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# Secondary Traumatic Stress and Alexithymia in High-Risk Professionals

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Graduate Program in Education

A thesis submitted in partial fulfillment of the requirements for the degree in Master of Arts

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Secondary Traumatic Stress and Alexithymia in High-Risk Professionals

by

Matthew R. J. Vandermeer

Graduate Program in Education

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts in Counselling Psychology

The School of Graduate and Postdoctoral Studies

The University of Western Ontario

London, Ontario, Canada

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### **Abstract**

This study investigated the role that cognitive deficits in emotional processing (i.e., alexithymia) play in the development of traumatic responses, such as secondary traumatic stress (STS), following work with clients who have experienced trauma. Using a prospective cohort of novice counselling psychology and pre-service education students, participants were measured for traits of alexithymia and STS before and after their first practicum placements. Elevated rates of STS consistent with a diagnosis of post-traumatic stress disorder were identified in participants following initial practicum placement. Correlation analyses demonstrated that alexithymia and alexithymia symptom clusters were significantly, and robustly, associated with STS and STS symptom clusters. Finally, hierarchal multiple regression analysis found that scores of alexithymia, pre-trauma exposure, predicted a significant amount of the variance in post-trauma exposure STS. Implications for identification, prevention, treatment, and destigmatization of negative emotional responses to working with clients who have experienced trauma are discussed along with future directions of study.

### **Keywords**

Alexithymia, Secondary Traumatic Stress, Post-Traumatic Stress Disorder, Therapists, Teachers.

### Acknowledgments

Anyone who's ever been in a classroom, sat down for a meal, or spent more than ten minutes with me knows that I'm definitely *not* a man of few words. In fact, it's only now that the time has come to write the acknowledgments section of my thesis that I find myself at a loss for words. There are so many people that were essential in supporting me through the completion of this work and I know that mere words will never convey the depth of my gratitude. With that being said, I hope that you all know just how much your unwavering encouragement, reassurance, and patience has meant to me through the duration of my Master's degree. As with anytime that I try to come up with names, I know that I've missed someone. There are people who NEED to be on this list that aren't. For anyone who I've inadvertently forgotten, all apologies and a sincere thank-you.

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## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

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## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

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**Table of Contents**

Abstract.....	ii
Acknowledgments.....	iii
Table of Contents.....	vi
List of Tables.....	xi
List of Appendices.....	xii
Chapter 1.....	1
1 Introduction.....	1
1.1 Secondary Traumatic Stress.....	2
1.1.1 Understanding Secondary Traumatic Stress.....	2
1.1.2 Vicarious Trauma and Burnout.....	4
1.1.3 Secondary Traumatic Stress in Teachers.....	5
1.1.4 Role of Teachers.....	7
1.1.5 Secondary Traumatic Stress in Mental Health Workers.....	8
1.1.6 Associated Factors.....	10
1.2 Alexithymia.....	12
1.2.1 Alexithymia and PTSD.....	15
1.2.3 Alexithymia and STS.....	18
1.3 Present Study.....	19
Chapter 2.....	20
2 Methodology.....	20
2.1 Participants.....	20
2.1.1 Time One Participants.....	20

## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

2.1.2	Time Two Participants.....	20
2.2	Materials.....	21
2.2.1	Secondary Traumatic Stress Scale.....	21
2.2.2	Toronto Alexithymia Scale.....	22
2.2.3	Trauma Preparation.....	23
2.2.4	Demographic Information.....	23
2.3	Procedure.....	24
2.4	Ethical Considerations.....	24
2.5	Research Questions.....	24
2.6	Analyses.....	25
2.6.1	Scale Reliability.....	25
2.6.2	Group Comparisons.....	25
2.6.3	Question 1 – Is STS Present in Emerging Professionals?.....	25
2.6.4	Question 2 – Is Alexithymia Associated with STS?.....	25
2.6.5	Question 3 – Does Alexithymia Predict Variance in STS?.....	26
2.7	Hypotheses.....	26
2.7.1	Hypothesis 1 – Is STS Present in Emerging Professionals?.....	26
2.7.2	Hypothesis 2 – Is Alexithymia Associated with STS?.....	27
2.7.2.1	Hypothesis 2a.....	27
2.7.2.2	Hypothesis 2b.....	27
2.7.3	Hypothesis 3 – Does Alexithymia Predict Variance in STS?.....	27
Chapter 3	.....	29
3	Results.....	29



## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

3.1	Scales.....	29
3.1.1	Secondary Traumatic Stress Scale.....	29
3.1.2	Toronto Alexithymia Scale.....	29
3.2	Group Comparison.....	30
3.2.1	Time 1 Participants Vs. Time 2 Participants.....	30
3.2.2	Program Comparison.....	30
3.2.3	Gender.....	31
3.2.4	Time 1 Vs. Time 2 Scores.....	31
3.3	Question 1 – Is Secondary Traumatic Stress Present in Emerging Professionals?.....	32
3.3.1	Overview.....	32
3.3.2	Results.....	32
3.4	Question 2 – Is Alexithymia Associated With STS?.....	35
3.4.1	Overview.....	35
3.4.2	Results.....	35
3.5	Question 3 – Does Alexithymia Predict Variance in STS?.....	36
3.5.1	Overview.....	36
3.5.2	Results.....	37
	Chapter 4.....	40
4	Discussion.....	40
4.1	Study Overview.....	40
4.2	Group Comparisons.....	42
4.2.1	Time 1 Participants Vs. Time 2 Participants.....	42

## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

4.2.2	Program Comparison.....	42
4.2.3	Time 1 Vs. Time 2 Scores.....	42
4.3	Question 1 – Is Secondary Traumatic Stress Present in Emerging Professionals?.....	43
4.3.1	Review.....	43
4.3.2	Conclusions and Discussion.....	43
4.3.3	Next Steps and Suggestions.....	45
4.4	Question 2 – Is Alexithymia Associated With STS?.....	46
4.4.1	Review.....	46
4.4.2	Conclusions and Discussion.....	46
4.4.2.1	Hypothesis 2a.....	46
4.4.2.2	Hypothesis 2b.....	49
4.4.2.3	Other Relationships.....	50
4.4.3.4	General Conclusions.....	51
4.4.3	Next Steps and Suggestions.....	51
4.5	Question 3 – Does Alexithymia Predict Variance in STS?.....	51
4.5.1	Review.....	51
4.5.2	Conclusions and Discussion.....	52
4.5.2.1	Correlational Analysis.....	52
4.5.2.2	Hierarchal Multiple Regression Analysis.....	53
4.5.2.3	General Conclusions.....	56
4.5.3	Next Steps and Suggestions.....	56
4.6	Implications.....	57

## SECONDARY TRAUMATIC STRESS AND ALEXITHYMIA

4.7	Strengths and Limitations.....	59
4.7.1	Strengths.....	59
4.7.2	Limitations.....	59
	References.....	62
	Appendices.....	75
	Curriculum Vitae.....	86

**List of Tables**

Table 1: Means and Standard Deviations of Scales.....	30
Table 2: Comparison of Means By Participant Academic Program.....	31
Table 3: STSS Response Frequencies and Descriptive Statistics at Time 2.....	34
Table 4: Frequency of PTSD/STS Diagnostic Criteria.....	35
Table 5: Correlations Between T2 STSS and TAS-20 Scores.....	36
Table 6: Correlations Between T1 TAS-20 Scores and T2 STSS Scores.....	38
Table 7: Hierarchal Multiple Regression Analysis With T2 STSS Full Scores as Outcome.....	39

**List of Appendices**

Appendix A: Ethical approval from the University of Western Ontario  
Research Ethics Board.....75

Appendix B: Participant letter of information for time 1 of the study.....76

Appendix C: Participant letter of information for time 2 of the study.....78

Appendix D: The Secondary Traumatic Stress Scale for measuring STS.....80

Appendix E: The Toronto Alexithymia Scale 20 question version for  
measuring alexithymia (TAS-20) .....81

Appendix F: Trauma preparation question for time 1 and time 2.....82

Appendix G: Time 1 demographics questionnaire.....83

Appendix H: Time 2 demographics questionnaire.....84

Appendix I: Mental health services information provided to participants.....85

## Chapter 1 – Introduction

Research has consistently found, and many personal accounts agree, that helping people who have experienced trauma can have deleterious effects on the helpers own mental health (Hesse, 2002). There are a number of professions that inherently involve a higher rate of exposure to people with traumatic experiences (i.e., first responders, social workers, psychotherapists, physicians, teachers etc.). Given the higher rate of exposure to client trauma, professionals in these fields can be assumed to be at an elevated risk of experiencing the negative affects of helping those with traumatic stress. Among the negative mental health consequences that these helping professionals may be vulnerable to is secondary traumatic stress.

Although there is a long history of research investigating the causes and factors associated with traumatic stress, the study of the impact of helping people experiencing traumatic stress is relatively new (Baird and Kracen, 2006). This is believed to be the first investigation of the relationship between the impact of working with people who have a history of traumatic stress (specifically secondary traumatic stress) and difficulty one's own emotional responses (alexithymia), and among the first studies to investigate the phenomenon of secondary traumatic stress in emerging professionals in education and counselling psychology.

As Killian (2008) stated, “healthy, psychologically present, and committed professionals are in a better position to offer assistance to trauma survivors than those providers who suffer from symptoms (of secondary traumatic stress)...” (p. 32). Given the work that professionals in the fields of education and mental health do to help improve the lives of society's more vulnerable populations (i.e., children, adolescents, mentally ill), it is essential to investigate the factors that may negatively impact their ability to effectively provide their client's with effective help and support.

This study investigated the relationship between secondary traumatic stress and alexithymia among a cohort of emerging educators and psychotherapists. Using a repeated measures design, data was collected before and after participants' potential exposure to work with trauma clients during their practicum placements. In addition to the aforementioned phenomena, the role of participants' sense of preparation to work with clients who had experienced trauma was also investigated. The relationships between these phenomena were analyzed using ANOVA, correlation analyses, and hierarchical multiple regression analysis.

This paper begins with an overview of both secondary traumatic stress and alexithymia. By reviewing the literature investigating these phenomena, and related issues, this paper will establish the role of the current study in understanding the risk and protective factors for negative mental health reactions to working with people who have experienced trauma. Following the literature review an explanation of the main questions, methodology, and results of this study will be provided. The paper will conclude with a discussion of both interpretation of the results and the implications for both practice and future research.

### **Secondary Traumatic Stress (STS)**

**Understanding secondary traumatic stress.** Secondary traumatic stress (STS), or compassion fatigue (CF), is a stress reaction wherein an individual acquires traumatic symptoms through exposure to a traumatized person, rather than through a primary traumatic stressor (Figley, 1995a; Beck, 2011). Although first described by Joinson (1992), it was Figley (1995a) who began using compassion fatigue as an analogous term to STS. For the purposes of this study, the traditional, and more semantically clear, "secondary traumatic stress" will be used.

The characteristic features of STS are essentially identical to the characteristic features and symptoms of post-traumatic stress disorder (PTSD; Figley, 2002). As such, a description of

PTSD symptomology is necessary in order to fully understand STS. In addition to exposure to a traumatic event, diagnosis of PTSD by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. revised; *DSM-IV-TR*; American Psychiatric Association [APA], 2000) requires that an individual exhibit symptoms from three different classes; these include: (a) one or more symptoms of re-experiencing the trauma, (b) three or more symptoms of avoidance and/or emotional numbing, and (c) two or more symptoms of increased arousal.

The primary distinguishing feature of STS is the origin of the subject's symptoms. Although individuals with PTSD have experienced some sort of traumatic event personally, those experiencing STS have been exposed to trauma secondarily (i.e., through a retelling of the traumatic event). The subsequent re-experiencing and avoidance seen in STS is centered on the person who experienced the primary trauma rather than the primary trauma itself. Essentially, the individual who was initially traumatized passes their traumatic experience onto another who then experiences STS. For all intents and purposes, STS is PTSD; the *DSM-IV-TR* acknowledges that an individual may develop PTSD following indirect exposure to another's trauma (APA, 2000). In addition, the recently updated *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-V*; APA, 2013) has acknowledged that an individual may develop PTSD through "repeated exposure to aversive details of traumatic events". Bride (2007) emphasized the interchangeability of the two terms in his validation study of the *Secondary Traumatic Stress Scale*.

Although most previous study of PTSD has focused primarily on those who experience the primary traumatic stressor (Figley, 1995a), this study will analyze traumatic stress in those who have experienced secondary trauma. Therefore, for the purposes of this study, it is important to distinguish PTSD due to primary trauma from PTSD in those who experience traumatic stress



through someone they are helping, as in the case of STS (Figley, 1995a; Ortlepp & Friedman, 2002).

**Vicarious trauma and burnout.** A common misconception, prevalent both in the literature and lay population, is thinking of vicarious trauma (VT), burnout and STS as synonymous terms (Newell & MacNeil, 2010); however, the three terms are distinctly complex phenomena. In order to avoid confusion, an explanation of both VT and burnout, in relation to STS, is warranted.

VT refers to a gradual cognitive shift in one's worldview and inner-world following the use of empathy in chronic interactions with traumatized individuals (Helm, 2010; Pearlman, 1999; Newell & MacNeil, 2010). Although the two (VT and STS) may seem similar, it is helpful to remember that current conceptualization of STS focuses on the behavioural symptoms of PTSD (Figley, 2002) and requires only one exposure to another's trauma (Beck, 2011). On the other hand, VT focuses on the alteration of internal cognitive events, and occurs after long-term, direct practice with trauma clients (Newell & MacNeil, 2010).

Burnout refers to a multidimensional condition present in many professions, not exclusively those who work with trauma clients (Maslach & Jackson, 1981); however, it is typically reported to have higher prevalence in helping professions (Cordes & Dougherty, 1993). Maslach (1982) constructed the dominant conceptualization of burnout as a three-component phenomenon; in which the features include: (a) emotional exhaustion, (b) depersonalization, and (c) a reduced sense of accomplishment (Newell & MacNeil, 2010). Emotional exhaustion is defined by low energy and feelings of being emotionally 'used up' (Cordes & Dougherty, 1993). Depersonalization refers specifically to the depersonalization or dehumanization of clients, including detachment and cynicism (Cordes & Dougherty, 1993). A reduced sense of

accomplishment manifests itself as negative evaluations of oneself, and one's competence at their job (Cordes & Dougherty, 1993). As with VT, and unlike STS, burnout develops over time (Maslach, 2003). It arises based on factors of the individual, the clientele they work with, and the organization they work within (Maslach, 2003; Maslach, Schaufeli, & Leiter, 2001).

As was previously mentioned, STS refers to a cluster of symptoms consistent with the *DSM-IV-TR* diagnostic criteria of PTSD (APA, 2000). Those experiencing STS have been exposed to trauma secondarily (i.e., through a retelling of the traumatic event), with the subsequent re-experiencing and avoidance characteristic of traumatic responses centered on the person who experienced the primary trauma rather than the primary trauma itself.

**Secondary traumatic stress in teachers.** As Manion, Short, Ferguson, and Ungerleider (2011) said, "Children and youth are with us (teachers) six hours a day, five days a week. We (teachers) can have an enormous influence in shaping their well-being". The fact that teachers occupy a distinct vantage from which to influence the well-being of students' mental health also puts them at higher risk of developing STS.

Epidemiological research has demonstrated extremely high rates of exposure to traumatic events among children, youth, and young adults. Porche, Fortuna, Lin, and Alegria (2011) found that, approximately 38% of young adults reported exposure to a major traumatic event prior to the age of 16. The "Developmental Victimization Study" (Finkelhor, Ormrod, Turner, & Hamby, 2005) found 71% of individuals between the ages of 2 and 17 had been the victims of some form of violent or criminal activity, with 70% of those individuals reporting repeated exposure. Kilpatrick and Saunders' (1997; in Fairbank, 2008) "National Survey of Adolescents" found that, 39.4% of American youth aged 12 to 17 had witnessed at least one serious incident of interpersonal violence, with 17.4% and 8.1% having experienced a serious physical and sexual

assault, respectively. In a survey of students recently admitted to American colleges (Read, Ouimette, White, Colder, & Farrow, 2011), 66% of students reported exposure to traumatic events. Read and colleagues (2011) also found higher rates and severity of trauma among students with lower socio-economic status (SES). In addition, Porche and colleagues (2011) found that approximately 4% of those under 16 years of age met the requirement for a diagnosis of PTSD, with another study finding 3.7% of males and 6.3% of females between the ages of 2 and 17 had been diagnosed with PTSD (Kilpatrick et al., 2003). Although the aforementioned studies were conducted on American samples, a previous Canadian study of PTSD and trauma exposure has demonstrated very similar rates between adults in the two countries (Van Ameringen, Mancini, Patterson, & Boyle, 2008). Given this finding, and the cultural homogeneity between the United States and Canada, it is reasonable to extend these findings to similarly aged children and youth in Canada.

The high rate of exposure to traumatic stressors among school aged children, along with the substantial amount of time teachers spend working with students in a helping capacity, makes it reasonable to assume that teachers and educators may be at risk of experiencing STS. While much has been written regarding the impact of burnout on teachers' mental health (Chang, 2009; Kyriacou, 2001; Wisnewski & Garguilo, 1997; Yavuz, 2009), there is presently very limited research available regarding teacher or educator experience with STS.

In a qualitative study, VanBergeijk and Sarmiento (2006) reported on the experiences of 28 South Californian teachers who had reported cases of sexual abuse in their students. During open interviews, many participants discussed experiencing some or all of the symptoms of STS as a result of their students' disclosure of sexual abuse. Although the findings of this study are

limited to the teachers in this high violence neighbourhood, it was one of the first to demonstrate the pervasiveness of STS among teachers.

Hatcher and colleagues (2011) conducted a quantitative analysis of STS among juvenile justice teachers. Using the well-validated *Secondary Traumatic Stress Scale* (Bride, Robinson, Yegidis, & Figley, 2004) researchers found that, among the juvenile justice teachers, 81% endorsed one symptom of STS (PTSD), 55% endorsed two, and 39% endorsed all three symptom categories. As the student population in this study consisted exclusively of juvenile delinquents, it is likely that there is a considerable difference compared with the general student population. Delinquent youth have previously been reported to have a higher frequency of exposure to traumatic events and a higher frequency of PTSD diagnoses than non-offending youth (Costello, Erkanli, Fairbank, & Angold, 2002). In this case, teachers reported that 95% of their students were traumatized and 34% of the students were severely traumatized. This must be taken into consideration when attempting to extend these results to a non-offender student population.

Aside from these studies, there is currently a deficit of literature with a focus on STS in teachers. The majority of available studies have investigated STS in other helping professions that involve a high rate of exposure to traumatized individuals (i.e., social workers [Simon, Pryce, Rolf, & Klemmack, 2005], child service workers [Cornille & Meyers, 1999; Caringi & Hall, 2008], nurses [Alexander et al., 1989; Laposa & Alden, 2003; Dominguez-Gomez & Rutledge, 2009], etc.) and show STS to be prevalent in the helping professions.

**Role of teachers.** Teachers occupy a unique position in the life of a student. While they are certainly expected to instruct and educate students based on their curriculum, they have also come to occupy a number of other important roles. In addition to dispensing knowledge, teachers are increasingly called upon to act as disciplinarians, organizational and student leaders (Scriven,

1994), mental health professionals (Rothi, Leavey, & Best, 2007), nurturers (Inbar, 2006), and instructors of social values and norms, amongst other roles.

Given the multitude of roles that teachers assume in order to educate their students, it may be argued that STS, much like VT or burnout, would negatively impact teachers' abilities to effectively function in their role as an educator. The teacher who is experiencing symptoms of STS, due to their students' trauma, is very likely going to be ineffective in meeting the demands of their role as an educator.

**Secondary traumatic stress in mental health workers.** Compared with the literature concerning STS in teachers, the study of STS in social workers is more developed. The greater number of studies investigating STS in mental health workers is of no surprise considering that the predominant measure of STS, the *Secondary Traumatic Stress Scale* (Bride et al., 2004), was initially designed for use with and validated on a sample of American social workers. Given the requirement of exposure to clients with a history of trauma for the development of STS, it follows that researchers have begun studying STS by focusing on mental health workers, and that mental health workers are likely at high-risk of developing STS.

Bride (2007) assessed the prevalence of STS in a survey of 294 randomly selected social workers in a Southern U.S. state using the *Secondary Traumatic Stress Scale*. He found that a great majority of respondents reported exposure to and direct work with traumatized clients; 70.2% of participants reported at least one symptom of STS in the previous week. It was also demonstrated that approximately 55%, 20%, and 15% met the requirements for one, two or three of the core criteria for a diagnosis of PTSD, respectively, following indirect trauma exposure. As Bride (2007) argues, a report of over 15% of social workers experiencing three core criteria of STS/PTSD in the past week, and thus the requirements of a diagnosis of PTSD, is almost twice

the lifetime prevalence of 7.8% (Kessler, Sonnega, Bromet, & Nelson, 1995) reported in the general population. Although the findings of this study are limited to a sample of social workers from a single Southern U.S. state, they emphasize the heightened risk of social workers developing STS or PTSD through indirect exposure to their clients' trauma.

A study of oncology social workers (Simon et al., 2005) found that 57% reported difficulty sleeping, 47% found themselves avoiding thoughts and feelings surrounding their clients, and 32% reported angry or irritable outbursts, all symptoms of STS/PTSD. Although Simon and colleagues (2005) explored the association of STS with a variety of other factors (i.e. emotional involvement with clients, empathic responding, burnout, etc.) no correlations reached significance. This is likely to do with the extremely small sample size ( $N = 21$ ) used in this study. Despite the study of STS being relatively young and most studies continuing to be exploratory in nature, it is important that future investigations take steps to ensure sufficient sample sizes to encourage more robust results.

Qualitative analysis has pointed to the possible benefits that exposure to others' trauma, and even STS, can provide to the practicing helping professional (Shamai & Ron, 2009). Through open-ended interviewing of Israeli social workers responding to victims of terrorist attacks, Shamai and Ron (2009) found that the immediate and short-term impact of interacting with trauma clients conferred mostly positive outcomes for their professional life (i.e. reduced anxiety due to training, support and acknowledgement at work, etc.) and negative outcomes for their personal life (i.e. chaos, anxiety, identifying with victims, disengagement, etc.); however, in the long-term, participants reported positive outcomes in both their professional and personal life. These positive outcomes mostly came in the form of personal and professional growth and maturation (Shamai & Ron, 2009). This brings forth the possibility that the psychological effects

of exposure to trauma clients need not be all negative; it can, and does, sometimes endow one with valuable experiences.

Several studies have investigated the presence of STS in social workers with youth clients (Conrad & Kellar-Guenther, 2006; Meyers & Cornille, 2002; Perron & Hiltz, 2006). In their study of approximately 30% (363) of all child protection social workers in Colorado, Conrad, and Kellar-Guenther (2006) found more than 50% to be at high or extremely high risk of STS. In a similar population, Meyers and Cornille (2002) found that 37% of child protection social workers were currently experiencing distress consistent with STS. Perron and Hiltz's (2006) examination of STS in social workers investigating child abuse found that neither personal characteristics of the participant nor demands specific to the job were not significantly associated with a higher risk of STS. They did however, show that participant self-efficacy was inversely related to risk of STS; therefore, it seems that improving helper self-efficacy may result in lower rates of STS (Perron & Hiltz, 2006).

**Associated factors.** The empirical study of STS is a relatively new field. As such, many of the proposed associations with STS are difficult to determine conclusively. Baird and Kracen (2006) highlight the nebulosity of the literature in their review of STS. While the authors initially intended to write a meta-analysis on the correlates of STS, they quickly realized that meta-analytic techniques were not feasible due to conceptual limitations in the young field. Instead, they synthesized the research using the epidemiological method, levels of evidence (Miller & Thorsen, 2003). In this approach, hypotheses are sorted on a scale from most persuasive to least persuasive (persuasive evidence, reasonable evidence, some evidence, and no evidence) based on the methodological soundness of different studies and the number of statistically significant findings. Using Miller and Thorsen's (2003) criteria, the authors found contradictory evidence

for a link between personal trauma history and STS, and persuasive evidence that greater levels of exposure to secondary trauma increases the likelihood of developing STS (Baird & Kracen, 2006).

Several studies have spoken to the possible link between professional experience and STS. For instance, among sexual assault nurse examiners, it has been found that older age and higher levels of education are associated with significantly lower levels of STS (Townsend & Campbell, 2008). They also found that those with more time spent as a sexual assault nurse examiner was associated with lower levels of STS (although this did not reach significance). This inverse association between experience/age and the risk of developing STS or PTSD symptoms in a helping profession has also been demonstrated in other studies (Mealer et al., 2011). It is difficult to determine whether the lower symptom incidence seen among older, more experienced professionals is a product of the experience itself. The data may be skewed due to an attrition bias; those who last long enough to be considered experienced in their profession are those that did not have to contend with STS in the early stages of their career. Those who developed STS at early stages of their career may have left the profession in disproportionate numbers.

Killian's (2008) mixed-methods study of child sexual abuse counsellors investigated risk and resiliency factors for STS. In the qualitative portion of the study, 20 counsellors were questioned using a semi-structured interview. Peer support and debriefing were identified as the most important coping factors, while social isolation was the most frequently reported risk factor. The results of the qualitative portion of this study informed the development of a quantitative analysis. A questionnaire was administered to 104 child sexual abuse therapists, which measured history of trauma, emotional coping style, coping strategies, burnout and



compassion fatigue, affective self-awareness, and work stresses and resources. They found an internal locus of control and a sense of powerlessness was associated with compassion satisfaction and compassion fatigue, respectively. Highlighting the importance of social support are a number of other studies finding that peer, family, and therapeutic support are effective in reducing the risk of developing STS reactions (Cohen & Collens, 2013; Harrison & Westwood, 2009; Hunter & Schofield, 2006; Jorgensen, 2012).

Bride et al. (2004), and Newell and MacNeil (2010) have provided review articles on STS/CF in which they collect much of the available information regarding associated factors. Among the many associated risk factors are: personal history of trauma (Gardell & Harris, 2003; Ghahramanlou & Brodbeck, 2000; Pearlman & Mac Ian, 1995), high volume of traumatized clients with little clinical trauma experience (Lerias & Byre, 2003), and poor coping mechanisms (Schauben & Frazier, 1995; Follette, Polunsky, & Milbeck, 1994).

With regards to poor coping mechanisms, both reviews describe the use of negative coping strategies, highlighting emotional suppression, as a risk factor for developing STS (Bride et al., 2004; Newell & MacNeil, 2010). The concept of emotional suppression has many similarities to the psychological construct alexithymia.

### **Alexithymia**

The term “alexithymia” was first introduced into psychological literature just under 40 years ago (Sifneos, 1973). As Taylor (2000) described, alexithymia is defined by three main symptom clusters, including: (a) difficulty identifying feelings (DIF); (b) difficulty describing feelings (DDF); (c) externally oriented thinking style (EOT). Current understanding of the concept is summed up by Ogrodniczuk, Piper, and Joyce’s (2008) statement that alexithymia is

described as a “deficit in the cognitive processing of emotional experience, such that individuals have a limited capacity to symbolize emotions and elaborate upon emotional experience” (p. 43).

There has been some debate regarding whether to conceptualize alexithymia as a stable personality trait or a state-dependent feature. Of those who consider alexithymia from the perspective of a state-dependent feature, one explanation is that of alexithymia as a coping mechanism (Lumley, 2000). Support for this perspective is found in studies of alexithymia and depression (Honkalampi et al., 2001; Marchesi et al., 2008; Saarijarvi, Salminen, & Toikka, 2001), in which researchers find that alexithymia tends to co-vary with changes in depressive states.

In Marchesi and colleagues’ (2008) study, researchers examined the relationship between alexithymia and major depression in pregnant women. Researchers followed 149 women, assessing them for the presence of major depression and depressive symptoms and alexithymia, using the *Toronto Alexithymia Scale* (TAS-20), during monthly prenatal checkups. Marchesi et al. (2008) found that those women who met criteria for a diagnosis of major depression or sub-threshold depression showed levels of alexithymia similar to the non-depressed controls prior to the onset of depression, a subsequent rise in alexithymic symptoms coinciding with the onset of depression, and a decrease in alexithymic symptoms during remission of depression. These researchers interpreted their findings as evidence for a state-dependent conceptualization of alexithymia.

The presence of alexithymia is widespread in many psychological disorders, including: depression (Honkalampi et al., 2000; Marchesi, Bertoni, Cantoni, & Maggini, 2008; Leweke, Leichsenring, Kruse, & Hermes, 2011), eating disorders (Carano et al., 2006; de Zwaan et al., 1995), panic disorders (Marchesi, Fonto, Balista, Cimmino, & Maggini, 2005; Parker, Taylor,

Bagby, & Acklin, 1993), obsessive-compulsive disorder (Rufer et al., 2006), and addiction (Evren et al., 2008; Taylor, Parker, & Bagby, 1990). Additionally, alexithymia has been found to be associated with lower levels of social support (Fukunishi & Rahe, 1995; Lumley, Ovies, Stettner, Wehmer, & Lakey, 1996; Mallinckrodt & Wei, 2005). Finally, meta-analytic research has demonstrated a higher level of alexithymia in both clinical and non-clinical populations of men when compared with women (Levant, Hall, Williams, & Hasan, 2009).

Alexithymia is also commonplace in the general population. It has been demonstrated to exist in 9% to 11% of the German population (Franz et al., 2008) and 13% of the Finnish population (Salminen, Saarijarvi, Aarela, Toikka, & Kauhanen, 1999). Although the prevalence studies of alexithymia are limited, the few that are available demonstrate that alexithymia does exist at a notable rate in the general population (Franz et al., 2008; Salminen et al., 1999). Studies demonstrating the relative stability of alexithymia over time (Tolmunen et al., 2011; Salminen, Saarijarvi, Toikka, Kauhanen, & Aarela, 2006) contributed to the predominant notion of alexithymia as a stable personality trait (Taylor, 2000; Taylor, Bagby, & Parker, 2003; Leweke et al., 2011). The idea that alexithymia is a stable personality trait along with the finding that it is more common in people with psychological disorders, has led to the notion that alexithymia may be a predictive or risk factor for mental health issues (Leweke et al., 2011).

**Alexithymia and PTSD.** Along with the other psychological disorders previously discussed, alexithymia has also been found to be associated with PTSD. Using meta-analytic techniques Frewen, Dozois, Neufeld, and Lanius (2008) provided a quantitative review of the PTSD-alexithymia literature available up to 2006. They found 12 studies comprising a total sample of 1095 participants with PTSD and 460 control participants. When alexithymia in the PTSD sample was compared with alexithymia in the control sample, researchers found a large

effect size ( $d = 0.80$ ). They then compared alexithymia in the PTSD sample with normative alexithymia values in a non-psychiatric population and found an even larger effect size ( $d = 1.20$ ). Frewen et al.'s (2008) review demonstrated that alexithymia is robustly associated with PTSD. It did not, however, speak to whether alexithymia acted as a risk factor for developing PTSD, or if alexithymia developed in concert with PTSD.

Yehuda and colleagues' (1997) study of Holocaust survivors demonstrated a similar relationship between alexithymia and PTSD. Yehuda et al. (1997) found a significant correlation between alexithymia, as measured by the Toronto Alexithymia Scale, and symptoms of PTSD, as measured by the Clinician Administered PTSD Scale (CAPS). In addition, among the PTSD symptom clusters, avoidance symptoms and intrusion symptoms were most and least robustly associated with alexithymia, respectively. Although Yehuda et al. (1997) were able to provide some support for the existence of an alexithymia-trauma relationship, they were unable to speak of the nature of the relationship (i.e., does alexithymia predispose one to developing trauma, or does it occur in response to a trauma reaction?).

A study of male inpatients with alcohol dependence demonstrated that alexithymia was significantly more prevalent among those with PTSD than those without a PTSD diagnosis (Evren, Dalbudak, Cetin, Durkaya, & Evren, 2010). This study's generalizability was limited by the exclusive use of participants who were alcohol-dependent males. These findings were replicated in a study of emotional responses to trauma among paramedics (Halpbern, Maunder, Schwartz, & Gurevich, 2012). Researchers demonstrated that alexithymia was significantly correlated with symptoms of PTSD following trauma exposure; however, this study is also limited to the very specific population of paramedics. In addition, it did not speak to directionality of the alexithymia-trauma relationship.

In an investigation of risk factors for developing PTSD, Heinrichs et al. (2005) followed a cohort of novice male German firefighters immediately following basic training and periodically over a period of two years in the field. Although the study did not speak to the value of alexithymia in predicting PTSD, it did suggest that those who were at higher risk of developing PTSD, due to a number of identified risk factors (i.e., hostility, aggression), demonstrated a trend of significantly increasing alexithymic traits, compared with those at low risk of developing PTSD. This suggests that those more likely to develop traumatic reactions are also likely to see a trend of increasing alexithymic traits over time.

A study of PTSD symptoms in 54 New York City (NYC) police officers before and after the September 11, 2002 terrorist attacks (9/11) has helped to shed more light on the relationship between PTSD and alexithymia (McCaslin et al., 2006). Researchers demonstrated that alexithymia was significantly correlated with PTSD symptoms both pre- and post- 9/11. Also, they found that pre- 9/11 alexithymia scores significantly contributed to the variance of post- 9/11 PTSD symptoms. This suggests that higher rates of alexithymia in police officers confer a greater risk of developing PTSD. Again, This study is limited by a relatively small sample size, and a lack of generalizability to other populations. It is extremely specific, not just to police officers, but NYC police officers following a large-scale collective trauma. In addition, this is among the very first studies investigating the directionality of the alexithymia-trauma relationship; it remains to be seen whether the directionality of the alexithymia-trauma relationship can be replicated in other populations.

Although most studies on the alexithymia-trauma relationship have only considered alexithymia as a single concept, there have been a number of recent investigations considering the role of alexithymia symptom clusters (i.e., DIF, DDF, EOT). In a study on veterans who had

experienced military sexual assault, O'Brien, Gaher, Pope, and Smiley (2008) explored the role of alexithymia in symptoms of trauma. Regression analysis demonstrated that the alexithymia symptom cluster DIF significantly predicted persistent trauma symptoms after treatment, even after controlling for baseline trauma.

Söndergaard and Theorell's (2004) study investigated the relationship between alexithymia and PTSD in a sample of refugees. They reported that alexithymia was significantly and positively correlated with diagnoses of PTSD. When considering the relationship between alexithymia symptom clusters and PTSD they determined that DDF and DIF drove the alexithymia-PTSD relationship; EOT was not correlated with PTSD. This suggests that EOT may be unimportant when considering the role of alexithymia in the development of PTSD.

Two studies on the relationship between alexithymia and PTSD related to physical illnesses found contradictory results. Chung and Wall (2013) studied the PTSD-alexithymia relationship in people with asthma. Using hierarchical regression analyses, they found that alexithymia did not significantly contribute to the prediction of PTSD. Focusing on post-epileptic PTSD, Chung and Allen (2013) investigated the role of alexithymia in predicting symptoms of PTSD. They demonstrated that alexithymia predicted PTSD; however, in this case, the researchers centered their study on the separate role of the three symptom clusters of alexithymia in predicting PTSD (difficulty identifying feelings [DIF]; difficulty describing feelings [DDF]; externally oriented thinking [EOT]). They found that DIF significantly predicted PTSD symptoms, above and beyond the other two symptom clusters (i.e., DDF and EOT).

In a sample of military nurses and ambulance workers, researchers investigated the relationship between alexithymia symptom clusters and PTSD symptom clusters (Declercq, Vanheule, & Deheegher, 2010). They found that, alexithymia, as well as the alexithymia

symptom clusters of DIF and DDF were significantly and positively correlated with traumatic stress. Additionally, hierarchical multiple regression analyses demonstrated that alexithymia and the alexithymia symptom cluster of DIF significantly contributed to the prediction of PTSD symptoms; however, participants' were only measured following exposure to trauma, therefore it is difficult to determine whether alexithymia preceded PTSD or vice-versa. The findings of this study suggest that, although alexithymia, DIF and, to a lesser extent, DDF may contribute to the development of traumatic stress, the EOT symptom cluster does not seem to contribute to traumatic responses.

**Alexithymia and STS.** To the best of this author's knowledge, there is no literature currently available on the relationship between STS and alexithymia. This is not surprising, given that the study of STS is a relatively new field. That being said, given the conceptual similarity between STS and PTSD, and the previous empirical support for a relationship between PTSD and alexithymia, it is reasonable to explore the possibility of a similar relationship between STS and alexithymia.

It should be noted that, although no studies exist regarding the alexithymia-STS relationship, there is qualitative research on STS that speaks to alexithymic-like experiences. Longergan, O'Halloran, and Crane (2004) found that novice trauma therapists often considered their emotional reactions to their client's trauma as evidence of weakness or incompetence. Additionally, many respondents reported that being able to recognize and express these emotional responses was helpful in seeking help and developing coping strategies for dealing with the stress caused by clients' trauma stories. Jorgensen (2012) reported on the experiences of trauma workers who stated they had ongoing difficulties expressing their emotions as a result of working with trauma clients. Given these findings it is reasonable to assume that, among high-

risk professionals, alexithymic behaviours may be observed as a useful response to, or protection against, the development of STS.

### **Present Study**

It is important to analyze the factors associated with STS, such as alexithymia, because “healthy, psychologically present, and committed professionals are in a better position to offer assistance to trauma survivors than those providers who suffer from symptoms (of secondary traumatic stress)...” (Killian, 2008, p. 32). Additionally, Rudolph, Stamm, and Stamm (1997) reported that professionals experiencing STS perform at a reduced capacity (as cited in Bride & Kintzle, 2011). Analysis of alexithymia, as a possible risk factor or correlate with STS, will allow researchers to design programs to prevent or cope with occurrences of STS in teachers and mental health workers, and indirectly improve the level of services they provide to their clients. Keeping these purposes in mind, the purpose of this study was to assess the relationship between alexithymia and STS in a cohort of students, before and after their first field placement as teachers and mental health workers.



## Chapter 2 – Methodology

Prior to beginning this study, ethical approval was received from the University of Western Ontario Research Ethics Board (Appendix A).

### Participants

Participants were drawn from the Bachelor of Education in Teacher Education (B.Ed.) and Master of Art's in Counselling Psychology (M.A.) programs at a large comprehensive university in Ontario, Canada. These groups were chosen as it was believed that they were representative of two professions, teachers and psychotherapists, at high-risk for experiencing STS.

**Time one (T1) participants.** All teacher education and graduate students in counselling at the faculty of education ( $N = 653$ ) were contacted via an online campus survey system offering an opportunity to volunteer for a study on the effects of stress (see Appendix B for a transcript of the letter of information sent to potential participants). Of those contacted, 56 people (46 females, 9 males, and 1 other), aged 21 – 42 years ( $M = 24.42$ ,  $S.D. = 3.96$ ) responded. Of these respondents, 31 were enrolled in the B.Ed. program and 25 were enrolled in the M.A. program.

**Time two (T2) participants.** All T1 participants were contacted again via the online campus survey system and invited to participate in the second round of data collection (see Appendix C for a transcript of the letter of information sent to potential T2 participants). Of the 56 people contacted from T1, 33 participants (27 females and 6 males), aged 21 – 35 years ( $M = 24.25$ ,  $S.D. = 3.25$ ) responded. Of those respondents who participated in both T1 and T2, 17 were enrolled in the B.Ed. program and 16 were enrolled in the M.A. program. The time between T1 and T2 responding range from 60 – 82 days ( $M = 71.13$   $S.D. = 6.11$ )

As a token of appreciation for their participation, respondents were offered the opportunity to have their name placed in a draw for a chance to win a new iPad 2. Respondents were able to enter their name in the draw for this prize each time they participated in the study (i.e. up to two times).

### **Materials**

In order to evaluate the presence and symptoms of STS, subjects were administered the *Secondary Traumatic Stress Scale* (Bride et al., 2004). Alexithymia was assessed using the 20-item *Toronto Alexithymia Scale* (Bagby, Parker, & Taylor, 1994a). Demographic data was collected at both time 1 and time 2. Finally, participants were asked about their experiences working with trauma.

**Secondary Traumatic Stress Scale.** The *Secondary Traumatic Stress Scale* (STSS; Bride et al., 2004; Appendix D) is a 17-item self-report measure. Responses are rated on a five point Likert-type scale ranging from 1 (never) to 5 (very often). The STSS is designed to assess the frequency of three symptom classes of STS using three subscales: (a) intrusion, (b) avoidance, and (c) arousal. The subscales were designed to correspond to the *DSM-IV-TR* (APA, 2000) “B, C, and D” core PTSD criteria, respectively (Bride et al., 2004). The instructions and wording of each item is designed such that the traumatic stressor in question is specified as exposure to clients (i.e., secondary exposure). Bride et al. (2004) notes that some professionals may not refer to the people they work with as clients; therefore, the authors of the STSS explain that another noun may be substituted to better represent the participant’s work (i.e., student, patient). In this case, each question was worded such that the referenced traumatic stressor was the participant’s student or client, depending on the participant’s profession (Appendix D). Some of the STSS items (1, 4, 5, 7, 8, 9, 11, 15, and 16) are not stressor specific, such that the item

asks about the frequency of general symptoms of traumatic stress. Scoring the STSS produces three subscales based on the aforementioned symptom classes of STS. As a result, the STSS produces four separate scores: one full-scale score and three subscale scores consisting of an intrusion, avoidance, and arousal subscale. In order to calculate STSS scores, one sums the scores for items making up the full scale or each of the three subscales. The possible range of STSS scores are as follows: STSS full scale, 17 – 85; STSS intrusion, 5 – 25; STSS avoidance, 7 – 35; STSS arousal, 5 – 25. Higher scores reflect more experience of STS symptoms. For this study, STSS scores were interpreted according to frequency of endorsement as well as the “algorithm approach” (Bride, 2007, pp. 67).

At T1 participants were instructed to respond to how frequently each item described them in the past seven days according to the STSS’ five point Likert-type scale. As some respondents had been finished their placement for over a week at T2, T2 participants were instructed to respond to how frequently each item described them over the course of the previous month. Again, participants were asked to rate the items on the STSS’ five point Likert-type scale.

Bride et al. (2004) demonstrated excellent internal reliability on the STSS full-scale ( $\alpha = .93$ ), and intrusion ( $\alpha = .80$ ), avoidance ( $\alpha = .87$ ), and arousal ( $\alpha = .83$ ) subscales. Bride et al. (2004) also demonstrated that the scale had good convergent, discriminant, and factorial validity. Ting, Jacobson, Sanders, Bride, and Harrington (2005) demonstrated similar levels of internal reliability; however, they showed a very high degree of covariation among the three subscales, suggesting that the full-scale STSS score is a sufficient measure of STS. See Beck (2011) for a more in depth review of the psychometric properties of the STSS.

**Toronto Alexithymia Scale.** The 20-item *Toronto Alexithymia Scale* (TAS-20; Bagby et al., 1994a; Appendix E) is a 20-item self-report measure; it is currently the most widely used

measure of alexithymia (De Gucht & Heiser, 2003). The TAS-20 is designed to assess the presence of alexithymia along three dimensions: (a) difficulty describing feelings (DDF; 5 items), (b) difficulty identifying feelings (DIF; 7 items), and (c) externally oriented thinking (EOT; 8 items). Participants rank items on a five point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Of the 20 items, five are reverse-scored. Once these five scores are reversed, the scores for all 20 items are summed in order to calculate the TAS-20 full score (Taylor, Bagby, & Parker, 1992). The possible range of TAS-20 full scale and subscale scores is as follows: TAS-20 full scale, 20 – 100; DDF, 5 – 25; DIF, 7 – 35; EOT, 8 – 40. A higher score reflects more symptoms of alexithymia. Several studies attest to the acceptable reliability and validity of the TAS-20 (Bagby et al., 1994a; Bagby, Taylor, & Parker, 1994b; Parker, Taylor, Bagby, 2003).

**Trauma preparation.** Previous research has highlighted that trauma preparation is associated with lower levels of post-trauma reactions (Ortlepp & Friedman, 2002; Renshaw, 2011). In order to determine the impact of preparedness to work with trauma clients on the experience of STS, participants were asked to rate their own sense of preparedness to work with trauma clients (trauma prep) on a seven point Likert-type scale ranging from 1 (totally unprepared) to 7 (totally prepared). Participants were asked to rate their sense of trauma prep both at T1 and T2 (Appendix F). In addition, change in trauma prep ( $\Delta$  trauma prep) was calculated by subtracting T1 trauma prep scores from T2 trauma prep scores. For  $\Delta$  trauma prep, a positive value referred to an increased sense of preparation over time, while a negative value referred to a decreased sense of preparation over time, and a value of zero referred to no  $\Delta$  trauma prep over time.

**Demographic information.** This section included questions regarding standard demographic information (i.e. age and gender) in addition to items more specific to this population (i.e., program of study, typical client age; Appendix G). The questionnaire administered at time 2 consisted of similar questions, with the addition of items enquiring into client trauma (Appendix H). In order to determine the time period elapsed between measurement 1 and 2, participants were also asked to report the date they completed each questionnaire.

### **Procedure**

Participant responses were measured before and after their first practicum placement. At T1, before placement, participants were asked to complete the TAS-20, STSS, and the demographic questionnaire. Following their first semester placement, at T2, all who had participated in T1 were invited to complete a second TAS-20, STSS, and demographic questionnaire.

### **Ethical Considerations**

This study was approved by the University of Western Ontario's Research Ethics Board (Appendix A). Informed, voluntary consent was obtained from all participants. Data was analyzed digitally, and kept in encrypted files to ensure only researchers with permission had access. Given the psychological risk inherent in having participants recalling traumatic experiences, participants were also informed that they were able to end participation in the study at any time. Also, information regarding the mental health services available to all students at the participants' study site was provided (Appendix I).

### **Research Questions**

This study aims to answer a number of questions:

- 1) Is STS present in young professional teachers and mental health counsellors?

- 2) Is alexithymia associated with STS in high-risk professionals, specifically pre-service teachers and mental health workers?
- 3) Does alexithymia predict variance in STS?

### Analyses

**Scale reliability.** Test reliability of the TAS-20 and STSS was analyzed using Cronbach's alpha scores.

**Group comparisons.** In order to determine if there were any systematic differences between those who ended participation at T1 and those who completed both T1 and T2, a one-way ANOVA, comparing responses on the STS, TAS-20 and participant demographic information was run. In addition, a one-way ANOVA, comparing those in the B.Ed. program with those in the M.A. program, was run in order to determine if there was any systematic difference depending on participants' program of study. Based on previous literature suggesting a small systematic difference in gendered expression of alexithymia (Levant et al., 2009), the role of gender was analyzed using a one-way ANOVA. Finally, a matched sample t-test analysis was performed to determine whether there was any difference between T1 and T2 STSS or TAS-20 scores.

**Question 1 – Is STS present in emerging professionals?** To determine whether STS is present in emerging professionals (teachers and mental health workers), an analysis of the frequency of STSS responses was performed. In addition, participant responses were analyzed to determine the frequency of STS symptom endorsement. Responses of “occasionally”, “often”, or “very often” were considered endorsement of individual items. Finally, Bride's (2007) “algorithm method” (p. 66) was used to determine the rate at which participants met the criteria of different *DSM-IV-TR* (APA, 2000) PTSD symptom clusters.

**Question 2 – Is alexithymia associated with STS?** In order to answer this question, a correlation analysis was performed on participants' T2 TAS-20 and STSS scores. In addition to the full-scale scores, the relationship between TAS-20 and STSS subscales at T2 was also analyzed. T2 was used as it followed the participants' potential exposure to secondary traumatic stressors during their practicum placement. It was assumed that, prior to potential exposure during their practicum placement, participants had not been secondarily exposed to trauma.

**Question 3 – Does alexithymia predict variance in STS?** A hierarchical multiple regression analysis was used to determine whether alexithymia predicted development of STS. Specifically, this regression analysis investigated the contribution of T1 alexithymia (T1 TAS-20 full scores) and  $\Delta$  trauma prep to the prediction of T2 STS (T2 STSS full scores), with T1 STS (T1 STSS full scores) treated as a control variable.

T1 STSS was entered in the first step of the regression model based on the theory that the best predictor of future behaviour is past behaviour (Oullette & Wood, 1998). By entering T1 STSS into the model first, the contribution of earlier scores of STS in the variance of T2 STSS was statistically controlled for. Following on previous research suggesting that alexithymia is a relatively stable personality trait (Taylor, 2000; Taylor et al., 2003; Leweke et al., 2011), T1 TAS-20 full scores were entered in the second step. Given previous research suggesting that those with less trauma experience (Mealer et al., 2011; Townsend & Campbell, 2008) and those with lower sense of self-efficacy (Perron & Hiltz, 2006) tend to be at a higher risk of developing STS, changes in trauma prep scores were entered in the third and final step.

### **Hypotheses**

**Hypothesis 1 – Is STS present in emerging professionals?** Previous findings reporting the presence of STS in established mental health care providers (Bride, 2007; Conrad & Kellar-

Guenther, 2006; Meyers & Cornille, 2002; Perron & Hiltz, 2006; Townsend & Campbell, 2008). Although there is limited information available on the rates of STS among teachers, the rates of trauma experienced by students (Finkelhor et al., 2005; Kilpatrick et al., 2003; Porche et al., 2011; Read et al., 2011) suggests that teachers are regularly being secondarily exposed to trauma. Given these factors, it is believed that novice teachers and mental health practitioners will endorse symptoms and symptom clusters of STS.

### **Hypothesis 2 – Is alexithymia associated with STS?**

*Hypothesis 2a.* Based on previous empirical evidence for a positive relationship between alexithymia and PTSD (Evren et al., 2006; Frewen et al., 2008; Halpbern et al., 2012; McCaslin et al., 2006; Söndergaard & Theorell, 2004; Yehuda et al., 1997), and the conceptual similarity between PTSD and STS (Bride 2007; Figley, 2002), it is hypothesized that a similar relationship will be observed between STS, as measured by the STSS and alexithymia, as measured by the TAS-20.

*Hypothesis 2b.* It is also hypothesized, given the similarity between alexithymia and the avoidance/numbing criterion of STS, that there will be a positive relationship between TAS-20 scores and STSS Avoidance subscale.

**Hypothesis 3 – Does alexithymia predict variance in STS?** The literature is more ambiguous with regards to the nature of this hypothesized relationship. If the current conceptualization of alexithymia as a stable personality trait (Taylor, 2000; Taylor et al., 2003; Leweke et al., 2011) holds true, it is hypothesized that alexithymic traits will predict the development of STS among pre-service teachers and mental health counsellors. In other words, it is believed that higher levels of alexithymic traits will act as a risk factor/marker for higher risk of STS. In addition, given previous literature highlighting the protective nature of self-efficacy



against STS (Perron & Hiltz, 2006), it is predicted that  $\Delta$  trauma prep will contribute to the variance of STS. Essentially, it is believed that an increased sense of preparation to work with trauma clients will act as a protective factor against STS.

### Chapter 3 – Results

#### Scales

**Secondary Traumatic Stress Scale.** T1 STSS full score (17 items;  $\alpha = .894$ ), intrusion subscale (5 items;  $\alpha = .805$ ), avoidance subscale (7 items;  $\alpha = .721$ ), and arousal subscale (5 items;  $\alpha = .811$ ) showed good internal reliability. T2 STSS full score (17 items;  $\alpha = .945$ ), intrusion subscale (5 items;  $\alpha = .738$ ), avoidance subscale (7 items;  $\alpha = .893$ ), and arousal subscale (5 items;  $\alpha = .879$ ) also showed good internal reliability. This is consistent with Bride and colleagues' (2004) findings.

**Toronto Alexithymia Scale.** T1 TAS-20 full score (20 items;  $\alpha = .855$ ), DIF (7 items;  $\alpha = .815$ ), DDF (5 items;  $\alpha = .798$ ), and EOT (8 items;  $\alpha = .736$ ) showed good reliability. T2 TAS-20 full score (20 items;  $\alpha = .865$ ), DIF (7 items;  $\alpha = .871$ ), and DDF (5 items;  $\alpha = .800$ ) showed good reliability. T2 EOT subscale (8 items;  $\alpha = .521$ ) showed poor reliability. TAS-20 scores were significantly lower than those reported for a community sample of adults ( $N = 1933$ ,  $M = 45.57$ ,  $S.D. = 11.53$ , Parker, Taylor, & Bagby, 2003), both at T1,  $t(54) = -4.64$ ,  $p < .001$ , and T2,  $t(32) = -2.57$ ,  $p = .015$ .

The means and standard deviations for all scales and subscales can be found in table 1.

Table 1  
*Means and Standard Deviations of Scales*

Scale Time 1	<i>M (S.D.)</i>
TAS-20 Total (55)	39.47 (9.74)
TAS-20 DIF (55)	12.56 (4.48)
TAS-20 DDF (55)	10.44 (3.70)
TAS-20 EOT (55)	16.47 (4.37)
STSS Total (50)	31.12 (8.68)
STSS Intrusion (51)	9.08 (3.10)
STSS Avoidance (51)	11.9 (3.40)
STSS Arousal (50)	9.96 (3.43)
<b>Scale Time 2 (N)</b>	
TAS-20 Total (33)	40.73 (10.82)
TAS-20 DIF (33)	13.12 (5.30)
TAS-20 DDF (33)	10.67 (4.17)
TAS-20 EOT (33)	16.94 (3.72)
STSS Total (32)	32.66 (12.05)
STSS Intrusion (33)	9.52 (2.89)
STSS Avoidance (32)	12.84 (5.59)
STSS Arousal (33)	10.03 (4.23)

*Notes: M (S.D.) = Mean (Standard Deviation)*

### Group Comparison

**Time 1 participants vs. time 2 participants.** In order to compare the characteristics of those who only participated in T1 of the study (single participants) and those who participated in both T1 and T2 (double participants) a one-way ANOVA and series of Chi-square tests were performed. These tests showed no significant differences between single participants and double participants in their age, typical client age, how prepared they felt for working with clients who had experienced trauma (trauma prep.), TAS-20 total score, STSS total score, participant's program of study, or gender.

**Program comparison.** A one-way ANOVA test was used to compare the results based on participant program of study (table 2). Participants enrolled in the B.Ed. program had a significantly younger clientele  $F(1, 52) = 53.684, p < .001$ . In addition, those enrolled in the

B.Ed. program had significantly higher full TAS-20  $F(1, 53) = 10.57, p = .002$ , TAS-20 DDF  $F(1, 53) = 11.88, p = .001$ , and TAS-20 EOT  $F(1, 53) = 8.83, p = .004$  scores at T1. Chi square analysis showed no significant difference between programs based on gender.

Table 2

*Comparison of Means By Participant Academic Program*

Measure	B.Ed.		M.A.		df	F
	M	S.D.	M	S.D.		
Client Age	12.43	3.37	19.54	3.54	53	53.68***
Participant Age	24.03	3.85	24.88	4.12	54	.62
Time 1 Scores						
Trauma Preparation	3.50	1.41	3.68	1.31	54	.24
TAS-20 Total	43.07	9.32	35.16	8.55	54	10.57**
TAS-20 DIF	13.23	4.90	11.76	3.85	54	1.49
TAS-20 DDF	11.87	3.95	8.72	2.49	54	11.88**
TAS-20 EOT	17.97	4.58	14.68	3.40	54	8.83**
STSS Total	32.54	10.15	29.58	6.61	49	1.46
STSS Intrusion	9.30	3.85	8.83	1.99	50	.28
STSS Avoidance	12.26	3.86	11.50	2.83	50	.628
STSS Arousal	10.62	3.63	9.25	3.11	49	2.02
Time 2 Scores						
Trauma Preparation	3.47	1.18	4.20	1.26	31	2.85
TAS-20 Total	42.47	11.59	38.88	9.97	32	.91
TAS-20 DIF	13.29	5.82	12.94	4.87	32	.04
TAS-20 DDF	11.29	4.63	10.00	3.63	32	.79
TAS-20 EOT	17.88	3.65	15.94	3.64	32	2.34
STSS Total	34.24	14.25	30.87	9.12	31	.61
STSS Intrusion	9.94	3.42	9.06	2.24	32	.75
STSS Avoidance	13.88	6.86	11.67	3.56	31	1.26
STSS Arousal	10.41	4.52	9.63	4.01	32	.28

Notes: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Gender.** Analysis of the differences in gender scores showed no significant differences in the study's main measures (i.e., T1/T2 STSS or T1/T2 alexithymia).

**Time 1 vs. time 2 scores.** The difference between scores for the two main measures, STSS full score and TAS-20 full score was analyzed using paired sample t-tests. Time 1 STSS

full scores were lower ( $M = 31.31$ ,  $SD = 8.52$ ) than STSS full scores at time 2 ( $M = 33.24$ ,  $SD = 12.52$ ); however, this difference did not reach significance. Similarly, time 1 TAS-20 full scores were lower ( $M = 39.41$ ,  $SD = 10.09$ ) than TAS-20 full scores at time 2 ( $M = 40.88$ ,  $SD = 10.96$ ); however, this difference did not reach significance.

### **Question 1 – Is Secondary Traumatic Stress Present in Emerging Professionals?**

**Overview.** In order to answer question 1, a frequency analysis of responses to the STSS was performed. In addition, using Bride's (2007) algorithm method for interpreting the STSS, an analysis of PTSD/STS criterion endorsement was also performed. As participants were assumed to have not been secondarily exposed to trauma prior to their practicum placements only T2 data was analyzed. It was hypothesized that novice teachers and mental health practitioners would endorse symptoms and symptom clusters of STS.

**Results.** Keeping with standard practice (Bride, 2007; Hatcher et al., 2011), responses of “occasionally”, “often”, and “very often” were considered indicative of item endorsement. Table 3 outlines the frequency of responses to items on the STSS at time 2. The intrusion subscale contained both the most and least frequently endorsed items.

In addition to the frequency of symptom endorsement, the frequency of PTSD/STS criteria met at time 2 was also investigated (table 4). This was done using Bride's (2007) “algorithm method” for determining the number of diagnostic criteria met. In keeping with the diagnostic practices described by the *DSM-IV-TR* (APA, 2000), criterion B (intrusion) was considered met if at least one item was endorsed, criterion C (avoidance) if at least 3 items were endorsed, and criterion D (arousal) if at least two items were endorsed. As this was done in order to determine the frequency of people who may meet the diagnostic criteria of STS or PTSD as

describe by the *DSM-IV-TR* (APA, 2000), only those who reported having worked with clients who had experienced trauma were included.

Table 3

*STSS Response Frequencies and Descriptive Statistics at Time 2*

Item #	M (S.D.)	1 – Never n (%)	2 – Rarely n (%)	3 – Occasionally n (%)	4 – Often n (%)	5 – Very Often n (%)	Endorsed n (%)
Intrusion		72 (43.6)	49 (29.7)	34 (20.6)	8 (4.8)	2 (1.2)	44 (26.6)
2	2.09 (.88)	10 (30.3)	11 (33.3)	11 (33.3)	1 (3.0)	-	12 (36.3)
3	1.27 (.45)	24 (72.7)	9 (27.3)	-	-	-	-
6	2.00 (.93)	12 (36.4)	11 (33.3)	8 (24.2)	2 (6.1)	-	10 (30.3)
10	2.73 (1.04)	4 (12.1)	9 (27.3)	14 (42.4)	4 (12.1)	2 (6.1)	20 (60.6)
13	1.42 (.71)	22 (66.7)	9 (27.3)	1 (3.0)	1 (3.0)	-	2 (6.0)
Avoidance		119 (51.7)	62 (27.0)	29 (12.6)	13 (5.7)	7 (3.0)	49 (21.3)
1	2.03 (1.01)	12 (36.4)	11 (33.3)	8 (24.2)	1 (3.0)	1 (3.0)	10 (30.2)
5	2.28 (1.28)	11 (34.4)	10 (31.3)	4 (12.5)	5 (15.6)	2 (6.2)	11 (34.4)
7	1.79 (1.11)	19 (57.6)	6 (18.2)	5 (15.2)	2 (6.1)	1 (3.0)	8 (24.3)
9	2.15 (1.25)	14 (42.4)	7 (21.2)	7 (21.2)	3 (9.1)	2 (6.2)	12 (36.4)
12	1.52 (.94)	22 (66.7)	8 (24.2)	1 (3.0)	1 (3.0)	1 (3.0)	3 (9.0)
14	1.58 (.75)	18 (54.5)	12 (36.4)	2 (6.1)	1 (3.0)	-	3 (9.0)
17	1.36 (.60)	23 (69.7)	8 (24.2)	2 (6.1)	-	-	2 (6.1)
Arousal		64 (38.8)	56 (33.9)	30 (18.2)	10 (6.1)	5 (3.0)	45 (27.3)
4	2.21 (1.17)	10 (30.3)	12 (36.4)	8 (24.2)	-	3 (9.1)	11 (33.3)
8	1.64 (.82)	18 (54.5)	10 (30.3)	4 (12.1)	1 (3.0)	-	5 (15.1)
11	2.24 (1.17)	11 (33.3)	10 (30.3)	6 (18.2)	5 (15.2)	1 (3.0)	12 (36.4)
15	2.09 (.91)	10 (30.3)	12 (36.4)	9 (27.3)	2 (6.1)	-	11 (33.4)
16	1.85 (1.03)	15 (45.5)	12 (36.4)	3 (9.1)	2 (6.1)	1 (3.0)	6 (18.2)

Table 4  
*Frequency of PTSD/STS Diagnostic Criteria (N = 26)*

Criteria Met	<i>n</i>	%
None	8	30.8
Intrusion (B)	18	69.2
Avoidance (C)	7	26.9
Arousal (D)	10	38.5
Intrusion (B) + Avoidance (C)	7	26.9
Intrusion (B) + Arousal (D)	10	38.5
Avoidance (C) + Arousal (D)	6	23.1
Intrusion (B) + Avoidance (C) + Arousal (D)	6	23.1

*Note: The criteria met are in addition to meeting the exposure criterion (A).*

### Question 2 – Is Alexithymia Associated with Secondary Traumatic Stress?

**Overview.** In order to answer this question, a correlation analysis was performed on participants' T2 TAS-20 and STSS scores. In addition to the full-scale scores, the relationship between TAS-20 and STSS subscales at T2 was also analyzed. T2 was used as it followed the participants' potential exposure to secondary traumatic stressors during their practicum placement. It was assumed that, prior to potential exposure during their practicum placement, participants had not been secondarily exposed to trauma.

**Results.** T1 results demonstrated a significant correlations between STSS and TAS-20 full scores,  $r(48) = .458, p = .001$ . T2 results demonstrated that STSS and TAS-20 total scores were significantly positively correlated,  $r(30) = .771, p < .001$ . All STSS and TAS-20 subscale scores and total scores were significantly and positively correlated (table 5), with the exception of the relationships between TAS-20 EOT and STSS intrusion and avoidance subscales.

T1 trauma prep was not significantly associated with T2 TAS-20 full scale scores or T2 STSS full scale scores. T2 participant trauma prep was significantly correlated with T2 TAS-20 full scale scores,  $r(30) = -.391, p = .027$ , and STSS full scale scores,  $r(29) = -.374, p = .038$  at



T2. In addition,  $\Delta$  trauma prep (i.e., trauma prep at T2 – trauma prep at T1) was not significantly correlated with either T2 TAS-20 full scale scores or T2 STSS full scale scores.

Table 5  
*Correlations Between T2 STSS and TAS-20 Scores*

Measure	1	2	3	4	5	6	7	8
1. STSS (full)	–							
2. STSS (intrusion)	.935***	–						
3. STSS (avoidance)	.964***	.858***	–					
4. STSS (arousal)	.946***	.863***	.848***	–				
5. TAS-20 (full)	.771***	.633***	.780***	.653***	–			
6. TAS-20 (DIF)	.755***	.645***	.746***	.706***	.867***	–		
7. TAS-20 (DDF)	.704***	.569***	.737***	.584***	.912***	.748***	–	
8. TAS-20 (EOT)	.377*	.284	.380*	.238	.651***	.260	.466**	–

Notes: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Those who reported having worked with trauma clients during their practicum placement reported an even more robust alexithymia-STSS relationship,  $r(23) = .813, p < .001$ ; however, those who denied having worked with trauma clients showed a less robust alexithymia-STSS relationship,  $r(4) = .650, p = .163$ .

Comparison of the means of those without alexithymia and those with alexithymia showed that those with alexithymia scored significantly higher on the STSS,  $t(30) = -5.40, p < .001$ .

### Question 3 – Does Alexithymia Predict Variance in STS?

**Overview.** In order to answer the first part of question two, does alexithymia predict variance in STS, a correlation analysis between time 1 TAS-20 scores and time 2 STSS scores

was performed. In addition, hierarchal multiple regression analysis was performed. In constructing the regression model used in this study, T1 STSS full scores, T1 TAS-20 full scores, and  $\Delta$  trauma prep were treated as the predictor variables.  $\Delta$  trauma prep was included as a predictor variable, despite no significant correlation with the dependent variable, as an exploratory analysis of the contribution of perceived preparation to work with clients who have experienced trauma. T2 STSS full score was treated as the outcome variable.

All assumptions of a multiple linear regression analysis were met. Analysis of Cook's D values identified one significantly over influential data point that was excluded from the regression analysis. Shapiro-Wilk statistics suggested that the residuals were approximately normally distributed and the Durbin-Watson statistic suggested independence of residuals. Tolerance values indicated that collinearity was not an issue in this model. Finally, visual analysis of scatterplots suggested homogeneity of variance in the model.

**Results.** Time 1 TAS-20 scores, with the exception of the EOT subscale, were significantly and positively correlated with time 2 STSS scores (table 6).

Table 6

*Correlations Between T1 TAS-20 Scores and T2 STSS Scores*

Measure	1	2	3	4	5	6	7	8
1. STSS (full)	–							
2. STSS (intrusion)	.935***	–						
3. STSS (avoidance)	.964***	.858***	–					
4. STSS (arousal)	.946***	.863***	.848***	–				
5. TAS-20 (full)	.614***	.601***	.575***	.593***	–			
6. TAS-20 (DIF)	.516**	.531**	.439*	.561***	.867***	–		
7. TAS-20 (DDF)	.675***	.581***	.722***	.578***	.912***	.748***	–	
8. TAS-20 (EOT)	.308	.332	.266	.280	.651***	.260	.466**	–

Notes: \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

The enter method was used to conduct a hierarchical multiple regression analysis, treating T2 STSS full scores as the outcome variable. The initial addition of T1 STSS full scores to the model (step 1) accounted for a significant amount of the variance in T2 STSS full scores,  $adjusted R^2 = .508$ ,  $\Delta F(1, 24) = 8.79$   $p < .001$ . The addition of T1 TAS-20 full scores to the model at step 2 significantly contributed to the model,  $\Delta R^2 = .160$ ,  $\Delta F(1, 23) = 11.84$ ,  $p = .002$ . Finally, the addition of  $\Delta$  trauma prep, at step 3, did not significantly contribute to the model (table 7).

Table 7

*Hierarchical Multiple Regression Analysis With T2 STSS Full Scores as Outcome (N = 26)*

Step	Variable	B	SE B	$\beta$	$\Delta R^2$	Adjusted R <sup>2</sup>
Step 1:	T1 STSS (full score)	1.02	.198	.727***		
					.528***	.508
Step 2:	T1 STSS (full score)	.598	.206	.424**		
	T1 TAS-20 (full score)	.572	.166	.502**		
					.160**	.661
Step 3:	T1 TAS-20 (full score)	.639	.210	.454**		
	T1 STSS (full score)	.560	.167	.491**		
	$\Delta$ Trauma Prep.	-1.009	1.027	-.117		
					.013	.661

Notes: \* =  $p < .05$ . \*\* =  $p < .01$ . \*\*\* =  $p < .001$ .

## Chapter 4 – Discussion

In this examination of Secondary Traumatic Stress, Alexithymia and exposure to clients who have experienced trauma, emerging practitioners in helping professions (counselling and education) were tested before and after they embarked on their first counselling or teaching practicum experience. Results indicated patterns of association among variables. These results will be discussed in terms of previous research and within the context of implications for professional practice, professional education, support and intervention. Although the majority of this section is dedicated to the review and discussion of this study's findings and its relevance to helping professionals, it begins with a brief summary of the purpose and methodology of the study. In addition, the role of group characteristics will also be reviewed.

### Study Overview

Secondary traumatic stress (STS) is a mental health stress reaction wherein the individual acquires traumatic symptoms through exposure to a traumatized person, rather than through exposure to the initial trauma (Figley, 1995). The features of STS are essentially identical to the symptoms necessary for diagnosis of post-traumatic stress disorder (PTSD; Figley, 2002), including: re-experiencing of trauma, avoidance and/or emotional numbing, and hyper-arousal. STS has been demonstrated in a number of professions with a high rate of exposure to traumatized clients (i.e., nurses, doctors, social workers, child service workers, therapists and teachers). Alexithymia is defined by difficulty in identifying and describing personal feelings, distinguishing between feelings and emotional bodily sensation, lack of imagination/fantasy, and an externalized style of thinking (Taylor, 2000). It is often conceptualized as a personality trait present in the general population. Higher rates of alexithymia have been found in populations of those with mental health disturbances (Leweke, Leichsenring, Kruse, & Hermes, 2011),

indicating that alexithymia either co-varies with mental health problems or acts as a risk factor for them. Frewen and colleagues (2008) provided a quantitative review of the PTSD-alexithymia literature, demonstrating a robust association between alexithymia and PTSD when compared with alexithymia in the general population. To the best of this author's knowledge, there is no data available on the relationship between alexithymia and STS. This study aims to answer two questions:

- 1) Is STS present in emerging professionals, specifically teachers and psychotherapists?
- 2) Is alexithymia associated with mental health problems in the form of STS?
- 3) Does alexithymia predict variance in STS?

Based on previous empirical evidence showing a positive relationship between alexithymia and PTSD and the conceptual similarity between PTSD and STS, it was anticipated that a similar relationship would be observed between STS and alexithymia. The literature is ambiguous with regards to the nature of this relationship. If the current conceptualization of alexithymia as a stable personality trait held true, it was expected that alexithymic traits would predict the development of mental health issues such as STS among professionals. In order to investigate these questions, repeated measures design was employed. The study followed a prospective cohort of university student trainees entering professions with high rates of exposure to traumatized clients. Data was collected regarding alexithymia and STS in participants before and after internship placement in a professional setting.

It is important to analyze the factors associated with STS, such as alexithymia, because "healthy, psychologically present, and committed professionals are in a better position to offer assistance to trauma survivors than those providers who suffer from symptoms of compassion fatigue..." (Killian, 2008, p. 32). Analysis of alexithymia as a possible risk factor or correlate of

STS allows us to inform programs designed to help prevent or treat mental health disturbances in high-risk professionals.

### **Group Comparisons**

**Time 1 participants vs. time 2 participants.** No significant differences were found in comparing those participants who completed both parts of the study and those who completed only time 1. This finding provided support for the notion that there were no systematic differences between those who did and did not participate in both phases of the study.

**Program comparison.** As this study used a sample of students from two separate programs of study, namely pre-service teachers in a B.Ed. program and counselling psychology students in a M.A. program, it was important to determine if the groups showed any significant differences. Considering that B.Ed. students were in training to teach in elementary and secondary schools (i.e., ages below 18), whereas the M.A. students were in training to work with clients across the lifespan, it is unsurprising that B.Ed. students reported a significantly younger clientele. In addition, the finding that counselling psychology students demonstrated significantly lower scores of alexithymia and alexithymia symptom clusters DDF and EOT is not surprising and may be explained by the type of person attracted to the different programs of study. Given that counselling is a field centered on the identification and description of feelings and one's inner world, it is understandable that counselling students would score lower on scales testing difficulty in these domains (i.e., alexithymia). The lack of significant differences at time 2 may be explained by insufficient sample size.

**Time 1 vs. time 2 scores.** A lack of significant differences between T1 and T2 in the two main measures of this study, STSS and TAS-20, may be explained by insufficient sample size.

Despite not reaching statistical significance, STSS and TAS-20 scores did rise over the course of

the study. The finding that levels of STS increased over the course of the study is expected in that it is reasonable to assume that participants may not have been exposed to secondary traumatic stressors until their practicum placement. The increase in TAS-20 scores suggests that alexithymic traits may increase as a coping mechanism for traumatic stress. This is consistent with previous findings suggesting alexithymia is a state-dependent phenomenon, rising and falling with the onset and remission of mental health disorders (Honkalampi et al., 2001; Marchesi et al., 2008; Saarijarvi, Salminen, & Toikka, 2001). More information must be collected before it can be determined whether alexithymia co-varies with STS.

### **Question 1 – Is STS Present in Emerging Professionals?**

**Review.** Although STS has been repeatedly demonstrated in established professionals, it has yet to be established in novice teachers or mental health practitioners. It is believed that this is the first study investigating the levels of STS and STS symptoms among novice mental health practitioners and novice teachers. This author hypothesized that both novice mental health practitioners and teachers will endorse both STS symptoms and STS symptom clusters.

**Conclusions and discussion.** Given that 78.8% of respondents reported working with people who have experienced trauma, it should be no surprise that a substantial portion of the sample (78.8%) endorsed at least one symptom of STS. Response frequencies for the STSS were consistent with what has been reported in other populations (Bride, 2007; Hatcher et al., 2011). Intrusive thoughts about clients (item 10), physiological reactions (items 2 and 6), a sense of foreshortened sense of the future (item 5), and difficulty with irritability (item 15) and concentration (item 11) were among the most frequently endorsed items across both of the aforementioned studies and the current study. Given that these have been demonstrated to be the most readily identified symptoms of STS among those working with trauma clients, preliminary



psychoeducation efforts should focus on highlighting these symptoms. Intrusive thoughts about clients, in particular, have been consistently shown to be prevalent in teachers and mental health workers. Special effort should be taken to help novice professionals in the helping fields to establish a healthy work-life balance.

As STS is essentially a special case of PTSD, as outlined by the *DSM-IV-TR* (APA, 2000) and *DSM-V* (APA, 2013) and the STSS was designed with the three core PTSD symptom clusters in mind (Bride et al., 2004), STS and PTSD are used interchangeably when discussing symptom clusters below. STSS scores prior to practicum placement (time 1) showed that only 3.8% of the sample met the requirements for all three of the core PTSD symptom clusters outlined by the *DSM-IV-TR* (APA, 2000). Following exposure to trauma clients during practicum placement, 69.2% of participants met criteria for at least one symptom cluster, and 23.1% met the criteria for all three of the core PTSD symptom clusters. In other words, following exposure to traumatic stressors almost one quarter of this sample demonstrated the core symptomology of a diagnosis of PTSD/STS. The frequency of PTSD diagnostic criteria being met was slightly higher in this sample than those reported by Bride (2007), but lower than that reported by Hatcher et al. (2011).

This study demonstrated that 80% of respondents experienced at least one symptom of STS, and one quarter of respondents reported symptoms consistent with a diagnosis of PTSD by the *DSM-IV-TR* (APA, 2000; table 4). These values are best considered in light of Van Ameringen et al.'s (2008) study showing a lifetime prevalence rate of PTSD at approximately 9% among Canadians. With the current study showing participants endorsing PTSD criteria at a rate approximately two and half times that of the general Canadian population, it is clear that that

novice teachers and mental health workers are at a high risk of developing PTSD through secondary traumatic exposure.

Previous research has repeatedly demonstrated the inverse relationship between age and experience, and STS (Mealer et al., 2011; Townsend & Campbell, 2008). As participants in this study were relatively young ( $M = 24.42$ ,  $S.D. = 3.96$ ) and inexperienced (all were involved in professional programs necessary for involvement in their intended fields), it is reasonable to assume that mean levels of STS symptoms and endorsement of STS symptom clusters will become attenuated with increased age and experience. Again, it is unclear whether hypothetical diminishing STS symptom endorsement with age and experience would be a result of experience itself or due to an attrition bias, with those most at higher risk of developing STS also being at high risk of leaving their profession. Future investigations should consider the role that traumatic stress plays in counsellors and educators prematurely leaving their field. Reports have stated that approximately 50% of new teachers leave the teaching profession in their first 5 years (Alliance for Excellent Education, 2005; Canadian Teachers' Federation, 2003). Although traumatic experiences are almost certainly not to blame for all early exits from the field, it is likely that they play an important role. Both fields, teaching and mental health counselling, demand a lot from professionals, even before having to cope with traumatic experiences. With almost one quarter of this sample reporting symptoms consistent with a PTSD diagnosis, it is clear that more prevention strategies must be implemented for neophyte professionals.

**Next steps and suggestions.** To the best of this author's knowledge, this is the first investigation into the prevalence of STS among novice professionals in the fields of education and mental health. Although this study was consistent with previous findings in other populations, more information must be collected in order to confidently determine the prevalence

of STS among emerging professionals in education and mental health. A relatively small sample size and a fairly homogenous population likely hamper the findings in this study. Future investigations should consider wider swaths of emerging professionals (i.e., emerging professionals from different schools, other professions of mental health workers [social workers, clinical psychologists, divinity students, etc.]).

### **Question 2 – Is Alexithymia Associated With Secondary Traumatic Stress**

**Review.** Question two asked whether alexithymia was associated with STS. Based on previous empirical evidence for a positive relationship between alexithymia and PTSD (Frewen et al., 2008), and the conceptual similarity between PTSD and STS (Bride 2007; Figley, 2002), it was hypothesized that a similar positive relationship will be observed between STS and alexithymia. Additionally, it was thought that, given the similarity between alexithymia and the avoidance/numbing criteria of PTSD/STS, a positive relationship between alexithymia and the avoidance subscale of the STSS.

**Discussion. Hypothesis 2a.** The results from the correlation analysis (table 5) fully supported hypothesis 2a. STS, as measured by STSS full score, was significantly and positively associated with alexithymia, as measured by TAS-20 full score. Although there was a relationship between TAS-20 and STSS scores prior to participants' practicum placements, the relationship became more robust after practicum placement. This makes sense as it can be assumed that STS was not a prevalent issue for participants at time 1 (prior to exposure to clients with trauma). Further investigation demonstrated that this relationship was most robust for participants who reported having worked with trauma clients during their practicum placement. This relationship failed to reach significance, and was not as robust, among those who denied having worked with trauma clients during their practicum. This further supports the notion that

the alexithymia-STS relationship is only relevant among those who worked with trauma clients. The current finding that STS and alexithymia showed a more robust correlation among those who reported being exposed to trauma clients is consistent with Frewen and colleagues' (2008) comparison between trauma patients and the general public. It may be that participants who denied working with trauma clients during the practicum placement are more representative of the general population in Frewen and colleagues' study, whereas those who readily identified that they had worked with trauma clients during their practicum are more similar to the trauma population in Frewen and colleagues' study.

Heinrichs and colleagues (2005) found that novice firefighters with a number of risk factors for developing PTSD showed a significant increase in alexithymic traits over time, compared with those without PTSD risk factors. Building off of Heinrichs et al. (2005) findings, the current study demonstrated that alexithymia was positively correlated with post-traumatic stress responses (i.e., STS) to trauma exposure. Although Heinrichs et al. (2005) did not report correlations between alexithymia and PTSD, it follows that an increase in alexithymia over time, among those developing PTSD, would yield a positive correlation.

McCaslin and colleagues' (2006) study on the relationship between pre- and post- 9/11 PTSD and alexithymia in NYC police officers also demonstrated a significant positive correlation between alexithymia and PTSD, both before and after trauma exposure. Although the valence of the alexithymia-PTSD relationship in McCaslin and colleagues' study was consistent with the current study's alexithymia-STS relationship, it was not as robust as the correlation found in the current study. Halpbern and colleagues also found a significant and positive relationship between alexithymia and PTSD in first responders; however, much like in McCaslin and colleagues' (2006) study, the correlation was not nearly as robust as that demonstrated by the

current study. This may be due, in part, to the age disparity between the two samples. Whereas the aforementioned previous studies' samples were made up of relatively experienced professionals averaging in their late 30's (Halpbern et al., 2012; McCaslin et al., 2006), the emerging professionals in this study were relatively inexperienced and in their mid 20's. Previous studies have shown that age and experience are negatively correlated with STS (Mealer et al., 2011; Townsend & Campbell, 2008). It may be that, experienced professionals (i.e., police officers) have developed better strategies for preventing traumatic reactions, regardless of alexithymic traits. Emerging, inexperienced professionals (i.e., teachers and mental health workers) are likely still developing these strategies.

The current study is believed to be the first to demonstrate that STS is significantly and robustly associated with alexithymia. Although previous investigations have shown significant correlations between alexithymia and PTSD, these associations were consistently less robust than those seen in the current study (Evren et al., 2010; Halpbern et al., 2012; McCaslin et al., 2006; Yehuda et al., 1997). Given that PTSD is a relatively more common concept than STS, it may be the case that those exposed to "primary" stressors, as in the case of PTSD, are more often identified as having experienced an event sufficiently great or important enough to be worthy of attention. Meanwhile, those exposed to "secondary" stressor, as in the case of STS, may not be as readily identified as having had a noteworthy experience. If this is the case, it is likely that those at risk of PTSD are more likely to be encouraged to seek therapy, or talk to others about their experiences, than those at risk of STS. As most psychotherapies encourage and teach clients to identify and describe their feelings (two central difficulties in those with alexithymia), it is likely that those more likely to be involved with therapy (i.e., those at risk of PTSD) will develop skills to counter their alexithymic traits, while those not being encouraged to seek therapy (i.e.,

those at risk of STS) will not. This may explain why those at risk of PTSD, as described in previous studies, show a less robust alexithymia-trauma correlation than those at risk of STS. It is believed that, an increased level of awareness of the risk of STS among those who work with trauma clients (i.e., teachers and mental health workers) will encourage individuals to be more open about or seek treatment for their trauma. Subsequently, this may decrease their alexithymic traits bringing the alexithymia-trauma association among those at risk of STS more in line with the findings of those at risk of PTSD.

The findings of the current study are consistent with previous research that reported alexithymia is positively correlated with PTSD (Evren et al., 2010; Frewen et al., 2008; Halpern et al., 2012; McCaslin et al., 2006; Yehuda et al., 1997). Although similar to PTSD, it is believed that this is the first study to consider the relationship between STS and alexithymia. In addition, it is believed that this is among the first prospective studies to consider a group of novice professionals involved with their initial exposure to trauma clients.

**Hypothesis 2b.** Hypothesis 2b was partially supported by the correlation analyses (table 5, table 6). Indeed, the largest correlation between measures of alexithymia and STS at time 2 was seen between TAS-20 full score and STSS avoidance subscale (table 5). This is consistent with the prediction of a more robust correlation between alexithymia and STS avoidance. It should be noted that, the STS avoidance-alexithymia association between time 1 alexithymia and time 2 STS (table 6) was not as strong; indeed, it was the least robust among alexithymia-STS symptom cluster correlations. This suggests that, unlike initial hypotheses, alexithymia is not a manifestation of the STS avoidance symptom cluster. This runs counter to previous assertions that alexithymia is essentially the same as the PTSD numbing symptom cluster (Badura, 2003; Zahradnik et al., 2009); however, it is consistent with previous findings that alexithymia is not

any more associated with the avoidance symptom cluster of PTSD than any of the other symptom clusters (McCaslin et al., 2006). At the very least, it seems that the relationship between alexithymia and the traumatic symptom cluster avoidance may be more complicated than initially thought.

A lack of prominent relationship between alexithymia and STS-avoidance may also be a function of the items in the STSS avoidance subscale. Regarding the PTSD avoidance symptom cluster, the *DSM-IV-TR* (APA, 2000) emphasizes both physical avoidance (i.e., avoiding people, places and things associated with the traumatic event) and emotional avoidance (i.e., emotional numbing, forgetfulness, anhedonia); however, the STSS avoidance subscale emphasizes physical avoidance (i.e., items 5, 7, 9, 12, and 14) over emotional avoidance (i.e., items 1 and 17). A measure of STS that more appropriately tapped into the emotional avoidance/numbing symptoms of STS/PTSD would likely demonstrate findings more in line with Badura (2003) and Zahradnik et al. (2009).

***Other relationships.*** Evren and colleagues' (2010) study found that, among the TAS-20 subscales, DIF was particularly associated with higher levels of PTSD. Although the current study found that all TAS-20 subscales had a significant positive correlation with STS, much like Evren et al. (2010) the DIF factor had the most robust association with trauma symptoms; however, considering that the DIF-STS relationship was attenuated when considering time 1 alexithymia and time 2 STS (table 6), it is difficult to say whether DIF-STS relationship is as pronounced as Evren et al. (2010) claimed.

The meager relationship between the alexithymia EOT symptom cluster and STS and STS symptom clusters suggests that EOT may be a less important point of focus when providing those at risk with preventative psychoeducation or designing treatment. On the other hand, DDF

and DIF consistently showed significant and robust relationships with STS (table 5 and table 6). This is consistent with Declercq and colleagues' (2010) paper stating that both DDF and DIF were significantly associated with and predictive of PTSD among military nurses and ambulance drivers. Slightly varying from the current findings, Chung and Allen (2013) reported that, among their sample of post-epileptic PTSD participants, DIF was the sole significant predictor and correlate of PTSD among the alexithymia symptom clusters.

**General conclusions.** The current study supported the idea that, like the relationship between alexithymia and PTSD, alexithymia and STS are significantly and positively correlated. This suggests that alexithymia may predict STS or act as a compensatory coping mechanism for STS. The findings of the study were unclear regarding whether the STS avoidance symptom cluster is more robustly correlated with alexithymia than the other STS symptoms.

**Next steps and suggestions.** The current study found that DDF and DIF were consistently significantly and robustly associated with STS, while EOT was not. Given this finding, and the aforementioned literature suggesting a strong relationship between DIF and DDF and traumatic reactions, it is suggested that psychoeducation efforts be focused on helping those in at risk professions to more readily identify and describe their feelings. Although the EOT-trauma relationship may be more complex than what is currently understood, at this time all signs suggest that EOT is not as closely associated or predictive of PTSD/STS as the other alexithymia symptom clusters. Future studies should take steps to further elucidate the relationship between alexithymia symptom clusters and STS/PTSD symptom clusters.

### **Question 3 – Does Alexithymia Predict Variance in STS?**

**Review.** Although previous research has repeatedly demonstrated the positive relationship between alexithymia and PTSD, it is believed that this is the first study to investigate



the relationship between alexithymia and STS. The results to question 2 suggest that alexithymia is positively related to STS; however, just as in much of the literature speaking to the alexithymia-PTSD relationship, it is difficult to determine the directionality of this relationship. In order to determine whether alexithymia predicts STS one must consider whether baseline measures of STS and alexithymia predict variance in later measures of STS. Using hierarchical multiple regression analysis this author attempted to answer question 3; does alexithymia predict the variance in STS?

The literature regarding the nature of the relationship between alexithymia and STS is relatively underdeveloped. It was believed that T1 alexithymia would be positively associated with later STS. Correlational analysis was used to determine the association between T1 alexithymia and T2 STS. It was also hypothesized that T1 alexithymia would significantly contribute to (predict) variance in STS at T2. Finally, the role of experience was considered. It was hypothesized that  $\Delta$  trauma prep would significantly contribute to variance in STS at T2. In order to determine whether T1 alexithymia or  $\Delta$  trauma prep significantly contributed to variance in STS at T2, a hierarchical multiple regression analysis was performed.

**Conclusions and discussion. *Correlational analysis.*** Significant positive correlations were observed between T1 alexithymia, with the exception of EOT subscales, and T2 STS. This suggests that having higher levels of alexithymic traits, prior to trauma exposure, is associated with a higher risk of STS later in time. This is consistent with previously reported findings by McCaslin et al. (2006), who found that pre-trauma alexithymia was significantly and positively correlated with later experiences of traumatic stress in first responders to the 9/11 terrorist attacks in New York City.

The non-significant and low value of the correlations between T1 EOT and all 4 measures of STS at T2 suggests that EOT may not be a good predictor of STS (table 6). This is similar to previous reports that EOT is not a significant predictor of PTSD symptoms among people with epilepsy or asthma (Chung & Allen, 2013; Chung & Wall, 2013) and that EOT is unrelated to PTSD (Söndergaard & Theorell, 2004). The majority of previous investigations into the relationship between alexithymia and trauma reactions have focused solely on the role of alexithymia as a whole concept, rather than the separate role of the three symptom clusters of alexithymia. Given the aforementioned findings (Chung & Allen, 2013; Chung & Wall, 2013; Söndergaard & Theorell, 2004) and the results of this current study, it may be that only certain alexithymia symptom clusters are driving the alexithymia-trauma relationship. Investigations into the relationship between PTSD and alexithymia symptom clusters have consistently found little evidence of any significant or notable relationship between the EOT symptom cluster and traumatic reactions.

***Hierarchical multiple regression analysis.*** Step 1 of the hierarchical regression analysis demonstrated that STS at T1 significantly predicted variance in STS at T2. The addition of T1 alexithymia (T1 TAS-20 full score) at step 2 accounted for an additional 16% of the variance in T2 STS. The addition of  $\Delta$  trauma prep scores at step 3 did not significantly contribute to the model. The final model, including the predictors STS at T1 (T1 STSS full scores), alexithymia at T1 (T1 TAS-20 full scores), and  $\Delta$  trauma prep, accounted for almost 66% of the variance in STS at T2.

Both T1 alexithymia and T1 STS were significant predictors of T2 STS in the full model. The finding that T1 alexithymia was a significant predictor suggests that an individual's level of alexithymia, prior to exposure to secondary trauma stimuli, predicts one's risk of STS.

Additionally, these findings suggest that earlier symptoms of STS predict later risk of STS.

Finally, the finding that  $\Delta$  trauma prep was not a significant predictor suggests that an increased feeling of preparation to work with trauma clients over time may not act as a protective factor in the development of STS.

A number of previous studies have investigated the alexithymia-trauma relationship using multiple regression analysis; however, the majority of these studies only measured participants' alexithymia and trauma levels following traumatic exposure. Considering only post-exposure symptoms, Declercq et al. (2010) demonstrated that alexithymia accounted for only 3% of the variance in PTSD. Additionally, a number of studies have found that the alexithymia symptom cluster, DIF, accounted for a small but significant proportion of the variance in trauma symptoms (Chung & Allen, 2013; O'Brien et al., 2008).

McCaslin and colleagues' (2006) study of PTSD and alexithymia in New York City police officers is believed to be the only longitudinal analysis evaluating the role of baseline alexithymia in predicting PTSD. The findings of the current study are consistent with McCaslin and colleagues' (2006) longitudinal study of PTSD and alexithymia in police officers. In keeping with McCaslin et al., the current study demonstrated that pre-trauma alexithymia scores predict a higher risk of developing a trauma reaction, following exposure to traumatic stimuli. McCaslin et al.'s regression model, consisting of baseline trauma scores and baseline alexithymia, accounted for approximately 44% of the variance in T2 trauma symptoms; similarly, the current study found that step 2, consisting of baseline trauma (T1 STSS full score) and baseline alexithymia (T1 TAS-20 full score), accounted for approximately 61% of the variance in T2 trauma symptoms. This finding emphasizes the importance of considering both prior trauma symptoms and alexithymia in assessing risk traumatic reactions in professionals at risk of exposure to

trauma. Additionally, McCaslin et al. (2006) found that baseline alexithymia accounted for approximately 9% of the variance in PTSD; however, the current study found that baseline alexithymia was accountable approximately twice the variance in STS (16%).

A number of possibilities could account for the inconsistencies between McCaslin et al. (2006) and the current study. McCaslin et al.'s study took place over a time period of approximately 16 months; whereas the current study had an average time period between assessments of approximately 71 days. It may be that, given the relatively short time period between assessments in the study, T1 STS and alexithymia are better able to predict variance in T2 STS. If the current study were to adopt a longer time period, similar to that of McCaslin et al., it is believed that a regression analysis would show more tempered values, in line with those reported by McCaslin et al.

Previous literature has suggested that those in professions at high-risk of trauma exposure may develop a certain level of emotional detachment in order to effectively function in or prepare for their high-risk profession (McCaslin et al., 2006). Indeed, Longernan et al. (2004) reported that novice trauma therapists may consider their emotional responses to client disclosures of trauma to be a sign of professional weakness. Jorgensen (2012) found that trauma workers often reported feeling emotionally drained as a result of their work, with a number reflecting that they had experienced ongoing difficulty with describing their emotional experience. However, the finding that alexithymia is significantly and robustly associated with STS, and that higher levels of baseline alexithymia predict higher levels of STS following exposure to trauma, shown by this study, suggest that alexithymia is not an effective way of preparing or coping with trauma exposure. Quite the contrary, much as with PTSD, it seems that

alexithymia and alexithymic traits, confer a higher risk of developing STS among high-risk professionals.

A lack of social support may explain the alexithymia-trauma relationship. A relatively large body of literature speaks to the importance of social support in preventing trauma reactions among those who work with traumatized clients (Cohen & Collens, 2013; Harrison & Westwood, 2009; Hunter & Schofield, 2006; Jorgensen, 2012; Killian, 2008). It is possible that DIF and DDF make it difficult for individuals experiencing the emotional sequelae trauma work to effectively seek support from others. For those who have sought support from others, DDF would almost certainly hamper one's ability to communicate their emotional experiences to others. Previous literature has found significant negative correlations between alexithymia and social support (Fukunishi & Rahe, 1995; Lumley et al., 1996; Mallinckrodt & Wei, 2005). This may also explain why EOT, something conceivably unrelated to social support, has been suggested to be less important in conceptualizing PTSD or STS.

**General conclusions.** Based on both the correlation analysis comparing T1 alexithymia to T2 STSS (table 6) and the hierarchal multiple regression analysis (table 7) this study supports the notion that both pre-trauma STS and alexithymia predicts post-trauma STS. Additionally, the results suggest that  $\Delta$  in trauma prep does not predict variance in post-trauma STS.

**Next steps and suggestions.** Considering that this is believed to be the first study investigating the relationship between alexithymia and STS there were a number of aspects of the alexithymia-STS relationship that have gone unanswered. Although the current study demonstrated that alexithymia predicts STS, it can not speak to whether specific alexithymia symptom clusters account for most of the variance in STS or whether alexithymia preferentially predicts specific symptom clusters of STS. Whereas recent studies have begun to investigate the

role of alexithymia and PTSD symptom clusters in the alexithymia-trauma relationship, very little information exists on the relationship STS and alexithymia symptom clusters. Future researchers should investigate whether specific symptom clusters of both alexithymia or STS/PTSD are responsible for the bulk of the alexithymia-trauma relationship.

Considering the relatively small sample size, this study was limited in the number of predictors that could be incorporated into the regression model. Future studies should aim to collect more data in order to include other important predictors in their regression model of STS (i.e., previous trauma experience, client age). Additionally, the finding that  $\Delta$  trauma prep was not a significant predictor of variance in T2 STS may be due to the small sample size. With previous literature suggesting that one's sense of efficacy is inversely related to risk of developing STS (Perron & Hiltz, 2006), it is thought that a larger sample size may better elucidate this relationship among emerging high-risk professionals.

Given the aforementioned theory that alexithymia may be working in concert with poor support networks to facilitate a higher risk of developing STS, future investigations should consider the role of social support in the alexithymia-STS relationship.

### **Implications**

The finding that STS is present in emerging professionals in both education and counselling psychology is a novel finding. Previous studies have investigated STS in established high-risk professionals; however, this study is among the first to consider the phenomenon in novice professionals. This study demonstrates that STS is present in emerging high-risk professionals at rates higher than PTSD in the general population. This suggests that university and college programs would be well suited to helping in-training professionals to identify and treat negative mental health reactions to work with clients who have experienced trauma. This

studies findings, coupled with previous research suggesting that novice professionals are often ashamed of and avoid their negative emotional reactions to working with clients who have experienced trauma (Longergan et al., 2004), suggests that a concerted effort by training programs to normalize these responses may help to lessen their stigma. Additionally, it is believed that by devoting resources to training novice professionals in effective strategies for coping with trauma may help to reduce some of the potential fallout of traumatic stress associated with work (i.e., employee attrition, poor service delivery). With peer support and communication consistently being identified as one of the most helpful strategies for coping with STS (Cohen & Collens, 2013; Harrison & Westwood, 2009; Hunter & Schofield, 2006; Jorgensen, 2012; Killian, 2008), this author suggests that the simple addition of peer support groups may be effective in reducing the impact of STS. Finally, it has been fairly widely reported that psychotherapists and mental health workers experience STS (i.e., Bride, 2007); however, the finding that teachers also experience STS is novel. Following this, it is suggested that both mental health worker and teacher employee assistance programs make allowances for trauma-informed counselling.

The finding that alexithymia, pre-traumatic exposure, predicts variance in STS, post-traumatic exposure, has a number of important implications for prevention, treatment, and selection policies. If higher rates of alexithymia confer higher risk for developing STS following exposure to traumatic stressors, high-risk professional programs may benefit from incorporating screening procedures for alexithymia as part of their admission criteria. Preferentially selecting candidates with a better ability to identify and describe their emotional experience may serve to reduce the rates of STS reactions among emerging professionals, along with some of the potential outcomes of the negative emotional reactions (i.e., professional turnover, diminished

client care, etc.). Additionally, efforts should be made to encourage high-risk professionals to improve their ability to identify and describe their feelings. It is believed that, if alexithymia causes STS, helping individuals with alexithymic traits to better process their emotional experiences may also help to reduce their risk of developing STS in response to working with clients who have experienced trauma.

### **Strengths and Limitations**

**Strengths.** Although a number of studies have previously considered the alexithymia-trauma relationship (Frewen et al., 2008), this is believed to be the first study investigating the relationship between alexithymia and STS in any population. In addition, this study is among the first to evaluate the rates of STS among educators. Although many studies utilize cohorts of university students this is believed to be the first to evaluate the rates of STS among emerging professionals pursuing high-risk occupations. Finally, the majority of literature available on STS and alexithymia originate in the United States and Europe. This study is one of the few to evaluate STS or alexithymia in a Canadian population.

**Limitations.** The current study has a number of limitations. Despite initially contacting over 600 people to participate in the study, only 56 participated. Moving on to the second phase of the study, there was an attrition rate of 41% leaving 33 participants who participated in the full study. The relatively small sample size limits statistical power and thereby the number of conclusions that can be drawn from the data collected. Additionally, the small sample size calls into question the representativeness of the study.

By neglecting to ask participants whether they had any history of traumatic experiences, or had ever been secondarily exposed to trauma this study took the assumption that no participants had ever been exposed to any trauma prior to their practicum placement. With



Canadian lifetime prevalence of PTSD estimated at approximately 9% (Ameringan et al., 2008), it is highly possible that participants had a history of traumatic stress or were exposed to some traumatic stressor, outside of their placement, during their practicum. With this in mind, it is difficult to determine whether the STSS was tapping into STS or other traumatic experiences. Future studies should include questions about participants' history of traumatic stress.

Bride et al. (2004) demonstrated that the STSS had good convergent validity based on a number of constructs (i.e., extent of clientele with a history of trauma, frequency of working with clients with trauma, anxiety, and depression); however, despite being designed to reflect the criteria clusters of PTSD there is scarce information available on the relationship between the STSS and measures of PTSD. It may be that the STSS is not tapping the construct that its authors claim it is. With regards to the population considered in this study (i.e., novice professionals) it may be that some items purported to be analyzing symptoms of STS (i.e., "I felt discouraged about the future", "I thought about my work with clients when I didn't intend to"), instead tapped into concerns about securing a position in highly competitive careers. If this is the case, the results found in this study should be considered tentatively.

The relatively short study period (approximately 71 days) may have been too short to see any of the long-term relationships between STS and the predictor variables. Specifically, there may have been too short of time elapsed between T1 and T2 to facilitate any robust  $\Delta$  trauma prep. Had participants been given enough time to actually experience a change in self-perceived preparation to work with client's who had experienced trauma, perhaps  $\Delta$  trauma prep would have been predictive of variance in STS. Finally, as with any repeated measures design, there is always the risk of cohort effects. Considering that participants for this study were all drawn from the same faculty of education, it is possible that a historical factor could be biasing the results of

this study. Future studies with larger samples are necessary in order to clarify the relationship between the investigated predictor variables and STS.

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Appendix A

Ethical approval from the University of Western Ontario Research Ethics Board.

 <p>Faculty of Education Graduate Programs &amp; Research Office</p>		<b>FORM A</b> <input type="button" value="Print Form"/> <input type="button" value="Reset Form"/>
<b>APPROVAL OF M.Ed. THESIS PROPOSAL</b>		
<p>If the proposed research does not involve human subjects or the direct use of their written records, video-tapes, recordings, tests, etc., this signature form, along with ONE copy of the research proposal should be delivered directly to the Graduate Programs &amp; Research Office for final approval.</p>		<p>If the proposed research involves human subjects, this signature form, along with ONE copy of the research proposal and Ethical Review Form signature pages (Section 1.1 to 1.7) must be submitted to the Graduate Programs &amp; Research Office for final approval.</p>
<p>IT IS THE STUDENT'S RESPONSIBILITY TO PROVIDE A COPY OF THE RESEARCH PROPOSAL (INCLUDING REVISIONS) TO THE THESIS SUPERVISOR AND ALL MEMBERS OF THE ADVISORY COMMITTEE.</p>		
<p>Student's Name: <u>Matthew R.J. Vandermeer</u> Student #: <u>250 427 208</u></p> <p>Field of Study: <u>Education (Counselling Psychology)</u></p> <p>Title of Thesis: <u>Secondary Traumatic Stress and Alexithymia in High Risk Professors</u></p> <p>Name of Thesis Supervisor: <u>Susan Rodger</u></p> <p>Name of Thesis Advisory Committee Member: <u>Alan Geschick</u></p>		
<p>DOES THIS RESEARCH INVOLVE THE USE OF HUMAN SUBJECTS: <input checked="" type="radio"/> Yes <input type="radio"/> No</p>		
<p><b>APPROVAL SIGNATURES:</b></p> <p>Graduate Student: _____ Date: <u>April 3, 2013</u></p> <p>Thesis Supervisor: _____ Date: <u>Apr 3/13</u></p> <p>Advisory Committee: _____ Date: <u>April 3/2013</u></p> <p>Ethical Review Clearance: _____ Date: <u>Aug 22/13</u></p> <p>Ethical Review Number: <u>1307-6</u></p> <p>Associate Dean Graduate Programs &amp; Research: _____ Date: <u>Aug 23, 2013</u></p>		
<p>A STUDENT MAY PROCEED WITH RESEARCH WHEN A COPY OF THIS FORM CONTAINING ALL APPROVAL SIGNATURES HAS BEEN RECEIVED. A copy of this proposal may be made public and kept on a two-hour reserve in the Faculty of Education Library.</p>		
<p><small>The University of Western Ontario Faculty of Education Graduate Programs &amp; Research Office</small></p>		



## Appendix B

Participant letter of information for time 1 of the study.

**Introduction**

**My name is Matthew Vandermeer and I am a graduate student studying counselling psychology at the Faculty of Education at Western University. I am currently conducting research into secondary traumatic stress (STS) and alexithymia in pre-service teachers and mental health counsellors, and would like to invite you to participate in this study.**

**Purpose of the study**

**The aims of this study are to investigate the nature of the relationship of STS and alexithymia in preservice teachers at Western University. Secondary Traumatic Stress (STS) or compassion fatigue (CF), is a stress reaction wherein an individual acquires traumatic symptoms through exposure to a traumatized person, rather than through exposure to the primary trauma itself. Alexithymia is best described as "deficit in the cognitive processing of emotional experience, such that individuals have a limited capacity to symbolize emotions and elaborate upon emotional experience" (Ogrodniczuk et al., 2008).**

**If you agree to participate**

**In order to participate in this study you must be a current student in either the M.A./M.Ed. counselling psychology program or the B.Ed./Dip.Ed. pre-service teaching program at the University of Western Ontario. If you agree to participate in this study you will be asked to complete three brief questionnaires prior to the start of your practicum placement followed by the completion of two similar questionnaires after completion of your practicum placement. You may choose to have them emailed to you, and you can complete them, print them out and drop them in a secure box in a designated area of the Faculty, or you can email the completed questionnaires back to me. You may also choose to pick up hard copies of the questionnaire from me at the Faculty, and complete and return them at your convenience. Each session should take you approximately 10 minutes, for a total of 20 minutes over the Fall semester. In appreciation for your assistance with this study, your name (if you provide it) will be entered into a draw for an iPad, once for the initial survey and again for the second survey.**

**Confidentiality**

**The information collected will be used for research purposes only, and neither your name nor information that could identify you will be used in any publication or presentation of the study results. All information collected for the study will be kept confidential. This will be ensured by keeping all completed questionnaires in a secure filing cabinet accessible only to the researchers, and encrypting all digital information. In order to match your data from time 1 to time 2 you will be asked to provide the last six digits of your student number. Once data have been matched these numbers will be erased and replaced with a code so that you cannot be identified.**

**Risks**

**You may find recollection of your interactions with traumatized individuals distressful. Information on supports to access following this study are on the reverse of this sheet, and this is yours to keep.**

**Voluntary Participation**

**Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your academic status.**

**Questions**

**If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University at [REDACTED].**

**If you have any questions about this study, please contact:**

**Matthew Vandermeer, H.B.Sc. – [REDACTED]**

**Susan Rodger, Ph.D, C. Psych – [REDACTED]**

**This letter is yours to keep for future reference.**

**By clicking 'Submit This Page' you are agreeing to the following:**

**I have read the "Letter of Information", have had the nature of the study explained to me, and I agree to participate. All questions/concerns have been addressed to my satisfaction.**

## Appendix C

Participant letter of information for time 2 of the study.

### Introduction

**My name is Matthew Vandermeer and I am a graduate student studying counselling psychology at the Faculty of Education at Western University. I am currently conducting research into secondary traumatic stress (STS) and alexithymia in pre-service teachers and mental health counsellors. Based on your completion of a similar survey earlier this semester I would like to invite you to participate in this study.**

### Purpose of the study

**The aims of this study are to investigate the nature of the relationship of STS and alexithymia in preservice teachers at Western University. Secondary Traumatic Stress (STS) or compassion fatigue (CF), is a stress reaction wherein an individual acquires traumatic symptoms through exposure to a traumatized person, rather than through exposure to the primary trauma itself. Alexithymia is best described as "deficit in the cognitive processing of emotional experience, such that individuals have a limited capacity to symbolize emotions and elaborate upon emotional experience" (Ogrodniczuk et al., 2008).**

### If you agree to participate

**In order to participate in this study you must be a current student in either the M.A./M.Ed. counselling psychology program or the B.Ed./Dip.Ed. pre-service teaching program at the University of Western Ontario. If you agree to participate in this study you will be asked to complete three brief questionnaires prior to the start of your practicum placement followed by the completion of two similar questionnaires after completion of your practicum placement. You may choose to have them emailed to you, and you can complete them, print them out and drop them in a secure box in a designated area of the Faculty, or you can email the completed questionnaires back to me. You may also choose to pick up hard copies of the questionnaire from me at the Faculty, and complete and return them at your convenience. Each session should take you approximately 10 minutes, for a total of 20 minutes over the Fall semester. In appreciation for your assistance with this study, your name (if you provide it) will be entered into a draw for an iPad, once for the initial survey and again for the second survey.**

### Confidentiality

**The information collected will be used for research purposes only, and neither your name nor information that could identify you will be used in any publication or presentation of the study results. All information collected for the study will be kept confidential. This will be ensured by keeping all completed questionnaires in a secure filing cabinet accessible only to the researchers, and encrypting all digital information. In order to match your data from time 1 to time 2 you will be asked to provide the last six digits of your student number. Once data have been matched these numbers will be erased and replaced with a code so that you**

cannot be identified.

### Risks

You may find recollection of your interactions with traumatized individuals distressful. Information on supports to access following this study are on the reverse of this sheet, and this is yours to keep.

### Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions or withdraw from the study at any time with no effect on your academic status.

### Questions

If you have any questions about the conduct of this study or your rights as a research participant you may contact the Office of Research Ethics, Western University at [REDACTED]

If you have any questions about this study, please contact:

Matthew Vandermeer, H.B.Sc. – [REDACTED]

Susan Rodger, Ph.D, C. Psych – [REDACTED].

This letter is yours to keep for future reference.

By clicking 'Submit This Page' you are agreeing to the following:

I have read the "Letter of Information", have had the nature of the study explained to me, and I agree to participate. All questions/concerns have been addressed to my satisfaction.

## Appendix D

The Secondary Traumatic Stress Scale for measuring STS.

### SECONDARY TRAUMATIC STRESS SCALE

The following is a list of statements made by persons who have been impacted by their work with traumatized clients. Read each statement then indicate how frequently the statement was true for you in the past **seven (7) days** by circling the corresponding number next to the statement.

NOTE: "Client" is used to indicate persons with whom you have been engaged in a helping relationship. You may substitute another noun that better represents your work such as consumer, patient, recipient, etc.

	Never	Rarely	Occasionally	Often	Very Often
1. I felt emotionally numb.....	1	2	3	4	5
2. My heart started pounding when I thought about my work with clients.....	1	2	3	4	5
3. It seemed as if I was reliving the trauma(s) experienced by my client(s).....	1	2	3	4	5
4. I had trouble sleeping.....	1	2	3	4	5
5. I felt discouraged about the future.....	1	2	3	4	5
6. Reminders of my work with clients upset me.....	1	2	3	4	5
7. I had little interest in being around others.....	1	2	3	4	5
8. I felt jumpy.....	1	2	3	4	5
9. I was less active than usual.....	1	2	3	4	5
10. I thought about my work with clients when I didn't intend to.....	1	2	3	4	5
11. I had trouble concentrating.....	1	2	3	4	5
12. I avoided people, places, or things that reminded me of my work with clients.....	1	2	3	4	5
13. I had disturbing dreams about my work with clients.....	1	2	3	4	5
14. I wanted to avoid working with some clients.....	1	2	3	4	5
15. I was easily annoyed.....	1	2	3	4	5
16. I expected something bad to happen.....	1	2	3	4	5
17. I noticed gaps in my memory about client sessions.....	1	2	3	4	5

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Intrusion Subscale (add items 2, 3, 6, 10, 13)

Avoidance Subscale (add items 1, 5, 7, 9, 12, 14, 17)

Arousal Subscale (add items 4, 8, 11, 15, 16)

TOTAL (add Intrusion, Arousal, and Avoidance Scores)

Intrusion Score \_\_\_\_\_

Avoidance Score \_\_\_\_\_

Arousal Score \_\_\_\_\_

Total Score \_\_\_\_\_

**Citation:** Bride, B.E., Robinson, M.R., Yegidis, B., & Figley, C.R. (2004). Development and validation of the Secondary Traumatic Stress Scale. *Research on Social Work Practice, 14*, 27-35.

## Appendix E

The Toronto Alexithymia Scale 20 question version for measuring alexithymia (TAS-20).

86

**TORONTO ALEXITYMIA SCALE (TAS-20)**

1	2	3	4	5
Strongly Disagree	Disagree	Neither Disagree or Agree	Agree	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 find it hard to describe how I feel about people.
- \_\_\_\_\_ 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 am often puzzled by sensations in my body.
- \_\_\_\_\_ 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.

*Revised date (4 October 2006)*

Appendix F

Trauma preparation question for time 1 and time 2.

On a scale from 1 (unprepared) to 7 (prepared), how prepared do you feel to deal with a client's traumatic experiences?

## Appendix G

Time 1 demographics questionnaire.

1. What is your age? (Please enter numbers)
  
2. Gender
  - a. Female
  - b. Male
  - c. Other
  
3. What program are you in?
  - a. Counselling Psychology
  - b. B.Ed./Dip.Ed.
  
4. The last 6 digits of your student number. (This information will not be used to connect responses to individuals, only to match your responses at time 1 with your responses at time 2). (Please enter numbers)
  
5. What is the typical age (in years) of your client population? (Please enter numbers)
  
6. Today's date (DD/MM/YY)



## Appendix H

Time 2 demographics questionnaire.

1. The last 6 digits of your student number. (This information will not be used to connect responses to individuals, only to match your responses at time 1 with your responses at time 2). (Please enter numbers)
2. Did you work with any clients who you believe had traumatic experiences? NOTE: “Client” is used to indicate persons with whom you have been engaged in a helping relationship. You may substitute another noun that better represents your work such as student, patient, recipient, etc.
3. What was the typical age (in years) of your client population? (Please enter numbers)
4. Today’s date (DD/MM/YY)

## Appendix I

Mental health services information provided to participants.

**Feeling Distressed?**

**Some of the questions asked by this study are of a sensitive nature, and some people may feel distressed when recollecting interactions they have had with clients. If at any time you are feeling distressed or uncomfortable due to these questions and think you would like to speak with someone about your thoughts or feelings, please be aware of the services that are available, free, to you as a student.**

**Psychological Services at the Student Development Centre**

**Western's Student Development Centre provides professional, confidential psychological services free of charge to all Western students. They are located on the fourth floor of Western's Student Services Building. More information can be found on their website at <http://www.sdc.uwo.ca/psych/>**

**Counselling at Student Health Services**

**Student Health Services offers free individual counselling to all registered students. We have a multidisciplinary team of psychiatrists, psychotherapists and social workers who work with the varying needs of students. Counselling is available year round. More information can be found on their website <http://www.shs.uwo.ca/counselling/counseling.html>.**

# Matthew Vandermeer

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## EDUCATION

**University of Western Ontario** – London, Ontario June 2014

Master of Arts, Counselling Psychology

- Thesis: Secondary Traumatic Stress and Alexithymia in High-Risk Professionals
- Supervisor: Dr. Susan Rodger

**University of Toronto** – Toronto, Ontario June 2012

Honours Bachelor of Science, Mental Health Studies and Biology

- Senior Study: Assessing the Utility of a Virtual Reality Test of Executive Dysfunction on Traumatic Brain Injury Patients
- Supervisor: Dr. Konstantine Zakzanis

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## COUNSELLING/CLINICAL EXPERIENCE

**Counsellor** September 2013 – Present

Psychological Services at Western University

- Providing Cognitive-Behaviour Therapy and Solution Focused Therapy to individuals with a wide variety of presenting concerns
- Facilitating groups on coping with stress, exposure therapies for social anxiety, and coping with grief
- Completing semi-structured intake and risk assessments on a daily basis
- Assessing clients with a variety of assessments (i.e., PAI, BDI, BAI, etc.)

**Group Facilitator** September 2013 – December 2013

Journey Through Loss Grief Group

- Facilitated weekly support groups for clients living with grief due to the loss of a loved one
- Provided clients with ongoing grief support from a person-centered framework

**Student Counsellor** September 2012 – December 2012

CMHA London Waitlist Clinic

- Provided ongoing, interim support to adults on a treatment waitlist via one on one meetings in a counselling setting
- Supported clients presenting with a range of anxiety, depression, and adjustment disorders

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## Peer Employment Counsellor

September 2011 – April 2012

University of Toronto – Academic Advising & Career Centre

- Counsellled students in the process of seeking employment both post-graduation and during their undergraduate career
- Advised students on how to best improve their resumes, cover letters, job applications and employment seeking skills
- Provided referrals to students who presented with a need for mental health resources, assistance with English, financial assistance and other services

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## RESEARCH EXPERIENCE

### Research Assistant

Dr. Susan Rodger, University of Western Ontario

May 2013 – Present

- Reviewing blended learning strategies for post-secondary education
- Implementing an online mental health education course for pre-service teachers at the University of Western Ontario
- Designing interactive learning tools for pre-service teachers in an online mental health education course

### Researcher – Working with Low Income Men

January 2013 – December 2013

Dr. Jason Brown, University of Western Ontario

- Interviewed community stake holders about their views on what is essential for volunteers to be aware of, to produce training manual
- Developed a comprehensive training manual for new volunteers working with low income men
- Presented volunteer training manual and training program to community stake holders

### Master's Thesis Researcher

September 2012 – April 2014

Dr. Susan Rodger, University of Western Ontario

- Investigating the relationship between alexithymia and secondary traumatic stress/vicarious trauma in students entering practicums
- Designed and implemented longitudinal methodology for collecting participant data across the entire faculty of education
- Demonstrated that higher levels of alexithymia confer a higher risk of developing secondary traumatic stress/vicarious trauma

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## Senior Supervised Study Researcher

September 2011 – May 2012

Dr. Konstantine Zakzanis, University of Toronto

- Studied subtle deficits in the executive functioning of mild traumatic brain injury patients using novel virtual reality based neuropsychological testing
- Quantitatively compared the ecological validity of traditional 'paper and pencil' based neuropsychological tests to novel virtual reality based tests
- Administered a variety of neuropsychological and psychological assessment tests (i.e. PAI, Wisconsin Card Sort Test, SPQ, etc.)
- Analyzed data using SPSS and MS Excel software

## Research Assistant

April 2011 – September 2011

Eliyas Jeffay, University of Toronto

- Administered intensive neuropsychological test batteries consisting of approximately 10 separate tests
- Scored completed test batteries to ensure more convenient analysis for the head researcher
- Contacted participants in advance to set up appropriate test administration schedules
- Maintained an extensive database on neurological trauma patients

## Student Review Study

April 2011 – September 2011

Michelle Hilscher, University of Toronto

- Thoroughly reviewed the primary and secondary literature on Post Traumatic Stress Disorder (PTSD) in modern military history
- Analyzed changing perspectives of PTSD in military history through the effects of advances in medical knowledge, the changing nature of war and the cultural zeitgeist
- Produced a major review paper on the changing views of Western militaries towards PTSD stricken soldiers

## Collaborating Textbook Author

March 2011 – October 2011

Dr. Katalin Szaszi at the Keenan Research Centre of St. Michael's Hospital Toronto

- Independently investigated the cellular wound healing literature, specifically regarding the use of Electric Cell-substrate Impedance Sensing (ECIS)
- Compiled a review of the most common techniques for analyzing cellular wound healing processes, with a more in depth look at ECIS
- Actively participated in the editing process of producing an academic textbook

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## **Student Meta-analysis Study**

September 2010 – December 2010

Dr. K. K. Zakzanis at the University of Toronto Scarborough

- Reviewed the literature on the relationship between basal cortisol levels and PTSD
- Quantitatively analyzed the relationship between basal cortisol levels and PTSD using meta-analytic techniques
- Presented findings to peers during the “Current Topics in Abnormal Psychology” lecture series and through a written meta-analysis

## **Research Assistant**

January 2010 – August 2010

Dr. Katalin Szaszi at the Keenan Research Centre of St. Michael’s Hospital Toronto

- Actively contributed to experimental investigations into the role of cytokines in activating biochemical pathways related to wound healing
- Designed and executed experimental procedures to more effectively understand the role of cytokines in wound healing
- Communicated experimental findings to peers and senior researchers during monthly grand rounds

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## **TEACHING & PROCTORING EXPERIENCE**

### **Teaching Assistant - Counselling**

September 2013 – April 2014

University of Western Ontario

- Trained graduate students in core aspects and skills of counselling psychology and clinical practice
- Observed graduate level counselling psychology students’ therapy sessions and provided them with ongoing feedback and supervision

### **Teaching Assistant – Psychological Research Methodology**

April 2013

University of Western Ontario

- Assessed students’ experimental research papers to ensure undergraduate understanding of psychological research methodology
- Provided students with ongoing feedback on the content and quality of their work through written correspondence and in person meetings

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## Psychology Proctor

(Intermittent) 2012 – Present

University of Western Ontario

- Explained the assessment process to groups of 100 – 500 students
- Monitored students during the assessment process, in order to ensure no breaches of academic integrity or academic honesty
- Assisted professor and other invigilators during the pre-exam setup

## Assessment Invigilator

June 2012 – September 2012

Centennial College

- Explained the computerized assessment process to large groups of students
- Provided students with assessment results and referrals to appropriate advising services, depending on assessment outcome
- Monitored students during the assessment process, in order to ensure no breaches of academic integrity or academic honesty

## “Get Started” Academic Orientation Coach

May 2012 – August 2012

University of Toronto

- Facilitated tutorial style discussion groups on topics surrounding the transition from high school to university for incoming students
- Instructed groups of 15 – 50 students on the basics of course selection and the various IT services available to them as U of T students
- Candidly and professionally answered all student inquiries

## Computer and Math Sciences Invigilator

October 2011 – April 2012

University of Toronto

- Explained the assessment process to groups of 100 – 500 students
- Monitored students during the assessment process, in order to ensure no breaches of academic integrity or academic honesty
- Assisted professor and other invigilators during the pre-exam setup

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## PEER REVIEWED PUBLICATIONS

Kakiashvili, E., Dan, Q., **Vandermeer, M.**, Zhang, J., Waheed, F., Pham, M., & Szaszi, K. (2011). The epidermal growth factor receptor mediates tumor necrosis factor- $\alpha$ -induced activation of the ERK/GEF-H1/RhoA pathway in tubular epithelium. *The Journal of Biological Chemistry*, 286, 9268-9279.

# Matthew Vandermeer

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## TEXT BOOK CONTRIBUTIONS

Szaszi, K., **Vandermeer, M.**, & Amoozadeh, Y. (2012). Epithelial wound healing and the effects of cytokines investigated by ECIS. In W. G. Jiang (Ed.), *Electric Cell-Substrate Impedance Sensing in Cancer and Cancer Metastasis Research* (pp. 131-176). London: Springer Verlag.

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## CONFERENCE & POSTER PRESENTATIONS

**Vandermeer, M.**, & Rodger, S. (2014). Secondary traumatic stress and alexithymia in novice counsellors. Canadian Counselling and Psychotherapy Association 2014 Research Conference. Moncton, NB.

**Vandermeer, M.** (2013). Secondary traumatic stress and alexithymia in high-risk professionals. 2013 Robert MacMillan Graduate Research in Education Symposium. London, ON.

Hanna, S., Klas, P., Jeffay, E., Zanjani, A., **Vandermeer, M.**, & Zakzanis, K. (2013). Pre-injury income and return to work after mild traumatic brain injury. 41st Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.

Klas, P., Hanna, S., Jeffay, E., Zanjani, A., **Vandermeer, M.**, & Zakzanis, K. (2013). Predicting disability using neuropsychological testing in patients with mild traumatic brain injury. 41st Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.

**Vandermeer, M.**, Zanjani, A., Jeffay, E., Klas, P., Hanna, S., & Zakzanis, K. (2013). A Novel, Ecologically Valid, Measure of Executive Functioning: A Pilot Study. 41st Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.

Zanjani, A., Jeffay, E., Klas, P., Hanna, S., **Vandermeer, M.**, & Zakzanis, K. (2013). Component analysis of memory function schizophrenia: A quantitative review. 41st Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.

Zanjani, A., **Vandermeer, M.**, Jeffay, E., Hanna, S., Klas, P., & Zakzanis, K. (2013). A novel virtual environment test and selective, sustained and divided attention in an mTBI population: A pilot study. 41st Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.



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**Vandermeer, M.**, Jeffay, E., & Zakzanis, K. (2012). Examining the differential sensitivity of a virtual reality test measure of executive functioning in traumatic brain injury. *National Academy of Neuropsychology 32nd Annual Conference*. Nashville, TN.

**Vandermeer, M.**, Dan, Q., Zhang, J., Waheed, F., Kakiashvili, E., & Szaszi, K. (2011). Tumor necrosis factor- $\alpha$  enhances proliferation and wound healing in the tubular epithelium: Role of the epidermal growth factor receptor. *Keystone Symposium on Epithelial Plasticity*. Vancouver, BC.

Kakiashvili, E., Dan, Q., **Vandermeer, M.**, Zhang, J., Waheed, F., & Szaszi, K. (2010). The epidermal growth factor receptor mediates tumor necrosis factor- $\alpha$ -induced GEF-H1 and Rho activation in tubular epithelial cells. *50th Annual Meeting of the American Society for Cell Biology*. Philadelphia, PA.

Kakiashvili, E., Dan, Q., **Vandermeer, M.**, Zhang, J., Waheed, F., & Szaszi, K. (2010). The epidermal growth factor receptor mediates tumor necrosis factor- $\alpha$ -induced Rho activation in the tubular epithelium. *6<sup>th</sup> International Congress of Pathophysiology*. Montreal, QC.

**Vandermeer, M.**, Zhang, J., Dan, Q., & Szaszi, K. (2010). Tumor necrosis factor- $\alpha$  enhances wound healing and proliferation in tubular epithelium via the transactivation of the of the epidermal growth factor receptor: *ECIS User's Meeting 2010*. Rensselaerville Institute, NY.

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## OTHER PUBLICATIONS

**Vandermeer, M. R. J.** (2014). Be kind to yourself: Practicing basic self-care. *Canadian Counselling and Psychotherapy Association's Newsletter*, 7(1), 12-13.

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## AWARDS & CERTIFICATES

Canadian Counselling & Psychotherapy Association (CCPA)	
Conference Grant	2014
Ontario Graduate Scholarship (OGS)	2013 – 2014
Western Graduate Research Scholarship (WGRS)	2012 – 2013
Western University Teaching Assistant Training Program	2012
U of T Scarborough Entrance Scholarship	2006

# Matthew Vandermeer

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## PROFESSIONAL MEMBERSHIPS

- |  |                |
|--|----------------|
| Canadian Psychological Association                 | 2014           |
| • Student Affiliate                                |                |
| Canadian Counselling and Psychotherapy Association | 2013 – Present |
| • Member and Student Representative                |                |

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## OTHER EXPERIENCE

### **Men's Luncheon Volunteer** 2013

Crouch Neighbourhood Resource Centre

- Helped prepare, serve, and clean lunch for low income men in the Hamilton Road area
- Provided referrals and promoting appropriate community services (i.e. housing, mental health, physical health, addictions, etc.) as needed

### **Charity Organizer** 2009 – 2012

Mark Vandermeer Memorial Golf Tournament

- Co-organized three annual Mark Vandermeer Memorial Golf Tournaments (MVMGT) in order to raise funds and awareness for hypertrophic cardiomyopathy research
- Effectively communicated with participants, volunteers and community partners to raise over \$70 000 for hypertrophic cardiomyopathy research
- Managed daily fundraising operations leading up to and including the day of the tournament

## SPECIAL SKILLS

- Proficient and experienced in administering and scoring many psychological tests, including: the Wisconsin Card Sort Test, Trail Making Test, Benton Judgement of Line Orientation, California Verbal Learning Test, Controlled Oral Word Association Test, WAIS digit span, grooved pegboard test, Ruff's 2s and 7s, the Wechsler Abbreviated Scale of Intelligence (WASI), Wide Ranging Achievement Test (WRAT), Rey-Osterrieth Complex Figure, Tower of London, Schizotypal Personality Questionnaire, Test of Memory Malingering (TOMM), Ruff Figural Fluency Test (RFFT), the Beck Depression Inventory (BDI-II), the Secondary Traumatic Stress Scale (STSS), Toronto Alexithymia Scale (TAS-20), and the Personality Assessment Inventory (PAI)

# Matthew Vandermeer

- Experienced with many biological laboratory research skills and techniques including: immunoprecipitation, protein assays, mammalian cell culturing, RNA interference, plasmid transfections, plasmid production and purification, bacteria culturing, immunofluorescence, microscopy, and western blotting
- Experienced and knowledgeable in web design using html, CSS, JavaScript, and jQuery