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Alexithymia Assessed through Auditory-Affective Perception and Interpersonal Problems as Mediators of the Relationship between Trauma and Depression

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by

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ABSTRACT

Alexithymia involves difficulties identifying and describing emotions and externally-oriented thinking, and is associated with numerous psychological problems. Though commonly assessed through self-report questionnaires, the present study also used a performance-based neuropsychological measure of auditory-affective perception (AAP). Hypotheses were: (1) AAP would be associated with self-reported alexithymia, and (2) AAP, alexithymia, and interpersonal problems would mediate the relationship between trauma exposure and depression. Fifty-three undergraduate students pre-screened for trauma exposure reported above-average alexithymia and interpersonal problems, mild trauma exposure and depression, and made an average number of AAP mistakes. Regression analyses supported self-reported alexithymia as a partial mediator of the relationship between trauma exposure and depression, suggesting that depressive symptoms developed following trauma exposure are partially related to the development of alexithymic symptoms. AAP performance was not significantly correlated with the measure of alexithymia, suggesting self-reported alexithymic symptoms are independent of the ability to recognize auditorially-presented emotions; possible explanations are discussed.

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CHAPTER I

INTRODUCTION

Objectives

This study had two goals: (1) to validate an auditory-affective perception task as a measure of alexithymia, and, (2) to use this measure, along with measures of alexithymia and interpersonal problems, to test a mediational model of the relationship between trauma and depression.

Rationale

In terms of validating a measure, alexithymia currently is most commonly measured using the Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994), a self-report questionnaire in which the respondent is asked to rate statements concerning difficulties in identifying and describing their feelings. However, this mode of measurement requires valid assessment about one's own capacity to monitor and describe internal emotional experience accurately, which paradoxically requires the very trait being measured.

Researchers have created alternative methods for assessing alexithymia in efforts to avoid this problem. The Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, 1990) or the Perception of Affect Task (PAT; Lane, Quinlan, Reidel, Weldon, Kaszniak, & Schwartz, 1996), for example, requires the individual to produce or read written emotional content which is then evaluated by the researcher. However, the LEAS and PAT do not measure real-world functioning of affective labeling. A neuropsychological test may be a more valid or useful assessment of alexithymia because

it uses both a performance-based design and focuses on the underlying cognitive process in question, that is, processing affect.

Although some research has demonstrated that alexithymia is associated with impaired visual affective processing (Gilbert, 2009), there is increased empirical support for cross-modal processing as the most accurate paradigm for assessing real-world recognition of affect. Thus, it seems most informative to consider alternate modes of affective reception when conducting research on alexithymia (Maurage & Joassin, 2007). Cross-modal theory stresses that, in vivo, individuals tap both auditory and visual sources for information. Two affectively congruent stimuli presented via different modalities (e.g. visual-auditory) facilitate processing-speed and accuracy. However, if one modality is falsely processed, it leads to incongruence, which results in decreased speed and accuracy (Calvert, 2001). Visual-affective processing detriments have been demonstrated in individuals with alexithymia, but it is important to investigate other modalities as well, as multi-incongruence may further impair affective processing. Given this importance, it is surprising that there is little to no research on auditory-affective processing, even at a perceptual level, in alexithymia.

Phase one of the present study addressed this issue by investigating whether the auditory pathway and auditory affect recognition contribute to the global affective impairments characteristic of alexithymia. This is a first step toward a more comprehensive understanding of the alexithymia construct. As well, there is increasing recognition that emotional awareness and communication capacities are central to psychological well-being and effective treatment outcome, highlighted by the robust correlations that measures of emotional dysregulation (i.e. the Difficulties in Emotional

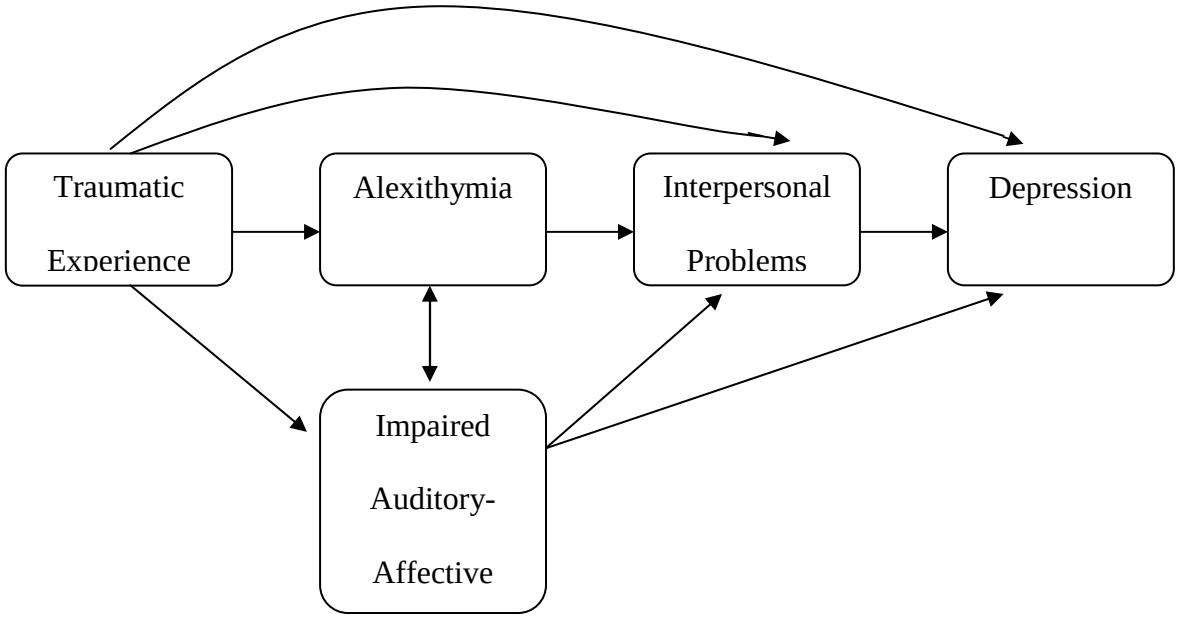
Regulation Scale; DERS; Gratz & Roemer, 2004) have with psychological disorders such as depression, anxiety, eating disorders, and drug/alcohol abuse (Gross & Munoz, 1995; Taylor, Bagby, & Parker, 1997; Weinberg & Klonsky, 2009). Thus accurate assessment of difficulties in this area can contribute to prevention and treatment of these difficulties.

In terms of testing an explanatory model, results of phase two of the study also have important implications for theory, research, and clinical practice. Understanding the factors that contribute to the relationship between trauma and depression informs prevention and treatment programs and benefits large numbers of individuals. Research indicates that prevalence rates for trauma exposure and subsequent development of disturbance in the general population are high (Foa, Keane, Friedman, & Cohen, 2009). The connection between trauma exposure and development of depression, in particular, is well-documented (Kooiman, van Rees Vellinga, Spinhoven, Draijer, Trijsburg, & Rooijmans, 2004; Wiersma, Hovens, van Oppen, Giltay, van Schaik, Beekman, et al., 2009). Moreover, depression is considered the "common cold" of psychological disorders, with some estimates of lifetime incidence of a depressive condition being as high as 20%, as well as imparting high costs both to the individual and society (Oldehinkel, Wittchen, & Schuster, 1999). The extant research also consistently has linked trauma with alexithymia (Kooiman et al., 2004; Wiersma, et al., 2009), alexithymia with interpersonal problems, and interpersonal problems with depression (Bermond, Vorst, & Vingerhoets, 1999; Dobkin, Panzarella, Alloy, Cascardi, Truesdell, & Gara, 2007). However, to date, no studies have tested a comprehensive model of the relationships among these variables. The present study tested such a model in a sample of undergraduates with a self-reported history of exposure to trauma (see Figure 1). The

present study therefore was a first step in understanding one pathway to depression and results potentially will generate hypotheses for testing in future research.

The following literature review focuses first on the assessment of alexithymia. This is followed by a review of the literature on the primary constructs in the proposed model and the relations among them.

Figure 1. Model for the link between Alexithymia and Depression in a Traumatized Sample



CHAPTER II

REVIEW OF LITERATURE

Assessment of Alexithymia

The concept of alexithymia developed from clinical observation that some patients demonstrated difficulties with symbolic and verbal labeling and expression of emotion (Ruesch, 1948). Empirical studies supported this observation, with psychosomatic patients being found to have limited emotional functioning and an impaired ability to verbally describe emotions (Sifneos, 1973). Recently, Sifneos (2002) has elaborated on this concept, stating, "[a]lexithymia, a term I introduced for better or worse in 1972, involves a marked difficulty to use appropriate language to express and describe feelings and to differentiate them from bodily sensations, a striking paucity of fantasies and a utilitarian way of thinking" (p. 265).

Another group of researchers proposed characterizing alexithymia as a personality construct where an individual has 1) difficulty identifying and communicating their feelings, 2) deficits in mental symbolism, that is, limited imagination, 3) a reduced ability to differentiate between bodily sensations and affective ones and 4) a proclivity to avoid focusing on internal experiences, favoring external events (Taylor, Doody, & Newman, 1981). This definition is favoured by most current research in the area (see: Bagby, Ouiltv, Taylor, Grabe, Luminet, Verissimo, et al., 2009; Meganck, Vanheule, Desmet, & Inslegers, 2010).

From a neuropsychological perspective, impaired cognitive processes occur in individuals diagnosed with alexithymia. These individuals may have difficulty with the actual sensorial perception of affective verbal cues, they may demonstrate a dysfunctional

linguistic-labeling process or affective-lexicon that is preventing them from correctly identifying perceived emotions, or they may have impaired integration of these cues with other emotion-related processes; most likely it is not just one of these difficulties, perhaps even others.

Since the mid 1970's, when the alexithymia construct first appeared in the literature, there has been debate about the development of alexithymic measures (Nemiah, 1977). Early scales, like the MMPI Alexithymia Scale were considered instruments to identify the pervasive personality traits associated with alexithymia (Kleiger & Kinsman, 1980). Research results indicated that this scale lacked internal consistency, possessed a social-desirability bias, and related poorly to other alexithymia constructs; thus the scale has largely fallen out of favor (Bagby, Parker, & Taylor, 1991).

Another mode of measuring alexithymia is through observation. The Beth Israel Hospital Psychosomatic Questionnaire (BIQ; Sifneo, 1973) consists of 17 absent-present items, with 8 of them identified as key to alexithymic characteristics. A clinician completes this questionnaire after interviewing a patient, deciding on whether the patient demonstrated behaviours such as difficulty expressing how they are feeling. The forced-choice aspect of the measure, as well as the arbitrary cut-off of 6 out of 8 endorsed, lead to initial critiques about its stability in factor analysis (Taylor & Bagby, 1988). The BIQ also is time consuming and falls prey to observer-bias (Kleiger & Kinsman, 1980). Although the BIQ converges with self-reports measured on the TAS-20, there is less support for its inter-rater reliability. This is thought to be due to the unstructured interview administration format (Taylor, Bagby, & Luminet, 2000).

Other measures of alexithymia include the Levels of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, & Walker, 1990) and the Perception of Affect Task (PAT; Lane, Sechrest, Reidel, Weldon, Kaszniak, & Schwartz, 1996). The LEAS measures a patient's ability to write descriptions of how they might feel, and how another person might feel in a presented situation. The PAT uses a variety of verbal and nonverbal stimuli presented on paper (i.e. words and images) to measure a patient's ability to correctly match emotionally-charged sentences with emotively-expressive faces or words. Both of these measures require individuals to use visual and lexical systems to assess the stimuli, and then access their semantic knowledge to make a decision on what emotion should be elicited. Individuals are conscious of these processes during testing.

The most commonly used means of assessing alexithymia is the Toronto Alexithymia Scale-20 (TAS-20; Bagby et al., 1994). The obvious reasons for this mode's popularity is the simplicity and speed it affords, and the construct validity of the scales which align with current clinical theory about alexithymia. The TAS consists of twenty-items, which load onto 3 factors: difficulty identifying feelings and distinguishing them from body-sensations, difficulty describing feelings to others, and externally-oriented thinking.

However, a critical literature review of the TAS-20 (Kooiman, Spinhoven, & Trijsburg, 2001) offered mixed results concerning its psychometric properties, prompting the reviewers to conduct their own study of the TAS-20 in both clinical and non-clinical populations. Results of the Kooiman et al. study indicated that two of the dimensions (describing feelings and identifying feelings) had variable, but adequate, reliability and validity. However, one dimension (externally oriented thinking) appeared not to have

adequate reliability. Additionally, most of the studies on the TAS-20 used non-patient samples. This led these authors to suggest that although it is currently appropriate for research, more studies must be conducted on patients for its clinical assessment value to be acceptable.

Currently, there is little research on neuropsychological measures of alexithymia. As discussed above, from a neuropsychological perspective, alexithymia represents impairments in one or more cognitive and affective processes, most likely an interaction between impairment in the two (Bermond, Bierman, Cladder, Moormann, &Vorst, 2010). Some interesting findings have emerged regarding alexithymia and neural functioning as well. Studies have demonstrated that individuals without symptoms of alexithymia, as measured on the TAS-20, are more efficient at transferring information between the cerebral hemispheres than individuals with these symptoms. These inter-hemispheric transfer deficits suggest that the cognitive style associated with alexithymia reflects poor integration of the information processed in the two cerebral hemispheres (Parker, Keightley, Smith, & Taylor, 1999). Therefore, it is possible that the emotional information processed in the right-hemisphere may not easily cross to the left-hemisphere, for subsequent labeling and verbal expression. In the area of trauma, which is associated with alexithymia, it similarly has been suggested that disturbance is partly a result of inadequate left-hemisphere (verbal) processing (e.g., van der Kolk, McFarlane, & Weisaeth, 1996) and that successful treatments require integration of these two systems (i.e. experiential memory and the verbal/logical system). Additionally, event-related P300's (signals that are indicative of response to a stimulus) measured after affective auditory stimuli suggest slower and incomplete cognitive processing in those

scoring high in alexithymia, measured with a Chinese version of the TAS-20 (Xiong-Zhau, 2006).

Not only do individuals diagnosed with alexithymia have impaired processing-speed when it comes to emotional stimuli, but when they do label visual-affective stimuli, they often display poor performance. For example, when under time-constraints (mirroring real-life), these individual show impairments in rating negative facial expressions, and differentiating between nine visually-presented emotions (Parker, Prkachin, K., & Prkachin, G., 2005; Parker, Taylor, & Bagby 1993). Furthermore, individuals who met criteria for alexithymia on the TAS-20 demonstrated poor ability to identify and correctly label the extent of sadness, anger, and fear in facial expressions (Prkachin, G., Casey, & Prkachin, K., 2009). This suggests that alexithymia also impairs the ability to judge others' emotional visual-cues.

While visual perception and processing of affective stimuli in alexithymia has been studied, auditory perception and processing has been largely ignored. This is important for two reasons. First, we interact largely through conversation laden with peri-verbal (i.e. tone, inflection, etc.) cues and second, research has demonstrated that affect is processed cross-modally (i.e. the integration of multiple senses). Studies using functional neuro-imaging techniques found that high alexithymia on the TAS-20 was associated with reduced reactivity of the amygdala and visual occipito-temporal areas, using a masked-faces paradigm. This suggests that there is less automatic engagement of emotional visual stimuli, reducing affective-coding of the information. Additionally, low spontaneous insular activity might suggest difficulty in identifying and then differentiating one's emotions after encountering affective-visual stimuli (Reker,

Ohrmann, Rauch, Kugel, Bauer, Dannlowski, et al., 2010). Other research also supports the view that alexithymia is a bottom-up process as opposed to the currently popular top-down model; that is, alexithymia is not so much due to difficulty in appraisal as it is impaired generation of a neurophysiologic response to emotive stimuli (Gilbert, 2009).

Research has demonstrated that cross-modal interactions influence judgments about affective stimuli. That is, when we process emotion when interacting with others, we integrate information received by visually observing the face and body, as well as listening to the tone and affective-features of the voice (De Gelder & Vroomen, 1995). Vroomen and De Gelder (2000) conducted multiple experiments and, from the results, postulated the existence of, "mandatory bidirectional links between affect detection structures in vision and audition" (p. 1588). In other words, the emotional information received from another person's voice can influence how we perceive the emotional information received from his/her face and body, and vice versa. In one experiment, Vroomen and De Gelder found that healthy individuals judging the expression of a face, that was constructed by integrating pictures of a happy and fearful face along a happy-fearful continuum, were biased in the direction of the affective tone of a voice presented concurrently (fearful versus happy). For example, the face was rated as happy more often if the tone of voice was happy, regardless of where it was on the happy-fearful continuum. This bias persisted even when participants were then asked to focus exclusively on the face, and to ignore the voice completely. The same researchers then demonstrated that this effect can be reversed, using a set of facial expressions (either fearful or happy) and an emotional tone-continuum of melded fearful-happy voices. This cross-modal influence was found even when individuals were instructed to disregard the

face and focus on the voice (Vroomen & De Gelder, 2000; Massaro & Egan, 1996). The fact that this bias was reported even after participants were told to disregard one modality (faces or voices) suggests that affective cross-modal integration takes place at an automated level, and is not under voluntary control.

Effective auditory communication, whether remotely over telephone or in person, relies heavily on accurate judgment regarding the tone another individual is using. The Emotional Perception Test (EPT; Green, 1986) was devised as a method of measuring perception of auditory emotion in the clinical field, after this cognitive process was shown to reliably identify right temporal and right parietal lobe lesions (Bryden & Ley, 1983). The EPT consists of a professional actress speaking three sentences in five distinct emotions. The five emotions are: happy, angry, frightened, sad, and neutral (an absence of emotion) – ordered here from most difficult to easiest to discriminate based on data from healthy adults. These 15 sentences are each repeated three times, resulting in a 45 item test. Participants are required to listen to each sentence, and then within a time limit (4 seconds) pick the emotional label they feel best describes the tone of voice in the previous sentence.

The EPT has demonstrated good external validity with individuals diagnosed with a psychiatric disorder. For example, in a study of 41 healthy individuals and 34 psychiatric patients, the patient sample made nearly twice as many errors as the healthy group (Severson, 1988). Other research has shown that the ability to distinguish vocal expression of different emotions correlates highly with the ability to distinguish emotions in other modalities (e.g. visual presentations like faces), as well as with the capacity to express emotions (Nash, 1974; Borod, 2000). This suggests that the EPT, which measures

auditory perception of emotion, is an ideal performance-based neuropsychological measure of difficulties in this area (alexithymia). Furthermore, Green (1986), the creator of the EPT, points out that neuropsychological measures are rarely directly related to interpersonal skills, and that the EPT might be unique in that aspect due to the impact that impaired auditory-affective processing has on relational problems, and the effectiveness of psychotherapy.

The following sections focus on the second goal of the present study (i.e., to test a model of depression) and review the literature on the major constructs in the proposed model and links among them, beginning with the literature on trauma and depression.

Definitions of Trauma and Depression

Before presenting the links among variables, it is important to understand what is meant by trauma and depression and how these constructs are defined in the current study.

Trauma. The Diagnostic and Statistical Manual-IV defines trauma according to two criteria: (A1) the event involved actual or threatened serious injury, death, or a threat to the physical integrity of the self or others, and (A2) the individual experienced fear, helplessness, or horror (APA, 1994). A review of current literature more broadly defines trauma to include events that may not meet criterion A1, such as emotional neglect, psychological and sexual abuse, as well as sudden loss of a loved one through death, divorce, or separation (Briere & Scott, 2006; Wiersma et al., 2009). Thus different forms of childhood maltreatment are considered traumatic experiences. The Center for Disease Control states that childhood maltreatment is the "commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child,"

including, “neglect, physical abuse, psychological/emotional abuse, and sexual abuse” (CDC, 2008). Exposure to trauma in childhood increases the risk of subsequent exposure and repeated exposure increases the risk of adverse effects (Briere & Scott, 2006; Courtois & Ford, 2009).

Researchers estimate that at least 50% of adults in the United States have been exposed to a major traumatic event that causes significant stress, and another study found that 76% of Canadians report exposure to at least one event sufficient enough to cause PTSD (Elliott, 1997; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Van Ameringen, Mancini, Patterson, & Bolve, 2008). Between 13-30% of adults experience a large-scale natural disaster (i.e. Hurricane Katrina hitting the American Gulf Coast or Hurricane Juan making landfall in Nova Scotia), the rise in popularity of terrorist attacks has led to a dramatic rise in exposure to mass interpersonal violence (Briere & Elliott, 2000; Briere & Scott, 2006). Fires and motor vehicle accidents not only are traumatic events in and of themselves but when physical injuries occur, the effects are multiplied (Gilboa, Friedman, Tsur, & Fauerbach, 1994). Sexual assault prevalence statistics are estimated to lie between 14-20% of women and 2-4% of men (Tjaden & Thoennes, 2000). A quarter of those in the United States who lived with a partner reported a physical altercation, with almost half of this group describing the event as severe (Straus & Gelles, 1990). Men and women report a history of physical abuse in the range of 10-20%, while 10-20% of men and 20-35% of women report a history of sexual abuse as a child (Briere & Elliott, 2003; Finkelhor, Hotaling, Lewis, & Smith, 1990).

Histories of trauma and childhood abuse and neglect have been associated with a constellation of long-term effects that include affect regulation difficulties (including

alexithymia), interpersonal problems, and symptoms distress, particularly PTSD and depression.

PTSD symptom clusters include intrusive thoughts, feelings, and memories of the trauma, emotional numbing and avoidance of reminders of the trauma, and hyper-arousal (DSM-IV-TR). Trauma severe enough to cause PTSD also frequently produces clinically significant depression (Kessler et al., 1995). Additionally, there is significant overlap between these disorders such as: stress, grief, loss, isolation, abandonment and depression. Further cognitive deficits such as psychomotor agitation, inability to concentrate, loss of interest, and sleep disturbances are common in both disorders as well (Briere & Scott, 2006).

Depression. The DSM-IV-TR characterizes a major depressive episode as the presence of a severely depressed mood for at least 2 weeks. This should include five of the following: the depressed mood being most of the day, nearly every day; markedly reduced interest or pleasure in most or all activities. Depressive symptoms include a loss of pleasure in all or most of activities, worsening of mood in the morning, psychomotor agitation/retardation, excessive weight loss/gain, excessive guilt, excessive sleep/insomnia, significant social impairment, and catatonia or the feeling of heavy limbs, fatigue; feelings of worthlessness/guilt; difficulty concentrating and making decisions; suicidal ideation and thoughts of death. As mentioned previously, the lifetime prevalence of a depressive disorder is extremely high, making depression one of the most commonly occurring mental health issues. Partially due to the high prevalence, but also due to the internalizing symptoms found in depressive symptoms, depression has a high cost for the

individual (i.e. withdrawing from the community, suicide), as well as society at large (i.e. absences from work, mental health services).

Trauma is Associated with Depression

There are a number of explanations for the relationship between trauma and depression.

Trauma, by definition, involves feelings of profound powerlessness, helplessness, and loss of control and symptoms of PTSD, outlined above, include numbing of affect, feelings of alienation and isolation, grief and loss, and suicidal ideation. These features and symptoms of unresolved trauma overlap with the features and symptoms of depression. In terms of traumatic experiences during childhood (e.g., abuse or loss), these have been associated with anxious and depressive symptoms later in life (Heim, Newport, Mletzko, Miller, & Nemeroff, 2008). Sklarew and Blum (2006) postulate that when a child is brought up in an abusive household or experiences loss of an attachment figure, he or she loses the sense of control, constancy, and security in their life, and develops a sense helplessness. These experiences can result in a vulnerability to depression later on in life, especially during times of stress when early memories are reactivated.

There is no shortage of research supporting the link between trauma exposure and depression. For example, studies have found that severity of both PTSD and MDD symptoms are related to the severity of trauma one experiences (particularly interpersonal violence), irrespective of age at time of experience (Gillespie, Bradley, Mercer, Smith, Conneely, Gapen et al., 2009). Additionally, PTSD is highly comorbid with the lifetime development of another psychological disorder with a majority of those diagnosed with PTSD going on to develop a dual diagnosis. In a national survey designed to identify the

lifetime mental health progression after PTSD diagnosis, depression was the most common disorder developed in an adult sample of 5,877 participants (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Moreover, a review of six potential determinants for depression found that traumatic experiences throughout life have a dose-response relationship with the intensity of depressive symptoms later in life (Riso, Miyatake, & Thase, 2002). A longitudinal study of 1230 healthy controls and individuals diagnosed with MDD who had a history of childhood trauma found trauma (both number of events and intensity), to be associated with increased risk of MDD occurring in adulthood, and increased chronicity of MDD episodes (Wiersma et al., 2009).

From a neurobiological perspective, trauma has been associated with chronic hyper-activation of the hypothalamic-pituitary-adrenal axis, which was also found to increase mood disorders (Heim, Newport, Mletzko, Miller, & Nemeroff, 2008). The study found that childhood trauma, in particular, was associated with a unique neurobiological profile of MDD in adult men that was different than non-trauma MDD. Specifically, results indicated an increased activation of the HPA, which has been associated with a persistent and chronic profile of depression.

Trauma is Associated with Alexithymia

The following sections outline the theoretical and empirical literature linking trauma exposure to difficulties identifying and articulating affective experience.

Trauma responses are characterized by affect regulation difficulties, including alexithymia (defined in earlier section). Generally, alexithymia is a deficiency in the ability to understand, process, or describe feelings, and an externally orientated cognitive style with limited attention to inner thoughts and fantasies (Taylor et al., 1997). In social

relationships, individuals high in alexithymia have difficulties identifying and communicating the emotional aspects of interaction, so they may appear cold and superficial. Taylor et al. view alexithymia as a stable personality trait and a predisposing risk factor for a variety of psychiatric disorders although more recent studies indicate that severity can change over the course of trauma therapy (Kubany & Ralston, 2006).

In terms of the link between trauma and alexithymia, traumatic experiences, by definition, are beyond normal experience and disrupt meaning construction and narrative processes. People cannot make sense of, and lack the vocabulary to, articulate and make sense of traumatic experiences, including the powerful and sometimes overwhelming feelings involved – thus unresolved trauma at any age can be associated with alexithymia (no words for feelings) (Paivio & Pascual-Leone, 2010). The link between repeated exposure to trauma in childhood (i.e. physical and sexual abuse) and alexithymia as a personality trait is even stronger. Childhood maltreatment likely leads to affect dysregulation because of the vulnerable developmental stage of the victim, plus the excessive stimulation of the CNS kindles ongoing neural circuits of affect arousal that are difficult to dampen (Krystal, H. & Krystal, J., 1988). In abusive and neglectful environments children not only experience intense negative emotions but also do not receive adequate support and "emotion coaching" to manage, articulate, and make sense of these experiences (Gottman, Katz, & Hooven, 1997). Thus individuals with histories of childhood abuse are likely to have more longstanding difficulties with affect regulation compared to those without such histories (van der Kolk et al., 1996) and learn to rely on avoidance of internal experience as a coping strategy. Lack of appropriate emotion coaching to identify, accurately label, and understand feelings, coupled with reliance on

avoidance of internal experience, together, interfere with emotional awareness and communication capacities, and thereby contribute to alexithymia.

Research supports the link between trauma history and alexithymia which, in turn, has been related to the presence of poor interpersonal skills and depression. Affect disruption due to childhood trauma was found to predict mood pathology and alexithymic symptoms later in life, though optimal parenting style was found to be a buffer (Kooiman et al., 2004). In a different study, alexithymia made a unique and independent contribution ($r = .37$; $\beta = .14$, $B = .23$, $SE\ B = .06$) to the post-traumatic stress symptoms of 677 adults who required psychiatric or medical hospitalization (Zahradnik, Stewart, Marshall, Schell, & Jaycox, 2009). Another study found that the degree of alexithymia found in a post-9/11 sample of 65 adults, was partially dependent on their vicinity and exposure to ground zero, although even those who did not have to evacuate their buildings showed features of alexithymia (Streich, 2008). Finally, impaired self-reference and dissociation are frequently observed post-trauma personality styles, with both styles correlating with difficulties identifying and communicating feelings, that is, with alexithymia (Clark-Knauft, 2001).

In terms of trauma in childhood, physical and sexual abuse is highly correlated with alexithymia later in life (Kooiman et al., 2004). One-hundred and thirty seven adults were assessed for alexithymic symptoms and a history of sexual abuse, the group ($n = 69$) that had a history of sexual abuse scored roughly 10 points higher on the TAS-20; this was, a significant difference (Scher & Twaite, 1999) Another study of 60 adults with and without a history of abuse found that those who reported childhood abuse had significantly higher self-reported symptoms of alexithymia measured on the TAS-20

(Berenbaum, 1996). A study of 363 undergraduate students similarly found that impoverished childhood family environments (diminished family expressiveness and less emotional safety during childhood) were associated with alexithymia in adulthood (Berenbaum & James 1994). This finding was supported by results from another study of 92 undergraduates in which low expressiveness in the family environment was the best predictor of TAS-20 scores (Kench & Irwin, 2000). Additionally, a study of 380 adults found that lower sociodemographic status predicted alexithymic symptoms measured on the LEAS (Lane, Sechrest & Riedel 1998). Furthermore, the type of trauma does not necessarily have to be abusive. One study of 252 treatment-seeking, outpatient-adults found that both emotional and physical neglect in childhood was positively associated with alexithymia (Zlotnick, Mattia, & Zimmerman, 2001).

Trauma is Associated with Interpersonal Problems

There is abundant literature to suggest that the majority of traumatic experiences and their effects are interpersonal in nature. The following sections review this literature.

Interpersonal behaviour has been identified both clinically and theoretically as a critical component of personality, both healthy and disordered (Benjamin, 1996; Pincus & Ansell, 2003). These skills are thought to encompass the degree to which an individual can successfully navigate the range of social situations experienced in day-to-day life. The assessment of interpersonal problems in those who may have psychological disorders is valuable for many reasons. First, psychopathology has been thought to socially express itself via impaired interpersonal skills (Benjamin, 2003). Additionally, psychological disorders like depression are thought to result, in part, from interpersonal difficulties (Joiner, 2002). Furthermore, it is important to consider the presence and role of interpersonal characteristics, as they are associated with therapeutic outcome. For example, a National Institute of Mental Health study found that interpersonal styles

such as perfectionism and coolness toward the therapist were associated with worse treatment outcome (Blatt, Zuroff, Quinlan, & Pilkonis, 1996).

Many traumatic experiences are interpersonal in nature, involving betrayals of trust and shattered assumptions about the benevolence of others. As a result, interpersonal trauma frequently negatively affects the victim's capacity for relatedness. For example, PTSD symptoms include feelings of alienation and isolation and feelings that others could not understand one's experience, and depression includes alienation and social withdrawal. Childhood maltreatment, in particular, frequently involves disruptions in attachment relationships and these have an impact on relationships later in life. According to attachment theory (Bowlby, 1988) negative experiences with attachment figures are encoded in memory and serve as enduring prototypes that influence expectations of others in adult intimate relationships.

Results of research support the link between trauma exposure and self-reported interpersonal problems, including aggression towards others, depressed mood, and apathy (Scarpa, 2003). In a review of outcomes, Schäfer, Ross, and Read (2008) found that childhood trauma also results in maladaptive interpersonal behaviours such as increased likelihood of using drugs, being involved with gangs/crimes, and develop psychiatric disorders. Another study of 326 undergrads found that the incidence of trauma exposure during childhood was associated with significantly more interpersonal problems and social withdrawal (Blumenthal, Neemann, & Murphy, 1998). Studies also have demonstrated that childhood trauma shapes how individuals relate to each other in times of need, as well as how they react to support offered by others. A history of childhood trauma is also associated with insecure and fearful attachment styles in adulthood, which is associated with interpersonal problems such as difficulty trusting partners, and personal distress (Waldinger, Schulz, Barsky, & Ahern, 2006).

Alexithymia is Associated with Interpersonal Problems

The following sections review the theoretical and empirical literature linking difficulties with affective awareness and communication (alexithymia) with interpersonal difficulties.

There is increasing recognition that "emotional intelligence" is crucial to healthy psychological functioning, particularly to healthy interpersonal functioning through appropriate management of emotions (Tarasuik, Ciorciari, & Stough, 2009). Efficient decoding of emotions is a crucial ability required to develop and maintain satisfactory interpersonal relations (Feldman & Rimé, 1991). Deficits in emotional perception are thought to make it difficult to negotiate the socio-emotional world, potentially leading to stress and conflict (Prkachin, 2009). Expressive and receptive communication is mediated by affective prosody and tone, which impacts individuals' interpersonal relationships with friends and family, and influences their self-appraisals of social support (Cummings, 2007). Some researchers have suggested that the cold and socially avoidant behaviours characteristic of individuals with alexithymia reflect their difficulties interacting with others on an emotional level which, in turn, perpetuates difficulties in social interactions (Spitzer, Siebel-Jürges, Barnow, Grabe, & Freyberger, 2005).

Research conducted on a group of 887 undergraduates and split into 3 studies to ensure replicability supports the link between alexithymia and interpersonal problems, including reduced social support and social avoidance (Lumley, Ovies, Stettner, Wehmer, & Lakey, 1996; Bermond et al., 1999). One of the Lumley et al. studies found that alexithymia partially mediated the relationship between trauma and social anxiety and limited social support. Finally, research is mixed as to whether alexithymia involves a

less complex vocabulary for verbal communication or some other problem. For example, Le (2008) analyzed undergraduate written trauma narratives and found that alexithymia was associated with more complex meaning construction processes rather than use of emotion words (emotion vocabulary), per se. A different study analyzed the transcribed clinical interviews conducted on an in-patient population (n = 50) and found alexithymia related to less use of complex vocabulary for communication words (Meganck, Vanheule, Inslegers, & Desmet, 2009). It also is possible that vocabulary is adequate but interpersonal problems are due to impaired auditory-affective processing.

Alexithymia is Associated with Depression

Although there is abundant literature (see Taylor et al., 1997) linking alexithymia with a number of psychological disturbances, including depression, little attention has been paid to possible explanations for this relationship. One study of 146 participants found that alexithymia (assessed on the TAS-20) and depression (assessed on the BDI-II) measured at baseline and at 6 month follow-up were correlated (Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000). Additionally, depressive personality traits were found to correlate with alexithymic symptoms assessed on the Amsterdam Alexithymic Scale (Bermond et al., 1999).

It has been suggested that rather than a causal relationship existing between childhood abuse and alexithymia, alexithymia could mediate, the associations between a history of childhood abuse and psychiatric symptoms, such as depression, in adulthood (Mazzeo & Espelage, 2002). Difficulties with emotional intimacy that are associated with alexithymia, could generate a positive feed-back cycle whereby the individual is deprived of social support which leads to and/or exacerbates depression. One study,

described earlier, found that psychiatric patients diagnosed with alexithymia suffered more often from depression than other patients and that the features of alexithymia among these patients changed as a function of changes in depression (Honkalampi, Hintikka, Antikainen, Lehtonen, & Viinamäki, 2001). Although no directional conclusions can be made, this suggests that alexithymia and depression may be dependent on one another.

Interpersonal Problems are Associated with Depression

Interpersonal problems and skills are intrinsic to depression. Relational problems are observed in those diagnosed with depression, and interpersonal skills are important in preventing and treating depression. Convergence across theories (e.g., Blatt, 2004; Hayes & Newman, 1993; Greenberg, 1984, 1992; Steer, Ball, Ranieri, & Beck, 1999) suggests two types of depression – intra-personal that is generated by failure and self-critical processes, and interpersonal that is generated by perceived rejection, isolation, and loss. The interpersonal-cognitive model of depression is a widely accepted description of the development of depressive symptoms (Dobkin, Panzarella, Alloy, Cascardi, Truesdell, & Gara, 2007). Interpersonal Psychotherapy (IPT; Klerman, 1989) is a short-term approach based on the view that psychological disorders are often secondary to or caused by social/interpersonal problems. IPT initially was developed to deal with depression stemming from bereavement, grief, and mourning; life events, and stress. Intervention focuses on the immediate interpersonal behavioral changes that can be made to improve interpersonal relations and relieve psychological disturbance (McCray & King, 2003).

Interpersonal problems are associated with a variety of psychological disturbances, including depression. For example, a longitudinal study of a cohort of 1,037

children found that parental-reports of children's interpersonal problems was a predictor for later psychiatric diagnoses of mania, non-psychotic anxiety and depressive disorders (Cannon, Caspi, Moffit, Harrington, Taylor, Murray, et al., 2002). Barrett and Barber (2007) found that MDD was associated with more interpersonal problems and patients were more distressed by these problems than a control group. Moreover, these researchers found that the group of individuals diagnosed both with MDD as well as Depressive Personality Disorder reported the most and the most severe distress from interpersonal sources. Another study found that severity of depression was related to self-reported interpersonal problems and that interpersonal distress decreased along with depressive symptoms following psychotherapy (Vittengl, Clark, & Jarrett, 2003). Research also has demonstrated that poor interpersonal problem-solving ability was correlated with depression-proneness (Zemore & Dell, 1983).

Finally, abundant research supports the efficacy of IPT for depression, thus providing support for the underlying theoretical model. These successes have been found in clinical trials as varied as rural Uganda to urban New York City, with specific success in depressive disorders (Clougherty, Verdeli, Mufson, & Young, 2006; Mulcahy, Reay, Wilkinson, & Owen, 2010; Weissman, 2007). IPT has been found to reduce the interpersonal problems associated with grief, loss, role disputes and role changes or transitions. It has also been shown to be an effective depression relapse-prevention therapy (O'Hara, Schiller, & Stuart, 2010). A recent variation of IPT developed for childhood sexual abuse survivors was effective in reducing depression in a sample of female outpatients, thus providing further support for the theory underlying the treatment model (Talbot & Gamble, 2008).

The Proposed Model of Depression

In sum, the above review of the literature suggests a chain of associations between trauma, alexithymia, interpersonal problems, and depression. Traumatic experiences are emotionally overwhelming and painful, and difficult to make sense of and articulate. Without adequate support and emotion coaching individuals learn to rely on avoidance of internal experience as a coping strategy. Although effective as an emotion regulation strategy in the short-term, chronic avoidance of internal experience interferes with emotional awareness and communication capacities. Deficits in emotional awareness and communication (alexithymia) interfere with the capacity for intimacy and interpersonal relatedness and the resulting loneliness and social isolation, in turn, contribute to depression. Although research supports associations among these individual factors, to date, no study has tested such a comprehensive theory of the relationship between trauma and depression. Moreover, no study has examined the contributions of alexithymia to this relationship using a neuropsychological performance-based measure of the alexithymia construct.

The Present Study

The present study was organized in two phases that focused first on validating a performance-based measure of alexithymia and next on using the measure, and questionnaires for alexithymia and interpersonal problems, to test the proposed model.

Although there are self-report and rater-scored measures for alexithymia, and there is research implicating impaired affective processing at some level in this disorder, no performance based test of auditory-affective processing has previously been validated for measuring alexithymia. Phase one of the present study predicted that the level of

auditory-affective perception impairment (measured on the EPT) would be significantly correlated with self-reported alexithymia (on the TAS-20). Positive findings would support the validity of the EPT and its subsequent use as a measure of alexithymia in the second part of the study.

Exposure to trauma in childhood and later in life consistently has been associated with a constellation of disturbances, including alexithymia, interpersonal problems, and depression. However, previous to the present study, the chain of associations described above has not been examined empirically. The second phase of the present study tested the mediational model presented in Figure 1. Full mediation was analyzed using Baron and Kenny's (1986) revised conditions (Kenny, Kashy, Bolger, 1998). Accordingly, all variables in the proposed model needed to be significantly associated with each other and the association between predictor and dependent variables no longer significant once the proposed mediators were entered into the equation. Thus the mediators would account for the association. The following hypotheses were tested, whether: (1) the extent of trauma was positively associated with the level of depression, (2) trauma was positively associated with severity of auditory-affective perception, alexithymia and interpersonal problems, (3) auditory-affective perception, alexithymia and interpersonal problems were positively associated with each other, (4) auditory-affective perception, alexithymia and interpersonal problems were positively associated with depression, and (5) auditory-affective perception, alexithymia and interpersonal problems mediated the relationship between trauma and depression. The study also examined the relative contributions of self-reported and performance-based alexithymia, as well as interpersonal problems to the relationship between trauma exposure and depression.

CHAPTER III

DESIGN AND METHODOLOGY

Participants

Undergraduate students from the University of Windsor registered in first-year psychology courses participated in this study, see below for specific demographics. Participants were offered bonus points toward their final mark in the course in exchange for participation. This study was approved by the REB of the University of Windsor.

Measures

Demographic Questionnaire. A questionnaire inquiring about participant age, education, ethnicity, time in Canada, sexual orientation, veteran status, disability status, and dominant hand was used to provide potential covariate information (see Appendix A).

Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item self-report inventory, designed to measure childhood/adolescent neglect and abuse (see Appendix B). Questions are answered using a 5-point Likert scale (Never True to Very Often True). This produces a score that is classified as ranging from "None" to "Extreme." Good internal reliability has been demonstrated for the sub-scales of the CTQ: Emotional Abuse (alphas = .84 to .94), Physical Abuse (alphas = .78 to .92), Sexual Abuse (alphas = .72 to .96), Emotional Neglect (alphas = .81 to .93), Physical Neglect (alphas = .60 to .83). A Minimization/Denial of Abuse scale is also included, to check for response bias. Retest validity alpha's ranged from .79 to .86, after a mean test interval of 3.6 months (*SD* = 1.0). While past measures of childhood trauma focused only on a limited area of maltreatment and/or abuse, the authors of the CTQ incorporated a broader range of content in order to provide a more comprehensive measure of childhood

trauma. A confirmatory factor analysis conducted by the authors found the 5 factor structure was a good fit across a non-clinical, and two clinical populations. Additionally, the CTQ scales were found to significantly correlate moderately to highly with scales from the Child Maltreatment Interview (Briere, 1992) and the Childhood Trauma Interview (Fink, 1995)

Trauma Questionnaire (TQ; Wild & Paivio, 2003). The TQ lists 20 traumatic events that are based on a review of commonly used trauma-assessment questionnaires (e.g., Traumatic Stress Schedule; Norris, 1990; PERI Life Events Scale; Dohrenwend, Krasnoff, Askenasy, & Dohrenwrend, 1978; Initial Trauma Review-3, Briere & Scott, 2006). Participants are asked to indicate whether (Yes-No) they have experienced each of the events. After endorsing an event, participants rate the degree of distress associated with it on a 5-point Likert scale (5 = extremely distressing, 0 = not distressing at all). They are also asked whether they experienced fear, horror or helplessness during the event (see Appendix C). The TQ was used successfully in previous research to screen a similar undergraduate student sample for the presence of a traumatic history. It was used in a similar fashion in the present study, that is, to screen participants for appropriate minimum levels of trauma (at least one) and it was also used as an index of trauma exposure, with more events considered to indicate more exposure.

Exposure to Trauma (ET). The Trauma Questionnaire (TQ) and Childhood Trauma Questionnaire (CTQ) are conceptually related and have significant overlap in the material and construct they measure. The measures also were found to have a Pearson correlation of .502 ($p < .001$). Thus in order to provide a more robust measure of

Exposure to Trauma (ET), a composite was formed by summing unit-weighed z-scores. This measure was used in subsequent analyses.

Twenty-item Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994). The TAS-20 is a self-report measure that consists of 20 items that assess the severity of alexithymia using a 5-point scale (1 = strongly disagree, 5 = strongly agree) (see Appendix D). The TAS-20 was empirically constructed such that items reflect the domains of the alexithymia construct. It yields three factors (difficulty describing feelings, difficulty identifying feelings, and externally oriented thinking). The TAS-20 total was used in the present study and has a reported internal consistency of .81 and a test-retest reliability of .77, using an undergraduate student sample (Bagby et al., 1994).

Sixty-four-Item Inventory of Interpersonal Problems (IIP-64; Horowitz, Alden, Wiggins, & Pincus, 2000) is a self-report questionnaire designed to assess the type and severity of various maladaptive interpersonal behaviours (see Appendix E). The scales consist of two orthogonal axes, a vertical one (status, dominance, power, or control) and a horizontal one (solidarity, friendliness, warmth, or love). It is based on a circumplex model that organizes interpersonal behaviors according to the dimensions of affiliation and control (Alden, Wiggens, & Pincus, 1990). Items reflect common interpersonal problems reported by individuals seeking psychotherapy. The present study used the overall average score in analyses. Horowitz et al. (2000) reported good convergent validity with the Brief Symptom Inventory's (BSI; Derogatis, 1993) Global Severity Index (r = .78) and with the Behavior and Symptom Identification Scale (BASIS-32; Eisen, Dill, & Grob, 1994) (r = .66), as well as good internal consistency (alpha = .96) and test-retest reliability (r = .78).

*The Beck Depression Inventory – Second Edition (*BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report questionnaire which asks individuals to endorse statements on a scale from 0-3, with item descriptions being unique to each item (e.g. 0 = I do not feel sad, 3 = I am so sad or unhappy that I can't stand it) (see Appendix F). It subscribes to the two-factor approach to depression, which holds that depression can be thought of as having an affective or mood component (e.g. feeling down) and a somatic component (e.g. loss of energy), and the BDI-II can be broken down into two corresponding subscales. The present study ued the total score in analyses. Researchers have reported high internal consistency (alpha = .91) and test-retest reliability (r = .93) for the BDI-II total score, as well as concurrent validity (.71) with the Hamilton Depression Rating Scale (Beck, Steer, Ball, & Ranieri, 1996; Beck et al., 1996)

*Emotional Perception Task (*EPT; Green, 1986). The EPT is a measure of auditory-affective processing. It consists of 45 items, covering five separate emotions (happy, angry, frightened, sad, and neutral). A tape recorded professional actress reads three different sentences (e.g., "Why didn't you tell me you were going to the store") in each of these emotions, three times, and participants are required to listen to each sentence, and then in a short time frame (4 seconds) pick the emotional label they feel best describes the tone of voice in the previous sentence. The test is administered via computer, and completely automated. After each sentence is played aloud, the five emotion options appear on the screen and the individual must select their answer. They are not given feedback as to whether they were correct or incorrect. The number of errors the individual makes is documented. Green reported good internal reliability for the EPT (alpha = .80), as well test-retest reliability (r = .78). Healthy participants achieved a mean

of 75% accuracy compared to chance (i.e. 20%), while a psychiatric patient group achieved 43% accuracy (Green, 1986).

Procedure

Potential participants were mass-screened as part of the participant pool's pre-screening protocol. They were selected if they respond affirmatively to two questions (see Appendix G) based on the TQ and DSM-IV-TR, that is, (1) they experienced one or more traumatic experiences listed in the TQ and (2) they experienced extreme distress, fear and/or helplessness related to the endorsed event(s). These two questions correspond to the DSM-IV-TR's criteria for trauma, that is, (A1) the event involved actual or threatened serious injury, death, or a threat to the physical integrity of the self or others, and (A2) the individual experienced fear, helplessness, or horror (APA, 2000). Those who responded affirmatively to both questions concerning a single event (minimum criteria for a trauma) were eligible to participate in the study in exchange for bonus points on their final grade. Participants were informed that they would first complete questionnaires in a group-setting, and then be responsible for attending a second phase of the study at a later date, to undergo an additional short one-on-one test. They were informed that a bonus point would be awarded after the first group assessment and then another after the second session, and that they were free to discontinue participation at any point. Furthermore, participants were informed that all information gathered during the study would remain confidential and not connected to their name. All participants completed a consent form after reading information about the study prior to participation (see Appendix H).

In a group setting, participants were administered all self-report measures (Demographic Questionnaire, CTQ, TQ, TAS-20, IIP, BDI-II) in random order. Because recalling traumatic experiences could evoke distress, participants were provided information about psychological services (i.e. Student Counseling Centre) as part of the debriefing (see Appendix I). Each participant signed up for a second session when they signed up for the first session. During this second phase, they were administered the EPT neuropsychological test of auditory-affective perception. After completion of the EPT, students were again debriefed about the study to check to see if they needed the mentioned services.

CHAPTER IV

ANALYSIS OF RESULTS

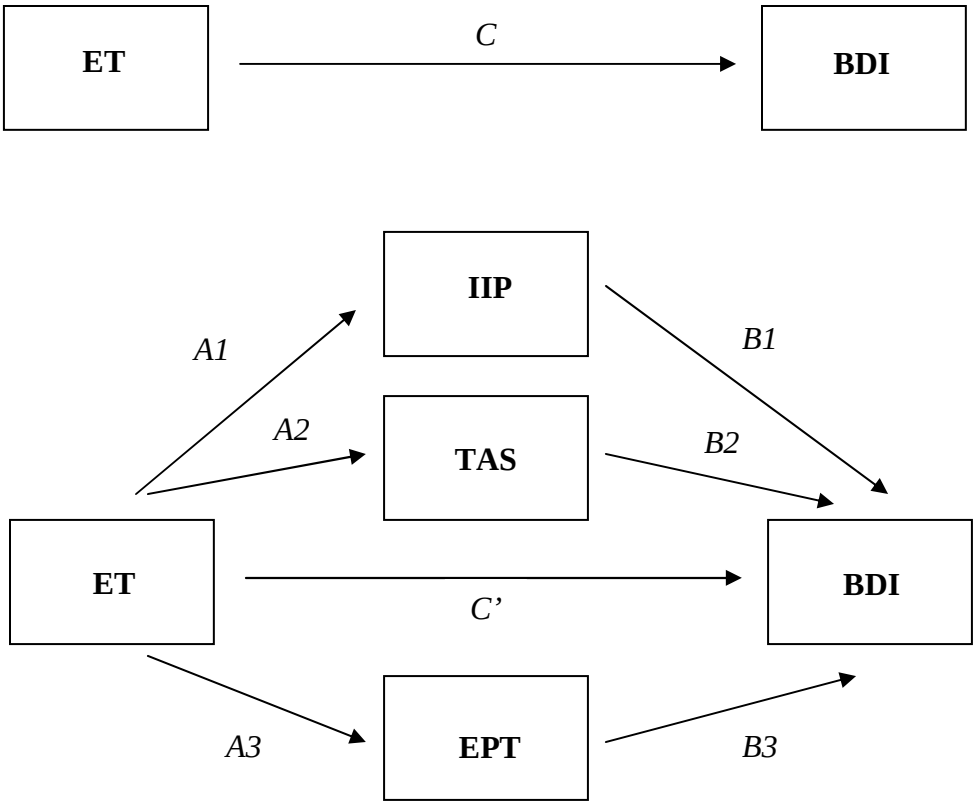
Statistical Analyses

Analyses of the data were conducted using IBM SPSS Statistics Version 19. There were three overarching objectives for the analyses; (1) to investigate whether auditory-affective perception was significantly related to exposure to trauma, alexithymia, interpersonal problems, and depression; (2) to investigate whether auditory-affective perception, alexithymia, and interpersonal problems mediated the relationship between exposure to trauma and depression; and (3) to investigate whether grouping together of the significant individual mediators improved the explanatory model. Due to sample size and resultant limitations on power, primary analyses used only each scale's total score. A regression analysis, rather than path analysis or SEM, is appropriate due to the previously mentioned limitations; the present study was a preliminary investigation designed to generate hypotheses for future testing using more powerful analyses with a larger sample.

Preacher and Hayes (2008) developed a macro for SPSS that is useful for analyzing the path coefficients in multiple mediator models. It utilizes a bootstrapping method, to produce confidence intervals for the total and specific indirect effects of an IV on a DV via one or multiple mediators. This method is considered superior to the more common alternative method of using individual mediation analysis followed by a SOBEL test. First, the SOBEL method is too liberal with smaller samples and thus requires a large sample to provide accurate results. Second, the Preacher and Hayes method handles both individual mediators and groups of mediators, and adjusts the path estimates for any

potential impact of covariates. Thus the present study utilized the Preacher and Hayes bootstrapping method to assess the proposed meditational model. Figure 2 presents the mediation pathways for this model that were analyzed using the Preacher and Hayes method.

Figure 2
Mediator Pathway Model



While the A and B paths and pathway C are constant across different combinations of the mediators, C' (i.e. the indirect effects of the IV on the DV through the mediators) and the model's significance can alter slightly when only one of the mediators is input using this analysis macro technique. Thus, it was decided that after analyzing the statistics with all proposed mediators included, another analysis would be

conducted using only those that were significant in the full model, to ensure this shift did not alter the degree of significance. Since the correlation analysis revealed that controlling for demographic variables did not affect the relationships between primary variables, they were not included as covariates for the analysis. For all analyses, a 95% confidence interval was used, along with 1000 iterations for the bootstrapping.

Assumptions

Before data collection, a power analysis was conducted using online modeling software (and suggested conservative values from the author due to an absence of pilot data). Conservative estimates of standard deviation of predictors (.25), variance inflation factor (3), standard deviation of the error (.4), detectable beta (1.2), and good power (.8), suggests a sample size of 52 individuals (Lenth, 2006-2009). This parallels the rule of thumb used when working with linear regressions of 10 participants per a predictor (i.e. 50). Data for 53 participants was collected, thus meeting the recommended requirement.

To investigate normality of data, Q-Q plots, skewness and kurtosis cut-offs (-2/2 and -3/3, respectively), and Shapiro-Wilk tests were used. Results indicated that the Emotional Processing Task (EPT), Inventory of Interpersonal Problems (IIP), Toronto Alexithymia Scale-20 (TAS), Childhood Trauma Questionnaire (CTQ), Trauma Questionnaire (TQ), all demonstrated normality for each of the three tests. Additionally, scatterplots of the residuals were visually inspected and did not appear to violate assumed normality; bivariate scatterplots were visually inspected, and demonstrated appropriate linearity between the variables. Investigating these scatterplots also suggested the data generally fell around lines of best fit, suggesting the data did not violate assumed homoscedastic distribution. As previously described, the normal distribution of the TQ

and CTQ, along with the conceptual/statistical relationship (Pearson correlation = .502, $p < .001$) between the TQ and CTQ allowed for consolidation of the two measures of exposure to trauma into a single measure for analyses, dubbed Exposure to Trauma (ET).

Multicollinearity was investigated by inspecting a correlation matrix for scales that correlated too strongly (>.80). Additionally, a VIF cut-off of < 3 was used; both methods suggested multicollinearity was not an issue. Finally, boxplots were used to identify potential univariate outliers. Results indicated that 3 EPT scores and 1 TAS score were outliers, though none were extreme (i.e. > 3 times the interquartile range from a quartile). After checking Mahalanobis' distances using df = 5, $p = .01$, with a chi-squared table cut-off of 15.086, no multivariate outliers were identified. Since the planned analysis is multivariate in nature and the size of the sample is small to moderate, all cases were retained for analysis.

Demographic and Descriptive Data

Table 1 summarizes the demographic information of the sample. Most participants were Caucasian females, in the midst of obtaining a university degree, who had spent either their whole lives or nearly their whole lives in Canada. Table 2 summarizes descriptive information for all primary variables. On average, participants endorsed Minimal-Low levels (score of 36-41) of exposure to traumatic events and maltreatment during childhood (CTQ; Bernstein & Fink, 1998) and a similar amount of distress from exposure to traumatic experiences as the previous study using the Trauma Questionnaire (TQ; Wild & Paivio, 2003). Though the sample endorsed elevated levels of alexithymia, they fell below a validated cut-off for clinical levels of alexithymia (score of 56+) (TAS-20; Loas, Otmani, Fremaux, Lecercle, Duflot, & Delahousse, 1996). With

regard to interpersonal problems, the sample scored near the cut-off for above-average in a non-clinical population (score of 81-85) (IIP-64; Horowitz, Alden, Wiggins, & Pincus, 2000). They endorsed a mild amount of depressive symptoms (score of 0-13) on average (BDI-II; Beck, Steer, & Brown, 1996). On the measure of auditory-affective perception, the sample made a similar number of errors to a healthy control group (12 or less errors) (EPT; Green, 1986). Internal reliability was good for all measures except the EPT (Cronbach's alpha = .58).

Table 1
Demographic Information for the Sample

Demographic	**N**	**Percent**
Gender		
Male	8	15%
Female	45	85%
Ethnicity		
Caucasian	38	71.7%
Black	4	7.5%
Arab	5	9.4%
South Asian	1	1.9%
East Asian	3	5.7%
Latin	1	1.9%
Other	1	1.9%
Sexual Orientation		
Heterosexual	50	94.3%
Homosexual	2	3.8%

No Answer	1	1.9%
Veteran	4	7.5%
Disabled	2	3.8%
Dominant Hand		
R	50	94.3%
L	3	5.7%

Demographic	**Mean**	***SD***
Males		
Age	27.38	8.85
Education	14.75	.89
Time in CA	27.13	9.08
Females		
Age	23.36	6.92
Education	14.89	.96
Time in CA	21.25	8.51

Note: Time in CA = Time in Canada

Table 2
Descriptive Statistics for all Primary Variables

Measure	**Mean**	**S.D.**	**Cronbach's alpha**
CTQ	38.19	13.70	.80
TQ	12.57	9.71	NA
ET	0	1.73	NA
TAS	45.35	12.77	.84

EPT	11.80	4.30	.58
IIP	80.50	34.64	.94
BDI	11.79	4.28	.91

Note: CTQ = Childhood Trauma Questionnaire, TQ = Trauma Questionnaire, ET = Exposure to Trauma consolidated measure, TAS = Toronto Alexithymia Scale – 20, EPT = Emotional Perception Task, IIP = Inventory of Interpersonal Problems – 64, BDI = Beck Depression Inventory – II.

Intercorrelations among Variables

As previously mentioned, the significant correlation and conceptual overlap between the Trauma Questionnaire (TQ) and the Childhood Trauma Questionnaire (CTQ) justified the two measures being collapsed into a measure of Exposure to Trauma (ET), which was included in the analyses. Since it was possible that some of the demographic data would significantly correlate with the primary variables, a bivariate correlation matrix (Table 3) was conducted to investigate which variables should be controlled for in subsequent analyses. Table 3 indicates that gender, age, sexual orientation, and disability all correlated with at least one primary variable (>.30), thus they were used as covariates in partial correlations among primary variables. Results indicated that partial correlation coefficients (controlling for demographic variables) were not meaningfully different from bivariate correlations. Thus, for ease of interpretation, only the bivariate correlational matrix is presented (see Table 4).

Table 4 indicates that the CTQ, TQ, ET constructed measure, TAS, IIP, and BDI are all significantly and positively related to each other, with the exception of the TAS and TQ. This provides partial support for the proposed hypotheses, and offers

justification for the subsequent analyses conducted. However, Table 4 also indicates that the Emotional Processing Task (EPT) was not significantly related to any of the other primary variables. This is inconsistent with study expectations.

Table 3
Bivariate Correlation Matrix of Primary Variables and Demographics

Measure	CTQ	TQ	ET	TAS	EPT	IIP	BDI
Gender	0.19	0.24	0.24	.33*	-0.11	0.08	.32*
Age	0.11	.33*	0.26	-.28*	0.2	-0.24	-0.2
Eth.	0.03	-0.02	0.01	-0.13	0.09	0.02	0.03
Time in CA	0.08	0.14	0.12	-0.11	0.11	-0.18	-0.07
Sexual Orien.	.31*	-0.09	0.13	-0.09	-0.03	0.21	0.1
Veteran	-0.12	0.21	0.05	-0.07	-0.07	0.04	0.01
Disabled	0.14	0.09	0.14	.35*	0.08	0.13	.37**

Note: * p < .05; ** *p* < .01. CTQ = Childhood Trauma Questionnaire, TQ = Trauma Questionnaire, ET = Exposure to Trauma consolidated measure, TAS = Toronto Alexithymia Scale – 20, EPT = Emotional Perception Task, IIP = Inventory of Interpersonal Problems – 64, BDI = Beck Depression Inventory – II, Eth = Ethnicity, Time in CA = Time in Canada, Sexual Orien. = Sexual Orientation.

Table 4
Bivariate Correlation Matrix with Significant Demographic Variables not Controlled

Measure	CTQ	TQ	ET	TAS	EPT	IIP	BDI
CTQ	1	.50**	.87**	.31*	-.17	.40**	.44**
TQ		1	.87**	.25	.00	.29*	.40**
ET			1	.32*	-.10	.40**	.49**

TAS	1	.06	.56**	.64**
EPT		1	.11	-.03
IIP			1	.41**
BDI				1

Note: *significant at $p = .01$, ** significant at $p = .001$. CTQ = Childhood Trauma Questionnaire, TQ = Trauma Questionnaire, ET = Exposure to Trauma consolidated measure, TAS = Toronto Alexithymia Scale – 20, EPT = Emotional Perception Task, IIP = Inventory of Interpersonal Problems – 64, BDI = Beck Depression Inventory – II.

Regression Analysis

Table 5 shows the pathways for the full mediation model and indicates that the exposure to trauma (ET) significantly predicts Depression (C pathway), but that only one of the potential moderators appears to be significantly predicted by ET and also predict for Depression (A and B pathways). The IIP was only significantly predicted by ET (A pathway). After controlling for the effect of all three potential mediators, ET remains a significant predictor of depression (C' pathway). Finally, the indirect effect of ET on Depression via the TAS is significant (AB pathway). Thus this model was found to be significant $F(4, 48) = 12.17$, $p < .001$, with an adjusted R-squared value of .46. Though the total indirect effect of the group of mediators is significant, Preacher and Hayes (2008) state that this statistic should only be interpreted if all contributing mediators are individually significant. Taken together, results indicated that the TAS was a partial mediator between ET and Depression.

Table 6 shows that even when only the TAS is included as a mediator there is little difference, the C' pathway remains significant, thus supporting a significant partial mediation model, $F(2, 50) = 25.17$, $p < .001$, with an adjusted R-squared value of .48.

Table 5
Regression Statistics for All Mediators

Path	**Coeff.**	***S.E.***	***t***	***p***
IV to Mediators (A)				
EPT	-.24	.34	-.70	.49
TAS	2.37	.98	2.43	.02
IIP	7.92	2.57	3.08	.003
Direct Effects of Mediators on DV (B)				
EPT	-.08	.24	-.32	.74
TAS	.43	.10	4.52	<.001
IIP	-.001	.04	-.20	.84
Total Effect of IV on DV (C)				
ET	2.79	.70	2.80	<.001
Direct Effect of IV on DV (C')				
ET	1.80	.65	2.80	.007
	Effect	***S.E.***	***Z***	***p***
Indirect Effects of IV on DV via Mediators (AB)				
TOTAL	.98	.49	2.01	.04
EPT	.02	.06	.31	.76
TAS	1.02	.47	2.17	.03
IIP	-.06	.28	-.21	.83

Note: ET = Exposure to Trauma consolidated measure, TAS = Toronto Alexithymia Scale – 20, EPT = Emotional Perception Task, IIP = Inventory of Interpersonal Problems – 64.

Table 6
Regression Statistics – TAS Only

Path	**Coeff.**	***S.E.***	***t***	***P***
Direct Effect of IV on DV (C')				
ET	1.79	.60	2.98	.004
	Effect	***S.E.***	***Z***	***P***
Indirect Effects of IV on DV via Mediators (AB)				
TAS (Same as Total)	.99	.45	2.22	.03

Note: ET = Exposure to Trauma consolidated measure, TAS = Toronto Alexithymia Scale – 20.

Exploratory Analysis

Additional analyses were conducted to help explain why the Emotional Processing Task (EPT) did not correlate with any of the theoretically related measures. The low internal reliability score for the EPT (see Table 2) suggested that one or more of the types of emotional errors being measured might be conceptually unrelated to the others. Thus, a principal component factor analysis was conducted to investigate this possibility. Table 7 shows results of this analysis using a Varimax with Kaiser normalization rotation to clarify the component matrix. The results indicate that "Neutral Errors" was an independent orthogonal factor. With this in mind, an EPT error score was computed excluding Neutral errors and included in regression analyses. The reliability did not improve with the removal of the Neutral errors (Cronbach's alpha = .60). Results indicated no improvement in the significance of the ET predicting the EPT, the EPT predicting Depression, nor the overall pathway's mediation effect.

Table 7

EPT Factor Analysis

	Component 1	Component 2
	1	2
Total Frightened Errors	.756	
Total Angry Errors	.747	
Total Happy Errors	.605	
Total Neutral Errors		.916
Total Sad Errors	.460	.584

Due to the unexpected lack of correlation between the EPT and TAS, the psychometric properties of the TAS were examined again to investigate whether there might be a statistical relationship between one or more of the TAS's subscales and the EPT. As discussed in the methodology, the TAS-20 has three subscales: difficulty describing feelings (DDF), difficulty identifying feelings (DIF), and externally-oriented thinking (EOT); however, previous research has called into question the EOT's reliability (Kooiman, Spinhoven, & Trijsburg, 2001). Conceptually, the first two subscales are what would be expected to relate more strongly to auditory-affective perception, with the EOT questions possibly masking the correlation between the first two scales and the EPT. Thus, for both of these reasons, a DDF and DIF score was compiled, and its correlation to EPT scores was analyzed. No significant correlations were found between any of the EPT scores (five emotions and Total errors) and the new TAS-20 score (*p's* > .80). This supports the original findings that there exists a lack of significant relationship between auditory-affective perception and self-reported alexithymia.

The sample size is too small for investigating each individual sub-scale of the IIP, so it was decided that quadrant scores would be computed by combining related adjacent scales of the

IIP circumplex (Gurtman, 1995). The quadrants are Dominant-Friendly (Overly Nurturant/Intrusive), Submissive-Friendly (Nonassertive/Exploitable), Submissive-Hostile (Cold/Socially Avoidant), and Dominant-Hostile (Dominant/Vindictive). None of these quadrant scores significantly mediated the relationship between exposure to depression and depression.

It was then supposed that investigating a sub-group of the sample, those who scored the most impaired on the EPT, TAS or the IIP, might reveal the mediation relationships not found in the original analysis. No significant mediation between exposure to trauma and depression was found for the EPT or the IIP when the upper quartile (more impaired scores) of any of the three measures was selected for analysis. Furthermore, when the upper quartile EPT subgroup was selected, the EPT still did not correlate significantly with any of the other primary variables (p's > .25).

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

General Discussion

This study investigated the relationships between exposure to trauma, auditory-affective perception (AAP), alexithymia, interpersonal problems and depression in a sample of undergraduate students pre-selected for exposure to trauma. The sample was homogenous (predominately young, Caucasian females), and the sample size was limited, thus the conclusions should be viewed within the appropriate context and not over-generalized. Additionally, the study investigated whether AAP, alexithymia, or interpersonal problems mediated the relationship between trauma exposure and depression. Participant demographics were investigated as potential covariates for the analyses. Results indicated that gender, age, sexual orientation, and disability all were correlated with at least one of the primary variables; however, none had a significant impact on inter-correlation among the variables, or on the meditational model. Measured levels of trauma exposure, alexithymia, interpersonal problems, and depression were significantly inter-correlated with each other. However, correlations between the AAP task and other variables were trivial suggesting that this was independent of the other constructs.

The data support a partial mediational model with self-reported alexithymia mediating the relationship between exposure to trauma and depression in this sample. This finding supported a study hypothesis. While degree of interpersonal problems was associated with trauma exposure, the data do not support it as a mediator between trauma exposure and depression. The data also do not support the hypothesis that the Emotional

Perception Test (EPT) measure of AAP was related to, or an effective measure of, alexithymia in this undergraduate sample. The latter findings were inconsistent with study hypotheses.

Participants

This study used a non-clinical sample of university students who were predominantly middle-class females, of European decent, with a history of exposure to one or more traumatic events. Past research on the relationships between exposure to trauma, alexithymia, interpersonal problems, and depression has employed university student samples, outpatient and inpatient clinical samples, as well as *in vivo* field studies. The present study's characteristics were largely consistent with those reported for undergraduate university samples (e.g., Follette, Polusny, Bechtle, & Naugle, 1996; Mason, Tyson, Jones, & Potts, 2005; Storch, Roberti, & Roth, 2004; Tracey, Rounds, & Gurtman, 1996).

The pre-screening for exposure to trauma was an advantage of the present study, in that it allowed for the targeting of a sample that was at risk for psychological complications from trauma. Another advantage was the use of a continuous measure of the extent of trauma, as opposed to splitting the sample dichotomously based on presence or absence of a traumatic experience. With regards to trauma exposure, on average, participants met criteria for mild childhood maltreatment on the Childhood Trauma Questionnaire (CTQ) comparable to levels reported for other undergraduate samples (Bernstein & Fink, 1998; Paivio & Cramer, 2004). Participants also endorsed similar types and numbers of traumatic experiences on the Trauma Questionnaire (TQ) to those reported for a similar group of undergraduate students at the University of Windsor (Wild

& Paivio, 2003). The present study indicated that, on average, participants had elevated scores for alexithymia that did not meet a clinical severity threshold (Loas, Otmani, Fremaux, Lecercle, Duflot, & Delahousse, 1996), met cut-offs for above-average levels of interpersonal problems (Horowitz, Alden, Wiggins, & Pincus, 2000), and for mild levels of depression (Beck, Steer, & Brown, 1996). Thus, participants in the present study reported sub-clinical levels of psychological disturbances typically associated with trauma exposure.

Significant associations between the TQ and the CTQ, as measures of psychological disturbance, supported the convergent validity of the measures. This is consistent with previously reported findings in a similar sample (Wild & Paivio, 2003), and, together, these findings support the use of the TQ as a screening or assessment tool in future research. The TQ is a brief, easily administered self-report measure that provides a summary of an individual's exposure to different traumatic events along with the extent to which each event generated feelings of terror or helplessness. Thus it is possible to determine whether events met DSM criteria (1A and 2A) for traumatic. Results of the present study also supported use of the CTQ, which specifically assesses the extent of childhood abuse and neglect, as a compliment to the TQ. Combining the two measures in the present study proved to be an effective method of measuring exposure to traumatic situations over a lifetime, allowing the authors to more accurately test the proposed model's validity.

With regard to AAP, it was thought that undergraduate student participants who reported above average psychological disturbance related to trauma (i.e., alexithymia, interpersonal problems, and depression) would demonstrate some impairments on the

Emotion Perception Task. Even though the measure was designed to assess clinically significant levels of neurologic, neuropsychological, and psychiatric dysfunction, it was hypothesized that the EPT would be sensitive enough to detect some degree of impairment. On average, participants made a similar number of errors in identifying auditorially-presented emotions on the EPT as the normative sample provided by the test publisher (Green, 1986). This supports the EPT's ability to effectively discriminate between non-clinical and clinical populations based on auditory-affective perception.

Associations among Individual Variables

The relationships among trauma exposure, alexithymia, interpersonal problems, and depression were consistent with previously reported findings (Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000; Neemann, & Murphy, 1998; Riso, Miyatake, & Thase, 2002; Streich, 2008). However, previous research did not collect data on each of these variables from the same sample at the same time, and thus were unable to examine the intercorrelations of all primary variables. This study supported the hypothesis that an interrelationship between these variables exists, even in a non-clinical sample that has a mild amount of trauma exposure. The finding that greater extent of exposure to trauma is related to increased severity of alexithymia, more severe interpersonal problems, and more severe depressive symptoms support the conclusion that there is an important relationship between these psychological constructs in those who have been exposed to trauma even if they do not endorse clinical-levels of symptoms.

The associations among study variables (with the exception of the EPT) support current theory and research on the etiology of depression. For example, present findings are consistent with research demonstrating an increase in depressive symptoms later in

life following a traumatic event, and that more exposure is related to more severe depressive symptoms, regardless of age at the time of the experience (Gillespie, Bradley, Mercer, Smith, Conneely, Gapen et al., 2009). Present findings also are consistent with past research suggesting that the affect disruptions following experiences of childhood maltreatment and traumatic experiences later in life increase the risk of developing alexithymia.

Specifically, it is thought that in children the disruption of the hierarchical development of emotional life (from physical sensation to a verbal/mental level) in childhood can lead to impaired ability to regulate and express emotions later in life. In adults, it is thought that post-traumatic experience, individuals are reluctant to reactivate the trauma-related memory network, along with the associated emotions. In some individuals, this avoidance can lead to disruptions in emotional awareness, regulation, and expression (Kooiman, van Rees Vellinga, Spinhoven, Draijer, Trijsburg, & Rooijmans, 2004; Zahradnik, Stewart, Marshall, Schell, & Jaycox, 2009). Additionally, this study lends support to the TAS-20 being an effective and reliable measure of self-reported alexithymia in the given sample. The relationship between interpersonal problems and depression in the present study also is consistent with the current interpersonal-cognitive model of depression, whereby perceived rejection, isolation, and loss all are thought to contribute to depressive symptoms (Dobkin, Panzarella, Alloy, Cascardi, Truesdell, & Gara, 2007). Finally, the relationship between trauma exposure and interpersonal difficulties found in the present study is consistent with other research reporting a link between trauma exposure and interpersonal problems, such as aggression and apathy towards others, and social withdrawal. Researchers theorize that this link is

attributed to a variety of causes, such as psychophysiological changes in cortisol levels when exposed to stress-related stimuli, an increase in mood disorders such as depression and posttraumatic stress disorder, and development of antisocial personality-like behaviours(Blumenthal, Neemann, & Murphy, 1998; Scarpa, 2003; Schafer, Ross, & Read, 2008).

The present endeavor is perhaps the only study to assess whether self-reported alexithymia is related to impaired ability to correctly perceive and label different affective tones of voice. Self-reported alexithymia on the TAS involves difficulties identifying and labeling feelings, and distinguishing feelings from bodily experience (Taylor, Doody, & Newman, 1981). From a neuropsychological perspective, these difficulties (alexithymia) are thought to be a function of some type of impaired cognitive processing of internal and/or external emotional stimuli. Impairments may be at the level of perception of affective cues, or labeling of these cues, or higher-order integration and associational processing of affective cues. The EPT was designed to assess emotional-perceptual neurological impairments. Given the conceptual overlap in these two methods of assessment, it was surprising to find that auditory-affective perception, as measured by the EPT, was not significantly related to self-reported alexithymia on the TAS. Nor was auditory-affective perception on the EPT related to other measures of psychological disturbance in the present study.

One explanation may be that the EPT has been validated and used more extensively with populations that have more severe psychiatric and neurological conditions, and thus it may not be sensitive enough to detect AAP impairments in a sample with sub-clinical levels of disturbance. The EPT requires individuals to

differentiate distinct emotions within 4 seconds, which may have been too easy for this sample. An alternative, more subtle task that also measured reaction time (e.g. see faces paradigm developed by Wright, Langenecker, Deldin, Rapport, Nielson, Kade, et al., 2009) would have been more sensitive, and may have detected impairments in this sample. Additionally, the low reliability for the EPT, compared to published psychometrics, suggests that the validity of this measure for our specific sample may explain its non-significant relationship to the other primary variables. Another possibility is that the difficulties on the TAS reported by participants in the present study are not a function of neuropsychological impairments, but rather a function of chronically avoiding emotions due to the distress it may cause. Alternatively, other research has investigated the possibility that alexithymia is not a top-down impairment, that is, a problem with labeling perceived affective stimuli, but rather it should be considered as a dysfunction in the generation of an appropriate neurophysiologic response to affective stimuli (Gilbert, 2009; Timary, Roy, Luminet, Fillee, & Mikolajczak, 2008). This would suggest that individuals with alexithymia would not be expected to have impaired performance on affect-recognition type tasks, as their ability to label emotional stimuli presented to them is intact.

With regard to the neuropsychological affective processes associated with depression, past research has found impairments in normal processing of emotional cues in those suffering depression (Abercrombie, Schaefer, Larson, Oakes, Holden, et al., 1998; Davidson, Pizzagalli, Nitschke, & Putnam, 2002). This may help explain the relationship between depression and self-reported alexithymia found in the present study; psychological distress from the difficulties associated with impaired emotional

processing might play a role in the development of depressive symptoms. However, results of the present study suggest that auditory-affective perception specifically is not significantly impaired in those reporting mild symptoms of depression on the BDI-II, in the present sample. It also may be that the EPT is not sensitive enough to detect the possible AAP impairments in a non-clinical sample. "

Mediational Model

The present study tested the theory that increased exposure to trauma leads to more severe depression, and that this relationship may develop partly through alexithymia and difficulties with interpersonal relationships. Additionally, findings from other studies support the mediating effects of alexithymia and interpersonal problems when these variables were examined individually (e.g., Lumley, Ovies, Stettner, Wehmer, & Lakey, 1996; Mazzeo & Espelage, 2002). However, none of these studies assessed the unique contribution of each of these variables controlling for other possible mediating variables. Results of the present study indicate that, when interpersonal problems and alexithymia are considered together, only self-reported alexithymia is a partial mediator. Even when interpersonal problems is considered alone, it was not found to significantly mediate the relationship between exposure to trauma and depression, which dismisses the argument that alexithymia was ‘hogging’ the variance. The present finding that self-reported alexithymia contributed to the relationship between trauma exposure and depression is consistent with theory and findings reported in previous research. That is, that experiencing a traumatic event can lead to feeling emotionally overwhelmed, resulting in an impaired ability to articulate and make sense of one’s own emotional experiences. If this impairment is not resolved, it can lead to decreased emotional competence.

Difficulties identifying and communicating feelings can in turn contribute to depression. The impaired ability to recognize and convey one's emotions can result in a decrease in emotional intimacy with others, which deprives the individual of social support, thereby sustaining or exacerbating the depressive symptoms (Honkalampi, Hintikka, Laukkanen, Lehtonen, & Viinamaki, 2001; Taylor, Bagby, & Parker, 1997).

The finding that interpersonal problems did not account for this link is inconsistent with theory and previous research (Barrett & Barber, 2007; Scarpa, 2003; Zemore & Dell, 1983). This is the theory underlying Interpersonal Psychotherapy (IPT) – a major and effective treatment for depression (Klerman, 1989; McCray & King, 2003). A study found that IPT was effective for female survivors of interpersonal trauma (e.g., abuse, assault, molestation) and comorbid PTSD (Krupnick, Green, Stockton, Miranda, Krause, & Mete, 2008). Present findings and prior research also have shown that these constructs are related, and one study found that the relationship between childhood sexual abuse (though not exposure to trauma in general) and depression was partially mediated by particular interpersonal problems (Whiffen, Thompson, & Aube, 2010). It is possible that only certain types of traumatic experiences and/or interpersonal problems contribute to depression, though this study's exploratory analysis of the IIP quadrants did not identify any of them as significant mediators.

The failure to find effects for demographic variables in the meditational analysis is inconsistent with previous research. For example, incidence of trauma exposure and subsequent development of PTSD has been found to vary significantly between genders, ages, and level of education (Brewin, Andrews, & Valentine, 2000). Alexithymia rates are higher in advanced aged males, with low education and from a lower socioeconomic

status (Salminen, Saarijärvi, Äärelä, Toikka, & Kauhanen, 1999). Adolescent and young adult females have also been found to report more interpersonal problems, and experience more distress from them (Birditt & Fingerman, 2003). Research has found that depression is more common in females, and this gender divergence occurs between the ages of 16 and 18, before receding later in young adulthood (Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998; Marcus, Young, Kerber, Kornstein, Farabaugh, Mitchell, et al., 2005). Present findings likely reflect the homogenous sample.

Limitations and Future Research

Due to limited resources and time, few longitudinal studies have been conducted where individuals exposed to trauma are followed and measures repeatedly administered. The present study, therefore, relied on theory and prior research to suggest a temporal order for the relationship model. However, one cannot assume causality. It is possible, for example, that depression contributes to both alexithymia and interpersonal problems.

Additionally, the sample characteristics of this study limit the conclusions that can be drawn. First, the predominance of females in the sample likely affected the scores on several measures. For instance, Green (1986) notes that in a non-clinical sample, females make less errors than males. In the future, the proposed model should be tested on a male or more heterogeneous sample. The small sample size prevented complete examination of the effects of measure subscales, that is individual subscales were not examined but quadrants were, as it would reduce power significantly. In particular, research described earlier (Whiffen et al, 2010) suggests that different types of trauma and interpersonal problems may contribute to depression, thus the eight subscales of the IIP-64 could be differentially related to the trauma-depression relationship. Future research with a lager

sample can test this hypothesis. Additionally, the failure to find a relationship between any of the primary variables and the EPT, along with the failure to reveal interpersonal problems as a mediator between trauma exposure and depression in this sample might be due to the non-clinical sample. Though the present study examined those scoring in the upper quartile of the EPT or IIP, this necessarily limited the sample size beyond ideal levels. Thus, future research in this area may wish to use higher cut-offs for screening or inclusion in analysis, with the expectation that more severe psychological symptoms in a sample might be required for these relationships to become significant. Finally, previously demonstrated impairments in *visual*-affective perception and processing in individuals with self-reported alexithymic symptoms are inconsistent with the level-of-processing implications of this study, that is, that *auditory*-affective perception is intact in those reporting alexithymia (Prkachin, G., Casey, & Prkachin, K., 2009; Parker, Prkachin, K., Prkachin, G., 2005; Parker, Taylor, & Bagby, 1993). Future research should attempt to investigate whether auditory-affective perception is indeed impaired in those with more severe alexithymic symptoms, or whether there is a true mode-dependent (aural versus visual) dichotomy in the affect-perception of this population. This might be accomplished by obtaining a sample that reports clinically significant alexithymia, and administering both auditory and visual affective perceptual measures. While this study found no significant relationship between self-reported alexithymia and AAP in those scoring in the upper quartile on the TAS, our sample size was necessarily limited, which limits the generalizability of said result.

An additional limitation is this study's exclusive reliance on self-report questionnaires in the final model. For one, the significant relationships found in this study

may, in part, be due to shared method variance. Future research should consider using alternate methods to measure the primary constructs of this study (e.g. the Toronto Structured Interview for Alexithymia; Bagby, Taylor, Parker, Dickens, 2006). There is controversy regarding the validity of retrospective self-reports of childhood abuse, such as those obtained on the CTQ. Loftus (1993), for example, has questioned the validity of retrospective accounts of childhood abuse. Others (e.g. Hardt & Rutter, 2004) agree with the thorough review of research supporting the validity of retrospective reports conducted by Brewin, Andrews, and Gottlib, (1993), and of the CTQ, in particular (Bernstein & Fink, 1998; Paivio & Cramer, 2004).

Conclusions

Research on auditory-affective processing in alexithymia is limited. Results of the present study indicate that a neuropsychological measure of auditory-affective perception may not be an appropriate test for symptoms of alexithymia in non-clinical samples similar to the present study. The partial mediation effect found for alexithymia in the present study is consistent with expectations based on theory and research. Greater exposure to trauma contributes to greater difficulties identifying and labeling emotional experience (alexithymia) which, in turn, contributes to increased depressive symptoms.

These findings have implications for the characteristics and direction of future research as well. First, as stated, these results lend support to a model incorporating exposure to trauma, alexithymia, and depression. However, the unexpected non-significant findings regarding interpersonal problems suggest that this is an area that warrants further attention. One possibility is that different populations are at different risk for developing interpersonal problems post-traumatic event. It may be that the present

study's population had demographic qualities that insulated them from developing those types of psychological difficulties. Alternatively, the IIP-64 may not have picked up on the specific types of interpersonal problems this sample experienced. Future research should attempt to further elucidate the kind and type of interpersonal problems experienced by different populations post-exposure to trauma. Secondly, future research in affect-perception and labeling should take into consideration the difficulty of the task, depending on the target population's characteristics. Even though this study found some clinical-levels of psychological disturbances for certain individuals in the sample, the task chosen was likely not challenging enough, as the publisher had demonstrated it producing differential scores for psychiatric/neurologic versus healthy controls. Some ways to improve the sensitivity of future affect-perception measures might include making the distinction between emotions more subtle, including more emotion label options, and including a reaction time component to the task. Third, the range of scores across all measures of psychological disturbance/impairment for this sample suggests that undergraduate non-clinical samples should not be discounted as an 'insulated' population that cannot be used if researchers wish to investigate psychological abnormality or pathology.

A history of exposure to trauma severe enough to cause significant stress is common enough in both the United States and Canada (estimates ranging from 50-76%) that the argument can be made that it is abnormal to go through life without experiencing a traumatic event. Furthermore, the incidence of depression is similarly high (lifetime incidence estimated to be near 20% in the United States). This suggests that these two areas of psychological distress deserve broad clinical awareness and familiarity. The

present study offers insight into the relationship between these two constructs and other psychological difficulties. First, the range of scores in this study's sample suggests that even in non-clinical and relatively well-off populations, some individuals have clinical levels of psychological distress or impairment. This suggests that this population (i.e. undergraduate females) might benefit from having resources made available to deal with past exposure to trauma, difficulties with emotional regulation and expression, interpersonal problems, and depression. Present findings also have implications for treatment of depression in individuals with a history of trauma exposure, specifically those individuals who are similar to the present study's sample. Results suggest that helping people identify and articulate emotional experience may be helpful in reducing depression. University psychological services might do well to target those who have been exposed to a traumatic event, and focus on cultivating emotional expression and awareness, as it might reduce the risk and/or severity of depressive symptoms in the future.

APPENDICES

APPENDIX A

Demographic Questionnaire

GENERAL

What is your gender?

__Female __Male __Transgender

__Other:_____

How old are you (years and months)? _____

What is your dominant hand? _____

CULTURE/ETHNICITY

What is your self-identified racial/ethnic background?

__White/Caucasian __Black/African Canadian

__Arab/Middle Eastern

__South Asian (e.g., Indian, Pakistani) __East Asian (e.g., Chinese, Japanese)

__Other:_____

What is your country of birth? _____

If you were not born in Canada, please answer the following two questions (in years and months)

How long have you been living in Canada? _____

How old were you when you arrived in Canada? _____

What is your current immigration status?

__refugee __landed immigrant __Canadian citizen

__International Student __Other:_____

SEXUAL ORIENTATION

__Bisexual __Heterosexual __Lesbian/Gay __Questioning

__Prefer not to answer __Other: _____

ACADEMIC STATUS

__Year 1 __Year 2 __Year 3 __Year 4 __Grad. Student

__Student's spouse/partner __Other: _____

If you are a **Graduate Student** please specify degree

__Masters __Doctorate __Other: _____

Major: _____ Units this term: _____

High School GPA: _____ College (if applies) GPA: _____

University GPA: _____

ADDITIONAL INFORMATION

Are you currently employed?

__Yes __No

Co- or Extra-Curricular activities? (please list)

Veteran?

__Yes __No

Student with disabilities?

__No __Yes, please specify: _____

APPENDIX B

Childhood Trauma Questionnaire

Instructions

Read each statement and rate how accurately it describes your childhood by writing the corresponding number next to the statement.

1: Never True
2: Rarely True
3: Sometimes True
4: Often True
5: Very Often True

When I was growing up …

___1. I didn't have enough to eat.

___2. I knew that there was someone to take care of me and protect me.

___3. People in my family called me things like "stupid," "lazy," or "ugly."

___4. My parents were too drunk or high to take care of the family.

___5. There was someone in my family who helped me feel that I was important or special.

___6. I had to wear dirty clothes.

___7. I felt loved.

___8. I thought that my parents wished I had never been born.

___9. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.

___10. There was nothing I wanted to change about my family.

___11. People in my family hit me so hard that it left me with bruises or marks.

___12. I was punished with a belt, a board, a cord, or some other hard object.

___13. People in my family looked out for each other.

___14. People in my family said hurtful or insulting things to me.

___15. I believe that I was physically abused.

___16. I had the perfect childhood.

___17. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.

___18. I felt that someone in my family hated me.

___19. People in my family felt close to each other.

___20. I had the best family in the world.

___21. Someone threatened to hurt me or tell lies about me unless I did something sexual with them.

___22. Someone tried to make me do sexual things or watch sexual things.

___23. Someone molested me.

___24. I believe that I was emotionally abused.

___25. There was someone to take me to the doctor if I needed it.

___26. I believe that I was sexually abused.

___27. My family was a source of strength and support.

APPENDIX C

Trauma Questionnaire

Instructions
Please complete all of the following questions using the following scale

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

1. Death of an immediate family member Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

2. Your own life threatening illness Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

3. Immediate family member's life-threatening illness Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

4. Immediate family member's serious illness Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

5. Your own disability not resulting from an accident Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

6. Immediate family member's disability not resulting from an accident Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

7. Your own disability resulting from an accident Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

8. Immediate family member's disability resulting from an accident Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

9. Personal injury or property loss as a result of fire, severe weather, or disaster Yes
No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

10. Childhood emotional abuse (e.g., criticized, yelled or screamed at, called names like "stupid", "lazy", or "ugly", was not cared for or protected, rarely received love or attention, no one showed confidence in you, parents said hurtful or insulting things to you, felt that a family member hated you) Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

11. Childhood physical abuse (e.g., hit, pushed, shoved or beaten, hit so hard that you had to seek medical treatment such as see a doctor or go to the hospital, hit so hard that you were left with bruises or marks, punished with a belt, a board, a cord, or some other hard object, beaten so badly that other people noticed it) Yes No

If yes, when did it occur? _____

Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

12. Child sexual molestation or abuse (e.g., someone tried to touch you or tried to make you touch them in a sexual way, someone threatened to hurt you or tell lies about you unless you did something sexual with them, someone tried to make you do or watch sexual things, experienced unwanted sexual intercourse with someone at least five years older than you)

Yes No

If yes, when did it occur? _____

Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

13. Sexual assault or rape by a stranger, acquaintance, or someone close to you Yes No

If yes, when did it occur? _____

Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

14. Physical assault by a stranger, acquaintance, or someone close to you Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

15. Robber, a theft involving force or threat of force Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

16. A break-in to your home, car, or office Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

17. Military war zone or combat experience Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

1 = not distressing at all 2 = somewhat distressing
3 = moderately distressing 4 = very distressing
5 = extremely distressing
Circle Yes or No if you have experienced any of the following. If no, please skip to the next question.

18. Witnessing someone being mutilated, seriously injured, or violently killed Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

19. Divorce of parents Yes No
If yes, when did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

20. Some other terrifying, distressing, extraordinary, stressful, or shocking event or situation

Specify:_____
__
When did it occur? _____
Did it involve intense fear, horror, or helplessness Yes No

Please circle how distressing the event was

|----------|----------|----------|----------|
1 2 3 4 5

21. Have you ever received professional counseling or therapy to help you deal with your traumatic event?
Yes No

22. If yes, please check which type(s) of counseling or therapy you received:

Therapy with a clinical psychologist	_____
Therapy with a social worker	_____
Therapy with a psychiatrist	_____
Therapy with a family physician or other type of doctor	_____
Medication from a physician, psychiatrist, or doctor	_____
Pastoral counseling	_____

Other (specify)_____

APPENDIX D

Twenty-item Toronto Alexithymia Scale

Instructions

Write in the number that corresponds to how much you agree or disagree with each of the following statements.

1 if you STRONGLY DISAGREE
2 if you MODERATELY DISAGREE
3 if you NEITHER DISAGREE NOR AGREE
4 if you MODERATELY AGREE
5 if you STRONGLY AGREE

__1. I am often confused about what emotion I am feeling.

__2. It is difficult for me to find the right words for my feelings.

__3. I have physical sensations that even doctors don't understand.

__4. I am able to describe my feelings easily.

__5. I prefer to analyze problems rather than just describe them.

__6. When I am upset, I don't know if I am sad, frightened, or angry.

__7. I am often puzzled by sensations in my body.

__8. I prefer to just let things happen rather than to understand why they turned out that way.

__9. I have feelings that I can't quite identify.

__10. Being in touch with emotions is essential

__11. I find it hard to describe how I feel about people.

__12. People tell me to describe my feelings more.

__13. I don't know what's going on inside me.

__14. I often don't know why I am angry.

__15. I prefer talking to people about their daily activities rather than their feelings.

__16. I prefer to watch "light" entertainment shows rather than psychological dramas.

__17. It is difficult for me to reveal my innermost feelings, even to close friends.

__18. I can feel close to someone, even in moments of silence.

__19. I find examination of my feelings useful in solving personal problems.

__20. Looking for hidden meanings in movies or plays distracts from their enjoyment.

APPENDIX E

Sixty-four-Item Inventory of Interpersonal Problems

Instructions

People have reported having the following problems in relating to other people. Please read the list below, and for each item consider whether it has been a problem for you with respect to **any** significant person in your life. Then write the number that describes how distressing that problem has been.

0: Not at all
1: A little bit
2: Moderately
3: Quite a bit
4: Extremely

It is hard for me to:

1. Trust other people _____
2. Say "no" to other people _____
3. Join in on groups _____
4. Keep things private from other people _____
5. Let other people know what I want _____
6. Tell a person to stop bothering me _____
7. Introduce myself to new people _____
8. Confront people with problems that come up _____
9. Be assertive with another person _____
10. Let other people know when I am angry _____
11. Make a long-term commitment to another person _____
12. Be another person's boss _____
13. Be aggressive toward other people when the situation calls for it _____
14. Socialize with other people _____
15. Show affection to people _____
16. Get along with people _____
17. Understand another person's point of view _____
18. Express my feelings to other people directly _____
19. Be firm when I need to be _____
20. Experience a feeling of love for another person _____
21. Set limits on other people _____
22. Be supportive of another person's goals in life _____
23. Feel close to other people _____
24. Really care about other people's problems _____
25. Argue with another person _____
26. Spend time alone _____
27. Give a gift to another person _____
28. Let myself feel angry at somebody I like _____
29. Put somebody else's needs before my own _____

0: Not at all
1: A little bit
2: Moderately
3: Quite a bit
4: Extremely

30. Stay out of other people's business _____
31. Take instructions from people who have authority over me _____
32. Feel good about another person's happiness _____
33. Ask other people to get together socially with me _____

It is hard for me to:
34. Feel angry at other people _____
35. Open up and tell my feelings to another person _____
36. Forgive another person after I've been angry _____
37. Attend to my own welfare when somebody else is needy _____
38. Be assertive without worrying about hurting the other person _____
39. Be self-confident when I am with other people _____

The following are things that you do too much.
40. I fight with other people too much. _____
41. I feel too responsible for solving other people's problems. _____
42. I am too easily persuaded by other people. _____
43. I open up to people too much. _____
44. I am too independent. _____
45. I am too aggressive toward other people. _____
46. I try to please other people too much. _____
47. I clown around too much. _____
48. I want to be noticed too much. _____
49. I trust other people too much. _____
50. I try to control other people too much. _____
51. I put other people's needs before my own too much. _____
52. I try to change other people too much. _____
53. I am too gullible. _____
54. I am overly generous to other people. _____
55. I am too afraid of other people. _____
56. I am too suspicious of other people. _____
57. I manipulate other people too much to get what I want. _____
58. I tell personal things to other people too much. _____
59. I argue with other people too much. _____
60. I keep other people at a distance too much. _____
61. I let other people take advantage of me too much. _____
62. I feel embarrassed in front of other people too much. _____
63. I am affected by another person's misery too much. _____
64. I want to get revenge against people too much. _____

APPENDIX F

The Beck Depression Inventory – Second Edition

Instructions

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then circle the **one statement** in each group that best describes the way you have been feeling during the **past two weeks, including today**. If several statements in the group seem to apply equally well, circle the highest number for that group.

1. Sadness
   - 0 I do not feel sad.
   - 1 I feel sad much of the time.
   - 2 I am sad all the time.
   - 3 I am so sad or unhappy that I can't stand it

2. Pessimism
   - 0 I am not discouraged about my future.
   - 1 I feel more discouraged about my future than I used to be.
   - 2 I do not expect things to work out for me.
   - 3 I feel my future is hopeless and will only get worse

3. Past Failure
   - 0 I do not feel like a failure.
   - 1 I have failed more than I should have.
   - 2 As I look back, I see a lot of failures.
   - 3 I feel that I am a total failure as a person.

4. Loss of Pleasure
   - 0 I get as much pleasure as I ever did from the things I enjoy.
   - 1 I don't enjoy things as much as I used to.
   - 2 I get very little pleasure from the things I used to enjoy.
   - 3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings
   - 0 I don't feel particularly guilty.
   - 1 I feel guilty over many things I have done or should have done.
   - 2 I feel quite guilty most of the time.
   - 3 I feel guilty all of the time

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry even more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

11. Agitation

0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness
    - 0 I make decisions about as well as ever.
    - 1 I find it more difficult to make decisions than usual.
    - 2 I have much greater difficulty in making decisions than I used to.
    - 3 I have trouble making any decisions.

14. Worthlessness
    - 0 I do not feel I am worthless.
    - 1 I don't consider myself as worthwhile and useful as I used to.
    - 2 I feel more worthless as compared to other people.
    - 3 I feel utterly worthless.

15. Loss of Energy
    - 0 I have as much energy as ever.
    - 1 I have less energy than I used to have.
    - 2 I don't have enough energy to do very much.
    - 3 I don't have enough energy to do anything.

16. Changes in Sleep Pattern
    - 0 I have not experienced any change in my sleeping pattern.
    - 1a I sleep somewhat more than usual.
    - 1b I sleep somewhat less than usual.
    - 2a I sleep a lot more than usual.
    - 2b I sleep a lot less than usual.
    - 3a I sleep most of the day.
    - 3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability
    - 0 I am no more irritable than usual.
    - 1 I am more irritable than usual.
    - 2 I am much more irritable than usual.
    - 3 I am irritable all the time.

18. Changes in Appetite
    - 0 I have not experienced any change in my appetite
    - 1a My appetite is somewhat less than usual.
    - 1b My appetite is somewhat greater than usual.
    - 2a My appetite is much less than before.
    - 2b My appetite is much greater than usual.
    - 3a I have no appetite at all.
    - 3b I crave food all the time.

19. Concentration Difficulty
    0 I can concentrate as well as ever.
    1 I can't concentrate as well as usual.
    2 It's hard to keep my mind on anything for very long.
    3 I find I can't concentrate on anything.

20. Tiredness or Fatigue
    0 I am no more tired or fatigued than usual.
    1 I get more tired or fatigued more easily than usual.
    2 I am too tired or fatigued to do a lot of things I used to do.
    3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex
    0 I have not noticed any recent change in my interest in sex.
    1 I am less interested in sex than I used to be.
    2 I am much less interested in sex now.
    3 I have lost interest in sex completely.

APPENDIX G

Prescreening Questions

1. Have you ever experienced, witnessed, or been confronted with a traumatic event that involved actual or threatened death or serious injury, or a threat to the physical integrity of yourself or others (such as the death of someone close to you, a serious injury, accident, disability, or illness to yourself or someone close to you, physical or sexual abuse, rape, a crime, or a combat-related experience)?

__ Yes __ No

2. Did this experience involve fear, helplessness, horror OR distress?

__ Yes __ No

APPENDIX H

Consent Form

LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: The psychological and interpersonal factors contributing to emotional distress

You are asked to participate in a research study conducted by Ciaran Considine and Dr. Sandra Paivio, from the Psychology Department at the University of Windsor. The results will be used in Ciaran Considine's Master's Thesis.

If you have any questions or concerns about the research, please feel to contact Dr. Paivio (xxxx@uwindsor.ca, xxx-xxx-xxxx ext. xxxx), or Ciaran Considine (xxxx@uwindsor.ca, or xxx-xxx-xxxx).

PURPOSE OF THE STUDY

This study intends to further understand the psychological and interpersonal factors contributing to the type of emotional distress that frequently occurs among university students.

PROCEDURES

If you volunteer to participate in this study, you will be asked to:

Initial Questionnaire Session
You will be scheduled for a group testing session, which will be conducted in Psychology Department (Chrysler Hall South). During this session, participants will be given written information about the study, have the opportunity to ask any questions, complete consent forms, and then will be administered the battery of six questionnaires. This will take approximately one hour.

Computer Task Session
After the questionnaire session, you will be contacted by email to schedule an individual appointment to complete a computer-administered task, again conducted in the Psychology Department. During this session, you will be asked to describe the vocal quality of a variety of recorded sentences. This will take approximately thirty (30) minutes.

POTENTIAL RISKS AND DISCOMFORTS

Participants in this study were deliberately selected for exposure to stressful life event(s), there is a risk that some participants will be experiencing lingering psychological distress as a result of this exposure, and that distress could be activated as a result of completing some of the questionnaires. Therefore, at completion of each phase of the study, participants will be provided with information about free psychological and counselling services on campus and in the community.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

You could gain a sense of satisfaction by contributing to the understanding of psychological phenomena and emotional difficulties that are prevalent among undergraduate students. You also could gain a sense of satisfaction by knowing that your participation, in turn, could contribute to prevention and treatment of these difficulties.

COMPENSATION FOR PARTICIPATION

Participants will receive 1.5 bonus points for 90 minutes of participation towards the psychology participant pool, if registered in the pool and enrolled in one or more eligible courses.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.

Only numbers will be attached to the physical data which is retained. Individual raw physical data will be stored in a cabinet in the supervisor's lab for a period of 10 years, after which they will be shredded. Individual data will be entered on computer file and retained in the files of both the principle investigator and supervisor for a minimum period of 10 years and may be used in future research.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. If you withdraw during the first session, you will receive bonus points only for that session. If you do not attend the second session you will not receive points for that session. If you complete or withdraw from the second session you will receive full bonus points. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so (e.g. incomplete or missing data).

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

Upon completion of this study you will be emailed a brief summary of the results. You may also investigate the psychology department's website to look for Thesis results/defence after the below date.

Web address: http://web4.uwindsor.ca/units/psychology/psycNew.nsf
Date when results are available: October 2011 (Estimate)

SUBSEQUENT USE OF DATA

This data may be used in subsequent studies.

RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study [The psychological and interpersonal factors contributing to emotional distress] as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____
Name of Participant

_____ _____
Signature of Participant Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____ _____
Signature of Investigator Date

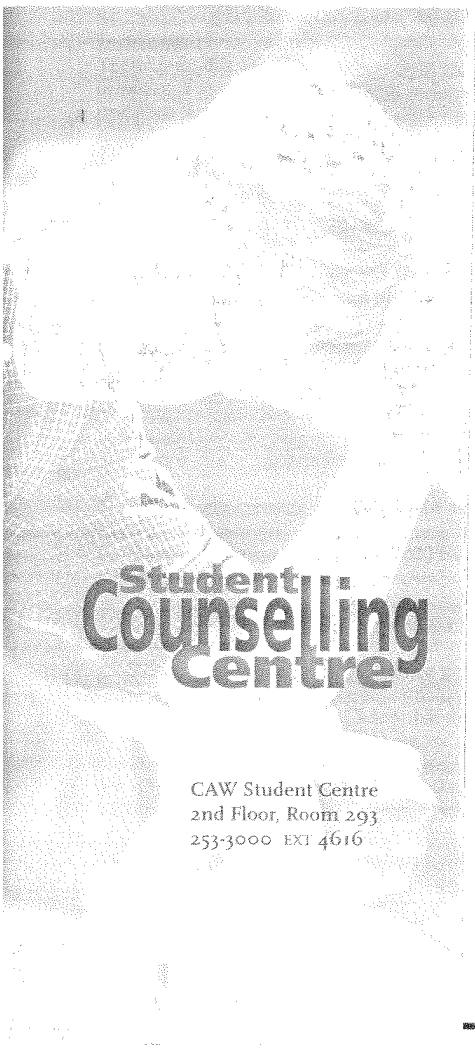
APPENDIX I

Psychological Services Information

Debriefing for Study: "Alexithymia Assessed through Auditory-Affective Perception and Interpersonal Problems as Mediators of the Relationship between Trauma and Depression"

CAMPUS PSYCHOLOGICAL SERVICES

Since participants in this study were deliberately selected for exposure to stressful life event(s), there is an increased risk that participants will be experiencing lingering psychological distress as a result of this exposure, and that distress could be activated as a result of completing some of the questionnaires. If you are experiencing psychological distress (e.g., anxiety, interpersonal problems, depression, suicidal ideation), you are strongly encouraged to seek confidential help for these difficulties. The following is a list of free psychological and counseling services on campus and in the community:



A New Student Support Service

The Student Counselling Centre provides short-term and crisis counselling, topic-focused group discussions, and workshops on topics such as stress management and relaxation training, all geared to student needs. Some common concerns that students have are: adjusting to university academic and social life, relationship problems, depression, anxiety, family difficulties, and cultural concerns. If any personal issue is affecting your life and you would like some help, please consider visiting us at the Student Counselling Centre.

What Is Counselling?

Counselling is a helping relationship between you and a professional counsellor. It involves exploring your thoughts, feelings, behaviours and relationships when these become difficult for you to manage. Discussion of whatever is important to you can lead to personal growth, mature choices, and responsible action.

Confidentiality

All inquiries and discussions are private and confidential, within the applicable legal and professional guidelines of the College of Psychologists of Ontario. No information about you will be given to anyone without your written consent. Rare exceptions to this rule will be discussed when you make your first appointment.

Meeting With A Counsellor

Come to the second floor of the CAW Student Centre, Room 293 between 8:30 to 4:30 any weekday. You will be asked to complete a brief information sheet and we will try to give you a prompt appointment that fits into your schedule, often the same day. In your first meeting, you will have a chance to describe your concerns to your counsellor and clarify the goals that you would like counselling to achieve. Often, this session, with one or two follow-up meetings, will be all that is needed to assist you with a specific problem. If necessary, longer term counselling options may also be suggested and a referral made for you.

The Staff

Dr. Mary Anne Johnston (C. Psych.), Clinical Director
Ms. Elizabeth Hall, M.A., Counsellor
Ms. Pat Jolie, Office Manager

Additional Off-Campus Psychological Services

Specialized Mental Health & Addictions Program

Windsor Regional Hospital
1453 Prince Road
Windsor, Ontario N9C 3Z4
mental.health@wrh.on.ca

Sandwich Community Health Centre

749 FELIX AVE
Windsor, Ontario N9C 1P9
(519) 258-6002

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