supported by my findings.

Alexithymia scores at baseline were significantly associated with dissociation scores at baseline ($b = .08, p < .001$). Forty-one percent of the variance in dissociation at baseline ($R^2 = .41$) can be accounted for by alexithymia at baseline. While alexithymia pre-treatment scores were not significantly associated with changes in dissociation symptoms between pre-treatment and post-WRAP (Time 1 and 3), improvement in alexithymia between pre-treatment and post-WRAP was significantly associated with improvement in dissociation during the same period ($b = .06, p < .001$). Thirty-nine percent of the variance in change in dissociation between pre-treatment and post-WRAP ($R^2 = .39$) can be accounted for by change in alexithymia between pre-treatment and post-WRAP. Improvement in alexithymia between pre-treatment and post-BRG (Time 1 and 2) was significantly associated with improvement in dissociation during the same period ($b = .04, p < .001$). Twenty percent of the variance in change in dissociation between pre-treatment and post-BRG ($R^2 = .20$) can be accounted for by change in alexithymia between pre-treatment and post-BRG. Finally, improvement in alexithymia between post-BRG (i.e., pre-WRAP) and post-WRAP (Time 2 and 3) was significantly associated with improvement in dissociation during the same period ($b = .05, p < .001$). Fifty percent of the variance in change in dissociation between pre- and post-WRAP ($R^2 = .50$) can be accounted for by change in alexithymia between pre- and post-WRAP (see Table 7).

Alexithymia and interpersonal problems. A positive association between alexithymia and interpersonal problems at baseline and between changes in alexithymia and changes in interpersonal problems were hypothesized and supported by my findings. However, the hypothesis that alexithymia at baseline and changes in interpersonal problems over the course of treatment would be negatively associated was not supported by my findings.

Alexithymia scores at baseline were significantly associated with interpersonal problems scores at baseline ($b = .83, p < .001$). Thirty-one percent of the variance in interpersonal problems at baseline ($R^2 = .31$) can be accounted for by alexithymia at baseline. While alexithymia pre-treatment (baseline) scores were not significantly associated with changes in interpersonal problems between pre-treatment and post-WRAP (Time 1 and 3), improvement in alexithymia between pre-treatment and post-WRAP was significantly associated with improvement in interpersonal problems during the same period ($b = 1.14, p < .001$). Sixty-five percent of the variance in change in interpersonal problems between pre-treatment and post-WRAP ($R^2 = .65$) can be accounted for by change in alexithymia between pre-treatment and post-WRAP. Improvement in alexithymia between pre-treatment and post-BRG (Time 1 and 2) was significantly associated with improvement in interpersonal problems during the same period ($b = .50, p = .005$). Eighteen percent of the variance in change in interpersonal problems between pre-treatment and post-BRG ($R^2 = .18$) can be accounted for by change in alexithymia between pre-treatment and post-BRG. Finally, improvement in alexithymia between post-BRG (i.e., pre-WRAP) and post-WRAP (Time 2 and 3) was significantly associated with improvement in interpersonal problems during the same period ($b = .76, p < .001$). Fifty percent of the variance in change in interpersonal problems between pre- and post-WRAP ($R^2 = .50$) can be accounted for by change in alexithymia between pre- and post-WRAP (see Table 7).

Research Question 2: To what extent do alexithymia and emotion regulation constructs overlap at baseline?

Exploratory factor analysis was applied to all nine scales composing the alexithymia and emotion regulation problems measures to determine the extent to which these constructs overlap. Analyses were conducted on data from 161 participants at baseline and this sample size was

deemed adequate for factor analysis as for each variable there were at least ten cases (Garson, 2008; Kass & Tinsley, 1979). As a first step, correlations among the three alexithymia dimensions (i.e., Difficulties Identifying Feelings, Difficulty Describing Feelings, Externally Oriented Thinking) and the six emotion regulation dimensions (i.e., Nonacceptance of Emotional Responses, Difficulties Engaging in Goal Directed Behaviors, Impulse Control Difficulties, Lack of Emotional Awareness, Limited Access to Emotion Regulation Strategies, Lack of Emotional Clarity) were examined for factorability and multicollinearity (see Table 8). None of the correlations between different measures approached the level (.8 or higher) that would be suggestive of significant problems with multicollinearity. The measures were often significantly correlated with each other, which suggests adequate factorability. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were also used as factorability criteria. The KMO was .81, above the recommended value of .6, and Bartlett's test was significant ($\chi^2(161) = 617.86, p < .001$) indicating sample adequacy (Tabachnick & Fidell, 2007). Finally, variables communalities were all above .3, with the exception of Externally Oriented Thinking that was .17, further confirming that all dimensions shared some common variance with other dimensions (see Table 9). Descriptive statistics and reliabilities of all variables are outlined in Table 10.

An unweighted least squares extraction method with promax rotation was used with the software SPSS v.17. The unweighted least squares method was used since it has been considered appropriate with samples that are not large (Bollen, 1989). An oblique rotation was the rotation method of choice since it allows the factors to correlate (Osborne, 2015).

The hypothesis that the constructs of alexithymia and emotion regulation difficulties would overlap with respect to the difficulty understanding feelings dimension was supported by

my findings. The factor analysis yielded two components with eigenvalues greater than one. Examination of the scree plot also revealed a two-factor solution. Both factors jointly explained 62.70 % of the total variance, with the first factor explaining 45.59 % and the second factor explaining 17.11 %. Factor 1 was labeled *Difficulty Understanding Feelings* and was composed of: all of the three alexithymia dimensions Difficulty Identifying Feelings, Difficulty Describing Feelings and Externally Oriented Thinking, and two emotion regulation difficulties dimensions Awareness of Emotions and Clarity of Emotions. These five dimensions were related to difficulties labeling emotions and tuning into internal experience. Factor 2 was labeled *Cognitive and Behavioural Self-Regulation Difficulties* and was composed of four emotion regulation difficulties dimensions: Nonacceptance of Emotional Responses, Difficulties Engaging in Goal Directed Behaviors, Impulse Control Difficulties and Limited Access to Emotion Regulation Strategies. These dimensions were concerned with difficulties to modulate strong negative emotions.

The subscales standardized factor loadings were all above the recommended criteria of .32 (Tabachnick & Fidell, 2007; Worthington & Whitaker, 2006) and ranged from .37 to .86. Most communalities after extraction ranged between .41 and .79. Factor 1 and Factor 2 were found to be moderately correlated ($r = .53$). Reliability for Factor 1 was .79 and for Factor 2 was .83. The factor loading matrix, the factor intercorrelations, the reliabilities for each factor and the communalities are presented in Table 9.

Research Question 3: Will emotion regulation mediate the association between alexithymia and: a) PTSD, b) dissociation, and c) interpersonal problems over the course of treatment?

A cross-lagged panel model for longitudinal data based on a structural equation modeling (Selig & Preacher, 2009) was used to determine the extent to which emotion regulation difficulties

mediated the association between alexithymia and PTSD, dissociation, and interpersonal problems. The analyses were conducted using AMOS v. 21.0 on observed variables that represented the total scores for all four variables at each of the three time points (Figures 3, 4 and 5). Cross-lagged models were utilized to examine the mediating effect of emotion regulation difficulties. The indirect effects are defined in the models so that the direction of causal flow begins with alexithymia at Time 1, extends to emotion regulation difficulties at Time 2, and ends with PTSD, dissociation and interpersonal problem at Time 3 (Figures 3, 4 and 5). A direct path that begins with alexithymia and ends with PTSD, dissociation and interpersonal problems was also tested in the models. Additionally, stability paths of alexithymia, emotion regulation difficulties, PTSD, dissociation, and interpersonal problems across three time points, and covariances among the residuals of these four variables within time were included in the models. Bootstrapping was used to obtain significance values and confidence intervals for the indirect effects (Preacher & Hayes, 2004). With this technique, 1,000 samples were taken with replacement from the original dataset. Bias-corrected bootstrapping was used because this method has detected large effects with power of .80 in samples as small as 34 (Fritz & MacKinnon, 2007). Multiple imputation was performed to address the missing data prior to conducting bootstrapping analyses (Schafer & Olsen, 1998; Zhang & Wang, 2013). Five imputations were applied since this number has been found to produce reliable results (Schafer & Olsen, 1998). After bootstrapping was conducted on each of the five multiply data sets generated, Rubin's (1987) procedures were applied to obtain final parameters estimates and standard errors for direct and indirect effects, and confidence intervals for indirect effects.

Overall, the measurement model fit the data well in all of the three models (Model 1 - PTSD: χ^2 (13, N = 51) = 19.65, $p = .11$, CFI = .98, RMSEA = .09, normed ratio = 1.51; Model 2

- Dissociation: $\chi^2 (16, N = 51) = 28.52, p = .03, CFI = .96, RMSEA = .12, \text{normed ratio} = 1.78$; Model 3 – Interpersonal Problems: $\chi^2 (14, N = 51) = 19.14, p = .17, CFI = .98, RMSEA = .08, \text{normed ratio} = 1.37$) since the recommended cut-offs for these measures are: a CFI value of .95 and above, a RMSEA value of less than .06, and a normed chi-square of less than 2 (Hooper, Coughlan, & Mullen, 2008).

The hypothesis that emotion regulation difficulties at Time 2 would mediate the relationship between alexithymia at Time 1 and PTSD, dissociation, and interpersonal problems at Time 3 was not confirmed. Results did not reveal significant indirect effects and therefore, mediation effects of emotion regulation difficulties were not detected in any of the three models. However, path *xm* was significant with alexithymia scores at Time 1 predicting emotion regulation difficulties scores at Time 2. Furthermore, a direct effect (path *xy*) of alexithymia at Time 1 (baseline) on dissociation at Time 3 (post-treatment) was detected in Model 2, with alexithymia scores at Time 1 predicting dissociation symptoms at Time 3. Relevant path estimates along with indirect effects are presented in Table 11.

Considering the results from Research Question 2 concerning the overlap between alexithymia and emotion regulation difficulties, a new variable for emotion regulation difficulties was created by removing the *Awareness of Emotions* and *Clarity of Emotions* dimensions, which overlapped with the alexithymia construct. The same models were re-run with the new variable, however, results remained unchanged.

Discussion

The primary purpose of the current study was to examine the role of alexithymia in the presentations of a treatment-seeking sample of women with histories of child abuse, prior to and following a trauma therapy group program. To test three key hypotheses, I conducted a structural

equation modeling analysis. The results from this investigation partially confirmed my hypotheses and both supported and extended the existing findings proposing a link between alexithymia and other common trauma-related symptoms and problems; specifically, PTSD, dissociation, and interpersonal problems. As expected in hypothesis 1, higher levels of alexithymia were associated with higher PTSD and dissociation symptoms as well as higher interpersonal difficulty scores at baseline. Also in line with my hypothesis 1, improvements in alexithymia were associated with improvements in PTSD, dissociation, and interpersonal problems following therapy. Contrary to hypothesis 1, however, alexithymia levels at baseline were not associated with how much clients improved in PTSD, dissociation, and interpersonal problems throughout therapy.

A second purpose of the current study was to examine the relationships between alexithymia and emotion regulation difficulties as stated in hypothesis 2. I looked at the nature of the overlap between alexithymia and emotion regulation difficulties constructs. My hypothesis 2 was tested through factor analysis of the dimensions of both alexithymia and emotion regulation difficulties combined. As expected, alexithymia and emotion regulation difficulties appeared to overlap with respect to the difficulty understanding feelings. Finally, I examined emotion regulation as a mediating variable between alexithymia and PTSD, dissociation, and interpersonal with a cross-lagged panel analysis for my hypothesis 3. Contrary to expectations, the mediating effect of emotion regulation was not detected.

The Relationships between Alexithymia and PTSD, Dissociation, and Interpersonal Problems at Baseline

A substantial number of clients in WRAP reported high levels (38%) and potentially high levels (34%) of alexithymia at baseline. As demonstrated by previous neurobiological research,

childhood trauma that takes place within attachment relationships may have deleterious impact on brain development and subsequent emotion processing and regulation capacities (e.g., Bagby & Taylor, 1997). The high prevalence of elevated levels of alexithymia in our sample supports the view that alexithymia develops in the context of childhood abuse and interpersonal trauma (e.g., Bermond et al., 2010).

In line with my hypothesis 1, alexithymia was significantly associated with other common trauma-related problems such as PTSD, dissociation, and interpersonal problems so that higher levels of alexithymia were associated with greater scores in these three variables. That is to say, clients with difficulties identifying and describing feelings and directing their attention to internal states and experiences clearly showed greater problems with respect to PTSD, dissociation, and interpersonal problems. Approximately 26% of the variance in PTSD, 41% of the variance in dissociation, and 31% of the variance in interpersonal problems at baseline (prior to treatment) was predicted by alexithymia at baseline.

The finding that alexithymia is significantly associated with PTSD is supported by previous research that found severe PTSD symptoms to be linked to high levels of alexithymia (Frewen et al., 2008). In my study, twenty-six percent of the variance in PTSD at baseline can be accounted for by alexithymia at baseline. Having limited access and understanding of their own emotional states, alexithymic individuals reporting PTSD symptoms often resort to suppression emotion regulation strategies; however, they may become easily dysregulated at times of stress or when they are faced with reminders of their trauma. Unable to understand their internal emotional states, clients reporting high levels of alexithymia become dysregulated, in the form of hyper- or hypoarousal, as a series of survival responses are initiated as if the trauma was happening in the here and now. For example, it may be adaptive for a child to shut down

emotions and not feel them during experiences of sexual abuse. However, shutting down emotions as coping strategies may follow them through life when trauma triggers are experienced, and this interferes with their overall functioning.

Consistent with hypothesis 1, my findings show that alexithymia is significantly associated with dissociation at baseline, with a considerable proportion of the variance in dissociation (i.e., 41%) being accounted for by alexithymia. Previous research has linked parental unresponsiveness and emotional unavailability to both alexithymia and dissociation (Carlson et al., 2009; Elzinga et al., 2002). Without an attuned parent that responds, mirrors, and labels the child's internal states, profound deficits in symbolization and mentalization emerge (Fonagy et al., 2002). Additionally, if the parent is also a source of threat, the intolerable feelings associated with trauma must remain separate from consciousness and verbal and non-verbal components of emotional experiences must remain dissociated as a form of coping with trauma (Bucci, 1997). In the absence of an attuned caregiver that attunes to and responds to the child's signs of dysregulation, thus helping her to express her emotional states, the child is not able to develop more adaptive self-regulation strategies. Faced with overwhelming affects that result from child interpersonal trauma and lacking more adaptive emotion processing and regulation skills, dissociation becomes an automatic mechanism to cope with stress. And when individuals with a history of childhood abuse have resorted to dissociation repeatedly during childhood development, they may more easily disconnect from both internal and external reality as adults, as a way to keep distance from overwhelming feelings when faced with stress. It is plausible to conclude that, in the long run, the deficits associated with alexithymia interfere with the development of more adaptive self-regulating skills, which in a way, serves as a mechanism that

maintains dissociation. It might be that, not until alexithymic individuals are able to access and understand their emotional states, will they need to rely on dissociation to cope with distress.

In line with my hypothesis 1, high levels of reported interpersonal problems were also significantly associated with alexithymia at baseline, with 31% of the variance in interpersonal problems being accounted for by alexithymia. Our findings support the view that an impaired ability to understand and describe one's emotional states contribute to one's interpersonal difficulties. Previous research suggests that alexithymic individuals' deficits involve difficulty understanding both their own and others' emotional and other mental states (Pollatos & Gramann, 2012; Spitzer et al., 2005). These individuals not only have difficulties understanding their emotions and internal states but also struggle to recognize and empathize with other's feelings (Grynberg et al., 2012; Moriguchi et al., 2007; Moriguchi et al., 2009; Prkachin et al., 2009). Their interpersonal style is often described as cold and detached, which may elicit negative feelings and reactions from others and further contribute to their interpersonal difficulties. For example, therapists' reactions to clients in group therapy with respect to their positive qualities, personal compatibility, and significance as a group member were found to mediate the impact of alexithymia on therapy outcome (Ogrodniczuk et al., 2005) Descriptions of relationship difficulties of individuals with avoidant attachment are very much consistent with those reported by alexithymic individuals. That is, they avoid intimacy and have difficulty disclosing feelings and engaging in close relationships. Examination of both the attachment and alexithymia literatures suggest that these interpersonal difficulties can be traced back to early disruptions in the attachment relationships (e.g., Fonagy et al., 2002; Krystal, 1997). When attachment figures are the perpetrators of abuse, these early attachment disruptions are even more severe, which ultimately disrupt the individual's capacity to attune to self and others'

mental states and to feel safe in relationships. Therefore, childhood abuse survivors reporting high alexithymic traits likely struggle to navigate relationships due to their difficulty understanding others' internal states and feeling safe in relationships in general.

Relationship between Improvements in Alexithymia and Improvements in PTSD, Dissociation, and Interpersonal Problems

As expected, our findings support the view that alexithymia levels play an important role in trauma therapy outcomes such as PTSD symptoms, dissociation symptoms, and interpersonal problems (hypothesis 1). In fact, the enhancement of self-capacities that include introspection and identifying and describing emotional states, seems to be crucial to the improvements observed in women over the course of WRAP. As hypothesized in hypothesis 1, our results revealed that improvements in alexithymia were significantly associated with improvements in PTSD, dissociation, and interpersonal problems during different portions of the program. My findings indicate that improvements in alexithymia traits are significantly associated with improvements in PTSD following BRG and following WRAP. The findings from this study suggest that clients who report an increased capacity to recognize and describe feelings, as well as to connect with internal experiences and states rather than focusing on external reality, also experience a reduction in their PTSD and dissociation symptoms, and interpersonal problems following therapy. It is noteworthy that the relationship between alexithymia and the three outcome variables was observed not only following the eight weeks in WRAP, but also following the group that prepares women (i.e., BRG) for intensive group treatment. However, the relationship between improvements in alexithymia and the three outcome variables appear to be stronger during the period of the actual intensive treatment in WRAP and when the entire treatment combining BRG and WRAP is examined.

WRAP encourages the development of safety and helps women to feel safer within themselves and in the world and to develop more adaptive emotion regulation and self-soothing skills. WRAP is an intensive program that teaches clients about the impact of trauma, and helps clients develop skills to regulate emotions and learn to attune to and make sense of their inner experience within a safe and trauma-informed environment. In sum, WRAP's overarching goals are: increasing clients' sense of safety, enhancing clients' affect and body awareness, strengthening clients' understanding of the impact of childhood abuse, improving clients' relational capacities, and empowering clients to make changes in their lives.

Given that one of WRAP main therapeutic goals is to improve emotion regulation skills, many of its interventions are consistent with those recommended in the alexithymia treatment literature (e.g., Krystal, 1988; Moorman et al., 2004; Vanheule, 2011). Specifically, WRAP interventions encourage clients to direct their attention to body sensations and other non-verbal expressions of emotions, and help them recognize a range of body sensations and affects, similar to what is proposed by other trauma treatment models proposed in the literature (e.g., Ogden et al., 2006; Paivio & Pascual-Leone, 2010). This takes place within a relational framework in which clients, with the help and support of therapists and other group members, enhance their introspective and reflective abilities. Some groups in WRAP (i.e., *Inside/Outside*) aim to improve affect regulation skills through the use of body-based and mindfulness techniques that help clients recognize, verbalize, and reflect on feelings, bodily sensations, and internal states of arousal. Even in groups that aim to address cognitive distortions and increase clients' awareness of negative automatic thoughts that influence emotions and behaviours, clients are also encouraged to monitor and share their feelings and bodily sensations. Other groups in WRAP encourage non-verbal expressions of a wide range of internal experiences, through art therapy

techniques, that can be later named and processed with the help of others in the group. More importantly, they do this in the context of a trauma-informed environment that emphasizes the development of a sense of safety and empowerment and the view of current symptoms and difficulties as attempts to cope with overwhelming trauma.

As demonstrated in a previous study with the current sample, after completion of WRAP, women reported statistically significant improvements in alexithymia scores (Classen et al., in press). By taking a closer look at the proportion of women meeting criteria for alexithymia (i.e., a score of 61 or greater on the TAS) at baseline and upon completion of therapy, we found that prior to treatment 42.9% of women met criteria for alexithymia as opposed to 26% following treatment. Given the severity and complexity of impairments observed in childhood survivors with respect to emotion processing and regulation, the finding that survivors are showing these improvements following a stage 1 program is promising.

Researchers and clinicians have expressed mixed opinions about the most effective therapy models to treat PTSD stemming from childhood abuse. While a meta-analysis highlights the superiority of exposure-based treatments to reduce PTSD symptoms when compared to non-trauma focused therapies (Ehring et al., 2014), it failed to distinguish between trauma-focused treatments alone and trauma-focused treatments following a safety-and coping skills development approach. Current evidence claiming that staged models are best to treat the complex needs of survivors of childhood abuse is compelling (e.g., Cloitre et al., 2010; Courtois, 2013). That is, severe problems of emotion dysregulation that often present following trauma need to be addressed before exposure-based treatment can be implemented (e.g., Cloitre et al., 2010).

The findings of our study suggest the important role of alexithymia in trauma therapy, which proposes that increasing awareness of emotions and internal experiences may help decrease the likelihood of emergence of overwhelming affect states in the presence of trauma reminders and may be important for treatments of PTSD symptoms (Frewen & Lanius, 2006). As reported in the PTSD literature, childhood trauma may impact brain functioning in a way that danger and threat are perceived as imminent or happening in the here and now (LeDoux, 1996). As such, the typical symptoms of PTSD such as hypervigilance, anxiety, and avoidance can be understood as reflecting the “there and then” of the trauma being experienced as happening in the “here and now.” In WRAP, the use of psychoeducation activities and mindfulness and relaxation exercises aims to help clients enhance their understanding of their symptomatology and increase their capacity to observe and monitor internal signs of abnormal arousal and stay in the “here and now.” Relaxation and mindfulness techniques have been recommended since they may help clients enhance their ability to focus on present sensory experiences and to de-escalate the sense of emergency and danger triggered by amygdala activation (Johnson, 2012). As they become more aware and attuned to their feelings and internal states of arousal in the present moment, clients in WRAP are less likely to experience dysregulation in the form of PTSD symptoms. Moreover, consistent with previous assertions, once clients become more aware of their emotions, they are better able to develop more adaptive coping strategies to deal with dysregulation (Lanius, Bluhm, & Frewen, 2011). Drawing on the notion of window of tolerance (see Siegel, 1999; Ogden et al., 2006), we could say that as clients in WRAP learn to identify and monitor their internal states of hyperarousal and hypoarousal, they also learn ways to return to an optimal arousal level, which is key to reducing the intensity of their PTSD symptoms.

Our results reveal that improvements in dissociation were also associated with improvements in alexithymia. Drawing on the structural dissociation model, Ryle (1997) states that integration of dissociated multiple self-states can only be achieved by developing awareness of them within a corrective therapeutic relationship. His findings on cognitive analytic therapy with clients with borderline personality disorder revealed significant reductions in dissociation and personality fragmentation following treatment (Ryle & Golyukina, 2000). Based on the view that the alexithymia deficits may help perpetuate dissociative processes as a coping mechanism, interventions that reduce these deficits may be an important step in the treatment of dissociation. In WRAP, this is done in the context of safe relationships and attuned therapists that name clients' internal states and facilitate the process of introspection and awareness of emotions. As clients develop greater cognitive insight of their emotions and internal experiences, they may need to rely less on dissociative mechanisms to cope with stress and be better equipped to develop alternative self-regulation strategies.

Finally, as hypothesized, our findings show that improvements in alexithymia are associated with improvements in interpersonal problems. In addition to fostering clients' greater sense of safety and stabilization, the issue of interpersonal learning is also a key ingredient in WRAP. As suggested in the literature, emotion regulation develops relationally, within the context of relationships with caregivers (e.g., Bowlby, 1988; Fonagy et al., 2002; Schore, 2001). In groups, survivors may experience less isolation and shame as they develop safe relationships and learn how to use them in the process of learning new emotion regulation strategies. Within the group relationships, clients have opportunities to learn how to attune to their own and others' emotions and develop a greater understanding of how their behaviours might impact others' experiences. For example, one of the WRAP groups specifically addresses relational difficulties

and interpersonal learning. In this group, trauma-related relational patterns often resurface and are addressed within the relationships in the group. By examining and discussing these re-enactments, clients begin to separate feelings and thoughts stemming from trauma and become more grounded in the present moment. It might be that, as a result of this process, clients may become better able to recognize and describe their own feelings and develop a greater capacity to recognize others' internal states and experiences. More importantly, this process can promote corrective emotional experiences, thus increasing clients' ability to form close connections and to reach out to others for relational soothing.

The issue of interpersonal difficulties associated with alexithymia has also been examined in the context of the therapeutic relationship. Research has shown that therapists' potential negative reactions towards alexithymic clients may be detrimental to the development of a positive therapeutic alliance, consequently leading to negative outcomes (Ogrodniczuk et al., 2011; Ogrodniczuk et al., 2005; Krystal, 1988). As a cohesive and trauma-informed team, WRAP clinicians not only monitor clients' progress in treatment but also their own personal reactions toward clients. By attending to their own internal experiences with respect to clients' behaviours and re-enactments in treatment, therapists are less likely to act upon their negative feelings, which could compromise their alliance with clients and influence outcome negatively. In fact, therapists' relational approach allows them to attend to and discuss the nature of the therapeutic relationship, which has been found to enhance alexithymic clients' capacity to think about relationships and feelings within relationships (Vanheule et al., 2007). One may wonder whether WRAP therapists' approach to in-treatment relationships, in combination with its focus on interpersonal learning, may have also influenced positive treatment outcomes.

Our results indicate that initial levels of alexithymia were not associated with change in PTSD, dissociation, and interpersonal problems at treatment termination. This finding suggests that treatment response was similar regardless of how high participants were on alexithymia at the beginning. Interventions in WRAP are not only consistent with a *stage 1* approach to trauma therapy but also to what has been proposed in the literature to treat alexithymic individuals. By increasing clients' understanding about trauma and implementing interventions that squarely focus on the issues of emotion awareness and regulation and interpersonal learning, WRAP helps clients to learn ways to reflect on and monitor a variety of internal states in context of relationships in the "here and now." Through a combination of approaches, including "bottom up" and "top down" modalities, WRAP aims to assist clients to become more attuned to their internal experiences and teaches cognitive- and somatic-based regulation strategies. These interventions can promote positive changes in alexithymia throughout therapy, which is associated with clients' improvements in other trauma-related symptoms and difficulties.

The findings that treatment response does not vary as a function of clients' initial alexithymia is not consistent with previous research. For example, previous studies with interpretive and supportive therapies encouraging the development of coping skills demonstrated that clients with higher alexithymic traits reported poorer outcomes (McCallum et al., 2003; Ogrodniczuk et al., 2010). It might be that the nature and techniques utilized in those types of treatments are at odds with the interventions that are most appropriate and effective with alexithymic clients. That is, assuming that all clients have some access to their emotions and are somewhat able to verbalize them may be a major setback in the treatment of alexithymic individuals.

While there is a significant association between improvements in alexithymia and improvements in PTSD, dissociation, and interpersonal problems, it is not possible to determine a causal relationship between these variables since these improvements occurred over the same period of time. These results may suggest that clients get better across multiple domains concurrently. It may also mean that there is a third variable, in addition to alexithymia or other than alexithymia, driving the reported changes in PTSD, dissociation, and interpersonal problems.

It is possible that clients in WRAP may have become more aware of and in tune with their emotions and internal experiences as a result of their newly learned skills to manage their PTSD and dissociation symptoms and their newly developed interpersonal skills and greater sense of safety in relationships. It could be argued that their new understanding of their own trauma-related symptoms helped to normalize their experience (Briere, 1996), thus reducing some common feelings of shame and self-blame (Giles et al., 2007) that could interfere with their ability to self-reflect on their feelings and internal experiences. Furthermore, the experiential activities (e.g., grounding techniques to deal with dissociation, meditation and relaxation exercises, art making) along with the relational approach proposed in WRAP may have helped alleviate their PTSD and dissociation symptoms and relationship difficulties, which in turn may have fostered their ability to identify and communicate their feelings and internal experiences.

Nevertheless, WRAP directly encourages clients to learn ways to self-regulate by gaining information about their internal somatic states and their “here and now” internal experiences (Giles et al., 2007). This is done mostly through experiential activities and group discussions that encourage clients to develop a greater awareness of their feelings and bodily sensations and to

rely on these somatic resources to self-regulate. Therefore, it is also plausible that as clients are better able to identify, attune to, and verbalize their internal emotional experiences, as reflected in their reductions in alexithymia scores over time, they are more likely to monitor their internal arousal and remain in the “here and now” in the presence of reminders of trauma, to use more adaptive coping mechanisms that do not involve dissociation, and to perceive relationships more positively as they are more able to recognize their own and others’ internal states

Overlap between Alexithymia and Emotion Regulation Difficulties

The second purpose of the current study was to examine the relationship between alexithymia and emotion regulation difficulties and the mediating effect of emotion regulation problems in the relationship between alexithymia and PTSD, dissociation, and interpersonal problems. As expected, we found that alexithymia and emotion regulation difficulties constructs overlap regarding difficulty understanding feelings. However, we did not find support for the hypothesis that emotion regulation difficulties are a mediator between alexithymia and PTSD, dissociation, and interpersonal problems.

The hypothesis that alexithymia and emotion regulation difficulties overlap with respect to difficulty understanding feelings was confirmed. Our findings indicate that the *Difficulty Identifying Feelings*, *Difficulty Describing Feelings*, and *Externally Oriented Thinking* dimensions of alexithymia along with *Lack of Emotional Awareness* and *Lack of Emotional Clarity* dimensions of emotion regulation difficulties load onto the same factor, which was defined as *Difficulty Understanding Feelings*. The remaining four dimensions of emotion regulation difficulties named *Non-acceptance of Emotional Responses*, *Difficulties Engaging in Goal-Directed Behaviours*, *Impulse Control Difficulties*, and *Limited Access to Emotion Regulation Strategies* loaded on a second factor defined as *Difficulty with Cognitive and*

Behavioural Self-Regulation Strategies. To my knowledge, the assertion that alexithymia and emotion regulation difficulties overlap with respect to difficulty understanding feelings has only been empirically demonstrated by a single study (Pandey et al, 2011). However, these authors' findings revealed a different pattern in terms of the variables comprising each of the two factors. The authors reported an overlap with respect to understanding feelings based on a cross-loading pattern finding in which one dimension of emotion regulation difficulties (i.e., lack of emotional awareness) loaded with other dimensions of alexithymia and one dimension of alexithymia (i.e., difficulty in identifying feelings) loaded with other dimensions of emotion regulation difficulties. The slightly different factor loadings may be attributed to the fact that they conducted principal component analysis, whereas we conducted factor analysis to extract factors. Despite marginally different results, our findings support the idea that two dimensions of emotion regulation difficulties load together with the alexithymia construct, thus indicating that these five dimensions tap into similar concept. On the other hand, our results reveal a clearer distinction between aspects concerning difficulties with emotional awareness and aspects reflecting difficulties with cognitive and behavioural emotion regulation.

A substantial body of research has identified the close link between alexithymia and emotion regulation (e.g., Parker et al., 1998; Pollatos & Gramann, 2012; Swart, et al., 2009; Connelly & Denney, 2007). Some researchers have suggested that emotion regulation is fundamentally associated with a capacity to be aware of and attuned to feelings and internal experiences and the capacity to implement strategies to modify emotional states. Nevertheless, little is known about the actual clinical implications of this relationship. Studies of emotion regulation difficulties often describe the importance of having awareness of feelings to the ability to regulate emotions. Gratz and Roemer (2004) outline four main components of emotion

regulation: 1) awareness and understanding of emotions; 2) acceptance of emotions; 3) ability to control impulsive behaviours and behave according to desired goals when experiencing negative emotions; 4) ability to flexibly use strategies to regulate emotion that are appropriate to the situation in order to meet personal goals and situational demands. Drawing on this framework, alexithymia has been mentioned in the context of the awareness of feelings dimension of emotion regulation (e.g., Shepherd & Wild, 2014). To our knowledge, no studies of emotion regulation have made a clear distinction between alexithymia and emotion regulation difficulties. This is problematic because the issue of alexithymia may have been overlooked and alexithymic clients' unique emotion-processing deficits may not have been properly addressed. Moreover, complex trauma survivors presenting with high levels of alexithymia may pose additional challenges to therapists due to these emotion processing deficits.

If we situate our findings about the distinction between alexithymia and cognitive strategies to regulate emotion within the context of previous hypotheses that alexithymia impedes the development of adaptive emotion regulation strategies (Pandey et al., 2011), it is plausible to conclude that the deficits associated with alexithymia lay ground for the emergence of emotion regulation problems. Considering the difficulties alexithymic individuals experience with respect to accessing and representing their subjective and physiological emotional states, these individuals may be at greater risk for engaging in maladaptive self-regulation behaviours and developing somatic problems. Until they are able to represent their emotions and internal states as well as verbalize them, it may be difficult, if not impossible, for them to accept their negative emotions, to control their impulsive behaviors, to access emotion regulation strategies, and to engage in more adaptive ways to self-regulate.

Alongside our findings suggesting the important role of alexithymia to trauma therapy outcomes, our findings supporting a clear distinction between difficulties understanding and representing emotions verbally and difficulties employing cognitive self-regulation strategies may serve as evidence of the centrality of addressing the deficits stemming from alexithymia in the treatment of survivors of severe childhood abuse. That is, we may have enough evidence to support the view that focusing on the specific deficits associated with alexithymia should be the very first step towards helping clients develop better emotion regulation strategies, which seem to fall into a separate construct. Thus, until clients develop some capacity to monitor and attend to emotions and internal experiences, especially at times of stress, they may not be able to implement alternative strategies to cope with dysregulation.

Emotion Regulation Difficulties as a Mediator between Alexithymia and Outcome

The third purpose of the current study was to examine the mediating effect of emotion regulation problems in the relationship between alexithymia and PTSD, dissociation, and interpersonal problems. We did not find support for the mediating effect of emotion regulation difficulties. Only the paths in which alexithymia at Time 1 (baseline) predicted emotion regulation difficulties at Time 2 (post-BRG) were statistically significant. The lack of mediating effect of emotion regulation difficulties may be attributed to two main factors. First, the length of interval between Time 2 and Time 3 may have impacted this relationship (Selig & Preacher, 2009). It might be that this interval was so long that the impact of emotion regulation difficulties at Time 2 on the three outcome variables (i.e., PTSD, dissociation, and interpersonal problems) at Time 3 had long since faded. Perhaps having an additional time point half way through WRAP (i.e., at four weeks) would have shed light on the issue of the intervals chosen in the current

study. Second, due to clients' attrition, the sample size for the second interval of the model reduced considerably, thus reducing power (Bengt & Curran, 1997). In addition to this, it is important to note that the three dimensions of alexithymia (i.e., difficulty identifying feelings, difficulty describing feelings, and externalizing thinking) and two dimensions of emotion regulation difficulties concerning emotional awareness (i.e., awareness of emotions and clarity of emotions) loaded together on the same factor (i.e., *Difficulty Understanding Feelings*) as demonstrated in my factor analysis. Due to this overlap between the alexithymia and emotion regulation difficulties constructs, having alexithymia at Time 1 as a predictor of emotion regulation difficulties at Time 2 may have weakened the predictive effect of emotion regulation difficulties on the subsequent path defined as *my*. That is, the remaining dimensions of emotion regulation difficulties alone may not be a significant predictor of PTSD, dissociation, and interpersonal problems at Time 3 (post-treatment). However, this interpretation is tentative and further research is warranted.

Limitations and Future Directions

The current study has several limitations. The main limitations were attrition and sample size. Although data were collected from 167 women at baseline, 143 completed BRG and only 51 completed WRAP. Of these 51 women who completed the program, only 43 completed the 6-month follow-up data collection. Given the complexity of our structure equation modelling analyses, follow-up data were not included due to low power concerns. Moreover, our sample size at post-treatment likely reduced power in our mediation analyses. Although these findings are conceptually meaningful, the number and nature of analyses run and the sample size suggest the need for replication.

Another limitation is the lack of a control group. As such, I was not able to show that the reductions in alexithymia or the relationships observed between alexithymia and other outcomes occurred due to the treatment received in WRAP. Rather than being randomly assigned, as in randomized controlled treatment (RCT) studies, participants in WRAP were carefully selected and assessed with respect to their suitability to attend an intensive group-based program. Thus, other participants' characteristics that made them suitable to group work may have impacted their response to treatment. For example, many clients in WRAP had received prior psychotherapy and factors such as type of treatment received and time in therapy may have also influenced outcome and the relationship between alexithymia and outcomes. Nevertheless, I could say that my sample is a "real world" sample and participants' clinical presentations are very much consistent with those reported in the complex trauma treatment literature.

The open group format is also a limitation of the current study. Because WRAP intake model is open and continuous, group constellation changes from week to week. Therefore, it is impossible to examine outcomes as a function of group composition in terms of clients' alexithymia levels. Given the significant interpersonal problems observed in alexithymic individuals, it is unknown whether the relationship between alexithymia and outcomes will vary as a function of the number of highly alexithymic clients in a given group. Further research is needed to determine to which extent this intake model impacts group members' interpersonal dynamics and outcomes.

Finally, the lack of multiple raters and measures of alexithymia is also a limitation. Relying solely on self-report measures may be problematic with clients with impaired emotional awareness and introspective abilities. Obtaining reports of collaterals and conducting interview-based measurements of alexithymia have received increased attention in the literature as a way to

mitigate the pitfalls of self-report assessment (Bagby et al., 2006). Further research should incorporate multi-method alternative measurement methods to increase measurement accuracy.

Clinical Implications and Conclusions

Despite these limitations, the current study represents an important contribution to the emerging literature on improvement in alexithymia throughout therapy and the ways in which this impacts symptom outcome. Consistent with previous research, there was an association between alexithymia and other common trauma-related problems. The results of the current study increase our understanding of the important role of alexithymia to trauma therapy outcomes since improvements in alexithymia throughout therapy were found to be associated with positive outcomes. Our findings also increase our understanding of the relationship between alexithymia and emotion regulation difficulties. Taken together, these results have important clinical implications since they highlight the importance to attend to the deficits and issues related to alexithymia at initial stages of therapy with survivors of childhood abuse. These findings also suggest that the numerous clinical interventions currently targeting emotion regulation that emphasize the increase of awareness of emotional and other internal states are on the right track.

My results show a close relationship between alexithymia and PTSD, dissociation, and interpersonal problems. Specifically, they show that improvements in alexithymia throughout therapy are associated with improvements in these three variables over the course of treatment. These findings suggest that therapeutic interventions that focus on enhancing emotional awareness and introspective abilities are effective and much needed at initial stages of the treatment of complex trauma. They also suggest that this can be done successfully within a multimodal paradigm that incorporates verbal and non-verbal techniques to facilitate clients'

expression of their internal states. Traditionally, most therapeutic interventions assume that clients have some access to their emotions and have some capacity to verbalize them in the context of therapy. As demonstrated by previous literature, this is a common pitfall in the treatment of alexithymic individuals (e.g., Krystal, 1988; Taylor, & Bagby, 2013; Vanheule, 2011). Moreover, it is reasonable to conclude that this can become an impediment to the treatment of these individuals in initial stages of trauma therapy that aim at the development of more adaptive affect regulation skills. WRAP interventions integrates non-verbal approaches (i.e., body-based and art therapies) to facilitate clients' expression of their internal experiences, and these approaches have been recognized as effective with alexithymic clients. This raises the question about the need to incorporate more "bottom up" interventions into the treatment of complex trauma. These interventions target present experience in which body sensations and sensory experiences are used as entry points (Ogden et al., 2006). Rather than focusing on how emotions and thoughts can affect the body, clients are encouraged to observe internal experiences from which a narrative and meaning making can develop. Similarly, art therapy invites clients to express themselves in a variety of forms that can be later named and discussed (Marmond et al., 2004).

Interventions targeting emotion regulation often draw on the view that understanding of emotions is just one more aspect of emotion regulation. However, my factor analysis findings suggest that having understanding of and being able to verbalize emotions are distinct from the ability to employ cognitive and behavioural self-regulation strategies. Therefore, it may be necessary to address clients' deficits in emotion awareness before attempting to teach them new emotion regulation strategies. That is, will they be able to develop strategies to cope with emotions that they were initially unable to recognize. This finding is crucial to stage 1 trauma

treatments since one of their overarching goals is to help clients develop more adaptive emotion regulation skills. As such, it might be that highly alexithymic clients in trauma therapy need more time and a combination of verbal and non-verbal techniques to help them address their deficits in cognitive emotion processing.

Taken together with the extant literature, the results of the current study suggest that more work needs to be done to ensure that the emotional and cognitive impairments related to alexithymia are properly assessed and addressed in trauma therapy. The prevalence of emotion regulation problems among survivors in childhood abuse is supported by research with children and adults and, therefore, a variety of trauma treatments have proposed to target emotion dysregulation problems as one of their overarching goals. However, the unique treatment needs of alexithymic individuals in the context of trauma therapy have been overlooked. This may be partially due to the fact that the relationship between alexithymia and emotion regulation problems have not been examined in depth and that alexithymia may have been considered just another dimension of the emotion regulation construct. Our findings demonstrate the extent to which these two constructs are distinct, which serves as further evidence to support the need to specifically assess and target alexithymia as part of trauma therapies. Improvement in alexithymia throughout therapy and its effects on symptom outcome represents an exciting new area of investigation and more research is needed to understand the best ways to increase the magnitude of improvement in alexithymia throughout clinical intervention.

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Table 1
Participant Demographic Information

Demographic	(<i>n</i>)	
Mean age (<i>SD</i>)		39.23 (11.51)
Ethnicity (%)		
Caucasian	(103)	64
Black	(11)	7
Asian	(9)	6
First Nations	(6)	4
Latin American	(6)	4
South Asian	(2)	1
Other	(22)	14
Family income (%)		
Less than \$20,000	(67)	42.1
\$20,000-\$39,999	(32)	20.2
\$40,000-\$59,999	(20)	12.4
\$60,000-\$79,999	(7)	4.3
\$80,000-\$99,999	(8)	5.1
\$10,000 or below	(5)	3
Don't know	(9)	5.6
Refuse to answer	(3)	2.2
Education level (%)		
Less than High School	(20)	12.3
Completed High School	(15)	9.5
Some College/University	(78)	48.6
Bachelors' Degree	(28)	17.4
Master's Degree	(10)	6.7
Ph.D./M.D./L.L.B.	(2)	1.1
Employment status (%)		
Unemployed	(53)	33
Employed part-time	(22)	14
Employed full-time	(40)	25
Medical leave/temporary disability	(50)	31
Relationship status (%)		
Single	(57)	35.6
Married/Committed	(112)	69.5
Relationship		
Separated	(14)	9
Divorced	(21)	13
Widowed	(4)	2.8
Other	(9)	5.6

Table 2
Descriptive Statistics for All Variables

	<i>n</i>	Range	Mean	<i>S.D.</i>	α
Alexithymia (Time 1)	161	26-82	57.98	11.88	.80
Alexithymia (Time 2)	75	32-87	55.45	11.70	.81
Alexithymia (Time 3)	50	26-84	50.98	15.06	.91
Emotion Regulation (Time 1)	161	45-172	115.24	25.98	.94
Emotion Regulation (Time 2)	75	61-157	109.54	16.87	.94
Emotion Regulation (Time 3)	49	30-113	68.62	13.46	.97
PTSD (Time 1)	161	17-85	59.63	14.17	.91
PTSD (Time 2)	75	27-77	55.55	13.86	.89
PTSD (Time 3)	49	18-82	50.37	16.38	.94
Dissociation (Time 1)	163	.71-83	27.90	18.48	.94
Dissociation (Time 2)	75	3-72	23.16	14.52	.92
Dissociation (Time 3)	51	0-85	23.05	19.07	.96
Interpersonal Problems (Time 1)	153	15-127	65.43	19.01	.89
Interpersonal Problems (Time 2)	70	26-91	61.96	15.67	.83
Interpersonal Problems (Time 3)	50	4-100	52.14	24.03	.94

Table 3*Descriptive Statistics of Treatment Completers and Non-Completers*

Alexithymia		Emotion Regulation Problems	PTSD	Dissociation	Interpersonal Problems
	<i>n</i>	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)
Completers	51	113.24 (28.02)	60.78 (13.67)	26.11 (15.81)	64.13 (18.29)
Non- Completers	113	116.27 (25.05)	59.12 (14.42)	28.72 (19.59)	65.99 (19.37)

Table 4*Alexithymia Levels at Baseline and Post-Treatment*

	<i>n</i>	Baseline (%)	<i>n</i>	Post-WRAP (%)
High Alexithymia	69	42.9	13	26
Possible Alexithymia	46	28.6	12	24
No Alexithymia	46	28.6	25	50

Table 5*Means and Standard Deviations of Outcome Variables Across Alexithymia Groups at Baseline*

Alexithymia		Emotion Regulation Problems	PTSD	Dissociation	Interpersonal Problems
	<i>n</i>	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)	Mean (<i>S.D.</i>)
High Alexithymia	69	128.48 (22.70)	64.19 (12.65)	37.19 (20.07)	71.15 (17.42)
Possible Alexithymia	46	116.89 (19.89)	60.20 (14.47)	24.73 (14.76)	70.36 (16.71)
No Alexithymia	46	94.05 (22.16)	52.24 (13.21)	17.21 (11.15)	52.46 (17.23)

Table 6
Intercorrelations among Alexithymia and Emotion Regulation, PTSD, Dissociation and Interpersonal Problems

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Alexithymia (Time 1)	1														
2. Alexithymia (Time 2)	.77**	1													
3. Alexithymia (Time 3)	.36*	.54**	1												
4. Emotion Regulation (Time 1)	.58**	.45**	.12	1											
5. Emotion Regulation (Time 2)	.61**	.65**	.46**	.67**	1										
6. Emotion Regulation (Time 3)	.28*	.44**	.81**	.25	.54**	1									
7. PTSD (Time 1)	.38**	.19	.12	.58**	.43**	.35*	1								
8. PTSD (Time 2)	.48**	.46**	.28	.53**	.62**	.41**	.62**	1							
9. PTSD (Time 3)	.22	.33*	.62**	.33*	.45**	.75**	.51**	.46**	1						
10. Dissociation sqrt (Time 1)	.58**	.46**	.33*	.44**	.41**	.43**	.43**	.58**	.38**	1					
11. Dissociation sqrt (Time 2)	.52**	.55**	.52**	.51**	.62**	.59**	.40**	.66**	.59**	.74**	1				
12. Dissociation sqrt (Time 3)	.32**	.25*	.61**	.34**	.28*	.68**	.33**	.28*	.65**	.59**	.62**	1			
13. Interpersonal Probl. (Time 1)	.42**	.29*	.38**	.57**	.58**	.39**	.29**	.29*	.29*	.26**	.28**	.22**	1		
14. Interpersonal Probl. (Time 2)	.36**	.41**	.36*	.47**	.61**	.36*	.18	.31**	.35*	.02	.22	.08	.60**	1	
15. Interpersonal Probl. (Time 3)	.13	.32*	.73**	.13	.40**	.74**	.11	.19	.56**	.13	.34*	.48**	.47**	.47**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Note. Time 1 = baseline, Time 2 = post-BRG, Time 3 = post-WRAP

Table 7*Summary of Regression Analyses for Predicting PTSD, Dissociation and Interpersonal Problems*

Predictor	Outcome Variable	B	S.E.	<i>p</i>
Alexithymia (Time 1)	PTSD (Time 1)	.51	.08	***
Alexithymia (Time 1)	Change PTSD (Time 1-Time 3)	.02	.13	.88
Change Alexithymia (Time 1-Time 2)	Change PTSD (Time 1-Time 2)	.35	.14	**
Change Alexithymia (Time 2-Time 3)	Change PTSD (Time 2-Time 3)	.69	.10	***
Change Alexithymia (Time 1-Time 3)	Change PTSD (Time 1-Time 3)	.70	.10	***
Alexithymia (Time 1)	Dissociation (Time 1)	.08	.01	***
Alexithymia (Time 1)	Change Dissociation (Time 1-Time 3)	.02	.01	.13
Change Alexithymia (Time 1-Time 2)	Change Dissociation (Time 1-Time 2)	.04	.01	***
Change Alexithymia (Time 2-Time 3)	Change Dissociation (Time 2-Time 3)	.05	.01	***
Change Alexithymia (Time 1-Time 3)	Change Dissociation (Time 1-Time 3)	.06	.01	***
Alexithymia (Time 1)	Interp. Problems (Time 1)	.65	.10	***
Alexithymia (Time 1)	Change Interp. Problems (Time 1-Time 3)	.20	.19	.29
Change Alexithymia (Time 1-Time 2)	Change Interp. Problems (Time 1-Time 2)	.50	.18	**
Change Alexithymia (Time 2-Time 3)	Change Interp. Problems (Time 2-Time 3)	.76	.13	***
Change Alexithymia (Time 1-Time 3)	Change Interp. Problems (Time 1-Time 3)	1.14	.14	***

p* < .01. *p* < .001*Note.* Time 1 = baseline, Time 2 = post-BRG, Time 3 = post-WRAPModel 1: χ^2 (39, *N* = 164) = 58.01, *p* = .03, CFI = .97, RMSEA = .05, normed ratio = 1.49Model 2: χ^2 (39, *N* = 164) = 64.19, *p* = .02, CFI = .97, RMSEA = .05, normed ratio = 1.49*Time 1:*PTSD: R^2 = .26, Dissociation: R^2 = .41, Interpersonal Problems: R^2 = .31*Change Time 1 – Time 2:*PTSD: R^2 = .10, Dissociation: R^2 = .20, Interpersonal Problems: R^2 = .18*Change Time 2-Post WRAP:*PTSD: R^2 = .57, Dissociation: R^2 = .50, Interpersonal Problems: R^2 = .50*Change Time 1 – Time 3:*PTSD: R^2 = .63, Dissociation: R^2 = .39, Interpersonal Problems: R^2 = .65

Table 8*Intercorrelations among Alexithymia and Emotion Regulation Dimensions at Baseline*

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Nonacceptance	1								
2. Goals	.48**	1							
3. Impulse	.53**	.49**	1						
4. Aware	.36**	.07	.25**	1					
5. Strategies	.66**	.59**	.67**	.34**	1				
6. Clarity	.51**	.29**	.42**	.62**	.45**	1			
7. Identifying	.42**	.30**	.36**	.40*	.41**	.65**	1		
8. Describing	.27**	.14	.14	.50**	.25**	.57**	.51**	1	
9. Extern. Oriented	.27**	.03	.27**	.35**	.21**	.28**	.18*	.29**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 9*Factor Analysis*

Subscales	Loadings		Communality
	<i>Factor 1: Difficulty Understanding Feelings</i>	<i>Factor 2: Cognitive Self- Regulation Difficulties</i>	
Non-acceptance	-	.59	.53
Goals	-	.72	.42
Impulse	-	.77	.58
Aware	.80	-	.55
Strategies	-	.89	.79
Clarity	.78	-	.73
Identifying	.57	-	.48
Describing	.79	-	.51
Externally Oriented	.37	-	.17
	Eigenvalue	4.10	1.54
	% of Total Variance	45.59	17.11
	Total Variance		62.70%
	Intercorrelation Factor 2	.53	

Note. Loadings below .3 are not shown.

Table 10*Descriptive Statistics and Reliabilities*

Subscales	No. of items	Range	M	S.D.	α
Non-acceptance	6	6-30	19.70	6.58	.91
Goals	5	9-25	18.89	4.16	.82
Impulse	6	6-30	17.12	6.15	.90
Aware	6	6-30	18.46	5.98	.88
Strategies	8	9-40	25.67	7.31	.88
Clarity	5	7-25	15.68	4.26	.81
Identifying	5	7-35	22.42	6.26	.80
Describing	7	5-25	16.23	4.67	.72
Externally Oriented	8	8-30	19.33	5.02	.60

Table 11*Results of the Cross-Lagged Panel Mediation Analyses*

Model X → M → Y	B _{xm} (S.E.)	B _{my} (S.E.)	B _{xy} (S.E.)	B Indirect Effect (S.E.)	Indirect Effect C.I. 95% B.C.
1. TAS 1 → DERS 2 → PCL 3	.68* (.28)	-.07 (0.17)	-.15 (.19)	-.04 (.12)	[-.28, .20]
2. TAS 1 → DERS 2 → DES 3	.65* (.22)	-.01 (.01)	.04* (.02)	-.01 (.01)	[-.04, .02]
3. TAS 1 → DERS 2 → IIP 3	.67* (.23)	.15 (.15)	-.43 (.33)	.33 (.43)	[-.51, 1.17]

Note. TAS 1 = alexithymia Time 1, DERS 2 = emotion regulation difficulties Time 2, PCL 3 = PTSD Time 3, DES 3 = DES Time 3, IIP 3 = interpersonal problems Time 3, * $p < .05$

Model 1: $\chi^2(13, N = 51) = 19.65, p = .11, CFI = .98, RMSEA = .09, \text{normed ratio} = 1.51$

Model 2: $\chi^2(16, N = 51) = 28.52, p = .03, CFI = .96, RMSEA = .12, \text{normed ratio} = 1.78$

Model 3: $\chi^2(14, N = 51) = 19.14, p = .17, CFI = .98, RMSEA = .08, \text{normed ratio} = 1.37$

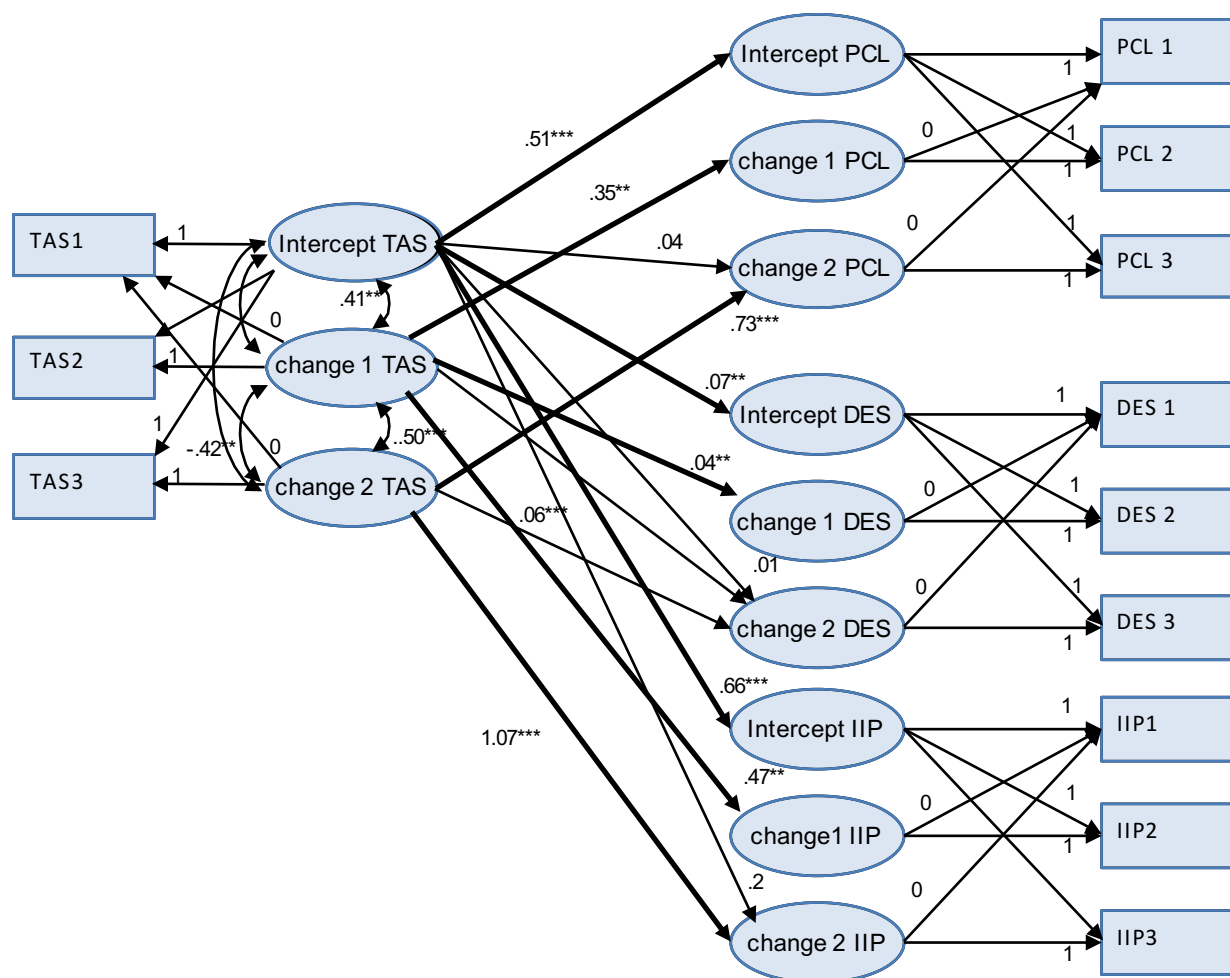


Figure 2. Relationship between alexithymia and outcome

TAS 1 = alexithymia time 1, TAS 2 = alexithymia time 2, TAS 3 = alexithymia time 3; PCL 1 = PTSD time 1, PCL 12 = PTSD time 2, PCL 3 = PTSD time 3; DES 1 = dissociation time 1, DES 2 = dissociation time 2, DES 3 = dissociation time 3; IIP 1 = interpersonal problems time 1, IIP 2 = interpersonal problems time 2, IIP 3 = interpersonal problems time 3; intercept = baseline; change 1 = time 1 to time 2; change 2 = time 1 to time 3

*Note. Arrows in bold represent significant relationships. Error terms were removed from the original model for better readability. In the full model, error terms for all intercept, slope 1, and slope 2 latent variables were set to covary.

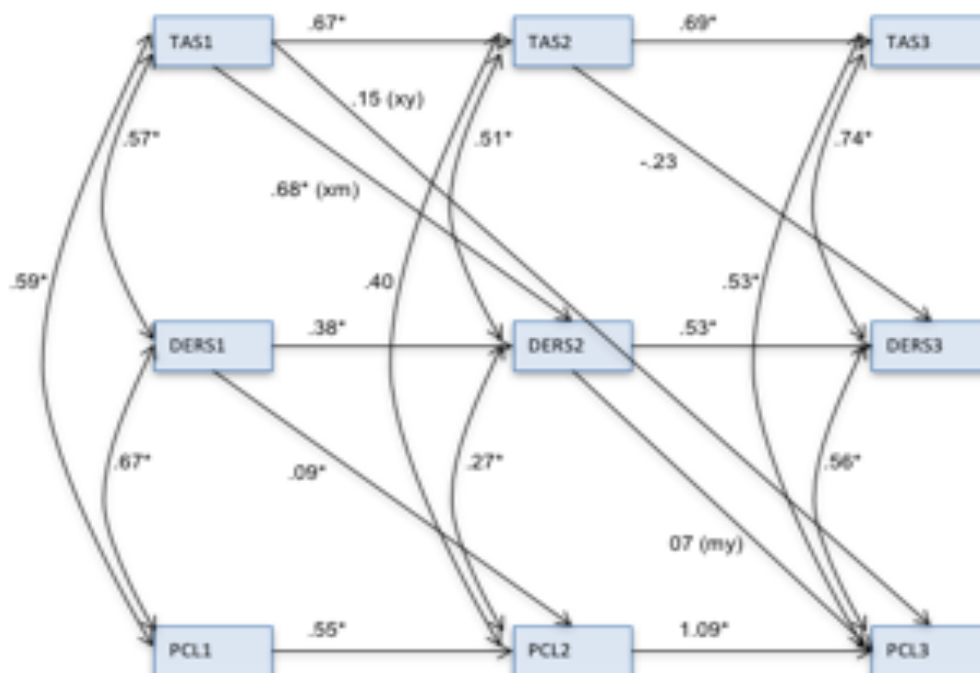


Figure 3. PTSD cross-lagged model

TAS 1 = alexithymia time 1, TAS 2 = alexithymia time 2, TAS 3 = alexithymia time 3; DERS 1 = emotion regulation difficulties time 1, DERS 2 = emotion regulation difficulties time 2, DERS 3 = emotion regulation difficulties time 3; PCL 1 = PTSD time 1, PCL 2 = PTSD time 2, PCL 3 = PTSD time 3; * $p < .05$

Note. Error terms were removed from the original model for better readability.

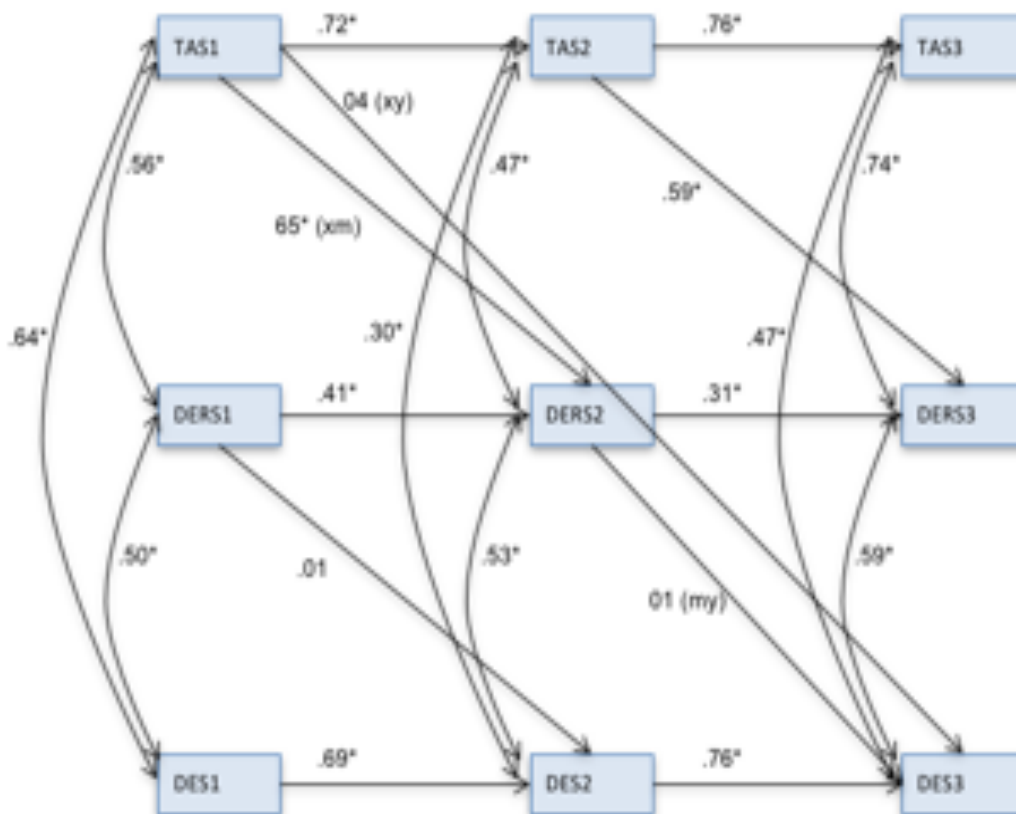


Figure 4. Dissociation cross-lagged model

TAS 1 = alexithymia time 1, TAS 2 = alexithymia time 2, TAS 3= alexithymia time 3; DERS 1 = emotion regulation difficulties time 1, DERS 2 = emotion regulation difficulties time 2, DERS 3 = emotion regulation difficulties time 3; DES 1 = dissociation time 1, DES 2= dissociation time 2, DES 3 = dissociation time 3; * $p < .05$

Note. Error terms were removed from the original model for better readability.

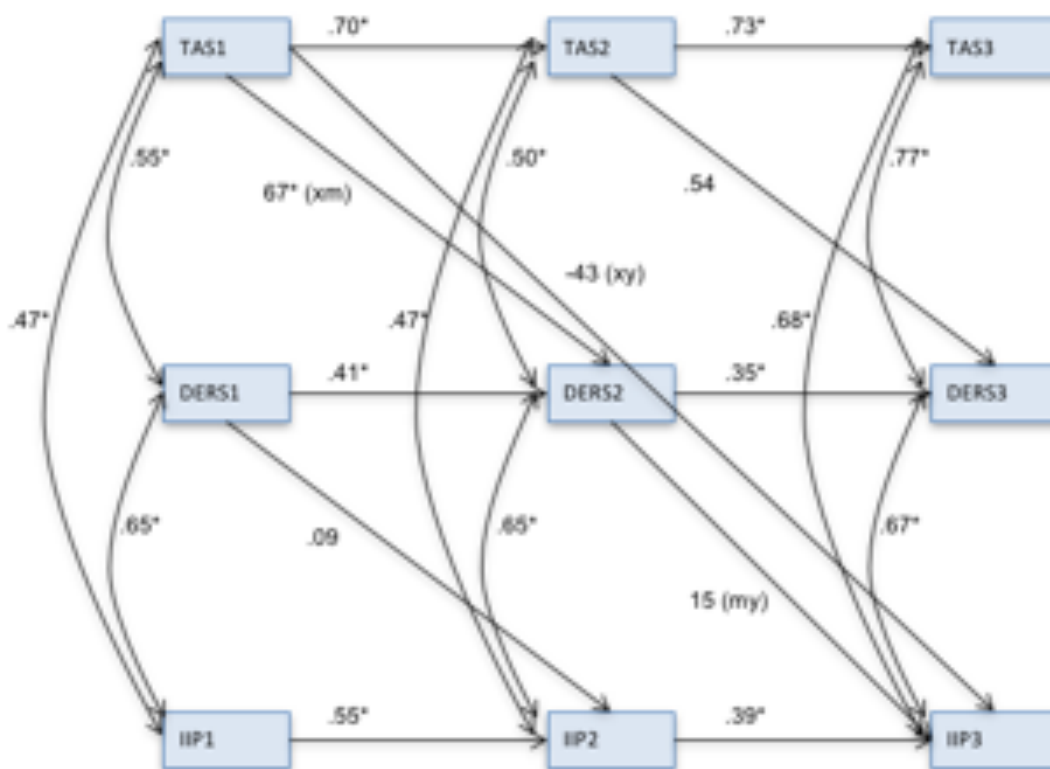


Figure 5. Interpersonal Problems cross-lagged model

TAS 1 = alexithymia time 1, TAS 2 = alexithymia time 2, TAS 3= alexithymia time 3; DERS 1 = emotion regulation difficulties time 1, DERS 2 = emotion regulation difficulties time 2, DERS 3 = emotion regulation difficulties time 3; IIP 1 = interpersonal problems 1, IIP 2= interpersonal problems time 2, IIP 3 = interpersonal problems time 3; * $p < .05$

Note. Error terms were removed from the original model for better readability.