

Conceptualizing Complex Post-Traumatic Stress:  
The Roles of Dissociation, Attachment, and Type of Traumatic Event

by

Cara Samuel

Bachelor of Arts Honours, University of Winnipeg, 2017

A Thesis Submitted in Partial Fulfillment  
of the Requirements for the Degree of

MASTER OF SCIENCE

in the Department of Psychology

© Cara Samuel, 2019  
University of Victoria

All rights reserved. This Thesis may not be reproduced in whole or in part, by photocopy or other means, without the permission of the author.

Conceptualizing Complex Post-Traumatic Stress:  
The Roles of Dissociation, Attachment, and Type of Traumatic Event

by

Cara Samuel  
Bachelor of Arts Honours, University of Winnipeg, 2017

**Supervisory Committee**

Dr. Marsha Runtz, Department of Psychology  
**Supervisor**

Dr. John Sakaluk, Department of Psychology  
**Departmental Member**

Dr. Erica Woodin, Department of Psychology  
**Departmental Member**

## Abstract

Those who experience relational traumatic events (i.e., traumatic events wherein there is a pre-existing relationship with the perpetrator such as intimate partner violence or some types of child maltreatment) often present with issues of affect regulation and poor self-concept, as well as functional impairment; which can be characterized as complex post-traumatic stress disorder (Complex PTSD). The roles of dissociation, adult attachment style and traumatic event type in Complex PTSD have yet to be fully examined. Using an undergraduate sample ( $n = 580$ ), I examined the symptom structure of Complex PTSD using confirmatory factor analysis to test a model with four first-order latent variables and one second-order latent variable, each consisting of three to four observed variables: (1) PTS (re-experiencing, avoidance, hypervigilance); (2) Affect Dysregulation (skill deficits, instability, tension-reducing activities); (3) Dissociation (depersonalization, derealization, disengagement and emotional constriction); (4) Negative Self-Concept (self-blame, self-criticism, helplessness); and (5) Interpersonal Difficulties (difficulty with intimacy, interpersonal conflicts, fearful-avoidant adult attachment style); and the second-order latent factor of (6) Complex PTS. The model demonstrated a good fit with moderate to high factor loadings. Next, I used structural equation modelling to examine if relational traumatic events were associated with Complex PTS, and if non-relational types of traumatic events were associated with PTS. The model demonstrated a good fit with moderate to high factor loadings, however the association between PTS and non-relational traumatic events was not significant. I then used latent profile analysis to examine whether those who endorse Complex PTS symptoms represent a distinct population from those who endorse only PTS symptoms. A two-group solution was the best fit to the data wherein one group endorsed low levels of all symptoms and

the other high levels. Lastly, I used hierarchical regression analyses to examine whether Complex PTS is associated with higher levels of impaired functioning, such as substance use, suicidality and psychosocial functioning over and above PTS alone. Complex PTS accounted for 25.81% more of the variance in suicidality, however the change in substance use (1.5%) and psychosocial functioning (6.18%) was minimal. This research will enhance clinicians' ability to capture variability in symptom presentation, thus increasing the potential for more effective assessment and treatment of trauma survivors.

## Table of Contents

Supervisory Committee.....	ii
Abstract.....	iii
Table of Contents.....	v
List of Tables.....	vi
List of Figures.....	vii
Acknowledgements.....	viii
Acknowledgements.....	ix
Introduction.....	1
Diagnosis and Categorization of Mental Illness.....	2
PTSD.....	2
Changes in PTSD diagnostic criteria from <i>DSM-IV</i> to <i>DSM-5</i> .....	3
Dissociative subtype.....	4
Change to PTSD diagnostic criteria <i>ICD-10</i> to <i>ICD-11</i> .....	4
Heterogeneity of PTSD.....	5
Complex PTSD.....	6
The Role of Traumatic Event Type.....	7
The Role of Dissociation.....	9
The Role of Attachment.....	10
Complex PTSD versus Borderline Personality Disorder.....	12
Research on Complex PTSD.....	16
Latent Dimensions versus Categories.....	19
The Current Study.....	21
Research Questions and Hypotheses.....	23
1) Do PTS and Complex PTS have distinct symptom clusters?.....	23
Hypothesis 1.....	23
2) Do PTS and Complex PTS result from different traumatic events?.....	23
Hypothesis 2.....	23
3) Do PTS and Complex PTS represent different populations?.....	24
Hypothesis 3.....	24
4) Do PTS and Complex PTS result in different levels of impaired functioning?...24	24
Hypothesis 4.....	25
Methods.....	25
Overview.....	25
Participants.....	26
Procedures.....	26
Measures.....	26
Demographic questionnaire.....	27
The Detailed Assessment of Posttraumatic Stress (DAPS).....	27
The Inventory of Altered Self-Capacities (IASC).....	29
The Multiscale Dissociation Inventory (MDI).....	30
Inventory of Interpersonal Problems (IIP).....	31
The Cognitive Distortions Scale (CDS).....	32

The Relationship Questionnaire (RQ).....	33
Results .....	34
Testing assumptions.....	34
Outliers.....	34
Multivariate normality.....	34
Descriptives and correlations.....	33
Confirmatory factor analysis (CFA).....	34
Model specification.....	35
Model evaluation.....	36
Reliability paradox.....	37
Results of the confirmatory factor analysis.....	39
Structural equation model.....	40
Model specification.....	40
Results of the structural equation model.....	42
Latent profile analysis.....	44
Model evaluation.....	45
Results of the latent profile analysis.....	45
Hierarchical regression.....	50
Results of hierarchical regressions.....	50
Discussion .....	53
Do PTS and Complex PTS have distinct symptom clusters? .....	53
Do PTS and Complex PTS result from different traumatic events? .....	57
Do PTS and Complex PTS represent different populations? .....	58
Do PTS and Complex PTS result in different levels of impaired functioning? ...	61
Limitations .....	62
Future Directions .....	63
Conclusion .....	66
References .....	67
Appendix A: Demographic Questionnaire .....	81
Appendix B: The Relationship Questionnaire .....	84

### List of Tables

Table 1. Comparison of the Diagnostic Criteria.....	3
Table 2. Means, Standard Deviations, and Correlations with Confidence Intervals.....	38
Table 3: Latent Profile Analysis Fit Indices.....	46
Table 4: Means, Standard Deviations, and Standard Errors by Group.....	47
Table 5: Hierarchical Regression.....	52

**List of Figures**

Figure 1. Confirmatory factor analysis.....	35
Figure 2. Factor loadings and significance results of confirmatory factor analysis.....	40
Figure 3. Structural equation model.....	42
Figure 4. Results of structural equation model.....	44
Figure 5. Means of symptom variables for Group 1 and Group 2.....	49

**Acknowledgments**

I would like to thank my supervisor Dr. Marsha Runtz for her guidance and support throughout this journey, as well as my committee members, Dr. John Sakaluk and Dr. Erica Woodin.

## Conceptualizing Complex Post-Traumatic Stress:

### The Roles of Dissociation, Attachment, and Type of Traumatic Event

The current system for classifying psychological disorders in North America, the *Diagnostic & Statistical Manual of Mental Disorders* (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association [APA], 2013), has been heavily criticized for constructing arbitrary boundaries between diagnoses and sacrificing validity for utility by failing to capture the variability within and between disorders (Kendell & Jablensky, 2003). The diagnostic criteria for post-traumatic stress disorder (PTSD) do not fully describe the psychological syndrome resulting from chronic and relational traumatic events such as child maltreatment, and do not take into account related concerns such as dissociation, attachment, interpersonal problems, affect dysregulation and issues of self-concept (Cloitre et al., 2009). Criteria that accurately address the presentation and course of a disorder are necessary in order to properly diagnosis and treat mental illnesses. To address these criticisms, a new diagnosis of Complex PTSD has been proposed by Briere, Kaltman, and Green (2008); Cloitre, Scarvalone, and Difede (1997); Herman (1992); Matheson, (2016); and Zlomick, Zakriski, Shea, and Costello (1996). While Complex PTSD is thought to be similar to other disorders recognized in the *DSM-5* such as borderline personality disorder (BPD; Kulkarni, 2017; Matheson, 2016), there are key differences that support Complex PTSD as a distinct diagnosis. A review of the issues surrounding diagnosis in general; issues concerning the PTSD diagnosis; the roles of traumatic event type, dissociation and attachment; and distinguishing Complex PTSD as a distinct disorder will follow.

## **Diagnosis and Categorization of Mental Illness**

The dominant conceptualization of mental illness as categorical via the DSM and the International Classification of Diseases (ICD) operate on the premise that mental disorders are diseases that cause the presenting symptomology associated with the illness, and that there are natural boundaries that separate one disorder from another (Kendell & Jablensky, 2003). While the classification of mental disorders in this fashion is no doubt useful, the validity of this system (as well as its underlying premise) has been called into question (Borsboom, 2017; Kendell & Jablensky, 2003). While most clinicians would likely agree that such arbitrary boundaries between disorders are only useful categorizations, problems arise when people assume their validity and when the idea of a mental disorder as a distinguishable disease is used to explain the origins of an individual's symptoms (Borsboom, 2017; Kendell & Jablensky, 2003). Furthermore, the statistical analyses often used when studying mental disorders reflect this conceptualization, and thus if the conceptualization is invalid our findings may then be irrelevant at best and misleading at worst. There is also the issue of complexity within categorization systems such as the DSM wherein a diagnosis could consist of one of many combinations of different criterion. This is particularly salient with the PTSD diagnosis.

**PTSD.** PTSD is a psychological disorder that may develop after an individual is exposed to a traumatic event and presents with symptoms of: (1) re-experiencing the traumatic event through nightmares and/or flashbacks; (2) avoidance of reminders of the traumatic event; (3) hypervigilance; and (4) negative alterations in mood and cognition (APA, 2013). The DSM-5, the most commonly used classification and diagnostic system in North America, defines PTSD using these four symptom clusters whereas the World Health Organization's (WHO)

International Classification of Diseases (*ICD-10*), which is used outside of North America, includes only the first three groups of symptoms (WHO, 1992). The *DSM-IV* also only included the first three symptom clusters of re-experiencing, avoidance and hypervigilance (American Psychiatric Association, 2000). Differences in PTSD diagnostic criteria will be discussed in more detail below (see Table 1 for diagnostic criteria in the *DSM-5*, *ICD-10*, and *ICD-11*).

Table 1

*Comparison of the Diagnostic Criteria between the DSM-5, ICD-10 and Proposed ICD-11 Demonstrating the Different Conceptualization of PTSD and Contribution of Dissociation*

DSM-5 PTSD	DSM-5 PTSD Dissociative Subtype	ICD-10 PTSD	ICD-11 Complex PTSD
Re-experiencing	Re-experiencing	Re-experiencing	Re-experiencing
Hypervigilance	Hypervigilance	Hypervigilance	Hypervigilance
Avoidance	Avoidance	Avoidance	Avoidance
Negative Mood & Cognitions	Negative Mood & Cognitions Dissociation		Negative Self- Concept Interpersonal Conflicts Affect Dysregulation Dissociation

**Changes in PTSD diagnostic criteria from *DSM-IV* to *DSM-5*.** Substantial changes were made to the PTSD diagnostic criteria when transitioning from *DSM-IV* to *DSM-5* including: 1) the creation of a new diagnostic category and reclassifying PTSD as a “Trauma and Stressor-related Disorder” rather than an anxiety disorder; 2) a more objective and explicit definition of exposure to traumatic events; 3) a reorganization of symptom groups wherein avoidance became its own symptom group and numbing symptoms were included in a new group of negative mood and cognitions (e.g., persistent low mood and self-blame). New criteria were also developed for

PTSD in children 6 and younger; as well as new specifiers for delayed expression and dissociative subtypes (APA, 2013).

***Dissociative subtype.*** The dissociative subtype is noted if the client presents with recurrent or persistent experiences of depersonalization (i.e., perceiving one's self or body as foreign or distant from oneself; APA, 2013; Briere, 2002) or derealization (changes in one's perception of the external world so that it seems strange or unreal; APA, 2013; Briere, 2002; Pai, Suris, & North, 2017). Validation studies found that 14% of PTSD cases throughout the world met criteria for this subtype, which was associated with greater symptom severity and suicidality (Stein et al., 2013).

This subtype is also thought to be more common in people who have experienced childhood trauma (Hanson et al., 2014; Stein et al., 2013). Frewen, Brown, Steuwe, and Lanius (2015) found that in the general population people with PTSD and dissociative symptoms were also more likely to experience interpersonal conflicts and affect dysregulation, a collection of symptoms that reflects the *ICD-11*'s proposed criteria for Complex PTSD. Findings from other studies further suggest that the dissociative subtype of PTSD is likely associated with a larger and more diverse range of symptoms than what is described in the *DSM-5* (e.g., Armour, Contractor, Palmieri, & Elhai, 2014; Müllerová, Hansen, Contractor, Elhai, & Armour, 2016).

**Changes to PTSD diagnostic criteria *ICD-10* to *ICD-11*.** Many changes have been proposed for the PTSD criteria in moving from *ICD-10* to *ICD-11*. Most notably is decreasing the number of symptoms from 13 to 6, wherein flashbacks, nightmares, and exaggerated startle response were retained; avoidance was split into avoidance of environmental cues and avoidance of thoughts and feelings associated with the traumatic event; and hypervigilance was added

(Barbano et al., 2018). These changes were made in order to distinguish PTSD from other disorders that are frequently comorbid with PTSD, such as depression (Brewin et al., 2017; Stein et al., 2014). However, some feel that sensitivity (i.e., strength of the criteria in discriminating between and detecting mental disorders) is being sacrificed for specificity (i.e., ability to screen out individuals who do not have a mental disorder; Barbano et al., 2018). Critics of these changes assert that only individuals with more severe symptoms will be diagnosed with PTSD according to the *ICD-11*, and thus clients with symptoms in low to moderate severity will have less access to health care due to lack of a diagnosis (Barbano et al., 2018).

**Heterogeneity of PTSD.** The *DSM-5* presents a four-factor model of PTSD (re-experiencing, avoidance, hypervigilance and negative alterations in mood and cognition; Brewin et al., 2017; Kilpatrick et al., 2013) whereas the *ICD-11* presents only three symptom clusters (re-experiencing, avoidance and hypervigilance; Barbano et al., 2018; Brewin et al., 2017; Stein et al., 2014). The *DSM-5* criteria contain seventeen symptoms of PTSD that load onto these four factors (APA, 2013; Brewin et al., 2017) in contrast to the *ICD-11*'s proposed three symptom factors. Galatzer-Levy and Bryant (2013) voiced concerns that the large number of PTSD symptoms in the *DSM-5* will contribute to the shapeless and heterogeneous nature of PTSD wherein through different combinations of symptoms the presentation of PTSD may look markedly different across individuals. The diagnosis of PTSD consists of a configuration of 20 symptoms with representation from each symptom criteria, resulting in an astounding 636, 120 combinations. (Galatzer-Levy & Bryant, 2013). The *ICD-11* reduced the number of symptoms associated with PTSD in part in order to avoid this issue (Barbano et al., 2018). These issues

raise an important consideration: are each of these permutations differential expressions of the same disorder, or are they separate disorders all together?

There are risks to conceptualizing mental disorders as both larger and smaller collections of symptom criteria. While the mass of symptoms that represent the criteria for PTSD diagnosis in the *DSM-5* likely results in a stronger ability to discriminate between and detect mental disorders, they lack the ability to accurately screen out individuals who do not in fact have PTSD (Barbano et al., 2018). Whereas while the much smaller set of symptoms that represent PTSD in the *ICD-11* is more accurately able to screen out those who do not have PTSD, they are less able to discriminate between mental disorders (Barbano et al., 2018). The identified issues with both conceptualizations of PTSD may lead to an improper diagnosis and thus potentially applying the wrong intervention strategy or treatment.

While the addition of a new Complex PTSD diagnosis in the *ICD-11* does not ameliorate these concerns, it is an attempt to better represent the experiences of trauma survivors that do not neatly fit into the current diagnostic criteria of PTSD for a number of reasons that will be explored below.

### **Complex PTSD**

Individuals who have experienced relational types of traumatic events (e.g., child maltreatment, intimate partner violence) often present with additional and more severe symptoms, and higher impairment compared to PTSD (Cloitre et al., 2013; Cloitre et al., 2009); recognition of this led to the proposal for the new diagnosis of Complex PTSD for the *ICD-11*, scheduled for release in 2019. The proposed criteria for Complex PTSD include three clusters beyond the classic PTSD symptoms (Matheson, 2016; Wolf et al., 2015). These include: (1)

affect dysregulation, (e.g., mood swings, difficulty inhibiting anger); (2) interpersonal conflicts (e.g., engaging in chaotic, unstable and emotionally distressing relationships); and (3) negative self-concept (e.g., self-criticism, self-blame, and hopelessness; Briere, 2000; Briere & Runtz, 2002a; Briere & Runtz, 2002b).

The traumatic events thought to precipitate Complex PTSD are generally relational and chronic, events in which there was no perceived or actual chance of escape, including child maltreatment, intimate partner violence, sex trafficking, torture, kidnapping/hostage situations, and being a prisoner of war (Brewin et al., 2017; Cloitre et al. 2009; Herman, 1997).

Dissociation (i.e., detachment from reality and/or one's sense of self) often occurs as a response to chronic and severe traumatic events (Briere, Dietrich, & Semple, 2016; Carlson, Dalenberg, & McDade-Montez, 2012). Survivors of complex trauma often also present with conflictual patterns of relating to others as adults, at times presenting as an insecure adult attachment style, particularly the fearful-avoidant style (Barazzone, Santos, McGowan, & Donaghay-Spire, 2018; Woodhouse et al., 2015). As such, it is worth examining the roles type of traumatic event, dissociation, and adult attachment style play in Complex PTSD.

### **The Role of Traumatic Event Type**

Relational and chronic types of traumatic events, especially during childhood, are thought to result in complex symptomology that goes beyond the current post-traumatic stress symptoms (Cloitre et al., 2009). While it is generally accepted that Complex PTSD may develop from severe, relational events in which there was no perceived chance of escape in adulthood (such as in cases of intimate partner violence, torture, kidnapping, or sex trafficking), developmental trauma is more strongly associated with Complex PTSD symptomology (Hyland et al., 2017).

Child maltreatment and neglect negatively impact developmental processes related to self-regulation and lead to contradictory symptoms such as emotional overactivation and deactivation/avoidance (such as outbursts of anger, dysphoria and dissociation); interpersonal behaviors that present as aggressive, dependent, distant and/or avoidant (Cloitre et al., 2009); and dysfunctional beliefs about oneself (Hyland et al., 2017). Those who have experienced child maltreatment are more likely to experience other potentially traumatic events throughout their lifespan (Cloitre et al., 2009). It has been suggested that an increasing amount of different types of these events is associated with greater symptom complexity and severity (Briere, Kaltman, & Green, 2008; Cloitre et al., 2009; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). This finding may be unique to cumulative traumatic events in childhood (that may or may not lead to traumatic events in adulthood), as this has not been seen with cumulative traumatic events in adulthood alone (Cloitre et al., 2009).

While the association between repeated and chronic relational forms of traumatic events in childhood and Complex PTSD has been extensively studied, few studies have sought to comparatively determine which traumatic events specifically lead to Complex PTSD versus PTSD. Hyland et al. (2017) found that childhood sexual abuse, childhood physical assault, adult physical assault, and being unemployed were significantly more likely to be associated with Complex PTSD as compared to PTSD, whereas near-drowning and robbery were more likely to be associated with PTSD rather than Complex PTSD. This finding supports the theory that relational types of traumatic events (e.g. childhood sexual abuse) are more likely to contribute to Complex PTSD symptomology, and single-event, non-relational types of traumatic events are more likely to lead to PTSD symptomology. As previously mentioned, these types of traumatic

events are more likely to be associated with dissociative symptoms as well, a key symptom cluster in Complex PTSD.

### **The Role of Dissociation**

While the *DSM-5* does include the previously mentioned dissociative subtype of PTSD, it only considers two forms of dissociation. These are derealization (changes in one's perception of the external world so that it seems strange or unreal) and depersonalization (perceiving one's self or body as foreign or distant from oneself; APA, 2013; Briere, 2002). According to Briere (2002), this excludes other relevant dissociative symptoms such as disengagement (separation either cognitively or emotionally from one's environment), emotional constriction (diminished emotionality or emotional responsiveness), memory disturbance (lack or inaccessibility of memories for specific events that are not due to a medical condition or everyday forgetfulness), and identity dissociation (experiencing multiple identities or perspectives within oneself). The inclusion of additional dissociative symptoms is essential to a conceptualization of Complex PTSD as derealization and depersonalization alone due not fully capture the range of dissociative experiences that may result from exposure to traumatic events, particularly chronic and relational traumatic events (Briere et al., 2016; Carlson et al., 2012).

In the literature on Complex PTSD, dissociation is included under symptoms related to affect dysregulation as dissociative states are thought to be a protective response to the intense emotions trauma survivors may experience (Cloitre et al., 2013; Maercker et al., 2013). While depersonalization and derealization are the forms of dissociation that are most often discussed and included in studies on PTSD, other forms likely play a meaningful role in regard to affect dysregulation and Complex PTSD more generally. As affect dysregulation often includes

symptoms of lack of emotion (Maercker et al., 2013) and states of detachment (Cloitre et al., 2013), emotional constriction and disengagement could also be considered responses to affect dysregulation. However, dissociation has also been implicated in re-experiencing symptoms such as flashbacks (APA, 2013), avoidance symptoms such as avoidance of internal triggers (e.g., emotions; Maercker et al., 2013), and negative self-concept as dissociation may be perpetuated by internal states such as shame (Platt, Luoma, & Freyd, 2017). As such, while related, dissociation may also be conceptualized as a stand-alone construct distinct from affect dysregulation.

Despite the importance of its inclusion, studies on the conceptualization of Complex PTSD and its distinction from PTSD have not included measures of dissociation in their analyses. Attachment style has similarly been excluded from these studies despite its key role in Complex PTSD.

### **The Role of Attachment**

Attachment was first examined by Bowlby (1982), in which he described the dynamics between children and their caregivers that form a style of relating. These interactions then influence emotional responses and emotional regulation throughout the child's lifespan. Bowlby (1982) believed that this was an evolutionary and biological response to the nearness of the caregiver wherein certain behaviors such as crying may be stimulated in order to increase proximity. Ainsworth, Blehar, Waters, and Wall (as cited in Woodhouse, Ayers, & Field, 2015) described particular attachment styles: secure, anxious-ambivalent, anxious-avoidant, and disorganized, which were then discussed by Hazan and Shaver (1987) as relating to relationship interactions in adulthood.

Continuing this line of inquiry, Bartholomew (1990) derived styles of adult attachment to capture pervasive and persistent patterns of relating in adult intimate relationships that are usually related to attachment style in childhood. The four styles exist on two continuums: avoidance (fear of closeness, dependency, and intimacy) and anxiety (fear of rejection and abandonment) and consist of:

- (1) Secure (low avoidance, low anxiety): finds it easy to be emotionally intimate with others, to have others depend on them, and to depend on others themselves. No concerns about being alone or not being accepted by others.
- (2) Dismissive-Avoidant (high avoidance, low anxiety): comfortable not having intimate emotional relationships. Discomfort with depending on others and having others depend on them. Independence and self-reliance are highly valued.
- (3) Fearful-Avoidant (low avoidance, high anxiety): holds strong desire for emotional closeness with others that is not felt to be shared by others. Discomfort without intimate relationships and fears that others don't value them as much as they do.
- (4) Anxious-Preoccupied (high avoidance, high anxiety): Discomfort with being intimate with others despite a desire for close relationships. Difficulty trusting and depending on others due to a fear of being hurt (Bartholomew & Horowitz, 1991).

Attachment style, both in children and adults, has long been conceptualized as categorical. However, Fraley and Spieker (2003) and Fraley, Hudson, Heffernan and Segal (2015) used taxometric analysis to determine that attachment styles actually exist on a continuum, and thus are better defined as dimensional constructs rather than categorical. While the decision to define constructs and variables as dimensional or categorical is often based on

preference or theory, taxometric analysis allows for this to be determined scientifically (Fraleley et al., 2015). These findings suggest that research on attachment style should be conducted using dimensional and not categorical models; and that we should shift our understanding of attachment from style as the cause of behaviors to style as a way to describe a collection of behaviors that is not exhaustive or exclusive.

Fearful-avoidant attachment is the style most frequently associated with relational, chronic types of traumatic events (e.g., childhood sexual abuse) and post-traumatic stress in general (Barazzone, Santos, McGowan, & Donaghay-Spire, 2018; Woodhouse et al., 2015). This may be due to the development of dysfunctional or underactive affect regulation skills that result from an insecure child-caregiver attachment, as the development of post-traumatic stress may be influenced by affect regulation abilities during and following a traumatic event (Kobak & Sceery, as cited in Woodhouse et al., 2015). As such, a fearful-avoidant style of relating to others in the context of an intimate relationship is potentially related to Complex PTSD, as Complex PTSD is often thought to be predisposed by developmental trauma in which attachment was disrupted (Cloitre et al., 2009; Hyland et al., 2017) and to impact relationship functioning in adulthood (Dorahy et al., 2013). Attachment has similarly been implicated in borderline personality disorder, a disorder for which there has been much debate concerning whether it is actually the same condition as Complex PTSD.

### **Complex PTSD versus Borderline Personality Disorder**

Complex PTSD was originally proposed as an alternative for understanding the psychological syndrome that occurs when people have experienced relational forms of abuse, many of whom were instead diagnosed with borderline personality disorder (BPD; Herman,

1992). Complex PTSD was defined as a syndrome with symptoms of emotional dysregulation, dissociation, somatization and poor self-esteem, with distorted cognition about relationships, following traumatic relational abuse and clearly distinguished from BPD (Herman, 1992).

It has been suggested that BPD is a chronic presentation of PTSD (Scheiderer, Wood, & Trull, 2015) wherein symptoms become personality traits. Some have also suggested that Complex PTSD may also simply be BPD comorbid with PTSD (Scheiderer et al., 2015). The two disorders do share high rates of comorbidity with 25 – 58% of people diagnosed with BPD also having PTSD, and 10 – 76% of people with PTSD also having a diagnosis of BPD. Either assertion is possible as Complex PTSD and BPD do share many similarities. Both are thought to develop from chronic traumatic events, often with a relational aspect, such as childhood sexual abuse (CSA) and childhood emotional abuse (CEA). CSA is thought to predict later development of BPD more so than any other personality disorder (Kulkarni, 2017; Scheiderer et al., 2015). One study found that 85% of participants with BPD had experienced childhood abuse (Zanarini et al., 1997). Another study found that trauma from childhood maltreatment were related to borderline personality symptomology later in life through insecure attachment (Godbout, Daspe, Runtz, Cyr, & Briere, 2018).

Key BPD symptoms (e.g., anger, impulsivity, fears of abandonment, idealization-devaluation, suicidal behaviors, and self-injury) are also frequently seen in Complex PTSD although the findings from studies on this controversy are mixed. Affect dysregulation and dissociation are also common to both disorders (Kulkarni, 2017). Furthermore, the revised *DSM-5* criteria for PTSD includes alterations in affect, identity, and behavior which overlap with the BPD criteria of identity disturbance and affect instability (Kulkarni, 2017).

Key distinctions between Complex PTSD and BPD have also been proposed that may suggest that they are indeed different disorders. Complex PTSD is distinct from personality disorders in general “by its restricted symptom profile and its responsiveness to specific treatments that differ from those for personality disorder...” (Maercker et al., 2013, p. 1684). BPD, or any personality disorder, does not require a traumatic event for diagnosis (Cloitre et al., 2014). Self-concept disturbances are common to both Complex PTSD and BPD however this symptom in Complex PTSD is typically a consistently negative self-identity rather than a shifting self-identity as seen in BPD (Cloitre et al., 2014). Affect dysregulation also presents differently in Complex PTSD as emotional sensitivity, reactive anger and maladaptive coping; in BPD this presents as suicidal behavior, self-injury, and impulsivity (Cloitre et al., 2014).

Few studies have used statistical techniques to untangle Complex PTSD from BPD. One such study used latent class analysis to distinguish PTSD, Complex PTSD and BPD in which it was found that Complex PTSD was defined by heightened PTSD symptoms and self-organization symptoms, and low endorsement of BPD symptoms (Cloitre et al., 2014). BPD was distinguished from Complex PTSD by four symptoms: fears of abandonment, unstable sense of self, interpersonal conflicts, and impulsivity (Cloitre et al., 2014). This may indicate that these symptoms are more characteristic of individuals with BPD rather than Complex PTSD and that these two disorders may be identified based on their presence or absence, thus having important implications for diagnosis.

Cyr, Bakhos, Belanger, Cloitre, and Godbout (2019) also used latent class analysis to distinguish BPD from Complex PTSD and found evidence to support a five class model comprised of a low symptom group, a PTSD group, a Complex PTSD group, a BPD group, and a

Complex PTSD/BPD group. The Complex PTSD group was differentiated from the BPD group by heightened scores on avoidance, intrusion, activation, and cognition/mood symptoms. This may indicate that symptoms specific to PTSD are what distinguishes Complex PTSD from BPD. However, these findings may also support the theory that Complex PTSD is BPD co-morbid with PTSD, as suggested by Scheiderer and colleagues (2015).

Frost, Hyland, Shevlin, and Murphy (2018) also used latent class analysis to examine Complex PTSD and BPD as distinct disorders. While a distinct profile of Complex PTSD was demonstrated, a distinct profile of BPD was not. BPD symptomology was evident in two classes in addition to PTSD and Complex PTSD symptomology wherein one class endorsed BPD symptoms and PTSD symptoms and the other endorsed symptoms from all categories. This contradicts findings from Cloitre et al. (2014) and conversely indicates that it may not be possible to untangle BPD from PTSD symptomology or to stand alone as a distinct disorder.

People with BPD are often stigmatized by mental health professionals as being more difficult or challenging to treat (Aviram, Brodsky, & Stanley, 2006). In one study, clinicians who perceived clients as having BPD over PTSD had more negative attitudes towards them and disagreed that their current difficulties were related to their abuse histories (Giacalone, 1997). Clinicians also were more likely to diagnose males with PTSD and females with BPD (Giacalone, 1997). As such, some have proposed that Complex PTSD may be a “less stigmatizing, more clinically useful term” than BPD, and would encourage a more trauma-informed approach when working with clients with BPD (Kulkarni, 2017). However, this has also been contested as not everyone with a trauma history develops BPD and not everyone with BPD has a trauma history (Lewis & Grenyer, 2009). Others have suggested that there may also

be recall bias when asked to report historical traumatic events from childhood (Podsakoff, MacKenzie, Lee, & Podsakoff as cited in Lewis & Grenyer, 2009).

While the current study does not aim to distinguish Complex PTSD from BPD, a discussion of this controversy provides valuable insight to the symptom composition and history of Complex PTSD as well as highlights the nuances of the disorder which distinguish it from other trauma related disorders.

### **Research on Complex PTSD**

There has been much debate around whether Complex PTSD is indeed a distinct disorder from PTSD. In order to examine the distinction between PTSD and Complex PTSD as separate disorders, Cloitre and colleagues (2013) sought to: 1) analyze the symptom structure of Complex PTSD using confirmatory factor analysis; 2) distinguish classes of individuals with PTSD compared to Complex PTSD using latent profile analysis (LPA); and 3) to identify differences in antecedent traumatic event type and consequential symptom severity using the proposed *ICD-11* criteria. Participants included 302 individuals seeking treatment for single interpersonal traumatic events (such as exposure to terrorist attacks) to chronic interpersonal traumatic events (such as child maltreatment) wherein 30% reported childhood abuse as their “worst trauma” and 20% reported the 9/11 terrorist attacks to be their worst trauma. Traumatic events were reported using the Life Events Checklist (Wolfe & Kimerling, 1997), and symptoms were measured using the Modified PTSD Symptom Scale – Self-Report Severity (MPSS-SR; Falsetti, Resnick, Resick, & Kilpatrick as cited in Cloitre et al., 2013) and the Brief Symptom Inventory (BSI; Derogatis & Melisaratos as cited in Cloitre et al., 2013).

Cloitre and colleagues (2013) found support for a four-factor model of Complex PTSD consisting of PTSD (with re-experiencing, avoidance and hypervigilance combined into a single factor), affect dysregulation, interpersonal conflicts, and negative self-concept. The latent profile analysis (LPA) revealed the Complex PTSD and PTSD classes (both with about 32% of participants) to be distinct from one another. The Complex PTSD group was nearly twice as likely to report child maltreatment as their “worst trauma” whereas the PTSD group was three times as likely to report 9/11 as their worst trauma. Additionally, using hierarchical linear regression Cloitre et al. (2013) found that the addition of Complex PTSD symptoms to the classic PTSD symptoms accounted for 21.2% more of the variance in functional impairment indicating that the Complex PTSD class experienced higher impairment.

In the same study, Cloitre and colleagues (2013) measured symptoms for both PTSD (re-experiencing, avoidance, and hypervigilance) and Complex PTSD (affect dysregulation, interpersonal conflicts, and negative self-concept) using only two items for each symptom cluster. Cloitre et al. (2013) defined the symptom clusters as follows: 1) affect dysregulation included heightened emotionality, outbursts, reckless or self-destructive behavior, and dissociative states; 2) negative self-concept involved persistent beliefs of being worthless or defeated, with deep feelings of shame and/or guilt; and 3) interpersonal conflicts referred to difficulty feeling close to others, lack of interest in relationships, and interpersonal conflicts/chaotic and emotionally intense relationships. However, no items were included that measured dissociation (a component of affect dysregulation in the Cloitre et al. 2013 study), reckless or self-destructive behaviors (a component of affect dysregulation), feelings of shame (negative self-concept), lack of interest in relationships (a component of interpersonal conflicts),

or difficulty maintaining relationships (a component of interpersonal conflicts). As such, the model tested did not truly reflect the symptoms clusters as they were defined and does not fully capture their multidimensionality.

Knefel & Lueger-Schuster (2013) analyzed the conceptualization and prevalence of Complex PTSD using confirmatory factor analysis in a sample of people who had experienced sexual abuse as children. To measure Complex PTSD and PTSD symptoms they used the Post-traumatic Stress Disorder Checklist – Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane as cited in Knefel & Lueger-Schuster, 2013) and the Brief Symptom Inventory (BSI; Derogatis & Melisaratos as cited in Knefel & Lueger-Schuster, 2013). Knefel & Lueger-Schuster (2013) analyzed the same four-factor model as Cloitre et al. (2013; PTSD, affect dysregulation, negative self-concept, and interpersonal problems), using the same definitions for each symptom cluster, and found that the model had a good fit with moderate factor loadings (0.45 to 0.49). They also found that 21.4% of the sample met the proposed *ICD-11* criteria for Complex PTSD. Seventeen items of the PCL-C were used to measure PTSD symptoms whereas affect dysregulation, negative self-concept and interpersonal problems had two items each taken from the BSI.

Wolf et al. (2015) also examined whether Complex PTSD and PTSD are distinguishable syndromes and noted several critiques of Cloitre et al. (2013) including: 1) the measurement of symptoms using tests that were not designed for or validated as indicators of Complex PTSD; 2) use of standardized scores instead of raw scores which tends to be discouraged in latent analyses as it may influence results (Kline, 2004); 3) conceptualizing PTSD as a multidimensional construct but not analyzing it as such; and 4) lack of comparison between the dimensional (CFA)

and categorical (LPA) models. To address these criticisms, Wolf and colleagues (2015) used: 1) the National Stressful Events Inventory for Complex Posttraumatic Stress Disorder (NSEI; Kilpatrick, Resnick, Baber, Guille, & Gros as cite in Wolf et al., 2015) to measure symptoms; 2) raw scores instead of standardized scores; 3) a multidimensional conceptualization of both Complex PTSD and PTSD; and 4) a factor mixture model (FMM; Lubke & Muthen as cited in Wolf et al. 2015) in order to use categorical latent classes to distinguish individuals and dimensional factors for their item responses. Wolf and colleagues (2015) found that classes of individuals did differ in symptom severity, however not by their PTSD versus Complex PTSD diagnoses. Furthermore, no differences in exposure for different types of traumatic events were found between classes. These findings contradict those found by Cloitre et al. (2013) and Knefel & Lueger-Schuster (2013) and suggest that PTSD and Complex PTSD do not represent distinct groups, and type of traumatic event does not distinguish between the groups that Wolf et al. (2015) did find. However, similar to the previous studies, Wolfe et al. (2015) used only two items for re-experiencing, avoidance, hypervigilance, affect dysregulation, and interpersonal conflicts; three items for negative self-concept; and although one item was selected to measure dissociation, it was not included in analyses.

### **Latent Dimensions versus Categories**

In psychological research, researchers often choose whether or not to define a construct as categorical or dimensional based on theory or clinical judgement, however this may not actually correspond to the construct's true structure. In fact, whether a construct appears to be categorical or dimensional may be an artifact of approach or measurement used by the researcher (Ruscio & Ruscio, 2008). Assuming that a mental disorder is categorical implies that the disorder

in question is represented in clear types in the population - there are those who have it and those who don't. If it is continuous, this implies that the disorder in question varies continuously in the population. That is, people differ in terms of type (categorical) or degree (dimensional/continuous) of symptoms (Borsboom et al., 2016). Dimensional latent variables are generally thought to manifest from the contribution of many influences (e.g., environmental factors), whereas categorical variables often arise from some kind of mechanism (e.g., a traumatic event), through interactions with other variables, or through threshold effects wherein there is a sudden increase once a certain limit has been reached (Ruscio & Ruscio, 2008). Using samples that likely have subclinical levels of symptoms, such as in the undergraduate sample used by the current study, is generally based on the idea that the variables of interest have a dimensional structure (Ruscio & Ruscio, 2008), as dimensional structure allows for the variable of interest to be observed at wider range of levels (Ruscio et al., 2006).

Knowledge of the structure of a latent variable informs how to classify individuals: on a continuum or in defined groups (Ruscio & Ruscio, 2008). Issues arise in incorrectly defining the latent variable. If the latent variable is incorrectly defined as categorical, or if the latent variable is assumed to be dimensional when it is in fact categorical, statistical power is lost (Ruscio et al., 2006). For example, according to taxometric analyses, BPD is a dimensional construct rather than categorical (Ruscio & Ruscio, 2008). As such, using latent variable analyses that classify individuals in categorical groups of those with BPD and those without, rather than on a continuum of borderline personality symptoms, may result in a loss of statistical power and construction of arbitrary boundaries.

This is directly applicable to the current study on Complex PTSD and the choice of whether to classify individuals and the latent variable as dimensional or categorical will be discussed further below.

### **The Current Study**

As previously discussed, Cloitre et al. (2013) used confirmatory factor analysis to examine potential symptoms of Complex PTSD and found support for a four-factor model. Latent profile analyses in the same study demonstrated three classes, a PTSD group, a Complex PTSD group, and a group with neither. The Complex PTSD group was associated with higher rates of child maltreatment and more impaired functioning. However, dissociation was excluded from their research; only a few items were used to measure each variable, and the variables lacked multidimensionality. In a critique of Cloitre et al. (2013), Wolf et al. (2015) examined Complex PTSD and its distinction from PTSD using a series of latent class and factor mixture models, and similarly only used two items to assess each of affect dysregulation, interpersonal conflicts, and negative self-concept (and thus also lacked multidimensionality). Furthermore, participants were excluded from the Complex PTSD group if they failed to endorse at least one of the items from each cluster, and dissociation was not included in analyses.

The small number of items used to assess constructs in these studies cannot fully capture the multidimensionality and nuanced nature of these symptoms clusters and as such may not be a complete measure of Complex PTSD symptomology. As such, it is essential to examine these constructs and their role in the conceptualization of Complex PTSD using multidimensional measures comprised of several items in order to comprehensively assess the symptoms they represent.

The current study addressed potential issues in previous studies by: (1) using complete validated, multidimensional measures for each symptom; (2) including the additional symptom of dissociation and conceptualizing it as a distinct variable rather than a component of affect dysregulation; and (3) including two additional forms of dissociation: emotional constriction and disengagement. While Wolf et al. (2015) pointed out the potential issues with conceptualizing PTSD as a multidimensional construct (comprised of re-experiencing, hypervigilance, and avoidance, which are generally conceptualized as their own distinct symptom clusters) and the three additional Complex PTSD symptoms as individual factors, I conceptualized PTSD the same way as Cloitre et al. (2013) in order to be consistent with previous studies for comparison purposes.

It is important to note that while I use clinically relevant labels I am not suggesting that participants have a mental disorder, as the aim of this study was not to diagnosis but to examine symptom clusters and determine whether there is a discernable pattern in how particular groups endorse the analyzed symptomology, whether it be at clinical levels or not. Diagnosis can only be assessed through diagnostic interviews. As such, Complex Post-Traumatic Stress (Complex PTS) will be used instead of Complex PTSD; and Post-Traumatic Stress (PTS) instead of PTSD.

In this study, I examined the validity of Complex PTS as a collection of symptoms distinct from PTS by focusing on four questions: 1) do PTS and Complex PTS have distinct symptom clusters; 2) do they result from different traumatic events; 3) do they describe different populations; and 4) do they result in different levels of impaired functioning?

Both dimensional and categorical models will be used to examine these questions. Taxometric analyses were not conducted and without statistical evidence of the underlying

structure of the data, one will not be chosen over the other. As the current study uses an undergraduate sample, and thus most likely will demonstrate subclinical levels of the variables of interest, conceptualizing the latent variable as dimensional is recommended (Ruscio & Ruscio, 2008). Assuming dimensional structure is further justified by the earlier critique of conceptualizing mental illness as categorical due to the construction of arbitrary boundaries between disorders that results in a loss of the complexity and variability of the human experience (Borsboom, 2017; Kendall & Jablensky, 2003). As such, confirmatory factor analysis was used to examine Complex PTS as dimensional in order to support the proposed structure and content of symptomology. In contrast, a categorical model of Complex PTS was also tested in the form of Latent Profile Analysis (LPA). While LPA uses dimensional variables, the result is categorical groups based on patterns of endorsement of these variables. A categorical model was examined in order to determine if discrete groups can be gleaned from the data that represent PTS and Complex PTS as distinct populations.

### **Research Questions and Hypotheses**

#### **1) Do PTS and Complex PTS have distinct symptom clusters?**

*Hypothesis 1.* I hypothesized that the distinct symptom clusters of Post-Traumatic Stress (PTS; consisting of re-experiencing, hyperarousal, and avoidance) and Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept will meaningfully contribute to a second order factor of Complex Post-Traumatic Stress (Complex PTS).

#### **2) Do PTS and Complex PTS result from different traumatic events?**

*Hypothesis 2.* A significant association will be demonstrated from Relational Traumatic Events to Complex PTS, and from Non-Relational Traumatic Events to PTS.

### **3) Do PTS and Complex PTS represent different populations?**

*Hypothesis 3.* A four profile model of a high score on PTS and low scores on all other variables (Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept); a high PTS score and high scores on all other variables; a low PTS scores and high scores on all other variables; and low scores on all variables including PTS will demonstrate the best fit to the data. This will indicate that four subpopulations are present in the data: those who endorse symptomology consistent with PTS, those who endorse symptomology consistent with Complex PTS, those who endorse only items related to issues of an interpersonal/affect/self-concept nature (and shares some borderline personality-related symptomology), and those who endorse neither, respectively.

### **4) Do PTS and Complex PTS result in different levels of impaired functioning?**

*Hypothesis 4.* I hypothesize that the Complex PTS group will demonstrate significantly higher levels of impaired functioning as demonstrated by higher scores in substance use, suicidality, and psychosocial functioning when compared to the PTS group.

## Methods

**Overview.** These questions were addressed by analyzing pre-existing data from the Life Events study previously conducted by Dr. Marsha Runtz using an undergraduate sample at the University of Victoria. In this study, participants completed a series of questionnaires measuring a diverse range of psychological functioning. Measures included the Detailed Assessment for Post-traumatic Stress (DAPS; Briere, 2001); the Inventory of Altered Self-Capacities (IASC; Briere & Runtz, 2002); the Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988); the Multidimensional Dissociation Inventory (MDI; Briere, 2002); the Cognitive Distortions Scale (CDS; Briere, 2002); and the Relationship Questionnaire (Bartholomew & Horowitz, 1991).

**Participants.** This research involved a sample of 580 undergraduate students (73% women) who responded to measures of psychological functioning along with a checklist assessing several types of traumatic events (such as childhood physical, psychological, and sexual maltreatment along with non-relational traumatic events such as motor vehicle accidents). Overall, 22.6% reported having experienced childhood maltreatment, which is often a key precipitating event in the development of Complex PTSD, 58.6% reported at least one instance of interpersonal trauma such as sexual assault or childhood maltreatment, and 69.8% reported non-interpersonal types of potentially traumatic events such as car accidents and natural disasters.

**Procedures.** Participants were recruited through the University of Victoria's psychology department's research participant pool. Participants were awarded bonus points towards their course grade in exchange for their participation. The study took place in a classroom wherein

there were small groups of participants seated at individual desks and in order to protect participant privacy a questionnaire package was placed on every second desk. The participants were introduced to the study before being given the consent form and beginning the questionnaire. The study was completed by most participants in 30 – 45 minutes. Once completed and handed-in, participants were given a debriefing form to explain the purpose of the study, and were provided with a list of counselling and support resources.

**Measures.** The current study will use several standardized questionnaires assessing post-traumatic stress symptoms, types of traumatic events, measures of impaired functioning, affect dysregulation, dissociation, interpersonal difficulties, and negative self-concept.

**Demographic questionnaire.** Demographic information about the sample was assessed with items concerning age, gender, relationship status, primary language, ethnicity/race, parental education and occupation, current income, and family of origin income (see Appendix A for items).

**The Detailed Assessment of Posttraumatic Stress (DAPS).** The DAPS (Briere, 2001) is a 104-item questionnaire that measures both exposure to trauma and the resulting traumatic response by examining the following: lifetime exposure to potentially traumatic events (e.g., sexual assault, physical assault, natural disaster, car accident); immediate responses such as cognitive, emotional and dissociative reactions to a traumatic event the participant has specified; PTS symptoms as defined by the *DSM-IV* criteria; likelihood of a diagnosis of either PTSD or Acute Stress Disorder (ASD); and associated features of PTSD (i.e., post-traumatic dissociation, suicidality, and substance abuse).

The DAPS measures PTSD symptoms in relation to the *DSM-IV* criteria which is consistent with the proposed *ICD-11* criteria for PTSD. It is also useful for its inclusion of subscales measuring various aspects of functioning and types of traumatic events experienced wherein participants are asked to identify which traumatic event was the most impactful. As previously mentioned, the DAPS will be used to assess PTS symptomology rather than diagnosis PTSD.

Subscales were used to measure re-experiencing (e.g., *“feeling like it was happening again even though it wasn’t”*), avoidance (e.g., *“avoiding people or places that reminded you of what happened”*), and hyperarousal (e.g., *“feeling easily startled or on edge since it happened”*). Each subscale contains 10 items assessed on a 5-point Likert scale (with a maximum of 50 for each subscale) measuring the frequency of each item over the prior month in relation to a particular traumatic event that the participant identified earlier in the questionnaire. Similar to previous studies, in the current sample, the subscales demonstrated good internal consistency ( $\alpha = .87$  to  $.89$ ).

The DAPS also contains a Relative Trauma Exposure (RTE) Scale that is used to report the types of potentially traumatic events experienced using 12 items (e.g., *“being hit, choked or beaten [including someone you lived with or were married to], when you were seriously hurt or were afraid you would be hurt or killed?”*) to which participants respond with either “yes” or “no”. Participants are asked to identify which event “bothers [them] the most”. The RTE Scale was used to measure types of potentially traumatic events including childhood physical abuse, childhood sexual abuse, natural disasters, and car accidents. Childhood sexual and physical

abuse will be combined to represent the variable of Relational Traumatic Events, whereas car accidents and natural disasters will represent Non-Relational Traumatic Events.

Lastly, the DAPS also contains the Posttraumatic Impairment (IMP) Scale which assesses the psychosocial impairment that occurs in PTSD (e.g. “*not being able to do things you need to due to the stress of what happened*”) and the Associated Features Scale which assesses psychological issues that are frequently comorbid with PTSD such as *substance abuse* (SUB; e.g., “*feeling like your substance use is beginning to control your life*”), and *suicidality* (SUI; “*wishing you could die and be free of problems or pain*”). The Associated Features Scale also includes a *trauma specific dissociation* subscale however; this was not used in analyses.

Consistent with the scoring procedures in the test manual, total scores were used in analyses.

Substance use-alcohol and substance use–drugs were combined to represent a single variable of substance use. Psychosocial impairment, substance abuse, and suicidality subscales were used to measure impaired functioning and, similar to previous studies, the subscales demonstrated acceptable to excellent internal consistency ( $\alpha = .79$  to  $.92$ ) in the current sample.

***The Inventory of Altered Self-Capacities (IASC)***. The IASC (Briere & Runtz, 2002) was used to measure the affect skills-deficits, affect instability, and tension-reducing activities components of Affect Dysregulation, and interpersonal conflicts of the Interpersonal Difficulties latent variable. This inventory contains 63 items assessed on a 5-point Likert scale ( $1 = \textit{Never}$ ,  $5 = \textit{Very Often}$ ). The IASC has 7 subscales of 9 items (for a maximum score of 45 on each subscale) each including: *affect dysregulation* which contains the two subscales of *skills deficits* and *instability* (e.g., “*not being able to calm yourself down*”), *tension-reduction activities* (measuring the tension-reducing activities component of the latent factor Affect Dysregulation;

e.g., “*harming yourself in an attempt to get rid of difficult feelings or thoughts*”), and *interpersonal conflicts* (measuring the interpersonal conflicts component of the latent factor Interpersonal Difficulties; e.g., “*having many highs and lows in your relationships with others*”). Other scales that were not used analyses include *identity impairment*; *idealization-disillusionment*; *abandonment concerns*; and *susceptibility to influence*.

Although *tension-reduction activities* are not a component of affect dysregulation in the IASC, the literature on Complex PTSD often includes these symptoms under the umbrella of affect dysregulation as they are a response often employed in an attempt to cope with intense and unstable emotional states (Cloitre et al., 2013; Knefel, Tran, & Lueger-Schuster, 2016). As such *tension-reduction* activities will be conceptualized as a component of the latent variable Affect Dysregulation. While identity impairment, idealization-disillusionment, abandonment concerns, and susceptibility to influence are all potential trauma responses, they are not conceptualized as symptoms of Complex PTS or PTSD specifically and so will not be included in analyses.

Consistent with the scoring procedures in the test manual, total subscale scores were used in analyses. Similar to previous studies, in the current sample, the subscales demonstrated excellent internal consistency ( $\alpha = .87$  to  $.89$ ). Affect dysregulation has been associated with child sexual, physical, and emotional abuse, while interpersonal conflicts have been associated with sexual abuse as well as emotional abuse. Both affect dysregulation and interpersonal conflicts have been associated with the fearful-avoidant adult attachment type (Briere & Runtz, 2002).

The IASC is useful for its multidimensional representation of the variables of interest and demonstrated usefulness in studying these types of symptoms in the context of trauma. The *skills*

*deficits* and *instability* subscales of *affect dysregulation* were analyzed separately in order to have three observed variables contributing to the latent factor of Affect Dysregulation, and were labelled by their subscale title in order to avoid confusion with the label of the latent variable Affect Dysregulation.

***The Multiscale Dissociation Inventory (MDI)***. The MDI (Briere, 2002) was used to measure dissociation. This inventory contains 30 items assessed on a 5-point Likert scale (*1 = Never, 5 = Very Often*). The MDI has 6 subscales of 5 items each including: *disengagement*, *depersonalization*, *derealization*, *emotional constriction*, *memory disturbances*, and *identity dissociation*. Only *derealization* (e.g., “*suddenly not recognizing your surroundings*”), *depersonalization* (e.g., “*feeling like you aren’t supposed to be in your body*”), *disengagement* (e.g., “*losing track of what’s going on because you were in your own world*”), and *emotional constriction* (e.g., “*not feeling upset even though you know you probably are*”) were used in this study and were combined to represent a single dissociation score. Consistent with the scoring procedures in the test manual, total scores were used in analyses. Similar to previous studies, in the current sample, the subscales demonstrated excellent internal consistency ( $\alpha = .81$  to  $.88$ ). People who had experienced interpersonal types of traumatic events have been found to score higher on all five subscales of the MDI when compared to those who have not, with differences in *derealization*, *emotional constriction*, and *memory disturbance* in a community sample, and also in a clinical sample with an especially marked difference in disengagement scores. In a combined clinical and community sample, people with a positive PTSD diagnosis also scored higher on all subscales of the MDI when compared to those without a PTSD diagnosis, with particularly strong differences in emotional constriction and memory disturbances (Briere, 2002).

The MDI is useful for its multidimensional representation of dissociation and subscales reflecting multiple different types of dissociation.

***Inventory of Interpersonal Problems (IIP)***. The IIP (Horowitz et al., 1988) has 127 items assessed on a 5-point Likert scale (*0 = not at all, 4 = extremely*) that measure how much difficulty or distress each participant feels regarding the situation described by the item. Items are divided into two groups: 1) interpersonal inadequacies or inhibitions (78 items) which begin with “it’s hard for me to...”, and 2) excesses or compulsions (49 items) which start with the phrase “I do these things too much...” This measure contains eight subscales: *hard to be assertive, hard to be sociable, hard to be submissive, hard to be intimate, too responsible, and too controlling*. Only the *hard to be intimate* (e.g., “*experience a feeling of love for another person*”) subscale was included in analyses as a component of Interpersonal Difficulties along with interpersonal conflicts from the IASC and fearful-avoidant adult attachment style (discussed below) in order to be consistent with how this symptoms cluster is described the in the literature. Similar to previous studies, in the current sample, the subscales demonstrated excellent internal consistency ( $\alpha = .84$ ).

The IIP is useful as it has been frequently used to assess interpersonal conflicts in research on complex post-traumatic stress (e.g., Cloitre et al., 2009; Huh, Kim, Yu, & Chae, 2014; Karatzias et al., 2016; Wilson & Scarpa, 2015).

***The Cognitive Distortions Scale (CDS)***. The *self-criticism, self-blame, and helplessness* subscales of the CDS (Briere, 2000) were used to measure these dimensions of negative self-concept. This scale has 40 items assessed on a 5-point Likert scale (*1 = Never, 5 = Very Often*). The CDS contains five subscales of eight items each, three of which were used in the current

study *self-blame* (e.g., “*calling yourself names*”), *helplessness* (e.g., “*feeling like you don’t have a say in what happens in your life*”), and *self-criticism* (e.g., “*blaming yourself for the bad things that happen to you*”). The other two subscales, *hopelessness* and *preoccupation with danger*, were not included. Consistent with the scoring procedures in the test manual, total subscale scores were used in analyses. The three subscales used in this study demonstrated excellent internal consistency ( $\alpha = .90$  to  $.92$ ) in the current sample.

The CDS is useful for its ability to capture a range of cognitive experiences related to post-traumatic stress and demonstrated associations with PTSD symptoms.

***The Relationship Questionnaire (RQ)***. The RQ (Bartholomew & Horowitz, 1991) is a measure of attachment in adult relationships that has four items wherein participants are asked which style best suits how they are in intimate relationships. Participants rate, on 7-point Likert scale (*1 = Not At All Like me, 7 = Very Much Like Me*), the extent to which each style suits them in general, in the context of a current intimate relationship, and in the context of a current friendship. The four types of attachment that are measured in the RQ are as follows:

- (1) Secure (low avoidance, low anxiety): finds it easy to be emotionally intimate with others, to have others depend on them, and to depend on others themselves.
- (2) Dismissive-Avoidant (high avoidance, low anxiety): comfortable not having intimate emotional relationships. Discomfort with depending on others and having others depend on them.
- (3) Fearful-Avoidant (low avoidance, high anxiety): holds strong desire for emotional closeness with others that is not felt to be shared by others. Discomfort without intimate relationships.

(4) Anxious-Preoccupied (high avoidance, high anxiety): Discomfort with being intimate with others despite a desire for close relationships. Difficulty trusting and depending on others due to a fear of being hurt (Batholomew & Horowitz, 1991). The fearful-avoidant subscale of the RQ was used to measure this particular adult attachment style as a component of the latent factor of Interpersonal Difficulties.

The RQ is useful for its ability to identify a particular style of Interpersonal Difficulties in adult relationships, particularly the fearful-avoidant subtype as it has been frequently associated with relational, chronic types of traumatic events (e.g., childhood sexual abuse) and post-traumatic stress in general (Barazzone et al., 2018; Woodhouse et al. 2015). See Appendix B for the RQ questionnaire.

## Results

**Testing assumptions. *Outliers.*** Mahalanobis' Distance was used to check for outliers in SPSS, however, outliers were not removed from the data. High scores on the constructs being measured, especially dissociation, may present as outliers as they are rare and scores are not normally distributed. Removing them would mean potentially excluding relevant and vital data from this study. Mahalanobis' Distance identified 16 outlier cases wherein  $p < .001$  and these were included in analyses.

***Multivariate normality.*** Mardia's Test was used to test for multivariate normality, specifically skewness, and kurtosis using the MVN package in R (Korkmaz, Goksuluk, & Zararsiz, 2014). These assumptions are expected to be violated as the constructs being studied are not normally distributed. The multivariate normality assumption was violated, as shown by the Mardia test (skewness =  $p < .05$ , kurtosis =  $p < .05$ ). As such robust fit indices and robust maximum likelihood estimation were used in the relevant analyses.

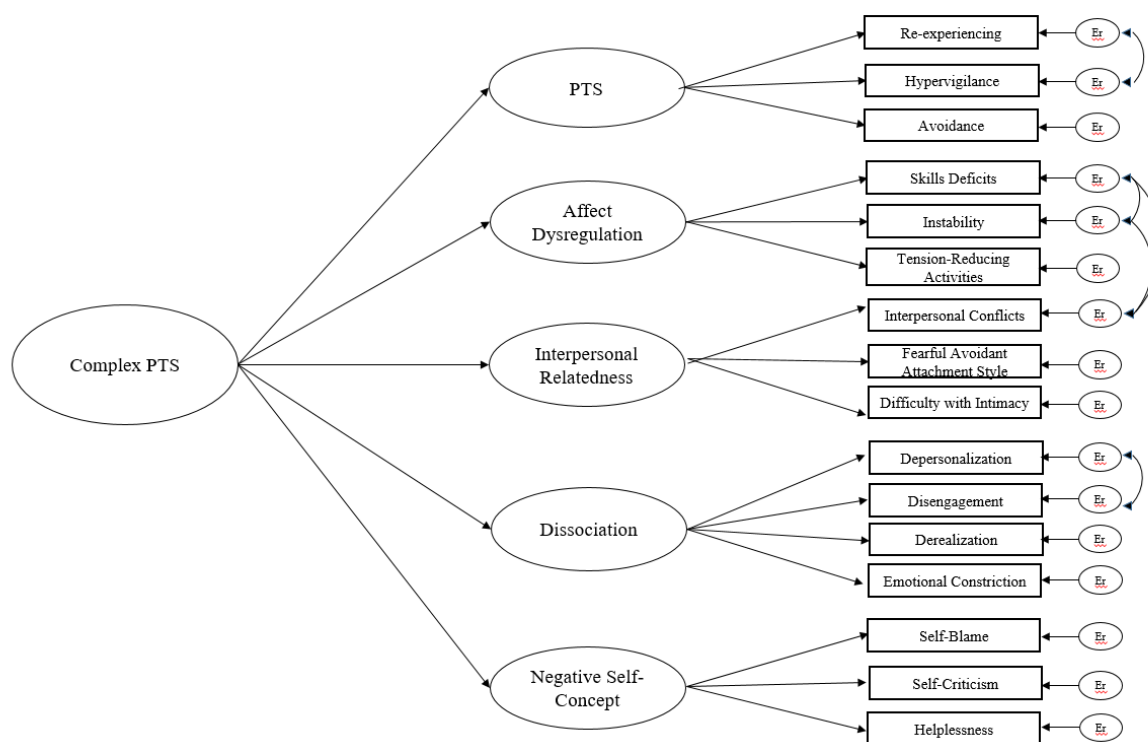
**Descriptives and correlations.** Means and standard deviations for all measures are represented in Table 2. All observed variables were correlated with each other to some degree and all correlations were significant at  $p < .01$  as reported in Table 2.

**Confirmatory factor analysis (CFA).** Using the lavaan package in R (Rosseel, 2012), CFA was used to distinguish between PTS symptom clusters and the additional Complex PTS symptom clusters and to demonstrate how they meaningfully combine to represent the psychological construct of Complex Post-Traumatic Stress. I conceptualized this model as consisting of five first-order factors (1-5), and one second-order factor model of Complex Post-Traumatic Stress (6) (see Figure 1). The five first-order latent variables were set up as follows:

- (1) Post-Traumatic Stress (PTS): re-experiencing, avoidance, and hypervigilance
- (2) Affect Dysregulation: skills deficits, instability, and tension-reducing behaviors
- (3) Dissociation: depersonalization, derealization, disengagement, and emotional constriction
- (4) Negative Self-Concept: self-criticism, self-blame, and helplessness
- (5) Interpersonal Difficulties: interpersonal conflicts, fearful-avoidant adult attachment style, and difficulty with intimacy

The second-order latent factor of Complex Post-Traumatic Stress was defined as the following:

- (6) Complex Post-Traumatic Stress (Complex PTS): PTS, Affect Dysregulation, Dissociation, Negative Self-Concept, and Interpersonal Difficulties



*Figure 1.* Confirmatory factor analysis of the observed symptom variables contributing to the four first-order factor symptoms clusters which then in turn contribute to the second-order factor of Complex PTSD.

**Model specification.** Scaling of the latent variables was accomplished by constraining them to have a mean of 0 and a variance of 1, standardizing them, and allowing for free estimation of all factor loadings (Hartman, 2018). A number of observed variables were allowed to co-vary. Re-experiencing and avoidance were specified to co-vary as avoidance occurs in response to re-experiencing symptoms such as flashbacks. Skills deficits and instability co-vary as they are sub-scales of the same scale but were analyzed separately for the latent variable of Affect Dysregulation. Skills deficits and instability were also specified to co-vary with interpersonal conflicts due to the high correlations between the IASC interpersonal conflicts subscales and affect dysregulation (Briere & Runtz, 2002). Depersonalization and derealization

were also allowed to co-vary as they are the types of dissociation most typically associated with each other and with PTSD, as evidenced by the dissociative subtype of PTSD discussed earlier.

Robust maximum likelihood (MLR) estimation was used in order to account for the non-normality of the indicator variables as maximum likelihood is affected by outliers (Hennig, 2004), with full information maximum likelihood (FIML) for the missing data. With FIML, missing data is not deleted or imputed but is handled within the model being analyzed by using all available information to create estimates (Collins, Schafer, & Kam, 2001). Using FIML to account for missing data achieves similar estimates as the more commonly used method of multiple imputation, however, it is accomplished in a single step instead of individual ones for imputation, analysis, and pooling (Hartman, 2018). FIML was also found to be superior to multiple imputation in simulation studies (Larsen, 2011).

***Model evaluation.*** The fit of the model was assessed using: the comparative fit index (CFI) to measure whether the model fits the data better than a more restricted reference (null) model where all co-variances among indicator variables are set to 0 (Hartman, 2018); the Tucker Lewis Index (TLI), a more conservative version of the CFI that penalizes overly complex models (i.e., for adding freely estimated parameters that do not markedly improve model fit); and the root mean-square error of approximation (RMSEA) and its confidence intervals which measure how closely the model resembles the covariances among the indicator variables (Kline, 2006). Hu and Bentler (1999) suggested the following as indicators of a good fit: CFI close to  $\geq .95$ , TLI close to  $\geq .95$ , and RMSEA close to  $< .06$ .  $\chi^2$ , a measure of whether the fitted model estimates produce the sample variances and covariances (a statistically significant value, i.e.,  $< .05$ , indicates the model is not perfect fitting), was also considered. However, in large samples the statistical

significance of  $\chi^2$  is compromised as  $\chi^2$  tends to be significant in large samples (Brown, 2006).

As such, more weight was given to other goodness of fit indices due to the study's large sample size (approximately 200 is a recommended sample size for structural equational modelling; Kline, 2006). Due to the non-normality of the data robust versions of these indices were used.

***Reliability paradox.*** The reliability paradox is a concept discussed by McNeish, An, and Hancock (2018) to describe the contradictory statistical relationship between reliabilities and fit indices in latent variable modelling. Hu and Bentler's (1999) cut-offs for fit indices, as described in the previous section, in latent variable modelling have been the gold standard for years however, growing investigation into statistical practices has led to new research questioning the validity of these standards. A contradictory relationship between the strength of reliabilities (i.e., factor loadings) and fit indices has been found. McNeish et al. (2018) demonstrated that fit indices are easily influenced by measurement quality. When there is high reliability among indicator variables (i.e., factor loadings above .70) the cut-offs defined by Hu and Bentler (1999) are likely too conservative as they did not include reliabilities above .70 in their study. This is to say that fit indices that violate these gold standard cut-offs may still indicate a well-fitting model. McNeish, An, and Hancock (2018) performed a series of model replications and found that the lower the reliabilities, the greater proportion of the replications met the guidelines (e.g., reliability of .40 resulted in 100% of replications meeting criteria for RMSEA) and the higher the reliabilities the fewer replications met guidelines (e.g., reliability of .80 resulted in 0% of replications meeting criteria for RMSEA). Although formal guidelines on how to interpret fit indices for models with high reliabilities have not been developed, this contradictory relationship will be considered conceptually when interpreting results.

Table 2  
Means, Standard Deviations, and Correlations with Confidence Intervals

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. RE	15.50	6.41															
2. AV	14.55	6.37	.83** [.80, .86]														
3. HY	14.95	6.75	.81** [.78, .84]	.80** [.77, .83]													
4. AD-S	8.90	4.30	.30** [.21, .38]	.31** [.22, .38]	.35** [.27, .42]												
5. AD-I	7.98	3.83	.26** [.17, .34]	.24** [.15, .32]	.29** [.21, .37]	.78** [.75, .81]											
6. TRA	13.72	4.96	.31** [.23, .39]	.31** [.23, .39]	.32** [.23, .40]	.69** [.64, .73]	.63** [.58, .68]										
7. DEP	6.86	2.69	.27** [.19, .35]	.32** [.24, .40]	.26** [.18, .35]	.36** [.28, .43]	.40** [.33, .47]	.44** [.37, .51]									
8. DER	8.69	3.53	.33** [.25, .41]	.32** [.23, .40]	.31** [.23, .39]	.39** [.32, .46]	.46** [.39, .52]	.46** [.39, .52]	.69** [.65, .73]								
9. DIS	12.78	4.05	.25** [.16, .33]	.23** [.15, .32]	.27** [.18, .35]	.34** [.26, .41]	.39** [.32, .46]	.35** [.28, .42]	.50** [.44, .56]	.58** [.52, .63]							
10. EC	8.37	4.17	.27** [.18, .35]	.37** [.29, .45]	.27** [.18, .35]	.30** [.22, .37]	.32** [.24, .39]	.34** [.26, .41]	.45** [.38, .51]	.46** [.39, .52]	.36** [.29, .43]						
11. IC	19.29	6.15	.23** [.15, .32]	.22** [.13, .30]	.25** [.17, .33]	.62** [.56, .67]	.66** [.61, .70]	.62** [.57, .67]	.32** [.25, .40]	.42** [.35, .49]	.41** [.34, .48]	.30** [.22, .37]					
12. Diff. Intim.	0.87	0.63	.12* [.02, .23]	.18** [.08, .29]	.14* [.03, .24]	.22** [.13, .31]	.27** [.18, .36]	.35** [.26, .43]	.27** [.18, .36]	.27** [.18, .36]	.20** [.10, .29]	.37** [.28, .45]	.35** [.26, .43]				
13. Fearful-Av.	3.76	1.93	.19** [.09, .29]	.23** [.13, .33]	.18** [.08, .28]	.32** [.23, .40]	.28** [.19, .36]	.29** [.20, .38]	.25** [.15, .33]	.22** [.13, .31]	.20** [.10, .29]	.30** [.21, .39]	.25** [.16, .34]	.37** [.29, .45]			
14. SB	14.55	6.26	.37** [.29, .44]	.44** [.36, .51]	.38** [.30, .45]	.53** [.47, .59]	.53** [.47, .59]	.52** [.46, .58]	.46** [.39, .52]	.48** [.42, .54]	.42** [.35, .48]	.42** [.35, .48]	.47** [.40, .53]	.35** [.27, .44]	.36** [.27, .44]		
15. SC	16.74	6.87	.26** [.17, .34]	.28** [.20, .36]	.26** [.18, .35]	.47** [.40, .53]	.53** [.46, .58]	.48** [.42, .54]	.41** [.34, .48]	.45** [.38, .51]	.43** [.36, .50]	.29** [.21, .36]	.45** [.38, .51]	.28** [.19, .37]	.26** [.17, .35]	.70** [.66, .74]	
16. HLP	13.39	6.00	.31** [.23, .39]	.36** [.28, .44]	.35** [.27, .43]	.53** [.47, .59]	.58** [.52, .63]	.53** [.47, .59]	.51** [.45, .57]	.47** [.40, .53]	.41** [.34, .48]	.42** [.35, .48]	.45** [.39, .52]	.32** [.23, .41]	.31** [.22, .39]	.68** [.64, .72]	.64** [.59, .69]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. *RE* = re-experiencing, *AV* = avoidance, *HY* = hypervigilance, *AD-S* = skills deficits, *AD-I* = instability, *TRA* = tension-reducing activities, *DEP* = depersonalization, *DER* = derealization, *DIS* = disengagement, *EC* = emotional constriction, *IC* = interpersonal conflicts, *Diff. Intim.* = difficulty with intimacy, *Fearful-Av.* = fearful-avoidant adult attachment style, *SB* = self-blame, *SC* = self-criticism, *HLP* = helplessness. Values in square brackets indicate the 95% confidence interval for each correlation. \*  $p < .05$ . \*\*  $p < .01$ .

***Results of the confirmatory factor analysis.*** The confirmatory factor analysis aimed to examine if the PTS symptoms and the additional Complex PTS symptoms have distinct clusters that meaningfully contribute to a second order latent factor of Complex PTS. The current model demonstrated a statistically significant robust  $\chi^2$  value ( $p = <.001$ ) indicating that this goodness of fit index found the model was not significantly different from the baseline reference model. As discussed in the methods section this is not unheard of in large samples. Aside from this index, the model demonstrated good fit (robust CFI = .96, robust TLI = .95 robust RMSEA = .054 [.048, .061]). All indicator variables demonstrated significant factor loadings onto their respective first-order latent factors ( $\lambda = .43$  to  $.91$ ,  $p <.001$ ; see Figure 3). All but four of the factor loadings (i.e., fearful-avoidant adult attachment, difficulty being intimate, disengagement, and emotional constriction) were above .70. Thus, the reliability paradox may be considered when discussing results. All five first-order latent variables demonstrated significant positive loadings on the second-order latent factor of Complex PTSD ( $\lambda = .48$  to  $.93$ ,  $p <.001$ ; see Figure 3). Interpersonal Difficulties demonstrated the lowest factor loadings for interpersonal conflicts, fearful-avoidant adult attachment style, and difficulty with intimacy ( $\lambda = .73$ ,  $.43$ , and  $.48$ , respectively), however it had the strongest loading onto the second-order latent variable of Complex PTS ( $\lambda = .92$ ,  $p <.001$ ) alongside Affect Dysregulation ( $\lambda = .92$ ,  $p <.001$ ). Conversely, the first-order latent factor of PTS had some of the strongest factor loadings ( $\lambda = .81$ ,  $.87$ , and  $.91$ ,  $p <.001$ ) and yet had the weakest loading onto Complex PTS ( $\lambda = .48$ ,  $p <.001$ ).

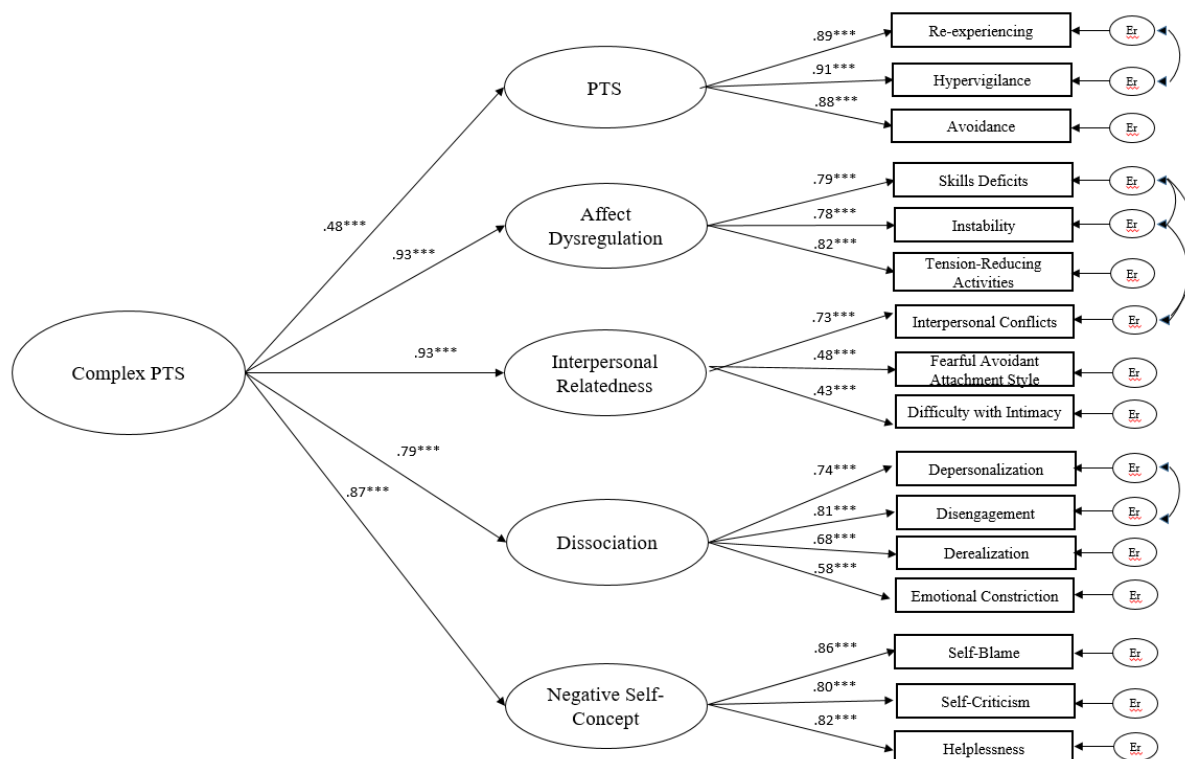


Figure 2. Factor loadings and significance results of confirmatory factor analysis of the observed symptom variables contributing to the four first-order factor symptoms clusters which then in turn contribute to the second-order factor of Complex PTSD. \*\*\* indicates  $p < .001$ .

**Structural equation model.** A SEM analysis was conducted in order to examine associations between types of traumatic events and Complex PTS and PTS using the lavaan package in R (Rosseel, 2012).

**Model specification.** Scaling of the latent variables was accomplished by constraining the latent variables to have a mean of 0 and a variance of 1, standardizing them, and allowing for free estimation of all factor loadings (Hartman, 2018). In addition to the latent variables in the

original CFA, two latent variables were constructed to represent Relational Traumatic Events (composed of childhood sexual abuse and childhood physical abuse), and Non-Relational Traumatic Events (composed of natural disaster and being in a car accident). Both the natural disaster and car accident variables, unlike childhood sexual abuse and childhood physical abuse, were included with the specifier of the event inducing fear of harm or death. This was included for natural disaster and car accident rather than the childhood abuse variables as there is more variability in severity for events such as natural disasters and car accidents. A car accident, for example, could refer to a fender bender or to an accident with severe injuries or a fatality. Complex Post-Traumatic Stress was represented as the second-order model analyzed in the CFA consisting of the first-order latent variables of PTS, Affect Dysregulation, Dissociation, Negative Self-Concept, and Interpersonal Difficulties and including all the same residual covariance specifications (see Figure 2).

Robust maximum likelihood (MLR) estimation was used in order to account for the non-normality of the indicator variables as maximum likelihood is affected by outliers (Hennig, 2004), with full information maximum likelihood (FIML) for the missing data. The SEM used the same fit indices for model evaluation as the CFA.

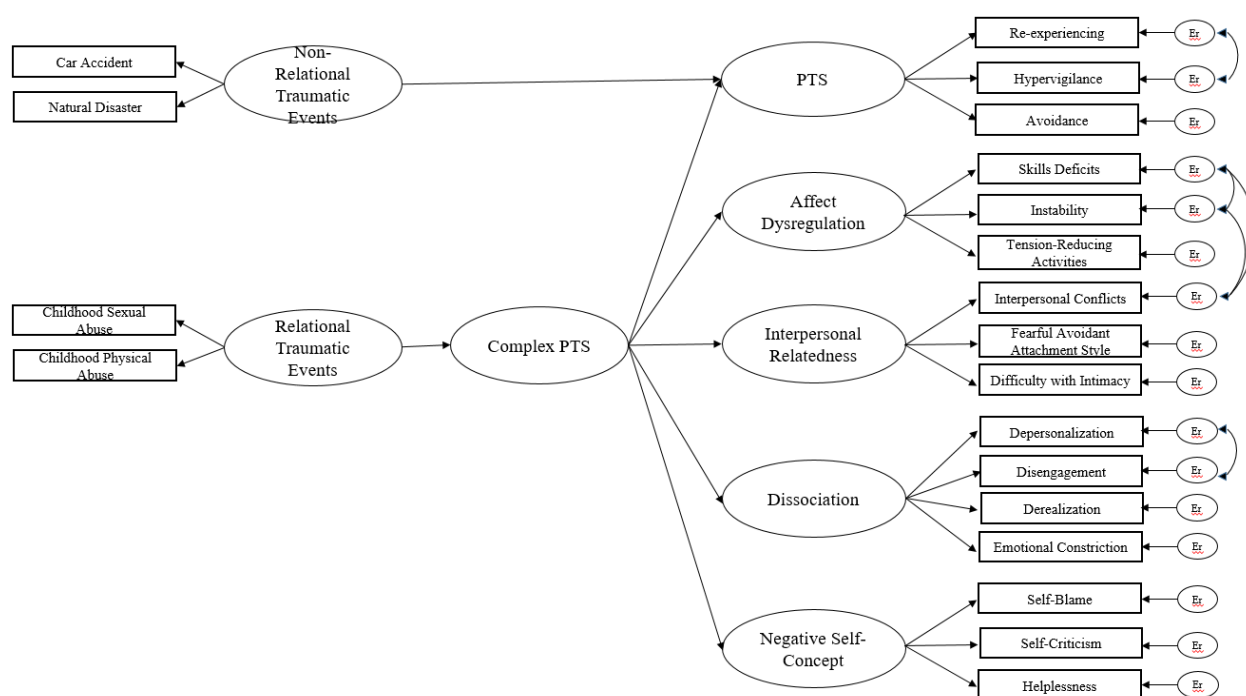


Figure 3. Structural equation model examining the association between different types of traumatic events and Complex PTS.

**Results of the structural equation model.** The structural equation model aimed to examine whether PTSD and Complex PTSD are associated with different types of traumatic events, namely whether PTSD is associated with non-relational traumatic events and Complex PTSD is associated with relational traumatic events. The current model demonstrated a statistically significant robust  $\chi^2$  value ( $p = <.001$ ) indicating that this goodness of fit index found the model was not significantly different from the baseline reference model. As discussed in the methods section this is not unheard of in large samples. Aside from this index, the model demonstrated good fit (robust CFI = .95, robust TLI = .94, robust RMSEA = .046 [.040, .051]).

All indicator variables of Complex PTS demonstrated significant factor loadings onto their respective first-order latent factors ( $\lambda = .43$  to  $.92, p < .01$ ). The factor loadings nearly all exceeded  $.70$  (with the exception of disengagement, emotional constriction, fearful-avoidant adult attachment style, difficulty with intimacy, and traumatic event types). According to the reliability paradox, the cut-off standards for fit indices in this case may then be too conservative, thus the TLI value of  $.94$  likely still indicates a good fitting model. Additionally, Hu and Bentler (1999) recommend the TLI be *close to*  $\geq .95$ , not necessarily exceed  $.95$ . The first order latent variable of Relational Traumatic Event Types demonstrated significant factor loadings for both childhood sexual abuse ( $\lambda = .43, p < .01$ ) and childhood physical abuse ( $\lambda = .42, p < .01$ ); a significant regression path to Complex PTS ( $\beta = .50, p < .01$ ). Non-Relational Traumatic Events demonstrated significant factor loadings for both car accidents ( $\lambda = .71, p = .137$ ) and natural disasters ( $\lambda = .26, p < .05$ ). However, a non-significant regression path to PTS was found ( $\beta = .25, p = .05$ ). See Figure 4 for full results of the structural equation model.

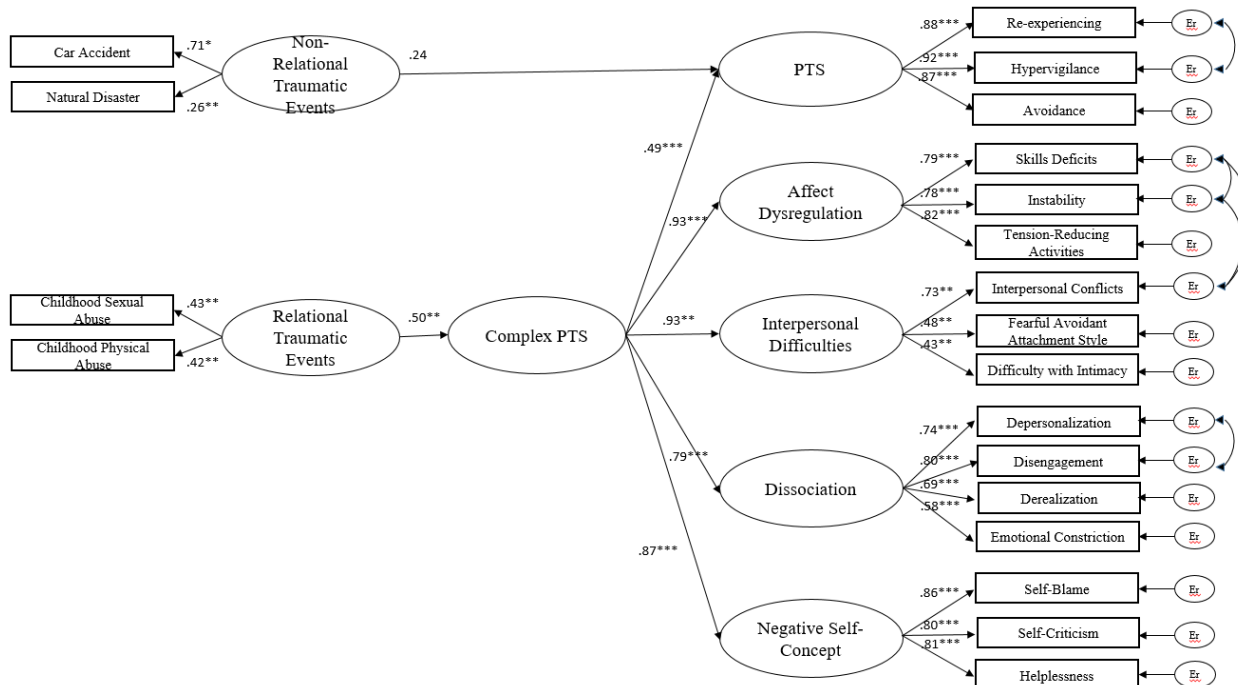


Figure 4. Results of structural equation model examining the association between non-relational traumatic events and relational traumatic events on Complex PTSD. \*  $p < .05$ , \*\*  $p < .01$ , and \*\*\*  $p < .001$ .

**Latent profile analysis.** Using the mclust package in R (Fraley & Raftery, 2007), LPA was performed to distinguish distinct subpopulations (profiles) in the sample that each represent a different pattern of symptoms. The variables discerning profile membership consisted of the variables included in the CFA and SEM: re-experiencing, hypervigilance, avoidance, skills deficits, instability, tension-reducing activities, depersonalization, derealization, disengagement, emotional constriction, interpersonal conflicts, fearful-avoidant adult attachment style, difficulty with intimacy, self-blame, self-criticism, and helplessness to construct a profile of Complex Post-Traumatic Stress.

Maximum likelihood (ML) estimation was used, with multiple imputation (MI) for the missing data using the mix package as an add-on to mclust in R (Schafer, 2017). Robust

maximum likelihood is preferable however the mclust package does not currently offer this function. The models to be analyzed were selected using the mclust label of “VVE” which specifies for the shape and volume of the model to vary while setting the orientation of the covariances to be equal across groups. These specifications allow for more flexibility in volume and shape of the latent variables while also improving parsimony (Scrucca, Fop, Murphy, & Raftery, 2016).

***Model evaluation.*** The first model tested had two profiles and successive profiles were added in an iterative process guided by the fit statistics for each model. The fit of each model was assessed using several indices. The sample adjusted Bayesian Information Criterion (BIC) provides a log-likelihood estimate that identifies the model with the best fit and the fewest parameters, a lower BIC indicates better fit (Sclove as cited in Stanley, Kellermanns, & Zellweger, 2017). Integrated Completed Likelihood (ICL) was also used and is a similar index to BIC; however, ICL penalizes models with greater entropy (Bertoletti, Friel, & Rastelli, 2015). Bootstrapped likelihood ratio test (BLRT) indicates how much adding another profile to the model will improve model fit, and has an associated a  $p$  value, wherein a significant  $p$  value indicates it will improve fit (McLachlan & Peel as cited in Stanley et al., 2017). Posterior probabilities associated with each profile wherein high values indicate that there is a high probability that a case belongs to the assigned profile and not another profile. The number of cases in each profile was also used as an indicator of whether the model was well-fitting.

***Results of the latent profile analysis.*** The latent profile analysis aimed to examine whether PTS and Complex PTS represented distinct populations. A four group model was hypothesized consisting of those who endorse symptomology consistent with PTS, those who

endorse symptomology consistent with Complex PTS, those who endorse only items related to issues of an interpersonal/affect/self-concept nature (and shares some borderline personality-related symptomology), and those who endorse neither, respectively. Fit indices for the models tested are presented in Table 3. A model with two groups had the lowest BIC (-46613.43), and ICL (-46660.00), and a BLRT  $p$ -value of .010, and therefore was selected as the best-fitting model. Mean posterior probabilities for each group in this model were also satisfactory ranging from .96 to .97, indicating that there was a high probability that the participants assigned to each group belonged in that group.

Table 3

*Number of Participants in each Group, Bayesian Information Criterion, Integrated Completed Likelihood and Bootstrapped Likelihood Ratio Test*

Model	$N$	$BIC$	$ICL$	$BLRT p$
2 Groups	288, 292	-46613.43	-46660.00	.010
3 Groups	294, 113, 173	-46436.66	-46531.90	.010
4 Groups	205, 163, 140, 72	-45305.16	-46421.76	.010

*Note.*  $n$ ,  $BIC$ ,  $ICL$ , and  $BLRT p$  are used to represent group size, Bayesian Information Criterion, Integrated Completed Likelihood, and Bootstrapped Likelihood Ratio Test  $p$ -value, respectively.

Group 1 ( $n = 292$ ) was most likely to endorse low levels of all symptomology consistent with Complex PTS. Group 2 ( $n = 288$ ) was most likely to endorse high levels of all symptomology consistent with Complex PTSD. For group descriptives and symptom means see Table 4 and Figure 5.

Table 4

*Means, Standard Deviations, and Standard Errors for each Variable by Group*

Group 1				Group 2				
Variable	<i>M (raw)</i>	<i>SD</i>	<i>M (scaled)</i>	<i>SD</i>	<i>M (raw)</i>	<i>SD</i>	<i>M (scaled)</i>	<i>SD</i>
1. RE	12.50	3.49	-0.39	0.62	18.11	7.40	0.38	1.19
2. AV	11.44	3.17	-0.41	0.58	17.11	7.40	0.35	1.20
3. HY	11.72	3.14	-0.39	0.52	17.84	8.13	0.36	1.23
4. AD-S	6.71	2.18	-0.50	0.55	11.05	4.12	0.53	1.07
5. AD-I	5.99	2.02	-0.52	0.46	9.92	4.84	0.51	1.14
6. TRA	11.39	2.36	-0.46	0.49	16.15	5.80	0.48	1.17
7. DEP	5.66	1.16	-0.44	0.43	8.04	3.20	0.46	1.19
8. DER	6.94	1.89	-0.48	0.54	10.42	3.90	0.49	1.112

9. DIS	11.28	3.19	-0.35	0.84	14.31	4.24	0.35	1.03
10. EC	6.38	2.01	-0.48	0.46	10.36	4.79	0.50	1.15
11. IC	16.82	3.84	-0.41	0.63	21.73	7.04	0.42	1.12
12. Diff. Intim.	.69	.59	-0.29	0.82	1.02	.69	0.34	1.06
13. Fearful- Av.	3.19	1.63	-0.31	0.84	4.41	2.16	0.35	1.06
14. SB	11.18	2.78	-0.54	0.44	17.91	6.90	0.57	1.11
15. SC	13.22	3.43	-0.52	0.49	20.27	7.58	0.55	1.10
16. HLP	10.17	2.46	-0.54	0.40	16.59	6.76	0.56	1.14

---

*Note.* *M* and *SD* are used to represent mean, standard deviation, respectively.

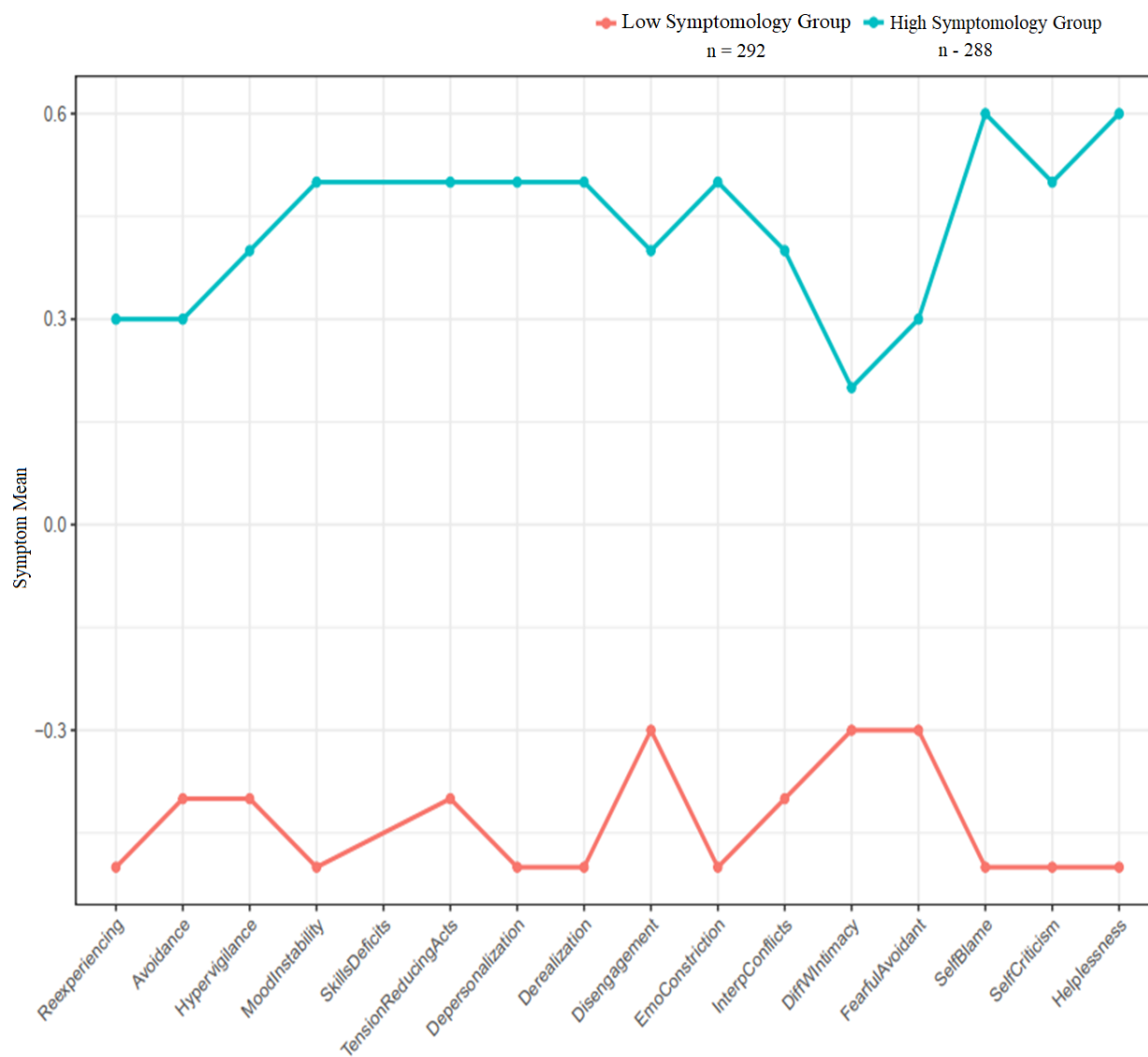


Figure 5. Standardized means of symptom variables for Group 1 (Non-symptomatic) and Group 2 (Complex PTS) of the latent profile analysis.

**Hierarchical regression.** Hierarchical regression was used to determine if the additional Complex PTS symptoms account for variability in impaired functioning over and above PTS symptomology alone. Impaired functioning was measured using the dependent variables of *suicidality*, *substance abuse-drugs*, *substance abuse- alcohol*, and *psychosocial functioning* subscales of the DAPS (Briere, 2001). The two substance abuse subscales were combined into one scale of *substance abuse*. Using code derived from the lavaan package in R (Rosseel, 2012), predicted scores of the latent variables analyzed in the CFA were created for each participant and saved back into the data frame. The PTS predicted scores were added to the model first wherein the dependent variable (one of suicidality, substance abuse or psychosocial functioning) was regressed onto the predictor variable of PTS predicted scores. In the second step, the dependent variable was regressed onto the predictor variable of predicted scores for Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept, in addition to PTS.

Whether the addition of the Complex PTS symptoms account for variability over and above the PTS symptoms was determined by comparison of the strength and significance of  $r/R$  between the two models via a  $\chi^2$  difference test and the change in  $R^2$  between the two models. The  $\chi^2$  difference test indicated if the second model accounts for variability over and above the first if the difference is significant.

**Results of hierarchical regression.** At step one the hierarchical regression demonstrated that PTS symptomology significantly predicted suicidality and accounted for 8.9% of the variance ( $R^2 = .089$ ,  $F(1, 569) = 55.79$ ,  $p < .001$ ). In step two the additional Complex PTS symptoms, the predicted scores for Affect Dysregulation, Dissociation, Interpersonal

Difficulties, and Negative Self-Concept, were added to the model explained an additional 25.81% of the variation in suicidality ( $R^2 = .347$ ,  $F [5, 565] = 55.79$ ,  $p < .001$ ). The  $\chi^2$  Difference Test revealed that this change between models was significant ( $\chi^2$  difference  $[4, 565] = 3183.9$ ,  $p < .001$ ).

In stage one of the second hierarchical regression PTS symptomology significantly predicted substance abuse and accounted for 1.5% of the variance ( $R^2 = .015$ ,  $F (1, 571) = 8.431$ ,  $p = .004$ ). In step two, the additional Complex PTS symptoms, the predicted scores variables of Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept, were added to the model and explained an additional 6.18% of the variation in substance abuse ( $R^2 = .077$ ,  $F [5, 565] = 9.43$ ,  $p < .001$ ). The  $\chi^2$  Difference Test revealed that this change between models was significant ( $\chi^2$  difference  $[4, 567] = 634.4$ ,  $p < .001$ ).

Lastly, in stage one of the third hierarchical regression PTS symptomology significantly predicted impaired psychosocial functioning and accounted for 72.81% of the variance ( $R^2 = .728$ ,  $F (1, 484) = 1296.00$ ,  $p < .001$ ). Ninety-four observations were dropped from the analysis due to missing data. In step two, the additional Complex PTS symptoms, the predicted scores of Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept, were added to the model and explained an additional 0.09% of the variation in psychosocial functioning ( $R^2 = .737$ ,  $F [5, 480] = 269.5$ ,  $p < .001$ ). The  $\chi^2$  Difference Test revealed that this change between models was significant, although the difference was relatively small in magnitude ( $\chi^2$  difference  $[4, 484] = 33.47$ ,  $p = .002$ ). See Table 8.

Table 5

*Hierarchical Regression of the Prediction of Suicidality, Substance Abuse, and Psychosocial Functioning from PTS Symptoms and the Additional Complex PTS Symptoms.*

Dependent Variables	Predictor Variables	$R^2$	$F$	$df$	$\chi^2$ diff.	$F$
Suicidality	PTS	.089	55.79***	1, 569		
	Complex PTS Symptoms	.347	60.07***	5, 565	3183.90***	55.78
Substance Abuse	PTS	.014	8.43***	1, 571		
	Complex PTS Symptoms	.076	9.44***	5, 567	634.4***	9.56
Psychosocial Functioning	PTS	.728	1296.0***	1, 484		
	Complex PTS Symptoms	.737	269.5***	5, 480	33.47***	4.23

*Note.*  $R^2$ ,  $F$ ,  $df$ , and  $\chi^2$  diff. are used to represent R Squared, F statistic, degrees of freedom and  $\chi^2$  of the difference, respectively. \*\*\* indicates  $p < .001$ .

## Discussion

**Do PTS and Complex PTS have distinct symptom clusters?** The confirmatory factor analysis provided evidence to support the conceptualization of PTS, Affect Dysregulation, Dissociation, Interpersonal Difficulties, and Negative Self-Concept symptoms forming distinct clusters, while also contributing to an over-arching factor of Complex PTS. The model demonstrated good fit and significant moderate to high factor loadings.

While no other study has used a second-order model to conceptualize Complex PTS, or specified dissociation as its own latent variable distinct from affect dysregulation (or even included dissociation at all), previous studies have also found support for distinguishing between PTS symptoms and the additional Complex PTS symptoms. Cloitre et al.'s (2013) four-factor model of PTSD, affect dysregulation, interpersonal conflicts, and negative self-concept demonstrated good fit, however the strength and significance of factor loadings was not reported. Similarly, Knefel, & Lueger-Schuster's (2015) four-factor model of the same symptom clusters demonstrated good fit, however, they did not report the significance nor values of the factor loadings. Comparatively, Wolf et al. (2015) found support for a two-factor model of PTSD symptoms and Complex PTSD symptoms (interpersonal conflicts, affect dysregulation and negative self-concept) with strong and significant factor loadings.

However, these studies also did not report details on their model specification, such as whether there were any constraints, if residual variances were allowed to co-vary, or how the latent variables were scaled. As such, it is difficult to draw comparisons between the current study and previous research. A number of factors could influence the outcome of latent variable modelling and without transparent reporting of the details of the analyses and sound explanation

for how these specifications are grounded in theory, the results of such models could be misinterpreted.

Regardless, the results of the current confirmatory second-order factor analysis suggest not only that PTS and the additional Complex PTS symptoms are best conceptualized as distinct clusters that contribute to an over-arching factor, but also that dissociation meaningfully contributes to the concept of Complex PTS while being best conceptualized as a distinct symptom cluster. Dissociation as a symptom cluster and as a trauma-related experience is not well understood. Particular dissociative symptoms such as depersonalization and derealization are consistently associated with PTSD symptomology, whereas it is possible that emotional constriction and disengagement may be more relevant to affect dysregulation as emotional constriction involves regulating or numbing affect and disengagement is described as emotional or cognitive detachment (Briere, 2002). Indeed, dissociation is often thought to be a protective response to intense and overwhelming states (Cloitre et al., 2013; Maercker et al., 2013), such as those seen in affect dysregulation and PTSD symptomology. Whereas, the flashbacks seen in PTSD symptom of re-experiencing are often thought to be experienced in a dissociative state (APA, 2013). As dissociation is likely related to all if not most of the symptom clusters in Complex PTSD, as well as symptoms and experiences not captured by this construct, it may be best conceptualized as a stand-alone feature.

This was supported as the dissociative symptoms included in this study were demonstrated to meaningfully contribute to a first-order latent factor, suggesting that they are related symptoms distinct from affect dysregulation and PTS, and contribute to the second-order factor of Complex PTS suggesting their association with all the symptom clusters. This differs

from the *ICD-11*'s proposed criteria for Complex PTSD which conceptualizes dissociation as a component of affect dysregulation, but is similar to the DSM's dissociative subtype of PTSD which conceptualizes dissociation as its own criteria, in this case used as a specifier to distinguish this subtype from more typical presentations of PTSD (APA, 2013). However, the dissociative subtype of PTSD only includes derealization and depersonalization and ignores other relevant forms, such as disengagement and emotional constriction, whereas the current study found support for their inclusion. As such, these findings suggest that dissociation is an important component of Complex PTSD and should be included in future analyses in multiple forms, rather than just derealization and depersonalization.

Interpersonal Difficulties and Affect Dysregulation demonstrated the strongest loadings onto the second-order latent variable of Complex PTS. This suggests that the Interpersonal Difficulties and Affect Dysregulation symptom clusters best represents the latent variable of Complex PTS. Complex PTS is a syndrome precipitated by profound relational and attachment loss during development and as such would manifest pervasively in intimate relationships throughout the lifespan, contributing to this finding. Studies examining the interconnections in networks of post-traumatic stress symptoms have similarly implicated affect dysregulation as a central symptom to post-traumatic stress, one that has associations with many of the other symptoms contributing to this disorder (Armour et al., 2017).

The weaker factor loading of PTS onto Complex PTS was unexpected. As Complex PTSD is a form of PTSD we would expect PTS symptoms to play a stronger role in this model. As Complex PTSD is often thought to develop following relational traumatic events in childhood and my sample consisted mostly of young adults, it is possible that the severity and frequency of

PTS symptoms in this hypothesized group may have diminished over the several years that have passed since the traumatic event if the event causing the PTS symptoms occurred in childhood. However, as participants were not selected based on type of traumatic event experienced, this cannot be concluded. It is also possible that while PTS symptoms do play a significant and substantial role in Complex PTS it may not be a central or even prominent role in comparison to other symptoms, particularly Interpersonal Difficulties, Affect Dysregulation, Negative Self-Concept and Dissociation.

### **Do PTS and Complex PTS result from different traumatic events?**

The structural equation model revealed little change in the factor structure of the latent variables originally included in the CFA when Relational and Non-Relational Traumatic events were included in the model, as to be expected. Several factor loadings changed unremarkably in strength (approximately .001 in most cases) and many *p*-values increased while maintaining significance (see Figure 4). The first-order latent variable of Relational Traumatic Event Types demonstrated significant factor loadings for both childhood sexual abuse and childhood physical abuse wherein they equally represented the construct of relational trauma. Non-Relational Traumatic Events demonstrated significant factor loadings for both car accidents or natural disasters, but varied greatly in strength and ultimately did not demonstrate a significant association with PTS as hypothesized. The issue here may lie in the conceptualization of these as latent variables. Childhood sexual abuse and childhood physical abuse likely share variance as subtypes of child maltreatment are often thought to co-occur (Warmingham, Handley, Rogosch, Manly, & Cicchetti, 2018). Car accidents and natural disaster however have no reason to co-occur, nor do they have any other association that may allow them to meaningfully and

substantially comprise a latent factor. As such, it is understandable why there is a discrepancy in the amount they each contribute to a latent factor of Non-Relational Traumatic Events. This finding may also be influenced by the variability in severity of events such as car accidents and natural disasters. While these variables did have the specifier of fear of harm or death in relation to the event, experiencing a relatively minor car accident would have a different impact than one that involved extensive injuries or a fatality.

However, a significant regression path from Relational Traumatic Events to Complex PTS was demonstrated and supports the hypothesis that Relational Traumatic Events (i.e., childhood sexual abuse and childhood physical abuse) are associated with Complex PTS symptomology. These types of traumatic events are thought to interfere with developmental processes related to affect dysregulation (Cloitre et al., 2009) and dysfunctional beliefs about the self (Hyland et al., 2017), two of the symptom clusters included in Complex PTS. Dissociation has also been associated with these types of traumatic events (Briere et al., 2016; Carlson et al., 2012), as well as PTSD (APA, 2013; Briere, 2002). Cloitre et al. (2013) and Knefel and Lueger-Schuster (2015) also found Complex PTSD was associated with child maltreatment. Similarly, Hyland et al. (2017) found that childhood sexual abuse, childhood physical assault, adult physical assault, and being unemployed were significantly more likely to be associated with Complex PTSD as compared to PTSD, whereas near-drowning and robbery were more likely to be associated with PTSD rather than Complex PTSD.

### **Do PTS and Complex PTS represent different populations?**

Discernable groups were found in the latent profile analysis that did not support the hypothesis that the data is best represented by four populations: those who endorse

symptomology consistent with PTS, those who endorse symptomology consistent with Complex PTS, those who endorse only items related to issues of an interpersonal/affect/self-concept nature, and those who endorse neither. The best fitting model found that two distinct groups best represented the data in that: Group 1 ( $n = 292$ ) was most likely to endorse lower levels of all symptomology and Group 2 ( $n = 288$ ) was most likely to endorse higher levels of all symptomology (and thus consistent with Complex PTS; see Table 4 for descriptions of the groups). The number of participants assigned to Group 2, the Complex PTS group, was unexpectedly high. However, as the raw score means in Group 2 do not meet clinical levels this does not indicate that 288 participants endorse symptomology consistent with a Complex PTSD diagnosis. This finding instead likely indicates a discernable split between those who score relatively lower and relatively higher.

These results differ from previous studies on latent profile analysis of Complex PTSD (e.g., Cloitre et al., 2013) in that a model with 4 groups (a PTSD group, a Complex PTSD group, a BPD group and a group with low endorsement across symptoms) had the best fit rather than 2 groups. This may be due to the inclusion of dissociation, to the larger number of items that were used to measure each symptom cluster as this may have captured a wider variety of ways these symptom clusters could be experienced, or the way the model was specified and the analyses were conducted. As Cloitre et al. (2013) did not include the details of either of these it is difficult to draw comparisons. It may also be possible that the four groups distinguished by Cloitre and colleagues (2013) were not well represented in the undergraduate sample. Furthermore, the sample consisted of undergraduate students wherein 22.6% had experienced child maltreatment and 76.6% had experienced other types of traumatic events such as car accidents or natural

disasters (most of which were likely minor in severity), whereas previous studies included entire samples of survivors of childhood sexual abuse (Knefel & Lueger-Schuster, 2015) and of the 9/11 terrorist attacks (Cloitre et al., 2013).

Wolf et al. (2015) tested a series of models and found the best fitting model to the data was one with four classes (categorical) as determined by their scores on two latent variables (dimensional) wherein classes did not differ in their pattern of symptom endorsement but in symptom severity, similar to the current study. Cloitre et al.'s (2013) model was also tested with Wolf et al.'s (2015) data set and while the model achieved acceptable fit, it was not as good a fit to the data as the model with four classes and two latent variables. These results were demonstrated by Wolf et al. (2015) in both a community sample and a veteran sample. Once again the key may be in the sample as Cloitre et al. (2013) and Knefel and Lueger-Schuster (2015) both included samples that had specifically experienced traumatic events associated with Complex PTSD symptomology. It is also possible that if the specifier of feeling fear of harm or death was included for the traumatic event variables included in this study, in addition to the car accident and natural disaster variables, the results may have differed. However, it may also be the case that if Cloitre et al. (2013) had analyzed a series of models with the number of groups tested increasing by one in each model to compare their fit, similar results may have been found.

The two group model, wherein one group endorsed a pattern of symptoms consistent with Complex PTS and one group demonstrated low endorsement of all symptoms, supports the idea that the categorization of symptoms into discrete mental disorders is likely creating arbitrary boundaries between disorders rather than accurately representing true patterns of adverse mental health experiences. The findings of the LPA demonstrate a pattern of high endorsement of all

symptomology or low endorsement that distinguish the two groups, potentially indicating that that while these symptoms do tend to co-occur, there is likely no clear distinction between a PTS group, a Complex PTS group and an affect/interpersonal/self-concept group in this sample, only a differentiation between experiences of low symptomology and high symptomology in general.

### **Do PTS and Complex PTS result in different levels of impaired functioning?**

The series of hierarchical regressions performed support the hypothesis that Complex PTS symptoms results in more impaired functioning than PTS symptoms alone, however to varying degrees. Complex PTS symptoms accounted for a large proportion of the variance in suicidality over and above PTS symptoms (25.81%); whereas only marginally more of the variance in substance abuse and psychosocial functioning (6.18% and .09%, respectively). Suicidality has been consistently associated with histories of complex trauma and Complex PTSD (Chafin & Kallivayalil, 2017; Dube et al., 2001; Hyland et al., 2018; Karatzias et al., 2019) and the results of the current study corroborate these findings. Beal and colleagues (2019) similarly did not find a meaningful association between substance use and traumatic events in childhood, however family instability was significantly correlated with substance use. Rosenkranz, Muller, and Henderson (2014) found that Complex PTSD symptomology partially mediated the relationship between child maltreatment and substance use. However, as the current study tested whether the additional Complex PTS symptoms predicted substance use over and above PTS symptoms, it is possible it was the PTSD symptoms included in the Rosenkranz et al.'s (2014) study that contributed to the association between child maltreatment and substance use. The current study's findings likely indicate that the additional symptom clusters of Affect Dysregulation, Interpersonal Difficulties, Dissociation and Negative Self-Concept do not account

for much more variability in substance use beyond that accounted for by PTS symptoms (re-experiencing, avoidance and hypervigilance) alone. While the additional Complex PTS symptom clusters did account for an additional 6.98% of the variability in substance abuse, this increase is likely not clinically significant.

### **Limitations**

The sample in this study consisted of undergraduate students which may have influenced results as this is likely not representative of the general population or populations who have experienced trauma, particularly relational trauma. While 22.6% of the sample had experienced childhood sexual and/or physical abuse, there are likely marked differences between this sample and those used in other studies on Complex PTSD, such as Cloitre et al. (2013) who included survivors of the 9/11 terrorist attacks and childhood sexual abuse, and Wolf et al. (2015) who included war veterans. The undergraduate sample included in this study by nature will have fewer participants who have experienced severe traumatic events and lower levels of Complex PTSD symptomology than the Cloitre et al. (2013) and Wolf et al. (2015) samples.

The current study was also limited by the instruments available to measure traumatic event types. As this was a pre-existing dataset I was not able to select which measures to include in my analyses outside of what was included previously. The DAPS does not include items for reporting psychological maltreatment or intimate partner violence, two types of traumatic events that likely play a role in the development of Complex PTSD. Chronicity of the traumatic events and other relevant details such as the identity of the perpetrator are not captured by the RTE subscale of the DAPS, further limiting which items could validly be used to measure relational and non-relational traumatic events. As such, the latent variables representing these constructs

each only had two indicator variables, potentially influencing results as it is recommended to have at least three indicator variables per latent variable.

The measures available to capture aspects of Interpersonal Difficulties were also limited. This component of Complex PTSD is thought to consist of symptoms of conflictual and chaotic intimate relationships, lack of interest in intimate relationships, and avoidance of intimate relationships (Cloitre et al., 2013). The *interpersonal conflicts* subscale of the IASC, the *difficulty being intimate* subscale of the IIP, and the *fearful-avoidant* attachment subtype from the RQ were used to measure these symptoms, respectively. While the *interpersonal conflicts* subscale of the IASC does accurately capture how this component of Interpersonal Difficulties as defined by Cloitre et al. (2013) for the *ICD-11*, it could be argued that the *difficulty being intimate* subscale of the IIP and the *fearful-avoidant* attachment style from the RQ do not, although these differences may be slight. Thus the measures used, and the conceptualization, of Interpersonal Difficulties in the current study thus differs slightly from the *ICD-11* criteria for Complex PTSD. The *ICD-11* also conceptualizes negative self-concept as having a component of shame, a construct that the pre-existing data in this study did not have an appropriate measure of, and thus the current model differs slightly from the proposed model.

There were also limitations to the statistical analyses as the *mclust* package in R does not currently have an option to use robust ML estimation in latent profile analyses, nor is there an option to use FIML for the missing data, neither of which is ideal for the non-normality of the dataset used in this study. Therefore, this may have influenced the results.

## **Future Directions**

While the current study did find a moderate association between Relational Traumatic Events and Complex PTS, it is possible that this association could be moderated by other factors. For example, while the current study included a measure of adult attachment, childhood attachment style is likely involved in the development of Complex PTSD, at times even being conceptualized as an attachment disorder (Walker, 2014), and as such may play a moderating role in the association between these types of traumatic events and Complex PTSD (Keating, Muller, & Classen, 2018). However, due to the use of an undergraduate sample, lower levels of Complex PTS symptomology and disrupted attachment are likely. Future studies on attachment style and Complex PTS should conceptualize attachment as continuous as attachment style was determined to be dimensional construct rather than a categorical disorder or type (Fraley et al., 2015; Fraley & Spieker, 2003). It may also be possible that the association between Relational Traumatic Events and Complex PTS simply represents an association between childhood maltreatment and trauma-related symptoms in general.

The current study found weaker factor loadings for the indicator variables of fearful-avoidant adult attachment style and difficulty being intimate symptoms and as such future studies should look at alternative ways of measuring these aspects of Interpersonal Difficulties that more accurately capture experiences of lack of interest and avoidance in intimate relationships. This may be accomplished by creating a measure that accurately represents the complex and at times contradictory aspects of Interpersonal Difficulties often seen in Complex PTSD.

The use of LPA in the current study follows the dominant conceptualization of mental illness as categorical by creating categorical groups from dimensional data, a conceptualization

that has been contested (Borsboom, 2017, Fried, 2017; Kendall & Jablensky, 2003). Many of the studies on the conceptualization and structure of Complex PTSD (Cloitre et al., 2013; Knefel & Lueger-Schuster, 2015; Wolf et al., 2015) use latent variable modelling techniques such as confirmatory factor analysis in addition to LPA. These types of analyses tend to be based on a reflective model which assumes that the mental disorder causes the symptoms (Fried, 2017). If the categorization and conceptualization of mental disorders as the cause of symptoms should only be employed for its usefulness rather than its validity, how valid are our studies that examine mental disorders using a reflective model? Does our research then accurately capture how mental illness is caused and experienced outside of theories and laboratories?

Another way of conceptualizing and examining mental illness is through network analysis. While confirmatory factor analysis and latent variable modelling operate on the idea that symptoms cluster because of a shared origin (Complex PTSD, i.e., the mental disorder), network analysis proposes that symptoms cluster because they influence each other and mental disorders are caused by the direct interplay between symptoms (Borsboom, 2017; Epskamp, 2017). Understanding mental disorders within this framework also has important implications for treatment as one could then expect that interventions targeting one symptom would then impact the entire network, reducing other symptoms as well.

A recent network analysis of PTSD revealed that all of the *DSM-5* PTSD symptoms were positively related to each other, however the strongest connections were between nightmares and flashbacks; blame (towards self and others) and negative emotionality; restricted emotionality and detachment; and hypervigilance and exaggerated startle response (Armour, Fried, Deserno, Tsai, & Pietrzak, 2017). Interestingly, symptoms within the same symptom clusters as defined by

the *DSM-5* did not always demonstrate associations between them, indicating that they may actually be independent of each other rather than related. The most central symptoms to the disorder of PTSD were found to be negative emotionality, flashbacks, detachment and reactivity to physiological cues (Armour et al., 2017). As centrality in network analysis is a measure of how connected a particular variable is to all of the others in the network (Epskamp, 2017), these symptoms may have the greatest significance clinically (Armour et al., 2017). Future research should employ network analysis to discern patterns of interconnectedness and potential causality between symptoms in Complex PTSD.

## **Conclusion**

The current study aimed to determine whether there was sufficient evidence to suggest that Complex PTS symptomology is distinct from PTS symptomology. PTS and the additional Complex PTS symptoms were found to have distinct symptoms clusters that contributed to an over-arching factor of Complex PTS. Complex PTS was associated with relational traumatic events (i.e., child maltreatment variables), and with higher dysfunction (specifically, increased suicidality). However, evidence was not found to support an association between PTS and non-relational events, nor to support PTS and Complex PTS as different populations in the data. Furthermore, Complex PTS was not associated with increased substance abuse or decreased psychosocial functioning. It is interesting that while the current study found evidence to support distinctions in symptomology when conceptualizing PTS and Complex PTS as dimensional, the same support was not found when conceptualized as categorical. As this alone cannot be taken as evidence supporting a dimensional structure of Complex PTS over categorical, taxometric analyses may be useful to future studies in order to determine the true underlying structure of

Complex PTS. Regardless, the current study provides evidence to support distinct dimensional constructs of Complex PTS and PTS, and found an increase in suicidality associated with Complex PTS. These findings provide valuable insights applicable to both therapy and future research on complex trauma.

## References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Armour, C., Contractor, A. A., Palmieri, P. A., & Elhai, J. D. (2014). Assessing latent level associations between PTSD and dissociative factors: Is depersonalization and derealization related to PTSD factors more so than alternative dissociative factors? *Psychological Injury and Law, 7* (2), 131-142.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1007/s12207-014-9196-9>
- Armour, C., Fried, E. I., Deserno, M. K., Tsai, J., & Pietrzak, R. H. (2017). A network analysis of *DSM-5* posttraumatic stress disorder in U.S. military veterans. *Journal of Anxiety Disorders, 45*, 49-59. <https://doi.org/10.1016/j.janxdis.2016.11.008>
- Aviram, R. B., Brodsky, B. S., & Stanley, B. (2006). Borderline personality disorder, stigma, and treatment implications. *Harvard Review of Psychiatry, 14* (5), 248-265.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1080/10673220600975121>
- Barbano, A. C., van der Mei, W. F., Bryant, R. A., Delahanty, D. L., deRoon-Cassini, T. A., Matsouka, Y. J., & Shalev, A., Y. (2018). Clinical implications of the proposed *ICD-11* PTSD diagnostic criteria. *Psychological Medicine, 49* (3), 1-8.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1017/S0033291718001101>

- Barrazone, N., Santos, I., McGowan, J., & Donaghay-Spire, E. (2019). The links between adult attachment and post-traumatic stress: A systemic review. *Psychology and Psychotherapy*, 92 (1), 131 – 147. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1111/papt.12181>
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology*, 61, 226–244. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/0022-3514.61.2.226>
- Beal, S. J., Wingrove, T., Constance, M., Lutz, N., Noll, J. G., & Greiner, M. V. (2019). Childhood adversity and associated psychosocial functioning in adolescents with complex trauma. *Child & Youth Care Forum*, 48 (3), 305-322. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1007/s10566-018-9479-5>
- Borsboom, D. (2017). A network theory of mental disorders. *World Psychiatry*, 16, 5-13. <http://dx.doi.org.ezproxy.library.uvic.ca/10.3389/fpsyg.2017.01305>
- Borsboom, D., Rhemtulla, M., Cramer, A. O. J., van der Mass, H. L. J., Scheffer, M., & Dolan, D. V. (2016). Kinds versus continua: A review of psychometric approaches to uncover the structure of psychiatric constructs. *Psychological Medicine*, 46 (8), 1-13, doi:10.1017/S0033291715001944
- Briere, J. (2000). *Cognitive Distortion Scales*. Odessa, FL: Psychological Assessment Resources.
- Briere, J. (2001). *Detailed Assessment of Posttraumatic Stress (DAPS)*. Odessa, FL: Psychological Assessment Resources.
- Briere, J. (2002). *Multiscale Dissociation Inventory* professional manual. Odessa, FL: Psychological Assessment Resources.

- Briere, J., Dietrich, A., & Semple, R. J. (2016). Dissociative complexity: Antecedents and clinical correlates of a new construct. *Psychological Trauma: Theory, Research, Practice, and Policy*, 8(5), 577- 584.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/tra0000126>
- Briere, J., Godbout, N., & Runtz, M. (2012). The Psychological Maltreatment Review (PMR): Initial reliability and association with insecure attachment in adults. *Journal of Aggression, Maltreatment & Trauma*, 21, 300-320.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1080/10926771.2012.659801>
- Briere, J., Kaltman, S., & Green, B. L. (2008). Accumulated childhood trauma and symptom complexity. *Journal of Traumatic Stress*, 21(2), 223-226.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/jts.20317>
- Briere, J., & Runtz, M. (2002). *The Inventory of Altered Self-Capacities (IASC)*: A standardized measure of identity, affect regulation, and relationship disturbance. *Assessment*, 9(3), 230-239. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1177/1073191102009003002>
- Carlson, E. B., Dalenberg, C., & McDade-Montez, E. (2012). Dissociation in posttraumatic stress disorder part I: Definitions and review of research. *Psychological Trauma: Theory, Research, Practice, and Policy*, 4(5), 479-489.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/a0027748>
- Chalfin, M., & Kallivayalil, D. (2017). Formulation and treatment of chronic suicidality in patients with developmental trauma. *Journal of Contemporary Psychotherapy*, 47 (4), 243-250. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1007/s10879-017-9362-y>

- Classen, C. C., Pain, C., Field, N. P., & Woods, P. (2006). Posttraumatic personality disorder: A reformulation of complex posttraumatic stress disorder and borderline personality disorder. *Psychiatric Clinics North American*, 29 (1), 87-12.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.psc.2005.11.001>
- Cloitre, M., Garvert, D. W., Brewin, C. R., Bryant, R. A., & Maercker, A. (2013). Evidence for proposed *ICD-11* PTSD and complex PTSD: A latent profile analysis. *European Journal of Psychotraumatology*, 5, 1-10.
- Cloitre, M., Garvert, D. W., Weiss, B., Carlson, E. B., & Bryant, R. A. (2014). Distinguishing PTSD, complex PTSD and borderline personality disorder: A latent class analysis. *European Journal of Psychotraumatology*, 5, 1-10.
- Cloitre, M., Scarvalone, P., & Difede, J. (1997). Posttraumatic stress disorder, self and interpersonal dysfunction among sexually re-traumatized women. *Journal of Traumatic Stress*, 10, 435-450.
- Cloitre, M., Stolbach, B. C., Herman, J. L., van der Kolk, B., Pynoos, R., Wang, J., & Petkova, E. (2009). A developmental approach to complex PTSD: Childhood and adult cumulative trauma as predictors of symptom complexity. *Journal of Traumatic Stress*, 22(5), 399-408. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/jts.20444>
- Collins, L. M., J. L. Schafer, & Kam, C. (2001). A comparison of inclusive and restrictive strategies in modern missing data procedures. *Psychological Methods* 6(4): 330-351.
- Dorahy, M. J., Corry, M., Shannon, M., Webb, K., McDermott, B., Ryan, M., & Dyer, K. F. W. (2013). Complex trauma and intimate relationships: The impact of shame, guilt and

dissociation. *Journal of Affective Disorders*, 147 (1-3), 72 -79.

<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.jad.2012.10.010>

Dorahy, M. J., McKendry, H., Scott, A., Yogeeswaran, K., Martens, A., & Hanna, D. (2017).

Reactive dissociative experiences in response to acute increases in shame feelings.

*Behaviour Research & Therapy*, 89, 75-85.

<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.brat.2016.11.007>

Epskamp, S. (2017). *AEB1804: Network Analysis: Introduction to Network Analysis, week 1*,

*session 1 notes* [PowerPoint slides]. Retrieved

from [http://sachaepskamp.com/files/NA2017/Lecture1\\_slides.pdf](http://sachaepskamp.com/files/NA2017/Lecture1_slides.pdf)

Fraley, C. R., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles

categorical or dimensional? A taxometric analysis of general and relationship-specific

attachment orientations. *Journal of Personality and Social Psychology*, 109 (2), 354-368.

<http://dx.doi.org/10.1037/pspp0000027>

Fraley, C., & Raftery, A. E. (2007). Model-based methods of classification: Using the mclust

software in Chemometrics. *Journal of Statistical Software*, 18 (6), 1-13.

Fraley, R. C., & Spieker, S. J. (2003). Are infant attachment patterns continuously or

categorically distributed? A taxometric analysis of strange situation behavior.

*Developmental Psychology*, 39 (3), 387- 404. DOI: 10.1037/0012-1649.39.3.387

Frewen, P. A., Brown, M. F. D., Steuwe, C., & Lanius, R. A. (2015). Latent profile analysis and

principal axis functioning of the *DSM-5* dissociative subtype. *European Journal of*

*Psychotraumatology*, 6, 1-17.

- Fried, E. I. (2017). What are psychological constructs? On the nature and statistical modelling of emotions, intelligence, personality traits and mental disorders. *Health Psychology Review, 11* (2), 130-134.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1080/17437199.2017.1306718>
- Frost, R., Hyland, P., Shevlin, M., & Murphy, J. (in press). Distinguishing Complex PTSD from Borderline Personality Disorder among individuals with a history of sexual trauma: A latent class analysis. *European Journal of Trauma & Dissociation*,  
<https://doi.org/10.1016/j.ejtd.2018.08.004>
- Galatzer-Levy, I. R., & Bryant, R. A. (2013). 636,120 ways to have posttraumatic stress disorder. *Perspectives on Psychological Science, 8*(6), 651–662.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1177/1745691613504115>
- Giacalone, R. C. (1997). A study of clinicians' attitudes and sex bias in the diagnosis of borderline personality disorder and posttraumatic stress disorder. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 57* (12-B), 7725.
- Godbout, N., Daspe, M-E., Runtz, M., Cyr, G., & Briere, J. (2018). Childhood maltreatment, attachment, and borderline personality-related symptoms: Gender-specific structural equation models. *Psychological Trauma: Theory, Research, Practice, and Policy, 11*(1), 90-98. <http://dx.doi.org/10.1037/tra0000403>
- Hansen, M., Müllerová, J., Elklit, A., & Armour, C. (2016). Can the dissociative PTSD subtype be identified across two distinct trauma samples meeting caseness for PTSD? *Social Psychiatry and Psychiatric Epidemiology, 51*, 1159-1169. doi:10.1007/s00127- 016-1235-2

- Hansen, M., Ross, J., & Armour, C. (2017). Evidence of the dissociative PTSD subtype: A systematic literature review of latent class and profile analytic studies of PTSD. *Journal of Affective Disorders, 213*, 59-69.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.jad.2017.02.004>
- Hartman, R. (2018). Understanding data: CFA in lavaan. Retrieved from  
<http://www.understandingdata.net/2017/03/22/cfa-in-lavaan/>
- Hazan, C., & Shaver, P. R. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*, 511–524.  
<http://dx.doi.org/10.1037/0022-3514.52.3.511>
- Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress, 5*, 377–391.
- Horowitz, L. M., Rosenberg, S. E., Baer, B. A., Ureno, G., & Villasenor, V. S. (1988). Inventory of interpersonal problems: Psychometric properties and clinical applications. *Journal of Consulting and Clinical Psychology, 56*, 885-892.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/0022-006X.56.6.885>
- Huh, H. J., Kim, S., Yu, J. J., & Chae, J. (2014). Childhood trauma and adult interpersonal relationship problems in patients with depression and anxiety disorders. *Annals of General Psychiatry, 13*, 1-13.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.
- Hyland, S. M., Karatzias, T., Fyvie, C., Roberts, N., Bisson, J. I., Brewin, C. R., & Cloitre, M. (2017). Alternative models of disorders of traumatic stress based on the new ICD\_11

- proposals. *Acta Psychiatrica Scandinavia*, 135 (5), 419-428.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1111/acps.12695>
- Karatzias, T., Hyland, P., Bradley, A., Cloitre, M., Roberts, N. P., Bisson, J. I., & Shevlin, M. (2019). Risk factors and comorbidity of *ICD-11* PTSD and complex PTSD: Findings from a trauma-exposed population based sample of adults in the United Kingdom. *Depression and Anxiety*, 36 (9), 887-894.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/da.22934>
- Karatzias, T., Shevlin, M., Fyvie, C., Hyland, P., Efthymiadou, E., Wilson, D., . . . Cloitre, M. (2016). An initial psychometric assessment of an *ICD-11* based measure of PTSD and complex PTSD (ICD-TQ): Evidence of construct validity. *Journal of Anxiety Disorders*, 44, 73 – 79. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.janxdis.2016.10.009>
- Kendell, R., & Jablensky, A. (2003). Distinguishing between the validity and utility of psychiatric diagnoses. *American Journal of Psychiatry*, 160, 4-12.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1176/appi.ajp.160.1.4>
- Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using *DSM-IV* and *DSM-5* criteria. *Journal of Traumatic Stress*, 26 (5), 537 – 547.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/jts.21848>
- Kline, R. B. (2004). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: Guilford Press.

- Knefel, M., & Lueger-Schuster, B. (2013). An evaluation of *ICD-11* PTSD and complex PTSD criteria in a sample of adult survivors of childhood institutional abuse. *European Journal of Psychotraumatology*, 4 (1). DOI: 10.3402/ejpt.v4i0.22608
- Knefel, M., Tran, U. S., & Lueger-Schuster, B. (2016). The association of posttraumatic stress disorder, complex posttraumatic stress disorder and borderline personality disorder from a network analytical perspective. *Journal of Anxiety Disorders*, 43, 70 – 78.  
<http://dx.doi.org/10.1016/j.janxdis.2016.09.002>
- Kulkarni, J. (2017). Complex PTSD: A better description for borderline personality disorder? *Australian Psychiatry*, 35 (4), 333-335.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1177/1039856217700284>
- Larsen, R. (2011). Missing data imputation versus full information maximum likelihood with second level dependencies. *Structural Equation Modelling*, 18 (4), 649-662.
- Lewis, K. L., & Grenyer, B. F. S. (2009). Borderline personality or complex posttraumatic stress disorder? An update on the controversy. *Harvard Review of Psychiatry*, 17 (5), 522 – 528.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.3109/10673220903271848>
- Matheson, C. (2016). A new diagnosis of complex Post-traumatic Stress Disorder, PTSD – A window of opportunity of the treatment of patients in the NHS? *Psychoanalytic Psychotherapy*, 30(4), 329-344.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1080/02668734.2016.1252943>

- McNeish, D., An, J., & Hancock, G. R. (2018). The thorny relation between measurement quality and fit index cutoffs in latent variable models. *Journal of Personality Assessment, 100* (1), 43-53. <https://doi.org/10.1080/00223891.2017.1281286>
- Müllerová, J., Hansen, M., Contractor, A. A., Elhai, J. D., & Armour, C. (2016). Dissociative features in posttraumatic stress disorder: A latent profile analysis. *Psychological Trauma: Theory, Research, Practice and Policy, 8* (5), 601-608.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/tra0000148>
- Pattern, S. B., Wilkes, T. C. R., Williams, J. V. A., Lavorato, D. H., el-Guebaly, N., Schopflocher, D., . . . Bulloch, A. G. M. (2015). Retrospective and prospectively assessed childhood adversity in association with major depression, alcohol consumption and painful conditions. *Epidemiology and Psychiatric Sciences, 24*, 158-165.  
[doi:10.1017/S2045796014000018](https://doi.org/10.1017/S2045796014000018)
- Pai, A., Suris, A. M., & North, C. S. (2017). Posttraumatic stress disorder in the *DSM-5*: Controversy, change and conceptual considerations. *Behavioural Science, 7* (1).  
[doi:10.3390/bs7010007](https://doi.org/10.3390/bs7010007)
- Platt, M. G., Luoma, J. B., Freyd, J. J. (2017). Shame and dissociation in survivors of high and low betrayal trauma. *Journal of Aggression, Maltreatment & Trauma, 26* (1), 34-49.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1080/10926771.2016.1228020>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879-903.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/0021-9010.88.5.879>

- Rosenkranz, S. E., Muller, R. T., & Henderson, J. L. (2014). The role of complex PTSD in mediating childhood maltreatment and substance abuse severity among youth seeking substance abuse treatment. *Psychological Trauma, 6* (1), 25-33.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1037/a0031920>
- Rosseel, Y. (2012). Lavaan: An R package for structural equation modelling and more. Version 0.5-12 (BETA). *Journal of Statistical Software*. Retrieved from <https://users.ugent.be/~yrosseel/lavaan/lavaanIntroduction.pdf> \
- Ruscio, J., Haslam, N., & Ruscio, A. M. (2006). Why latent structure matters, *Introduction to the Taxometric Method* (pp. 18-34). New York, NY: Routledge.
- Ruscio, J., & Ruscio, A., M. (2008). Categories and dimensions: Advancing psychological science through the study of latent structure. *Current Directions in Psychological Science, 17* (3), 203-207.
- Schafer, J. L. (June 12, 2017). Package 'mix'. Retrieved from <https://cran.r-project.org/web/packages/mix/mix.pdf>
- Sclove, S. L. (1987). Application of model-selection criteria to some problems in multivariate analysis. *Psychometrika, 52*, 333-343.
- Scheiderer, E. M., Wood, P. K., & Trull, T. J. (2015). The comorbidity of borderline personality disorder and posttraumatic stress disorder: Revisiting the prevalence and associations in a general population sample. *Borderline Personality Disorder and Emotion Dysregulation, 2* (1), 11-27. <https://doi-org.ezproxy.library.uvic.ca/10.1186/s40479-015-0032-y>

- Scrucca, L., Fop, M., Murphy, T. B., & Raftery, A. E. (2016). Mclust 5: Clustering, classification and density estimation using Gaussian finite mixture models. *The R Journal*, 8 (1), 289-317.
- Stanley, L., Kellermanns, F. W., & Zellweger, T. M. (2017). Latent profile analysis: Understanding family firm profiles. *Family Business Review*, 30 (1), 84-102.
- Stein, D. J., Koenen, K. C., Friedman, M. J., Hill, E., McLaughlin, K. A., Petukhova, M., . . . Kessler, R. C. (2013). Dissociation in posttraumatic stress disorder: Evidence from the world mental health surveys. *Biological Psychiatry*, 73, 302-312.  
doi:10.1016/j.biopsych.2012.08.022
- Stein, D. J., McLaughlin, K. A., Karestan, C. K., Lukoye, A., Friedman, M. J., Hill, E. D., . . . Kessler, R. C. (2014). *DSM-5* and *ICD-11* definitions of posttraumatic stress disorder: Investigating “narrow” and “broad” approaches. *Journal of Depression & Anxiety*, 31 (6), 494-505. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/da.22279>
- Tol, W. A., Barbui, C., Galappatti, A., Silove, D., Betancourt, T. S., Souza, R., . . . van Ommeran, M. (2011). Mental health and psychosocial support in humanitarian settings: Linking practice and research, *Lancet*, 378(9802), 1581–1591.  
[http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/S0140-6736\(11\)61094-5](http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/S0140-6736(11)61094-5)
- Warmingham, J. M., Handley, E. D., Rogosch, F. A., Manly, J. T., & Cicchetti, D. (2018). Identifying maltreatment subgroups with patterns of maltreatment subtype and chronicity: A latent class analysis. *Child Abuse & Neglect*, 87, 28 – 39.
- Walker, P. (2014). *Complex PTSD: From surviving to thriving*. Azure Coyote: USA.

- Wilson, L., & Scarpa, A. (2015). Interpersonal difficulties mediate the relationship between child sexual abuse and depression symptoms. *Violence & Victims, 30* (1), 163-176.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1891/0886-6708.VV-D-13-00059>
- Wolf, E. J., Miller, M. W., Kilpatrick, D., Resnick, H. S., Badour, C. I., Marx, B. P., . . .  
Friedman, M. J. (2015). *ICD-11* complex PTSD in U.S. national and veteran samples: prevalence and structural associations with PTSD. *Clinical Psychological Science, 3* (2), 215-229.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1177/2167702614545480>
- Woodhouse, S., Ayers, S., & Field, A. P. (2015). The relationship between adult attachment style and post-traumatic stress symptoms: A meta-analysis. *Journal of Anxiety Disorders, 35*, 103-117. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.janxdis.2015.07.002>
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization. <https://icd.who.int/browse10/2016/en>. Retrieved September 12, 2019.
- van der Kolk, B. A., Roth, S., Pelcovitz, D., Sunday, S., & Spinazzola, J. (2005). Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. *Journal of Traumatic Stress, 18*, 389–399.  
<http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/jts.20047>
- Zanarini M. C., Williams A. A., Lewis R. E., Reich, R. B., Vera, S. C., Marino, M. F., . . .  
Frakenburg, F. R. (1997). Reported pathological childhood experiences associated with the development of borderline personality disorder. *American Journal of Psychiatry, 154*, 1101–1106. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1176/ajp.154.8.1101>

Zlomick, C., Zakriski, A. L., Shea, M. T., & Costello, E. (1996). The long-term sequelae of sexual abuse: Support for a complex posttraumatic stress disorder. *Journal of Traumatic Stress, 9*, 195-205. <http://dx.doi.org.ezproxy.library.uvic.ca/10.1002/jts.2490090204>

### Appendix A: Demographic Questionnaire

Please tell us about yourself by answering the following demographic questions:

1. Are you: Female \_\_\_\_\_ Male \_\_\_\_\_
2. How old were you on your last birthday? (*age in years*) \_\_\_\_\_
3. What is your current marital status?
  - Single, never married \_\_\_\_\_
  - Married \_\_\_\_\_
  - Living as married partners  
(e.g., common-law) \_\_\_\_\_
  - Separated \_\_\_\_\_
  - Divorced \_\_\_\_\_
  - Widowed \_\_\_\_\_
4. What is your current citizenship?
  - Canadian \_\_\_\_\_
  - Other (specify) \_\_\_\_\_
5. Which of the following best describes your racial affiliation/background?
  - Aboriginal/First Nations \_\_\_\_\_
  - African-Canadian/Black \_\_\_\_\_
  - Asian \_\_\_\_\_
  - Caucasian/White \_\_\_\_\_
  - Other (*Specify*) \_\_\_\_\_
6. What language is your “mother-tongue” (i.e., the first language you spoke, that you still understand)?
  - English \_\_\_\_\_
  - French \_\_\_\_\_
  - Other (specify) \_\_\_\_\_
7. What is your father’s current occupation? \_\_\_\_\_
8. What is your mother’s current occupation? \_\_\_\_\_
9. What is the highest level of education obtained by your father?

- some high school \_\_\_\_\_  
 completed high school \_\_\_\_\_  
 technical school or trade diploma \_\_\_\_\_  
 some College or university courses (undergraduate level) \_\_\_\_\_  
 completed university undergraduate degree (e.g., B.A.) \_\_\_\_\_  
 some graduate level courses \_\_\_\_\_  
 completed graduate degree (e.g., MA or Ph.D.) \_\_\_\_\_  
 other professional degree (e.g., M.D., LLB) \_\_\_\_\_
10. What is the highest level of education obtained by your mother?
- some high school \_\_\_\_\_  
 completed high school \_\_\_\_\_  
 technical school or trade diploma \_\_\_\_\_  
 some College or university courses (undergraduate level) \_\_\_\_\_  
 completed university undergraduate degree (e.g., B.A.) \_\_\_\_\_  
 some graduate level courses \_\_\_\_\_  
 completed graduate degree (e.g., MA or Ph.D.) \_\_\_\_\_  
 other professional degree (e.g., M.D., LLB) \_\_\_\_\_
11. How many children were in the family you grew up in, including yourself? \_\_\_\_\_
12. Which birth-order position do you occupy in your family?
- Oldest child \_\_\_\_\_  
 Middle child \_\_\_\_\_  
 Youngest child \_\_\_\_\_  
 Only child \_\_\_\_\_
- If you are *not* an only child,  
 Number of younger brothers \_\_\_\_\_; Number of older brothers \_\_\_\_\_  
 Number of younger sisters \_\_\_\_\_; Number of older sisters \_\_\_\_\_
- Are you a twin? Yes \_\_\_\_\_; No \_\_\_\_\_  
 if yes, are you identical twins? Yes \_\_\_\_\_; No \_\_\_\_\_  
 if *not* identical twins, is your twin: female \_\_\_\_\_ or male \_\_\_\_\_
13. What is your current household's yearly gross income (if living with a roommate with whom you do not share income, list only your own income)?
- Less than \$10,000 \_\_\_\_\_  
 \$10,000-\$19,999 \_\_\_\_\_

\$20,000-\$29,999	_____
\$30,000-\$39,999	_____
\$40,000-\$49,999	_____
\$50,000-\$59,999	_____
\$60,000-\$69,999	_____
\$70,000-\$79,999	_____
\$80,000 or more	_____

14. What was your family of origin's estimated yearly gross income when you were 18?

Less than \$10,000	_____
\$10,000-\$19,999	_____
\$20,000-\$29,999	_____
\$30,000-\$39,999	_____
\$40,000-\$49,999	_____
\$50,000-\$59,999	_____
\$60,000-\$69,999	_____
\$70,000-\$79,999	_____
\$80,000 or more	_____



