5-20-2021

Examining Dissociation and Cannabis Use as Links in the Pathway Between Childhood Maltreatment and Schizotypy

Brittany A. Blose
bab4236@rit.edu

Examining Dissociation and Cannabis Use as Links in the Pathway Between Childhood Maltreatment and Schizotypy

by

Brittany A. Blose

Rochester Institute of Technology

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Experimental Psychology

Department of Psychology

College of Liberal Arts

Rochester Institute of Technology

May 20th, 2021

We approve the thesis of Brittany A. Blose:

Dr. Lindsay Schenkel Date

Associate Professor of Psychology, Rochester Institute of Technology

Thesis Advisor

Dr. Stephanie Godleski Date

Assistant Professor of Psychology, Rochester Institute of Technology

Committee Member

Dr. Rebecca Houston Date

Assistant Professor of Psychology, Rochester Institute of Technology

Committee Member

Acknowledgments

I want to thank my thesis advisor, Dr. Lindsay Schenkel, for your dedication and support in helping me perform to my full potential at RIT. Your guidance and expertise have helped shape me into someone I have always wanted to be and am incredibly proud of. I will always be grateful for everything I have learned from you, including writing papers, teaching courses, and how to be a well-rounded academic researcher. I would not have done as well as I did in my time as a graduate student without your help; I am truly lucky to have been your mentee.

I also want to thank my committee members, Dr. Stephanie Godleski, and Dr. Rebecca Houston, for their help and expertise with this project. I have learned so much about statistics and how to conceptualize and analyze information on a deeper level because of you two. Thank you for challenging me to always improve.

Lastly, I want to thank my peers in the Experimental Psychology program for their support. We've grown close over the past two years and had to endure challenges that would have been hard to overcome without each other. Thank you for being so supportive at every turn.

Table of Contents

Acknowledgments 3

Abstract 6

Introduction 7

Schizotypy 8

CM and Schizotypy 10

Dissociation 13

CM and Dissociation 15

Dissociation and Schizotypy 16

CM, Dissociation, and Schizotypy 18

CM and Substance Use 21

CM and Cannabis Use 22

Schizotypy and Cannabis Use 22

CM, Schizotypy, and Cannabis Use 25

Significance of the Research 27

Current Study 28

Methods 29

Participants and Procedure 29

Measures 29

Statistical Analyses 34

Main Analyses 34

Additional Analyses 35

Results 35

Data Screening 36

Descriptive Statistics and Preliminary Analyses 37

Mediation Analyses 39

Conditional Process Analyses 40

Discussion 42

Limitations 47

Conclusions and Future Directions 49

References 51

Tables 71

Figures 77

Appendix 84

Abstract

Childhood maltreatment (CM) is a risk factor for a number of psychiatric consequences, including many different mental disorders. Recent research has focused on the connection that CM has with schizotypy and how these adverse experiences during development contribute to symptomatology. Studies have demonstrated that peritraumatic dissociation experienced during CM and trait dissociative symptoms may indirectly affect the relationship between CM and schizotypic psychopathology, helping to elucidate this complex relationship. Moreover, research has indicated cannabis use, especially its use in adolescence, as a potential moderator in the CM-schizotypy relationship. That is, cannabis use further increases the risk that maltreated individuals will experience schizotypic psychopathology. To further examine the association between CM and the expression of schizotypy, the current study explored how peritraumatic and trait dissociation may indirectly affect it and how adolescent cannabis use may impact its strength. Participants (N = 356) were undergraduate students who completed online self-report measures on CM, dissociation, cannabis use, and schizotypic symptoms. Correlational analyses revealed significant associations between CM, schizotypy, trait dissociation, peritraumatic dissociation, and cannabis use frequency. In addition, mediational analyses indicated significant indirect effects of dissociation on CM and schizotypy. However, conditional process analyses did not reveal adolescent cannabis use as a significant moderator in the CM-schizotypy relationship. These results highlight dissociation as an important mechanism driving the expression of schizotypic symptoms among maltreated individuals. Understanding how trauma sequelae lead to schizotypic psychopathology may be crucial in assessing and treating maltreated individuals or those on the psychotic spectrum.

Examining Dissociation and Cannabis Use as Links in the Pathway Between Childhood Maltreatment and Schizotypy

Childhood maltreatment (CM), which includes physical abuse, sexual abuse, emotional abuse, emotional neglect, and physical neglect against an individual under the age of 18, is a serious problem in society affecting approximately 1 in 4 children in the United States and costing a lifetime economic burden of $124 billion (Fang et al., 2012; Finkelhor et al., 2013; World Health Organization, 2016). In 2018, 678,000 children were victims of CM throughout the United States, resulting in 1,770 child deaths (U.S. Department of Health & Human Services, 2020). A significant consequence of CM is psychopathology, as CM is linked to a number of mental disorders, including panic disorders, anxiety disorders, depression, substance use disorders, eating disorders, personality disorders, and posttraumatic stress disorder (PTSD) (Mash & Barkley, 2014). CM is also associated with a higher risk of developing schizophrenia spectrum disorder (SSD) symptomatology and traits, which encompass schizophrenia, schizoaffective disorder, schizophreniform disorder, schizotypal personality disorder, and other psychotic disorders, and this connection has been well-established in the literature (Abajobir et al., 2017a; Conus et al., 2009; Read & Bentall, 2012; Read et al., 2001). In addition, research indicates that CM may even hold a dose-response relationship with psychosis (Read & Bentall, 2012). However, the pathway from CM to schizophrenia spectrum disorders is complex and not well understood and thus requires more in-depth research. What is known, though, is that certain factors mediate and moderate this relationship, including dissociation and cannabis use. Individuals who were maltreated in childhood are at a higher risk for abusing substances in adolescence and adulthood and are likely to develop PTSD symptoms, such as dissociation (Afifi et al., 2012; Vonderlin et al., 2018). In addition, cannabis use and dissociative symptoms have

both been found to be associated with SSDs (Humpston et al., 2016; Khokar et al., 2018). Knowing the particular elements that make SSDs more or less likely to occur among CM victims is crucial for preventing serious mental illness and informing effective treatment.

Schizotypy

Schizotypy is a multidimensional latent personality construct developed by Meehl (1962) that refers to an underlying liability for schizophrenia (Lenzenweger, 2010). According to the schizotypy model, it is believed that schizophrenia is one extreme way in which schizotypy manifests itself (Lenzenweger 2010). In addition to schizophrenia, schizotypy can also manifest itself as schizotypic psychopathology, which refers to signs and symptoms grouped into three domains, corresponding to those seen in schizophrenia, albeit an attenuated form (Debbané et al., 2014; Lenzenweger, 2010). First, there is a positive or cognitive-perceptual factor, which encompasses perceptual aberrations, paranoid ideation, ideas of reference, and magical thinking (Debbané et al., 2014). The negative factor, or interpersonal factor, includes paranoid ideation, social anxiety, constricted range of emotions, and a lack of close relationships with others besides first-degree relatives (Debbané et al., 2014). Finally, the disorganized factor is characterized by disruptions in the ability to organize thought, emotion, and behavior, and includes odd speech and conduct (Debbané et al., 2014; Kwapil et al., 2018). Schizotypy supports the widely accepted, fully dimensional theory that SSD psychopathology exists on a spectrum experienced by the entire population, ranging from minor, nonpathological deviations from normalcy to profound, pathological deviations from normality (Nelson et al., 2013). This approach is justified by studies that have found a high rate of psychotic experiences distributed among the general population and findings of overlap in SSDs between nonclinical and clinical populations (Nelson et al., 2013; Verdoux et al., 1998; Johns and van Os, 2001; van Os et al.,

2009). People can be considered low on measures of schizotypy, without it affecting their functioning and wellbeing, to high on measures of schizotypy, with it adversely affecting their functioning and wellbeing (Nelson et al., 2013). At the phenotypic level, schizotypy falls along a continuum of severity. For example, they are more extreme in schizophrenia and personality disorders, such as schizotypal personality disorder, an extensive pattern of pathological personality traits associated with interpersonal impairments, cognitive-perceptual abnormalities, and disorganized behavior, and less extreme in subclinical, attenuated psychotic experiences, such as perceptual aberrations and ideas of reference (American Psychiatric Association, 2013; Lenzenweger, 2018).

Schizotypy research is beneficial to the etiological study of SSDs because of its predictive power in the development of SSDs. Many studies have found associations between schizotypy and SSDs, meaning that individuals who score higher on the schizotypy spectrum are at an increased risk of developing a SSD or other psychotic disorder (Barrantes-Vidal et al., 2015; Lenzenweger, 1994). A significant number of individuals who possess schizotypic psychopathology eventually develop SSDs, which justifies its importance in schizophrenia research. One notable study, conducted by Kwapil et al. (2013), found that high schizotypy scores, especially positive schizotypy, were related to the development of schizophrenia spectrum and other psychotic disorders in young adults who were assessed ten years later. Observing schizotypic psychopathology also provides insight into how psychotic illnesses begin before their clinical manifestations. It can be challenging to determine the antecedents involved in the development of SSDs after these disorders have taken their acute courses because many confounding variables obscure significant factors that contribute to symptom onset (Lenzenweger, 2010). These confounds associated with the clinical expression of SSDs include

medications, comorbid diseases and conditions, psychiatric institutionalization, and deterioration in functioning (Lenzenweger, 2010). All of these factors distort the true expression of schizophrenia in that individual, potentially obscuring the underlying factors that lead to the eventual manifestation of full-blown SSDs. Thus, researching schizotypy through the examination of schizotypy psychopathology is essential to the study of schizophrenia and related disorders.

CM and Schizotypy

A large body of research has linked CM with schizotypy, including schizotypic psychopathology and schizophrenia. This connection can be explained by a traumagenic neurodevelopmental theory proposed by Read et al. (2001), arguing that prenatal and perinatal biological factors, such as genetic vulnerability, are not the only causes of the neurodevelopmental abnormalities observed in SSDs; Environmental stressors, such as CM, can cause these abnormalities as well, which explains why a significant number of individuals with SSDs have CM histories. Long-term exposure to stressors, especially when experienced early on in life, can result in hyperactivity of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in a sensitization of the stress response that persists into adulthood. A sensitized HPA axis due to chronic stress can result in dysfunction of the dopaminergic system, with increased dopamine receptor densities and activity, a main neurobiological abnormality observed in schizophrenia (Walker & DiForio, 1997). In addition, reduced hippocampal volume has been observed among individuals with CM histories *and* among individuals with schizophrenia, which affects the HPA axis stress response, as the hippocampus plays a role in attenuating HPA axis activity (Bremner et al., 1997; Chua & Murray, 1997; Walker & DiForio, 1997). Moreover, reversed structural cerebral asymmetry, with smaller left hemispheres, a common abnormality found in

schizophrenia, has also been found in CM victims (Chua & Murray, 1996; Ito et al., 1998; Teicher et al., 1997). These abnormalities in brain functioning and circuitry that result from CM, Read et al. argue, underly a heightened sensitivity to stressors, eventually resulting in psychosis.

Indeed, research supports this view, as studies have demonstrated that CM influences the expression of schizotypy and increases the probability that schizotypic psychopathology will transition into psychosis (Afifi et al., 2011; Berenbaum et al., 2008; Rössler et al., 2007; Velikonja et al., 2015). This relationship has been demonstrated in clinical samples and general population samples (Velikonja et al., 2015). In clinical samples, the CM-schizotypy link has been indicated in people with SSDs, while research on CM and schizotypy in the general population has found connections between CM and attenuated psychotic experiences and subclinical schizotypal personality traits (Afifi et al., 2011; Rössler et al., 2007).

CM has been linked with a number of different psychiatric and personality disorders. However, studies have found robust associations with schizotypal personality disorder, as well as SSDs. A large, nationally representative study on personality disorders in the general population revealed that out of all cluster A, B, and C personality disorders, schizotypal personality disorder had the most robust connection with CM (Afifi et al., 2011). Many studies have found connections between CM and all facets of schizotypy, but the most robust connections appear to exist between CM and positive, cognitive-perceptual, schizotypic psychopathology (Velikonja et al., 2015). These findings are consistent with a prospective study of a large, nonclinical sample that found significantly high rates of schizotypy, as measured by attenuated psychotic experiences, among adults who were maltreated in childhood (Rössler et al., 2007). In this study, individuals who experienced schizotypic psychopathology, including paranoid ideation or

suspiciousness, inability to feel close to others, ideas of reference, and odd beliefs, had significantly high rates of CM (Rössler et al., 2007).

In clinical samples, including individuals with schizophrenia and other psychotic disorders, elevated levels of schizotypy have consistently been associated with childhood trauma (Abajobir et al., 2017a; Conus et al., 2009; Read et al., 2001). A longitudinal study assessing the relationship between CM and a diagnosis of a psychotic disorder in young adults followed from birth identified a significant association between CM and psychosis, with effect sizes ranging from medium to large (Abajobir et al., 2017a). Those who experienced maltreatment in childhood were far more likely to be diagnosed with a lifetime psychotic disorder compared to those without CM histories. The severity and frequency of occurrence of CM are also associated with greater risk for later psychosis, such that more severe and multiple incidences of CM predict an increased risk for developing a SSD and heightened psychotic symptoms among schizophrenic individuals (Abajobir et al., 2017a; Schenkel et al., 2005). In the aforementioned study, Abajobir and colleagues observed that as the number of CM instances increased, the likelihood of receiving a diagnosis of psychosis also increased. These findings support results from an earlier study indicating that the risk of developing a SSD was 4.23 times higher among individuals exposed to at least two types of childhood trauma and ten times higher in individuals exposed to at least 4 types of childhood trauma (Álvarez et al., 2015).

There are many mediating and moderating variables that can strengthen the relationship between CM and schizotypy, suggesting that individuals with CM histories who are exposed to or experience certain socio-contextual and psychological factors are more likely to be higher on the schizotypy spectrum, oftentimes reaching pathological magnitude. Research has identified a number of these factors, including symptoms of PTSD (Williams et al., 2018). For example, in a

study on the mediational effects of PTSD on CM and schizotypal personality disorder, Powers et al. (2011) found that lifetime PTSD symptoms partially mediated the relationship between childhood emotional abuse and schizotypal personality disorder in a community sample of adults. PTSD symptoms in individuals with CM histories have also been linked to attenuated psychotic experiences and symptoms. In a study on adult outpatients with a high risk for psychosis and histories of CM, Choi (2017) found that posttraumatic stress symptoms, as measured by intrusion, avoidance, hyperarousal, numbing, and dissociation served as partial mediators in the link between CM and persecutory ideation.

Dissociation

Individuals with PTSD often experience intrusive, dissociative symptoms related to a traumatic event such as flashbacks and negative alterations in thinking patterns and affect, including memory loss and detachment from interpersonal relationships (American Psychaitric Association, 2013). Dissociation, in both its pathological and nonpathological forms, is a robust mediator in the relationship between CM and SSD psychopathology (Williams et al., 2018). It is referred to as "unbidden intrusions into awareness and behavior, with accompanying losses of continuity in subjective experience . . . and/or inability to access information or to control mental functions that normally are readily amenable to access or control . . ." (American Psychiatric Association, 2013, p. 291). According to a review of the literature on dissociation, Holmes et al. (2005) revealed that pathological dissociative phenomena can be categorized into two distinct forms: detachment and compartmentalization. Detachment refers to an "altered state of consciousness" (Holmes et al., 2005, p. 5**)** in which one feels cut off from normal day-to-day experiences. This form of dissociation includes depersonalization, which is the feeling of being out of one's own body as if viewing the self from an outside perspective or separation from one's

sense of self, and derealization, which is the feeling that outside surroundings are surreal or dreamlike (American Psychiatric Association, 2013; Holmes et al., 2005). Detachment can be experienced acutely or chronically, and also ranges in severity, from little or no disturbances in functioning and wellbeing to complete, pathological dysfunction (Holmes et al., 2005). Compartmentalization, on the other hand, refers to impairments in controlling and regulating normal, conscious processes, as seen in dissociative amnesia and somatoform dissociation (Holmes et al., 2005). The processes and information surrounding them that are out of an individual's control are compartmentalized but continue to occur normally and impact thoughts, feelings, and behavior (Brown, 2002a,b, 2004; Cardeña, 1994; Holmes et al., 2005; Kihlstrom, 1992). In dissociative amnesia, a person endures an event but has no conscious memory of it (Classen, Koopman, & Spiegel, 1993). Like detachment, compartmentalization is thought to exist on a spectrum of severity, ranging from nonpathological to pathological, and can occur acutely or chronically (Holmes et al., 2005). The difference between detachment and compartmentalization, though, is that in compartmentalization, one is still able to function normally (even though he or she may be unaware of it) (Holmes et al., 2005). However, detachment and compartmentalization are able to occur together, even though they often occur separately (Holmes et al., 2005).

Absorption is another form of dissociation, but unlike detachment and compartmentalization, it is considered to be nonpathological and something that many people experience (Roche & McConkey, 1990). It is defined as exclusive attention toward a specific attentional object of interest, whether it be a thought, memory, movie, or fantasy (Tellegen & Atkinson, 1974). In states of absorption, an individual is completely engaged in a certain point of

focus to the extent that the individual becomes unaware of his or her surroundings and thus, dissociates from extraneous stimuli (Waller et al., 1996).

When experienced acutely, pathological dissociation is often the result of exposure to trauma and occurs during or immediately after a traumatic event. Dissociation in the context of trauma is referred to as peritraumatic dissociation (Marmar et al., 1994). It is thought that during highly traumatizing events, individuals dissociate because they cannot cope with external forces or upsetting and distressing feelings, so they cut off their connections to usual awareness to lessen the impact of the traumatic event (Trzepacz & Baker, 1993). The result of peritraumatic dissociation on one's cognition is a disintegration of trauma-associated information in memory, where this information is disorganized and separated from emotional and physiological responses (Mash & Barkley, 2014). Children who are maltreated often experience peritraumatic dissociation during maltreatment, as they may not possess the mental or physical capacity to defend themselves like adults can (Schalinksi & Teicher, 2015; Schauer & Elbert, 2010). This is considered an adaptive response during exposure to the traumatic event when one cannot readily use their "fight or flight" response, increasing chances of survival (Bracha, 2004). However, dissociation is considered maladaptive in the long term because it disables an individual from psychologically processing and understanding the thoughts, feelings, and emotions surrounding the trauma (Trzepacz & Baker, 1993). This can then lead to pathological dissociation, as peritraumatic dissociation has a positive relationship with the development of PTSD symptomatology (Lensvelt-Mulders et al., 2008).

CM and Dissociation

Research has found that exposure to maltreatment in childhood significantly increases the likelihood of dissociative experiences and has been found to persist into adulthood (Steine et al.,

2017; Teicher et al., 2006; Vonderlin et al., 2018). Various studies have found relations to dissociative experiences for all types of childhood abuse and neglect, but it appears that physical abuse and sexual abuse hold the most robust connections, according to a recent meta-analysis (Vonderlin et al., 2018). In addition, there appears to be a dose-response relationship between CM and dissociation, with more severe CM being associated with greater dissociative experiences (Vonderlin et al., 2018). For example, in a study assessing dissociation levels in maltreated preschoolers, researchers observed that preschoolers exposed to CM across multiple levels of development (infancy, toddlerhood, and preschool) had higher levels of dissociation (Macfie et al., 2001). Moreover, researchers found that more severe CM and the occurrence of multiple types of CM predicted higher dissociative levels. These trends were also observed in a sample of foster children who experienced CM in young childhood (Hulette et al., 2011). In this study, Hulette et al. (2011) found that foster children who endured the most severe forms of abuse and neglect and multiple types of abuse and neglect had significantly elevated dissociative symptoms in middle childhood compared to maltreated foster children with less severe and fewer types of CM.

Dissociation and Schizotypy

Dissociation and schizotypy have a robust relationship. Studies have found an association between dissociation and psychoticism, such that people with schizophrenia tend to report high rates of dissociative symptoms (Braehler et al., 2013; Vogel et al., 2013). In a study comparing rates of dissociative symptoms among chronic SSD patients, first episode psychosis SSD patients, and a community sample, Braehler et al. (2013) observed the highest rates of dissociation among the chronic SSD patients, followed by the first episode psychosis patients, followed by the community sample. Research has also shown that dissociation's connection to

the schizotypy spectrum is strongest between the positive and disorganized domain of schizotypy (Spitzer et al., 1997). A study conducted on schizophrenia patients presenting with either predominantly positive or predominantly negative symptoms revealed that patients with predominantly positive symptoms exhibited higher levels of dissociation than patients with predominantly negative symptoms (Spitzer et al.,1997).

The relationship between dissociation and schizotypy has also been established in normative populations, with stronger connections between dissociation and the positive/disorganized factors of schizotypy (Chmielewski & Watson, 2008; Humpston et al., 2016; Merckelbach et al., 2000; Pope & Kwapil, 2000). In a study examining the connection between dissociative symptoms and schizotypy, Pope and Kwapil (2000) found strong, positive correlations between dissociative experiences and the perceptual aberration and magical ideation factors of schizotypy in an undergraduate sample. These findings are consistent with Merckelbach et al. (2000), who found that undergraduate dissociative tendencies were related to unusual perceptual experiences, magical thinking, and paranoid ideation.

While an association between trait dissociation and schizotypy has been established, less is known about the relationship between peritraumatic dissociation and schizotypy. To date, two studies have examined the association between peritraumatic dissociation and schizotypy, but unlike trait dissociation, no significant relationship has been found (Holmes & Steel, 2004; Marzillier & Steel, 2007). For example, Marzillier and Steel explored the relationship between PTSD symptomatology, peritraumatic dissociation during a traumatic event, and positive schizotypy in an adult clinical sample seeking outpatient trauma services and found that higher levels of positive schizotypy were related to PTSD symptomatology but found no statistically significant connection between peritraumatic dissociation and positive schizotypy.

CM, Dissociation, and Schizotypy

While a direct connection has been established between trait dissociation and schizotypy, many researchers argue that this connection may be due, in part, to experiences of maltreatment in childhood, and indeed, a preponderance of research supports this notion. First, research has consistently found a high prevalence of CM histories among highly dissociative people who are also high on the schizotypy spectrum. Specifically, among psychiatric inpatients with schizophrenia, elevated rates of CM have been associated with greater dissociative experiences (Sar et al., 2010). The link between CM, dissociation, and schizotypy has also been demonstrated in mediational analyses, with studies finding an indirect effect of trait dissociation on the relationship between CM and schizotypy expression (Williams et al., 2018). Studies have found an indirect association through trait dissociation, as well as through its subtypes, although the mediational effects of dissociation subtypes have been less robust (Bellido-Zanin et al., 2018; Cole et al., 2016).

In clinical populations, trait dissociative tendencies have been found to at least partially explain the link between CM and psychotic/schizotypal symptoms (Muenzenmaier et al., 2015; Sun et al., 2018; Varese et al., 2012). A study by Varese et al. (2012) exploring the mediational effects of trait dissociation in psychotic patients with SSD diagnoses and childhood trauma histories revealed that dissociative tendencies mediated the association between childhood trauma and hallucination proneness. This finding was consistent with a study on outpatients with severe mental illness by Muenzenmaier et al. (2015). In this study, researchers found that stressful childhood experiences and hallucinations were mediated by trait dissociation. Muenzenmaier and colleagues also tested dissociation as a mediator between stressful childhood experiences and delusions but did not find a significant mediational relationship. Another study

found that trait dissociation explained the relationship between childhood trauma and delusions but not the relationship between childhood trauma and hallucinations in outpatients with first episode psychosis (Sun et al., 2018).

The mediational effect of trait dissociation between CM and schizotypy has also been demonstrated in normative and subclinical populations (Choi, 2017; Cole, 2016; Giesbrecht et al., 2007). Research on CM, trait dissociation, and schizotypy in these populations is consistent with research on clinical populations, with findings supporting an indirect relationship between CM and schizotypic psychopathology via trait dissociation (Berenbaum et al., 2008; Choi, 2017; Cole et al., 2016; Gómez & Freyd, 2017; Perona-Garcelán et al., 2014). For example, a study investigating the relationships between childhood trauma, trait dissociation subtypes, and hallucination-proneness in healthy adults found that both absorption and depersonalization mediated the connection between childhood trauma and a high propensity toward hallucinating (Perona-Garcelán et al., 2014). Similarly, Cole et al. (2016) observed an indirect effect of dissociation on CM and hallucination proneness and delusional ideation and an indirect effect of absorption on CM and hallucination proneness and delusional ideation in an undergraduate student sample.

The indirect effect of trait dissociation on the CM-schizotypy relationship may also be different between males and females. For example, in a study on adults expressing high levels of schizotypy, Berenbaum et al. (2008) found that dissociation, both pathological (dissociative amnesia, depersonalization, and derealization) and nonpathological (absorption), partially mediated the association between childhood maltreatment and schizotypal symptoms for women, but only absorption partially mediated that relationship for males. Thus, gender might play an

important role in whether chronic dissociative symptoms following CM lead to schizotypic psychopathology.

While there is a considerable amount of evidence indicating trait dissociation as an indirect link between CM and schizotypy, no studies have explored how peritraumatic dissociation experienced during maltreatment may indirectly affect this relationship. One study, conducted by Choi (2017), found that dissociation occurring during trauma and lasting until the time of testing partially mediated the relationship between CM and perceptual aberrations among Korean outpatients. Although this study examined the mediating effect of dissociation as both peritraumatic dissociation and chronic dissociation, it is a step towards understanding how peritraumatic dissociation may indirectly affect the pathway between CM and schizotypic psychopathology.

A solid theory is yet to exist regarding why dissociation may mediate the relationship between CM and schizotypy manifestations. For now, it is thought that because dissociation causes an individual to feel less grounded to the external world, it leads to a disruption in reality testing (Allen et al., 1997). Moreover, dissociation causes a detachment from feeling connected to one's body, sense of self, and actions, which can also lead to a loss of touch with reality. That said, it follows that peritraumatic dissociation experienced during CM leads to trait dissociation that persists into adulthood. According to van der Kolk et al. (1996), when individuals learn to use dissociation as a coping mechanism in response to trauma, it can become trait-like and will be used again in response to subsequent stressors or trauma. Moreover, to describe how chronic dissociation may then lead to psychotic symptomatology, Millon and Davis (1996) suggest that the more an individual detaches from his or her sense of self and the external world, the more distant he or she becomes from the normal social environment. The less contact and association

that an individual has to the social environment due to dissociation, the more he or she disconnects from reality and normal thinking patterns because he or she is less exposed to reality checks that are provided by social interactions. Chronic dissociators may then be more likely to feel a detachment from reality if they frequently feel disconnected from the outside world, especially if exposed to additional life stressors.

CM and Substance Use

In addition to evidence suggesting that dissociation plays a significant role in connecting CM to schizotypy, there is also evidence pointing to cannabis use as impacting the CM-schizotypy relationship as well. First, it has been well established that exposure to CM puts individuals at higher risk for using substances in adolescence and adulthood (Afifi et al., 2012; Halpern et al., 2018; Lansford et al., 2010). For instance, individuals with substance use disorders (SUD) have a significantly high prevalence of CM histories, with more severe and a longer duration of CM associated with increased risk of developing a substance abuse problem (Medrano et al., 2002; Rasmussen et al., 2018). A study conducted by Rasmussen and colleagues (2018) comparing a sample of adult SUD patients to a matched control group revealed that the SUD patients reported significantly higher levels of all types of CM than the control group. In addition, the SUD patients reported more severe CM in comparison to the matched controls. Indeed, the risk of abusing substances increases substantially when an individual is abused or neglected as a child. In a meta-analysis of longitudinal studies assessing the CM and substance abuse link, Halpern et al. (2018) revealed that individuals with a history of childhood physical abuse had a 74% increased risk of abusing illicit substances, and individuals with a history of childhood sexual abuse had a 73% increased risk of abusing illicit substances. Another study observed how mental disorders contributed to the link between CM and SUDs in a nationally

representative sample of adults (Afifi et al., 2012). This study found that all five types of CM were significantly related to lifetime SUDs. After controlling for Axis I and Axis II disorders, all types of CM remained statistically significant in their relationship to SUDs, with the exception of emotional neglect.

CM and Cannabis Use

While many people with substance use problems are polysubstance users, cannabis is often among the substances abused and is independently related to CM. A prospective study of cannabis use and CM histories among young adults found that CM had a significant association with cannabis use at age 21 (Abajobir et al., 2017b). Rates of cannabis abuse and dependence among participants who experienced any type of child maltreatment were 29.8% and 22.3%, respectively. The study also found that higher severity and frequency of CM predicted increased rates of cannabis abuse and dependence. Another prospective study found that childhood sexual abuse predicted an elevated risk of cannabis use in young adulthood both

Schizotypy and Cannabis Use

A relationship also exists between cannabis use and schizotypy, as cannabis use is associated with a higher risk of developing psychotic symptomatology and disorders (Fergusson et al., 2003; Moore et al., 2007; Rössler et al., 2011). However, cannabis use varies in its placement in the etiology of SSDs, as some people diagnosed with SSDs began using cannabis before or around the same time as becoming symptomatic, whereas others began using cannabis after becoming symptomatic (Hambrecht & Häfner, 2000). Due to this variability in timing of symptomatology relative to cannabis use, it is clear that different pathways exist, and there are multiple theories that attempt to elucidate them. One notable theory that explains how cannabis use precedes the onset of psychosis is the diathesis-stress model, which argues that a genetic

vulnerability for schizophrenia interacts with an environmental stressor, such as cannabis use, to influence the phenotypical manifestation of schizophrenia (Fowles, 1992; Khokhar et al., 2018). A recent review combined commonalities based on multidisciplinary research between the diathesis-stress model and other similar theories to create a unifying hypothesis that explains how cannabis use can act as a precipitating factor in the onset of SSDs (Khokhar et al., 2018). According to Khokhar and colleagues, converging data supports the idea that individuals with a genetic risk of developing SSDs are also at a higher risk of developing a substance use disorder than those without a genetic vulnerability for SSDs. In turn, substance use may induce the development of SSDs in this vulnerable population, likely leading to continued substance use and further exacerbating the etiology of SSDs. Thus, psychosis can develop among individuals on the schizotypy spectrum as a result of cannabis use. Indeed, the literature supports this, as many studies have found connections between cannabis use and schizotypy, with cannabis use beginning prior to the onset of psychotic symptomatology. (Kuepper et al., 2011; Rössler et al. 2011; van Winkel, 2015). A study on the timing of cannabis use in psychiatric patients aged 12-59 diagnosed with a SSD conducted by Hambrecht and Häfner (2000) observed three different groups of individuals based on timing of cannabis use and the emergence of symptoms and a diagnosis: a ‘vulnerability group,’ comprising 27.5% of the entire sample, who abused cannabis more than a year before the emergence of schizophrenia symptoms, a ‘stress group,’ comprising 34.6% of the entire sample, who abused cannabis around the same time of symptom onset, and a ‘coping group,’ comprising of 37.9% of the entire sample, who started abusing cannabis after the emergence of symptoms. The researchers posited that the symptomatology among the vulnerability group could be a result of cannabis use, which may have lowered their vulnerability threshold for SSDs or impaired their ability to adaptively cope, leading to a long-term decline in

mental wellbeing and functioning. Individuals in the stress group, on the other hand, were already at risk for developing a SSD, due to various biological factors, before the onset of cannabis abuse. Hambrecht and Häfner believed that cannabis use in these individuals acted "as the dopaminergic stress factor" to induce psychosis. Finally, the coping group was identified as individuals who abused cannabis after the onset of psychosis as a way to self-medicate.

Cannabis use in adolescence may be more predictive of psychotic symptomatology compared to cannabis use in adulthood (Caspi et al., 2005). In a 30-year prospective cohort study exploring how adolescent substance use relates to subclinical psychotic experiences and schizotypal personality traits in adulthood, Rössler et al. (2011) found that casual and regular cannabis use in adolescence predicted higher schizotypy scores in adult participants. Cannabis use also predicted attenuated schizophrenia nuclear symptoms, as Rössler et al. (2011) observed that casual cannabis use in adulthood predicted higher rates of delusions of control, auditory hallucinations, thought-broadcasting, and thought-insertion. These results are in line with another longitudinal study that assessed the relationship between cannabis use in adolescence and subclinical psychotic experiences in adulthood in individuals from the general population (Kuepper et al., 2011). In this study, Kuepper et al. (2011) found that cannabis use in adolescence significantly increased the risk of experiencing subclinical psychotic symptoms in adulthood, even when age, sex, socioeconomic status, other drug use, residing in an urban versus rural environment, and childhood trauma were controlled for. Additionally, it was observed that chronicity of cannabis use predicted attenuated psychotic experiences, such that longer usage of cannabis was associated with higher rates of attenuated psychotic experiences in adulthood. Another noteworthy finding on cannabis use and schizotypy is that relatives of individuals with a psychotic disorder may be particularly sensitive to the potentially psychotic effects that may

arise from cannabis use (van Winkel, 2015). Researchers in this study found that cannabis use moderated subclinical psychotic experiences among at-risk family members. It was also discovered that these high-risk relatives were 2 to 3 times more likely to exhibit psychotic symptoms from cannabis use compared to unrelated controls. Based on these results, van Winkel (2015) concluded that the environmental effect of cannabis acts synergistically with the genetic predisposition for psychosis, thus further increasing the risk of psychosis in individuals with a family history of psychotic disorders, lending support to the diathesis-stress model.

CM, Schizotypy, and Cannabis Use

Due to the excess of findings indicating that CM is a risk factor for problematic cannabis use and the significant relationship between cannabis use and schizotypy, it is plausible to argue that cannabis use may have a moderating role in explaining the association between CM and schizotypy. Indeed, the literature has ascertained these connections, as it has been identified that a relationship that cannabis use may impact the relationship between CM and schizotypic psychopathology. For instance, studies have revealed that a history of CM further increases the odds that cannabis use will lead to the development of psychosis (Konings et al., 2012; Sideli et al., 2015). In two prospective studies assessing the interactions between CM and later cannabis use in a population-based sample, Konings et al. (2012) found that CM occurring before age 7 moderated the outcomes of cannabis use between age 7 and 19 in a dose-dependent manner, such that those with CM histories were significantly more likely to experience psychotic symptoms between age 7 and 19 if they used cannabis. Moreover, the severity of CM predicted more substantial effects of cannabis in the development of psychotic experiences, with more severe CM associated with the strongest effects. Konings et al. (2012) argue that these results provide evidence for the idea of sensitization, suggesting that early life stress due to CM may cause an

individual to be more "sensitive" to the potential psychotic outcomes of cannabis use. These results support outcomes of a prior study investigating the interplay between childhood sexual abuse, cannabis use, and a diagnosis of psychosis in a large community sample conducted by Houston et al. (2008). In Houston et al.'s study, they observed a moderating effect of cannabis use before age 16 in which individuals who reported using cannabis before age 16 and had a history of sexual abuse in childhood were 12 times more likely to be diagnosed with psychosis compared to those who did not use cannabis before age 16. A study conducted by Alemany et al. (2014) replicated these findings and found evidence that the moderating effect of cannabis in the CM and psychotic experience relationship is due to the Val158Met polymorphism of the COMT gene. The Val158Met polymorphism of the COMT gene affects dopaminergic signaling in the prefrontal cortex and results in excess dopamine in the mesolimbic areas of the brain (Meyer-Lindenberg et al., 2005). This is consistent with a large body of research indicating that a dysregulation of dopamine underlies the expression of schizophrenia (Miyake et al., 2011). Thus, the results of Alemany et al.'s findings suggest that psychotic experiences arise from interactions between genetic factors and environmental factors.

The link between CM and the expression of schizotypy via dissociation and cannabis use may be explained by the idea of sensitization, which is the process by which repeated exposure to environmental risk factors over time leads to increasing effects (Collip et al., 2008). In the context of schizophrenia psychopathology, it is believed that sensitization leads to psychosis susceptibility by increasing the odds that stressors and dopamine-agonist drugs will induce psychosis (Howes et al., 2004). In particular, environmental stressors and dopamine-releasing substances may lead to dopamine sensitization, which causes a dysregulation of the dopamine

system that in worst cases results in psychosis. As mentioned earlier, CM can disrupt and dysregulate the dopaminergic system.

When an individual is exposed to maltreatment in childhood, they often develop maladaptive thought patterns and beliefs, attributing negative events to external causes (Collip et al., 2008). Later on, additional stressful life events can provoke changes in automatic cognitive processes and maladaptive appraisals. It is believed that the combination of prior cognitive biases that resulted from the maltreatment and the changes in cognition that result from additional life stressors contribute greatly to the manifestation and chronicity of psychosis. In other words, CM leads to the sensitization of maladaptive cognitive processes, which can then worsen when exposed to additional environmental insults, such as cannabis use, reaching pathological magnitude.

Significance of the Research

Findings on the mediational and moderation effects of dissociation and cannabis use are essential for understanding the relationship between CM and schizotypy. Knowledge of these factors improves researchers' predictive ability in determining outcomes that result from CM and how they relate to the development of SSDs. This can then help clinicians develop effective prevention and intervention strategies for those expressing schizotypy, which is especially important because higher levels of schizotypy are associated with functional impairment and personal distress and may lead to a diagnosis of schizophrenia (Barrantes-Vidal et al., 2015; de Leede-Smith et al., 2017; Kwapil et al., 2013). Research on the CM-schizotypy link also demonstrates the importance of screening for CM histories among mental health patients, a practice that is lacking in the clinical mental health field (Read & Fraser, 1998). Trauma history can shape the expression of a psychiatric illness, so it is essential for clinicians to know how an

individual's trauma history relates to their current mental health symptomatology to deliver efficacious, individualized care (Weinreb et al., 2010).

Current Study

The pathway linking CM to schizotypic psychopathology is complex and warrants more research attention. Understanding how certain variables interconnect in this pathway can help to shed light on the pathogenesis of SSDs. Previous studies have examined trait dissociation as an indirect mechanism for explaining the relationship between CM and psychotic symptoms, including hallucinations and delusions, as well as CM and attenuated psychotic symptoms. In addition, studies have investigated cannabis use as moderating the relationship between CM and psychotic symptoms/psychotic disorder diagnosis. However, no studies have explored the influential effects of both dissociation and cannabis use together in one model to explain the CM-schizotypy relationship. Moreover, a paucity of research exists that examines this pathway using psychometrically defined schizotypy as an outcome. Lastly, research on the mediational effects of peritraumatic dissociation is lacking. Therefore, the aim of the current study is to explore the relationship between CM and schizotypy by investigating dissociation, both trait and peritraumatic dissociation, as an indirect link and cannabis use as a potential moderator. More specifically, this study will examine how both peritraumatic dissociation during CM and subsequent trait dissociation are associated with schizotypy and how cannabis use affects the direct pathway between CM and schizotypy. Consistent with past research, it is hypothesized that 1a) more severe CM will be associated with elevated schizotypy, 1b) more severe CM will be associated with greater peritraumatic dissociation and trait dissociation, and 1c) peritraumatic dissociation during CM will be associated with elevated schizotypy. and 1c) peritraumatic dissociation during CM will be associated with elevated schizotypy. Also, based on previous

research, it is hypothesized that 2) CM will be associated with increased adolescent cannabis use. Finally, it is hypothesized that 3a) dissociation (both peritraumatic dissociation and trait dissociation) will mediate the relationship between CM and schizotypy, 3b) adolescent cannabis use will moderate the relationship between CM and schizotypy, such that the relationship between CM severity and schizotypic symptom severity would be more robust for those who used cannabis during that time period in adolescence than it would be for those who never used cannabis during that period. Hypotheses are depicted in a conceptual model in Figure 1.

Methods

Participants and Procedure

Participants were $N = 356$ undergraduates from a private Northeastern university recruited through the online SONA system as partial fulfillment for psychology course credit. Demographic information for the sample is displayed in Table 1. Within the SONA system, individuals were made aware of the study from reading a brief description on it. Those interested in the study signed up for it and then completed it at their convenience. The study was administered entirely online through a battery of measures assessing CM history, dissociative symptoms, cannabis use, and schizotypic psychopathology on Qualtrics. After indicating their informed consent, participants completed this battery and were then thanked for their time. Because the battery included questions on sensitive topics that may have been distressing to some individuals, information for psychological counseling services was provided. Participants were excluded if they were under the age of 18.

Measures

Demographics

Participants completed a number of items that provided information on their gender, socioeconomic status (SES), ethnicity, prescribed psychotropic medication, psychiatric history, and parent psychiatric history.

Attention Checks

To minimize the issue of inattentive responding while taking this survey, 10 attention check items were dispersed throughout it. At the beginning of the survey, participants were told that it is important that they remain attentive while taking it and to respond as accurately as possible. They were also told that if their responses to items indicate inattentive responding, that they may be denied full or partial SONA credit.. If a participant failed an item, it was scored as a "1," while correct answers received a score of "0." For example, in regards to the attention check item, "I make frequent trips to the moon," if a participant responded (0) Never True, it was scored as 0. If a participant responded with (1) Rarely True, (2) Sometimes True, (3) Often True, or (4) Very Often True, the item was scored as a 1. All items were added up to yield a total score, which could range between 0 and 10. Cases were retained if they scored no more than a 3 out of 10.

Childhood Trauma Questionnaire Short Form (CTQ-SF; Bernstein et al., 2003)

This is a 28-item, self-report measure of the severity of childhood sexual abuse, physical abuse, emotional abuse, emotional neglect, and physical neglect. Participants rated the frequency that various types of CM occurred while growing up on a 5-point Likert scale, ranging from Never True (1) to Very Often True (5). Each type of CM, as well as total CM including each type, was scored between 5 and 25, with higher scores indicating more severe maltreatment in terms of how frequent each type occurred. This measure has been validated in both clinical and nonclinical samples and demonstrates good psychometric properties. For example, Cronbach's

alpha values for each CM subtype in the CTQ-SF ranged between .68 and .94 in a normative community sample. Cronbach's alphas for each subscale in the current study ranged between .67 and .96, and the value for the total score scale was .93. Additional questions were added regarding the time that the maltreatment first began and the time that it last occurred. Because the literature assessing different subtypes of CM and their relationships with dissociation and schizotypy are mixed regarding which subtype has a stronger association, total CM scores were used for the analyses. In addition, individual subtypes of CM often do not address the entire extent of CM, as the majority of maltreated individuals experience more than one type of CM (Warmingham et al., 2019). Therefore, using CM severity in the analyses would capture the extent of all types of maltreatment. Mean CTQ-SF scores for the current study were consistent with mean scores from other studies using student populations, $t(143.85) = -0.96$, $p = .338$ (Rosales, 2021).

Dissociative Experiences Scale II (DES II; Bernstein & Putnam, 1986)

The DES is a 28-item, self-report scale of trait dissociation that screens for the frequency of dissociative symptoms in individuals' daily lives and can be divided into three factors: dissociative amnesia, depersonalization/derealization, and absorption. Participants rated the percentage of the time that each item occurs in their daily lives, ranging from 0% to 100%, in increments of 10%. All items are scored by dropping the zero from the percentage score, then added up, multiplied by 10, and divided by 28 (the total number of items) to produce the average total score. Higher scores indicate higher levels of dissociation, with scores ranging from 0 to 100. The DES II has good psychometric properties and has been well-validated. Internal consistency in student samples has been shown to be excellent, with a Cronbach's alpha of 0.95 (Cole et al., 2016). The Cronbach's alpha for the current study was .94. Additional questions

were added regarding the time period that these dissociative symptoms began occurring. Total DES II scores were used for the analyses. Mean DES II scores for the current study were consistent with mean scores from other studies with student populations, $t(666.63) = -.135$, $p = .178$ (Patihis & Lynn, 2017).

Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1994)

This is a 10-item, self-report measure of dissociation experienced during a traumatic event. Participants rated the extent to which each item describes their most traumatic experience of CM on a 5-point Likert scale, ranging from Not at all (1) to Extremely true (5). Higher scores indicate higher levels of peritraumatic dissociation. Scores from each item are added up to yield a total PDEQ score. A score above 15 indicates significant dissociation. The PDEQ has been well-validated in a range of trauma survivor samples and demonstrates good psychometric properties (Sijbrandij et al., 2012). In a sample of adults with CM histories using the PDEQ, internal consistency was high (Cronbach's alpha of 0.89) (Ginzburg et al., 2006). Cronbach's alpha for the current study was .94. Total PDEQ scores were used for the analyses.

Cannabis Use

To determine cannabis use frequency across adolescence and young adulthood, the battery included questions regarding whether they used cannabis between age 12 and 16, as well as whether they used between age 17 and their present age. These age ranges were chosen because prior research has indicated that cannabis use in mid-adolescence may have more of an effect on psychotic symptoms/psychotic disorder diagnosis compared to cannabis use later in life (Albertella et al., 2017; Houston et al., 2008). Thus, using these two age ranges would reveal whether there are differences in effects of cannabis use at different developmental stages. In addition, to frequency of cannabis use between age 12 and 16 and between age 17 and present

age were assessed in order to determine the correlation between CM and frequency of adolescent cannabis use, addressing Hypothesis 2. This was measured on a 7-point Likert scale, ranging from (1) "once or twice" to (7) "every day." The frequency variable was recoded for analyses to an 8-point Likert scale to include participants who never used during the two periods.

Schizotypal Personality Questionnaire (SPQ; Raine, 1991)

This is a 74-item, self-report measure of schizotypal personality disorder that measures the 3 factors of schizotypy (positive, or cognitive-perceptual, negative, or interpersonal, and disorganized), which can further be broken down into 9 subscales (ideas of reference, excessive social anxiety, odd beliefs or magical thinking, unusual perceptual experiences, odd or eccentric behavior, no close friends, odd speech, constricted affect, and suspiciousness). Participants answered either "yes" or "no" for each item to indicate whether the item pertains to them or not. Higher scores indicate higher levels of schizotypy. A "yes" response receives a score of (1) and a "no" response receives a score of (0). All items are added up to yield a total SPQ score, ranging between 0 and 74. In addition, scores for each of the 3 factors and each of the 9 subscales are totaled to yield SPQ total scores for each individual factor and each individual subscale. The SPQ has demonstrated good psychometric properties and has been validated in undergraduate student samples, with high internal reliability (Cronbach's alpha of .90 - .91) and test-retest reliability (0.82) (Raine, 1991). Cronbach's alpha for the current study was .94. Additional questions were added regarding the time period that these schizotypic symptoms began occurring. Total SPQ scores were used for the analyses. Mean SPQ scores for the current study were consistent with mean scores from the student population that the SPQ was originally developed and tested on, $t(651.19) = 0.53$, $p = .596$ (Raine, 1991).

Statistical Analyses

Main Analyses

This study used a retrospective, correlational design to test for indirect effects and moderation. Bivariate correlations were conducted between CM, peritraumatic dissociation, trait dissociation, frequency of cannabis use between age 12 and 16 and between age 17 and present, and schizotypy were conducted to address Hypothesis (1a), (1b), (1c), and (2). Hypothesis (3a) was tested using three simple mediation analyses, with CM as the predictor variable, schizotypy as the outcome variable, and gender as a covariate. The first model used a composite dissociation variable, which included both peritraumatic dissociation and trait dissociation as the proposed mediator to examine the combined effects of both types of dissociation in indirectly affecting the relationship between CM and schizotypy, which has not been explored in previous studies. It is expected that peritraumatic dissociation and trait dissociation will be correlated highly enough to justify combining them into one dissociation construct. This variable was created by standardizing the DES II and PDEQ scores and then averaging them. For the second model, peritraumatic dissociation was the proposed mediator, while trait dissociation was included as a covariate. The third model did the opposite: trait dissociation was the proposed mediator and peritraumatic dissociation was included as a covariate. These two mediation analyses were done in order to examine how peritraumatic dissociation and trait dissociation may indirectly affect the CM-schizotypy relationship independent of each other and to parse out their individual effects. Finally, to test Hypothesis (3b) and determine the conditional direct effect of CM and schizotypy as a function of cannabis use, in conjunction with an indirect effect of CM and schizotypy through dissociation, two conditional process analyses were run: One with early to mid-adolescent cannabis use (age 12 -16) as a proposed moderator and the second with late adolescence to young adulthood cannabis use (age 17 to present) a proposed moderator. These

variables were dichotomous and split between those who had used cannabis at least once during that time period versus those who had not used. Using dichotomous variables for cannabis use is common for studies examining the moderating effect of cannabis use with CM in predicting schizotypic psychopathology outcomes (e.g., Houston et al., 2007; Konings et al., 2012). Both models used the composite dissociation variable and included gender as a covariate.

Statistical analyses were conducted through IBM's Statistical Package for the Social Sciences (SPSS) version 27 (IBM, 2019). Mediational and conditional process analyses were run with Hayes' (2018) PROCESS macro for SPSS using Model 4 and Model 5, respectively, with a 95% confidence interval (CI) and 10,000 Bootstraps. Significant results were determined based on whether the CI did not have a "0" in it.

Additional Analyses

Independent samples *t* tests were run on the variables to examine potential gender differences and whether gender should be included as a covariate during analyses, as prior research has indicated differences between males and females in CM and dissociative symptomatology, as well as differences in the mediational effects of dissociation on the CM-schizotypy pathway (Berenbaum et al., 2008; Fisher et al., 2009; Moormann et al., 2011). In addition, means and standard deviations on the age in which individuals first experienced CM, trait dissociative symptoms, and schizotypic symptoms were also assessed to determine whether the proposed direction of causal flow for the mediation analyses was plausible.

Results

Data Screening

Data were cleaned and checked prior to analyses. Attention check scores were examined to identify whether any participant displayed inattentive responding. These scores did not

indicate any inattentive responding, as 99% of participants passed at least 70% of the items, so all cases were retained. There were some missing data, as 4.3% of cases on the SPQ, 1.3% of the cases on the PDEQ, and 4.0% of the cases on the DES-II were missing. Multiple imputation was conducted to address the missingness, and then analyses were run using the imputed dataset and the original dataset with missing values. Comparison of the imputed dataset to the original dataset revealed that there were no differences between the analyses' outcomes, so 16 cases with missing values were deleted via listwise deletion. This was also done so because PROCESS does not handle missing data well (Hayes, 2018). There were initially $N = 372$ participants, and deletion of these cases left $N = 356$ for analyses. Examination of the skewness and kurtosis of peritraumatic dissociation and CM revealed substantially positively skewed distributions, so CM and peritraumatic dissociation were logarithmically transformed, which is recommended when distributions are positively skewed (Tabachnick & Fidell, 2019). The distribution of trait dissociation was moderately positively skewed, so a square root transformation was executed. The distributions appeared approximately normal after the transformations. In addition, the linearity and homoscedasticity between predictors and outcomes were also improved upon transformations.

For CM and trait dissociation, six univariate outliers were identified, and one univariate outlier was identified, respectively, as having standardized values > 3.29 (Tabachnick & Fidell, 2019). Analyses were run with and without univariate outliers to determine their influence. Comparisons of the analyses revealed that the univariate outliers were not influential and were retained in the analyses. No multivariate outliers were identified upon examination of the Mahalanobis distances.

Multicollinearity was first checked by examining correlations among the predictor variables. There were no predictor variables with correlations higher than .70, which is a standard value indicating that multicollinearity may exist (Tabachnick & Fidell, 2019). However, the correlations between CM and peritraumatic dissociation and peritraumatic dissociation and trait dissociation were .65 and .61, respectively, so further examination using other indicators of multicollinearity was done just to be safe. Collinearity diagnostics on the predictor variables revealed that there were no dimensions with condition indices greater than 30 that had more than one variance proportion greater than .50, which indicated that there was no serious problem with multicollinearity (Tabachnick & Fidell, 2019).

Descriptive Statistics and Preliminary Analyses

Descriptive statistics and correlations among the main study variables are presented in Table 2 and Table 3, respectively. All variables had significant, positive relationships with each other. Regarding specific hypotheses, CM severity, as measured by the CTQ-SF, was significantly positively associated with schizotypy, as measured by the SPQ (Hypothesis 1a). In addition, CM severity had a significant, positive relationship with both peritraumatic dissociation, as measured by the PDEQ, and trait dissociation, as measured by the DES II (Hypothesis 1b). In regards to cannabis use frequency, CM severity had a significant, positive association between frequency of cannabis use in early to mid-adolescence (between ages 12 and 16) and between frequency of cannabis use in late adolescence to young adulthood (age 17 to present) (Hypothesis 2). Peritraumatic dissociation was significantly positively associated with schizotypy (Hypothesis 1c).

Means and standard deviations on the main measures grouped by gender are displayed in Table 4. Females scored significantly higher on the CTQ-SF compared to males, $t(354) = 4.55$, p

< .05. Similarly, females scored significantly higher on both the PDEQ, $t(354) = 3.32$, $p = .001$ and the DES II, $t(354) = 4.16$, $p < .05$. No significant gender differences were found for the SPQ, $t(354) = 1.57$, $p = .119$. Stepwise regression analyses were run on the following variables with gender as a covariate to ensure that gender did not contribute significantly to the model: (1) CM as a predictor with schizotypy as the outcome, (2) CM as a predictor with peritraumatic dissociation as the outcome, (3) CM as a predictor with trait dissociation as the outcome, (4) peritraumatic dissociation as a predictor with schizotypy as the outcome, (5) CM as the predictor and frequency of cannabis use between age 12 and 16 as the outcome, and (6) CM as the predictor and frequency of cannabis use between age 17 and present as the outcome. Analyses indicated that gender was not a significant correlate in any of the models.

Cannabis Use

Out of the entire sample, 139 (39%) participants had used cannabis at least once during their lifetime. Only one (0.28%) participant used at least once between age 0 and 11, 50 (14%) participants used at least once between age 12 and 16, and 122 (34%) used at least once between age 17 and their present age. Since only one participant used cannabis from age 0 to 11, that time period was not assessed in the analyses. Frequency of use between age 12 and 16 and between age 17 and present are displayed in Table 5. On average, participants were age $M = 16.8$ years ($SD = 2.08$) when they first tried cannabis. Independent samples *t* tests were run to explore differences in CM, peritraumatic dissociation, trait dissociation, and schizotypy between those who had used cannabis between age 12 and 16 and between those who had used cannabis between age 17 to present. Results are depicted in Table 6. These analyses indicated that means on every single variable were significantly higher for cannabis use compared to no cannabis use during both time periods. That is, that CM severity, peritraumatic dissociation, trait dissociation,

and schizotypic psychopathology were greater in cannabis users (those who used cannabis at least once) than in individuals who did not use cannabis.

Mediation Analyses

For the first mediation analysis, CM was the predictor, a composite dissociation variable including both peritraumatic and trait dissociation was the mediator, and schizotypy was the outcome (see Figure 2). Gender was included as a covariate. This model was significant, $F(3, 352) = 89.19$, $R^2 = .43$, $p < .05$. Analyses indicated that the total effect of CM on schizotypy was significant ($\beta = .40$, $p < .05$, 95% CI [29.27, 48.93]) and the direct effect of CM on schizotypy was nonsignificant ($\beta = -.01$, $p = .847$, 95% CI [-11.04, 9.07]). The indirect effect of CM via dissociation was significant ($\beta = .40$, 95% CI [0.33, 0.48]), which suggests that dissociation indirectly affected the relationship between CM and schizotypy.

Two more simple mediation analyses were conducted to determine whether there were differences when using trait dissociation as a proposed mediator versus using peritraumatic dissociation (see Figures 3 and 4, respectively). In the first analysis, peritraumatic dissociation was the proposed mediator, while gender and trait dissociation were included as covariates; this model was significant, $F(4, 351) = 76.82$, $R^2 = .47$, $p < .05$. The total effect of CM on schizotypy was significant ($\beta = .12$, $p = .008$, 95% CI [3.12, 20.60]), while the direct effect of CM on schizotypy was not significant ($\beta = .06$, $p = .266$, 95% CI [-4.39, 15.89]). In addition, the indirect effect of CM on schizotypy via peritraumatic dissociation was significant ($\beta = .06$, 95% CI [.01, .12]). This indicated that peritraumatic dissociation indirectly affected the CM-schizotypy pathway. In the second analysis, trait dissociation was the proposed mediator, while gender and peritraumatic dissociation were included as covariates. Neither the total effect of CM on schizotypy ($\beta = .11$, $p = .063$, 95% CI [-0.61, 23.05]), nor the direct effect of CM on schizotypy

were significant (β = .06, p = .266, 95% CI [-4.39, 15.89]). Similarly, the indirect effect of CM on schizotypy via trait dissociation was not significant (β = .06, 95% CI [-.01, .12]), which indicated that trait dissociation did not indirectly affect the CM-schizotypy pathway.

Although these mediation analyses suggest evidence of mediation, they are limited by the fact that the variables may not have occurred in the order that is theorized (CM leads to dissociation, which then leads to schizotypy expression). While the age in which CM began occurring preceded the other two variables (M = 8.75, SD = 4.50), the mean age that schizotypic symptoms (M = 10.99, SD = 4.96) began occurring was lower than the mean age that dissociative symptoms began occurring (M = 11.83, SD = 4.85), making interpretation of the mediation analysis difficult. With these descriptives in mind, another mediation analysis was conducted to explore what the results would look like with schizotypy as the proposed mediator and dissociation as the outcome (with CM still the predictor variable and gender still a covariate) (see Figure 5). This model was significant, $F(3, 352) = 168.09$, $R^2 = .59$, $p < .05$. In addition, both the total effect of CM on dissociation (β = .60, $p < .05$, 95% CI [3.24, 4.30]) and the direct effect of CM on dissociation were significant (β = .41, $p < .05$, 95% CI [2.09, 3.04]). The indirect effect of schizotypy on the CM-dissociation pathway was also significant (β = .19, $p < .05$, 95% CI [.14, .25]). This indicates that schizotypy indirectly affected the relationship between CM and dissociation.

Conditional Process Analyses

For the first conditional process analysis, CM was the predictor variable, the composite dissociation variable was the proposed mediator, schizotypy was the outcome variable, and early to mid-adolescent cannabis use (between age 12 and 16) was the proposed moderator, with gender as a covariate (see Figure 6). This model was significant, $F(5, 350) = 53.68$, $p < .05$, R^2 =

.43, and the indirect effect of CM on schizotypy through dissociation was significant (β = .41, 95% CI [.33, .48]). However, neither the main effects of CM (β = .11, p = .776, 95% CI [-15.62, 37.87]) and cannabis use (β = -.01, p = .414, 95% CI [-4.13, 3.09]) on schizotypy, nor the interaction effect of cannabis use and CM on schizotypy (β = -.13, p = .356, 95% CI [-31.52, 10.47]) were significant. The lack of significance in the interaction term indicated that the direct path linking CM to schizotypy did not depend on whether or not cannabis was used in early to mid-adolescence. For the second conditional process analysis, CM was the predictor variable, the composite dissociation variable was the proposed mediator, schizotypy was the outcome variable, and late adolescent to young adult cannabis use (between age 17 and present) was the proposed moderator, with gender as a covariate (see Figure 7). This model was also significant, $F(5, 350) = 54.81$, $p < .05$, $R^2 = .44$, as was the indirect effect of CM on schizotypy through dissociation (β = .40, 95% CI [.33, .47]). Neither the main effects of CM (β = -.23, p = .103, 95% CI [-50.60, 4.70]) and cannabis use (β = -.07, p = .117, 95% CI [-4.38, .488]) on schizotypy, nor the interaction effect of cannabis use and CM on schizotypy (β = .23, p = .108, 95% CI [2.94, 29.76]) were significant. This indicated that the pathway linking CM to schizotypy did not depend on whether cannabis was used between late adolescence and young adulthood.

Because the third mediation analysis indicated that there was no significant relationship between CM and trait dissociation when peritraumatic dissociation was included as a covariate, a stepwise regression was run to determine whether peritraumatic dissociation may be accounting for this relationship. At Step 1, gender and CM were entered into the model with trait dissociation as the outcome. This model was significant, $F(2, 353) = 51.52$, $R^2 = .23$, $p < .05$, and both gender (β = -.12, p = .029) and CM (β = .44, $p < .05$) were significant predictors. Peritraumatic dissociation was entered into the model at Step 2, adding additional significance,

$F(3, 352) = 75.53$, $\Delta R^2 = .17$, $p < .05$. Both peritraumatic dissociation ($\beta = .53$, $p < .05$) and gender ($\beta = -.09$, $p = .032$) were significant predictors of trait dissociation in this model. However, CM lost significance with the addition of peritraumatic dissociation ($\beta = .10$, $p = .083$). This indicated that peritraumatic dissociation was driving the relationship between CM and trait dissociation.

Discussion

Consistent with hypotheses and previous studies, CM was associated with dissociation (Schalinski et al., 2015; Vonderlin et al., 2018), adolescent and young adult cannabis use (Lansford et al., 2010; Rogosch et al., 2010), and schizotypy (Velikonja et al., 2016). Specifically, analyses indicated that more severe CM corresponded to higher schizotypy, greater peritraumatic dissociation, and a higher frequency of cannabis use in adolescence and young adulthood. In addition, mediation analyses revealed an indirect effect of dissociation on the relationship between CM and schizotypy, meaning that dissociation following CM led to more severe schizotypic psychopathology in young adulthood. However, it could also be argued that CM led to schizotypic psychopathology, which then led to trait dissociation, or that trait dissociation and schizotypic psychopathology may have developed at similar times, possibly sharing some other variable in common. Mediation analyses examining peritraumatic dissociation and trait dissociation separately as proposed mediators indicated that peritraumatic dissociation, but not trait dissociation, had an indirect effect on the relationship between CM and schizotypy. The conditional process analyses revealed that neither cannabis use between age 12 and 16 nor cannabis use between age 17 and young adulthood moderated the relationship between CM and schizotypy, which is inconsistent with prior research (Houston et al., 2008; Konings et al., 2012). In other words, cannabis use did not make a difference in levels of

schizotypic symptom expression predicted by CM severity. Additionally, while there appeared to be a relationship between CM and trait dissociation, this relationship was no longer significant once the effect of peritraumatic dissociation was adjusted for.

The results of peritraumatic dissociation indirectly affecting the pathway between CM and schizotypic psychopathology is consistent with Choi's (2017) findings. However, the current study differs in that it found an indirect effect of peritraumatic dissociation with schizotypy as an outcome, while Choi examined separate indirect effects of peritraumatic dissociation on perceptual aberrations and persecutory ideation, finding only a significant indirect effect of peritraumatic dissociation on the CM-perceptual aberration experience. Thus, it could be that peritraumatic dissociation affects only certain components of schizotypy. Future research looking at the indirect effect of peritraumatic dissociation on the relationship between CM and schizotypy's different subcomponents may provide insight into which symptoms are specifically affected, rather than schizotypy as a whole.

With respect to trait dissociation, it was interesting that it did not indirectly affect the CM-schizotypy pathway, as found in previous studies (Bellido-Zanin et al., 2018; Berenbaum et al., 2008; Cole et al., 2016). However, it could be that peritraumatic dissociation may be driving this indirect effect given that it was included as a covariate in the model and no previous studies covaried for it. Interestingly, when trait dissociation and peritraumatic dissociation were combined into a composite dissociation variable, the composite dissociation did, in fact, indirectly affect the CM-schizotypy pathway. That said, dissociation, as whole, does appear to have an indirect effect on the relationship between CM severity and the expression of schizotypy, but it may be primarily due to peritraumatic dissociation. Another explanation for the inconsistency in finding trait dissociation as an indirect link compared to previous studies is that

the current study used schizotypy as a whole as an outcome, while previous studies used specific schizotypic/psychotic symptoms as outcomes (Bellido-Zanin et al., 2018; Cole et al., 2016).

Along a similar vein, an unexpected finding was that the relationship between CM severity and trait dissociation in young adulthood was actually due to peritraumatic dissociation. This would suggest that CM, per se, does not lead to trait dissociation later in life but that the trait dissociation is due to the peritraumatic dissociation experienced during CM. Previous studies have found a robust relationship between CM and later dissociative symptoms, but none of them controlled for peritraumatic dissociation, so this finding may change how researchers analyze these variables in the future.

There are a few cognitive theories that attempt to explain how dissociation stemming from CM may be responsible for the expression of schizotypy. First, according to Holmes et al. (2005), it is thought that physiological and psychological changes that occur from peritraumatic dissociation during a traumatic event may interfere with the encoding process for the traumatic information occurring, resulting in a poorly consolidated autobiographical memory for the event. That said, it is suggested that this poorly processed memory may then be reexperienced as intrusive thoughts or images, such as hallucinations or delusions (Cole et al., 2016). With respect to the current study, this could account for the experience of schizotypic symptoms, especially the positive symptoms, like ideas of reference, perceptual aberrations, magical thinking, and paranoid ideation. Second, it is suggested that dissociation as a defense mechanism weakens cognitive inhibition in order to prevent traumatic information from intruding into conscious awareness in an attempt to mitigate its psychological impact (Dorahy & Green, 2008). Weakened cognitive inhibition has also been found to be associated with the positive symptoms of schizophrenia and schizotypy in some studies (Moritz & Mass, 1997; Park et al., 2002; Peters et

al., 1994). Thus, it is hypothesized that dissociation may lead to psychotic symptomatology through weakened attentional processing that results as a defense mechanism (Dorahy & Green, 2008; Frith, 1979). Integrating these ideas, it is possible that experiencing a traumatic event, such as CM, leads to dissociative symptoms as a protective mechanism. However, this mechanism results in a weakened ability to discern between relevant and irrelevant stimuli and may be responsible for the expression of intrusive thoughts that may become delusional or perceptual aberrations/full blown hallucinations (Varese et al., 2012).

The finding that CM leads to schizotypic psychopathology via dissociation also fits with the theory of sensitization, where exposure to environmental risk factors sensitizes individuals to later stressors, resulting in a greater susceptibility to psychosis (Collip et al., 2008). In the case of CM, it may be that these early traumatic experiences sensitize an individual to being more reactive when exposed to later environmental stressors, which then lead to the expression of psychosis. The fact that CM led to peritraumatic dissociation, which then led to schizotypy, indicates that peritraumatic dissociation plays a significant factor in the expression of schizotypic psychopathology. Since peritraumatic dissociation as a result of trauma, such as CM, is believed to be a defensive coping mechanism, it is possible that people who experienced CM developed dissociative symptomatology, which sensitized them to the susceptibility of psychosis, as dissociation involves a disconnect from the outside world, one's identity, and one's actions and behaviors (Allen et al., 1997). This decrease in grounding to both the outside world and the inside world due to dissociative symptomatology may then lead to psychotic symptomatology, which involves the same feelings of alienation from one's inner self and the environment (Allen et al., 1997).

While this study did not assess for later traumatic experiences, it would be interesting to see how additional traumas affect this pathway, as studies have found associations between later traumatic experiences and higher levels of schizotypy (Berenbaum et al., 2008; Marzillier & Steel, 2007). Specifically, Berenbaum et al. (2008) found that in separate mediation analyses, dissociation indirectly affected the relationship between CM and schizotypy and the relationship between later traumatic events and schizotypy. That said, it might follow that CM leads to dissociative symptoms and schizotypic symptoms, and if there is exposure to later traumatic experiences, that might further lead to dissociative symptoms and schizotypic symptoms, which would lend additional support for the theory of sensitization. Future studies should examine how additional life traumas fit into the CM-dissociation-schizotypy pathway as a more specific look at the sensitization theory.

The lack of a significant interaction between CM and cannabis use in predicting schizotypic psychopathology in this study may be due to a number of factors. First, this study used a nonclinical population and a self-report measure of schizotypy, whereas previous studies have used populations of individuals diagnosed with a psychotic disorder or used standardized, structured interviews to ascertain symptomatology (Houston et al., 2008; Konings et al., 2012; Sideli et al., 2015). Thus, it is possible that an interaction between CM and cannabis use may not have an effect in individuals with subclinical schizotypic symptoms. Second, previous studies used logistic regression models to examine an addictive interaction between CM and cannabis use in predicting psychosis/psychotic disorder diagnosis, whereas this study employed OLS regression to explore cannabis use as a potential moderator. Differences in statistical analyses may have led to different results. Additionally, whether or not cannabis was used was the variable used for the analyses, so it is possible that there may have been a different result if, for

example, consequences of use, disorder symptomatology, or amount consumed were used instead. Lastly, these studies used larger sample sizes, with more individuals who used cannabis during adolescence, so it is possible that this study did not have enough power to detect a moderating effect of cannabis use due to its smaller sample.

Limitations

An important limitation to keep in mind is that this study was correlational and cross-sectional in nature. Therefore, it cannot be implied that CM caused dissociative or schizotypic symptomatology. Future research employing longitudinal designs to examine indirect pathways and the conditional nature of certain pathways linking CM to schizotypy would improve the limitations of the findings.

In addition, this study relied on retrospective accounts of CM and peritraumatic dissociation. Because of this, it is possible that memory for CM and peritraumatic dissociative symptoms may not be as accurate because of the time that has passed, which increases the chance that additional life events may confound memory. However, this was likely not a significant issue because retrospective self-reports of CM have still been found to be reliable and valid methods of assessing CM, with studies finding that both retrospective reports and prospective reports are associated with psychopathology, and that retrospective reports may be stronger indicators of clinical psychiatric needs (Newbury et al., 2018). Future studies assessing connections between CM and resulting psychopathology would benefit the most from using a longitudinal design employing both retrospective and prospective measures of CM.

Another limitation is that mediation analysis runs under the assumption that a ‘cause’ occurs before the ‘effect,’ and this study was not able to control that (Hayes, 2018). Thus, for the model to make sense, CM would have had to occur first, followed by dissociation, and then

followed by schizotypic psychopathology. However, this was likely not the exact order of events for every participant, as the mean age of onset for trait dissociation was slightly higher than the mean age of onset for schizotypic psychopathology, meaning that, on average, individuals experienced schizotypic psychopathology before experiencing trait dissociative symptoms. A mediation analysis of this alternative direction of causal flow, where schizotypy was the proposed mediator and dissociation was the outcome, indicated that there was still a significant effect of CM on dissociation after adjusting for schizotypy, whereas when dissociation was the proposed mediator, and schizotypy was the outcome, there was no longer a significant relationship between CM and schizotypy after adjusting for dissociation. Thus, it would seem that the model with dissociation as the mediator is more plausible. In addition, it is important to note that trait dissociation and schizotypy have considerable overlap in symptoms (Merckelbach et al., 2000; Merckelbach & Giesbrecht, 2006). Because of this, it makes it harder to detect whether dissociative symptoms or schizotypic symptoms came first. In addition, it might be that there is no indirect effect, but rather, some factor or combination of factors that both dissociation and schizotypy share that is associated with CM. Future studies ascertaining that CM occurred first, followed by dissociation, and then followed by the onset of schizotypic psychopathology in every participant would help us better understand the complex intertwining of dissociation and schizotypy predicted from CM.

In regards to the conditional process analyses, the current study may also have been limited by the use of a dichotomous variable as a moderator that did not have equal sample sizes across groups, which reduces statistical power (Aguinis, 1995). For example, the first conditional process analysis used a moderator that split between individuals who used cannabis between age 12 and 16 and between those who did not use during that period. There were $n = 50$ participants

who used cannabis versus *n* = 306 participants who did not use. Similarly, the moderator of the second conditional process analysis was split between those who used between age 17 and their present age and between those who did not use during that period. For this age range, there were *n* = 122 participants who used cannabis versus *n* = 234 participants who did not use. Thus, these unequal sample sizes between those that used cannabis and those that did not use cannabis may have contributed to lower power and lack of a significant moderating effect.

Conclusions and Future Directions

This study contributed to the literature on the CM-schizotypy relationship by examining the mediational effects of dissociation and the conditional effect of cannabis use. Overall, the findings suggest that peritraumatic dissociation, and to a lesser extent, trait dissociation, may be what is driving the onset of schizotypic symptoms among maltreated individuals. Although no moderating effect of adolescent cannabis use was found, it was still associated with CM, dissociation, and schizotypy, which indicates that cannabis use may still affect the CM-schizotypy relationship in another way. Future studies examining cannabis use's conditional effect on different pathways, such as the indirect pathway between CM and schizotypy through dissociation, may help shed light on cannabis use's contribution. The CM-schizotypy association may also be further understood by examining how peritraumatic dissociation leads to trait dissociation, which then leads to schizotypy expression since peritraumatic dissociation and trait dissociation were associated with each other. It could, therefore, be plausible that peritraumatic dissociation resulting from CM results in experiencing chronic dissociative symptoms, which then lead to schizotypic symptoms. In conclusion, this study demonstrates the unique and joint effects that CM, dissociative symptoms, and adolescent cannabis use have on the expression of

schizotypy. It may, therefore, be beneficial to assess these factors when making clinical decisions among individuals with maltreatment histories or those expressing schizotypic psychopathology.

References

Abajobir, A. A., Kisely, S., Scott, J. G., Williams, G., Clavarino, A., Strathearn, L., & Najman, J. M. (2017a). Childhood maltreatment and young adulthood hallucinations, delusional experiences, and psychosis: A longitudinal study. *Schizophrenia Bulletin, 43*(5), 1045-1055. https://doi.org/10.1093/schbul/sbw175

Abajobir, A. A., Najman, J. M., Williams, G., Strathearn, L., Clavarino, A., & Kisely, S. (2017b). Substantiated childhood maltreatment and young adulthood cannabis use disorders: A pre-birth cohort study. *Psychiatry Research, 256*, 21-31. https://doi.org/10.1016/j.psychres.2017.06.017

Afifi, T. O., Henriksen, C. A., Asmundson, G. J. G., & Sareen, J. (2012). Child maltreatment and substance use disorders among men and women in a nationally representative sample. *Canadian Journal of Psychiatry*, *57*(11), 677-686.

Afifi, T. O., Mather, A., Boman, J., Fleisher, W., Enns, M. W., MacMillan, H., & Sareen, J. (2011). Childhood adversity and personality disorders: Results from a nationally representative population-based study. *Journal of Psychiatric Research*, *45*, 814-822. https://doi.org/10.1016/j.jpsychires.2010.11.008

Aguinis, H. (1995). Statistical power problems with moderated multiple regression in management research. *Journal of Management, 21*(6), 1141-1158. https://doi-org.ezproxy.rit.edu/10.1177/014920639502100607

Alderson-Day, B., McCarthy-Jones, S., Bedford, S., Collins, H., Dunne, H., Rooke, C., & Fernyhough, C. (2014). Shot through with voices: Dissociation mediates the relationship between varieties of inner speech and auditory hallucination proneness. *Consciousness and Cognition, 27*, 288-296. http://dx.doi.org/10.1016/j.concog.2014.05.010

Alemany, S., Sampériz, B. A., Fatjó-Vilas Mestre, M., Martín, E. V., Higueras, J. M., Ribes, M. I. I., Ortet I Fabregat, G., Gastó, C., Saura, L. F. (2014). Psychosis-inducing effects of cannabis are related to both childhood abuse and COMT genotypes. *Acta Psychiatrica Scandinavica*, *129*(1), 54-62. http://dx.doi.org/10.1111/acps.12108

Allen, J. G., Coyne, L., & Console, P. (1997). Dissociative detachment relates to psychotic symptoms and personality decompensation. *Comprehensive Psychiatry, 38*(6), 327-334. https://doi.org/10.1016/S0010-440X(97)90928-7

Álvarez, M., Masramon, H., Peña, C., Pont, M., Gourdier, C., Roura-Poch, P., & Arrufat, F. (2015). Cumulative effects of childhood traumas: Polytraumatization, dissociation, and schizophrenia. *Community Mental Health, 51*, 54-62.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA.

Barrantes-Vidal, N., Grant, P., & Kwapil, T. R. (2015). The role of schizotypy in the study of the etiology of schizophrenia spectrum disorders. *Schizophrenia Bulletin, 41*(2), 408-416. https://doi.org/10.1093/schbul/sbu191

Bellido-Zanin, G., Perona-Garcelán, S., Senín-Calderón, C., López-Jiménez, A. M., & Rodríguez-Testal, J. F. (2017). Relationship between inner dialog and ideas of reference and the mediating role of dissociation. *Personality and Social Psychology, 58*, 100-106. https://doi.org/10.1111/sjop.12344

Berenbaum, H., Thompson, R., Milanak, M. E., Boden, M. T., & Bredemeier, K. (2008). Psychological trauma and schizotypal personality disorder. *Journal of Abnormal Psychology, 117*(3), 502-519. https://doi.org/10.1037/0021-843X.117.3.502

Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E., & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry, 151*, 1132–1136.

Bernstein, E. M. & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation

Bracha, S. H. (2004). Freeze, flight, fight, fright, faint: Adaptationist perspectives on the acute stress response spectrum. *CNS Spectrums, 9*(9), 679-685.

Bremner, J., Randall, P., Vermetten, E., & Lawrence, S. (1997). Magnetic resonance imaging-based measurement of hippocampal volume in posttraumatic stress disorder related to childhood physical and sexual abuse: A preliminary report. *Biological Psychiatry, 41*(1), 23-32. https://doi.org/10.1016/s0006-3223(96)00162-x

Brown, R. J. (2002a). The cognitive psychology of dissociative states. *Cognitive Neuropsychiatry*, *7*, 221-235.

Brown, R. J. (2002b). Epilepsy, dissociation and nonepileptic seizures. In M. R. Trimble & B. Schmitz (Eds.), *The neuropsychiatry of epilepsy* (pp. 189-209). Retrieved from https://ebookcentral.proquest.com/lib/rit/reader.action?docID=217973#

Brown, R. J. (2004). The psychological mechanisms of medically unexplained symptoms: An integrative conceptual model. *Psychological Bulletin, 130*, 793-812.

Buckley, P. F., Miller, B. J., Lehrer, D. S., & Castle, D. J. (2009). Psychiatric comorbidities and schizophrenia. *Schizophrenia Bulletin, 35*(2), 383-402. https://doi.org/10.1093/schbul/sbn135

Buhi, E. R., Goodson, P., & Neilands, T. B. (2008). Out of sight, not out of mind: Strategies for handling missing data. *American Journal of Health Behavior, 32*(1), 83-92. https://doi.org/10.5555/ajhb.2008.32.1.83

Cardeña, E. (1994). The domain of dissociation, In S. J. Lynn & J. W. Rhue (Eds.), *Dissociation: Clinical and theoretical perspectives* (pp. 15-31). New York, NY: The Guilford Press.

Carlson, E. B. & Putnam, F. W. (1993). An update on the Dissociative Experiences Scale. *Dissociation, 6*(1), 16-27.

Caspi, A., Moffitt, T. E., Cannon, M., McClay, J., Murray, R., Harrington, H., Taylor, A., Arseneault, L., Williams, B., Braithwaite, A., Poulton, R., & Craig, I. W. (2005). Moderation of the effect of adolescent-onset cannabis use on adult psychosis by a functional polymorphism in the catechol-o-methyltransferase gene: Longitudinal evidence of a gene X environment interaction. *Biological Psychiatry, 57*, 1117-1127. https://doi.org/10.1016/j.biopsych.2005.01.026

Chmielewski, M. & Watson, D. (2008). The heterogeneous structure of schizotypal personality disorder: Item-level factors of the Schizotypal Personality Questionnaire and their associations with obsessive-compulsive disorder symptoms, dissociative tendencies, and normal personality. *Journal of Abnormal Psychology, 117*(2), 364-376. https://doi.org/19.1937/0021-843X.117.2364

Choi, J. Y. (2017). Posttraumatic stress symptoms and dissociation between childhood trauma and two different types of psychosis-like experience. *Child Abuse & Neglect, 72*, 404-410.

Chua, S. & Murray, R. (1996). The neurodevelopmental theory of schizophrenia: Evidence concerning structure and neuropsychology. *Annals of Medicine, 28*(6), 547-555. https://doi.org/10.3109/07853899608999119

Classmen, C., Koopman, C., & Spiegel, D. (1993). Trauma and dissociation. *Bulletin of the Menninger Clinic, 57*(2), 178-194

Cole, C. L., Newman-Taylor, K., & Kennedy, F. (2016). Dissociation mediates the relationship between childhood maltreatment and sub-clinical psychosis. *Journal of Trauma & Dissociation, 17*(5), 577-592. https://doi.org/10.1080/15299732.2016.1172537

Collip, D., Myin-Germeys, I., & Van Os, J. (2008). Does the concept of "sensitization" provide a plausible mechanism for the putative link between the environment and schizophrenia? *Schizophrenia Bulletin, 34*(2), 220-225. https://doi.org/10.1093/schbul/sbm163

Conus, P., Cotton, S., Schimmelmann, B. G., McGorry, P. D., & Lambert, M. (2009). Pretreatment and outcome correlates of sexual and physical trauma in an epidemiological cohort of first-episode psychosis patients. *Schizophrenia Bulletin, 36*(6), 1105-1114. https://doi.org/10.1093/schbul/sbp009

de Leede-Smith, S., Roodenrys, S., Horsley, L., Matrini, S., Mison, E., Barkus, E. (2017). Neurological soft signs: Effects of trait schizotypy, psychological distress and auditory hallucination predisposition. *Schizophrenia Research: Cognition, 7*, 1-7. https://doi.org/10.1016/j.scog.2016.11.001

Debbané, M., Eliez, S., Badoud, D., Conus, P., Flückiger, R., & Schultze-Lutter, F. (2014). Developing psychosis and its risk states through the lens of schizotypy. *Schizophrenia Bulletin, 41*(2), 396-407. https://doi.org/10.1093/schbul/sbul176

Dorahy, M. J. & Green, M. (2008). Cognitive perspectives on dissociation and psychosis: Differences in the processing of threat? In A. Moskowitz, I Schäfer, & M. J. Dorahy (Eds.), *Psychosis, trauma and dissociation: Emerging perspectives on severe psychopathology* (pp. 191-207). Wiley.

Fang, X., Brown, D. S., Florence, C. S., & Mercy, J. A. (2012). The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse and Neglect, 36*(2), 156-165. https:doi.org/10.1016/j.chiabu.2011.10.006

Fergusson, D. M., Horwood, L. J., & Swain-Campbell, N. R. (2003). Cannabis dependence and psychotic symptoms in young people. *Psychological Medicine, 33*, 15-21. https://doi.org/10.1017/S0033291702006402

Finkelhor, D., Turner, H. A., Ormond, R., & Hamby, S. L. (2013). Violence, crime, and abuse exposure in a national sample of children and youth: An update. *JAMA Pediatrics, 167*(7), 614-621. https://doi.org/10.1001/jamapediatrics.2013.42

Fisher, H., Morgan, C., Dazzan, P., Craig, T. K., Morgan, K., Hutchinson, G., Jones, P. B., Doody, G. A., Pariante, C., McGuffin, P., Murray, R. M., Leff, J., & Fearon, P. (2009). Gender differences in the association between childhood abuse and psychosis. *The British Journal of Psychiatry, 194*(4), 319-325. https://doi.org/10.1192/bjp.bp.107.047985

Fowles, D. C. (1992). Schizophrenia: Diathesis-stress revisited. *Annual Review of Psychology, 43*(1), 303-336. https://doi.org/10.1146/annurev.ps.43.020192.001511

Frith, C. D. (1979). Consciousness, information processing and schizophrenia. *British Journal of Psychiatry, 134*(3), 225-235. https://doi.org/10.1192/bjp.134.3.225

Giesbrecht, T., Merckelbach, H., Kater, M., & Sluis, A. F. (2007). Why dissociation and schizotypy overlap: The joint influence of fantasy proneness, cognitive failures, and childhood trauma. *The Journal of Nervous and Mental Disease, 195*(10), 812-818. https://doi.org/10.1097/NMD.0b013e3181568137

Ginzburg, K., Koopman, C., Butler, L. D., Palesh, O., Kraemer, H. C., Classen, C. C., & Spiegel, D. (2006). Evidence for a dissociative subtype of post-traumatic stress disorder among

help-seeking childhood sexual abuse survivors. *Journal of Trauma & Dissociation, 7*(2), 7-27. https://doi.org/10.1300/J229v07n02_02

Gómez, J. M. & Freyd, J. J. (2017). High betrayal child sexual abuse and hallucinations: A test of an indirect effect of dissociation. *Journal of Child Sexual Abuse, 26*(5), 507-518. https://doi.org/10.1080/10538712.2017.1310776

Halpern, S. C., Schuch, F. B., Scherer, J. N., Sordi, A. O., Pachado, M., Dalbosco, C., … Von Diemen, L. (2018). Child maltreatment and illicit substance abuse: A systematic review and meta-analysis of longitudinal studies. *Child Abuse Review, 27*, 344-360. https://doi.org/10.1002/car.2534

Hambrecht, M. & Häfner, H. (2000). Cannabis, vulnerability, and the onset of schizophrenia: An epidemiological perspective. *Australian and New Zealand Journal of Psychiatry, 34*, 468-475. https://doi.org/10.1046/j.1440-1614.2000.00736.x

Hayatbakhsh, M. R., Najman, J. M., Jamrozik, K., Mamun, A. A., O'Callaghan, M. J., & Williams, G. M. (2009). Childhood sexual abuse and cannabis use in early adulthood: Findings from an Australian birth cohort study. *Archives of Sexual Behavior, 38*, 135-142. https://doi.org/10.1007/s10508-007-9172-5

Hayes, A. F. (2018). *An introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.

Hetzel, M. D. & McCanne, T. R. (2005). The roles of peritraumatic dissociation, child physical abuse, and child sexual abuse in the development of posttraumatic stress disorder and adult victimization. *Child Abuse & Neglect, 29*, 915-930. https://doi.org/10.1016/j.chiabu.2004.11.008

Holmes, E. A., Brown, R. J., Mansell, W., Fearon, R. P., Hunter, E. C. M., Frasquilho, F., & Oakley, D. A. (2005). Are there two qualitatively distinct forms of dissociation? A review and some clinical implications. *Clinical Psychology Review, 25*, 1-23. https://doi.org/10.1016/j.cpr.2004.08.006

Houston, J. E., Murphy, J., Adamson, G., Stringer, M., & Shevlin, M. (2008). Childhood sexual abuse, early cannabis use, and psychosis: Testing an interaction model based on the National Comorbidity Survey. *Schizophrenia Bulletin, 34*(3), 580-585. https://doi.org/10.1093/schbul/sbm127

Howes, O. D., McDonald, C., Cannon, M., Arseneault, L., Boydell, J., & Murray, R. M. (2004). Pathways to schizophrenia: The impact of environmental factors. *The International Journal of Neuropsychopharmacology, 7*(1), S7-S13. https://doi.org/10.1017/S1461145704004122

Hulette, A. C., Freyd, J. J., & Fisher, P. A. (2011). Dissociation in middle childhood among foster children with early maltreatment experiences. *Child Abuse & Neglect, 35*, 123-126. https://doi.org/10.1016/j.chiabu.2010.10.002

Humpston, C. S., Walsh, E., Oakley, D. A., Mehta, M. A., Bell, V., & Deeley, Q. (2016). The relationship between different types of dissociation and psychosis-like experiences in a non-clinical sample. *Consciousness and Cognition, 41*, 83-92. http://dx.doi.org/10.1016/j.concog.2016.02.009

IBM. (2019). *Statistical package for the social sciences* (SPSS; Version 27) [Computer software]. https://www.ibm.com/products/spss-statistics

Ito, Y., Teicher, M., Glod, C., & Ackerman, E. (1998). Preliminary evidence for aberrant cortical development in abused children: A quantitative EEG study. *Journal of Neuropsychiatry and Clinical Neurosciences, 10*(3), 298-307. https://doi.org/10.1176/jnp.10.3.298

Johns, L. C. & van Os, J. (2001). The continuity of psychotic experiences in the general population. *Clinical Psychology Review, 21*(8), 1125-1141. https://doi.org/10.1016/s0272-7358(01)00103-9

Khokhar, J. Y., Dwiel, L. L., Henricks, A. M., Doucette, W. T., & Green, A. I. (2018). The link between schizophrenia and substance use disorder: A unifying hypothesis. *Schizophrenia Research, 194*, 78-85. https://doi.org/10.1016/j.schres.2017.04.016

Kihlstrom, J. F. (1992). Dissociative and conversion disorders. In D. J. Stein & J. E. Young (Eds.), *Cognitive science and clinical disorders* (pp. 247-270). San Diego, CA: Academic Press.

Konings, M., Stefanis, N., Kuepper, R., de Graaf, R., ten Have, M., van Os, J., … Henquet, C. (2012). Replication in two independent population-based samples that childhood maltreatment and cannabis use synergistically impact on psychosis risk. *Psychological Medicine, 42*(1), 149-159. https://doi.org/10.1017/S0033291711000973

Kuepper, R., van Os, J., Lieb, R., Wittchen, H., Höfler, M., & Henquet, C. (2011). Continued cannabis use and risk of incidence and persistence of psychotic symptoms: 10 year follow-up cohort study. *BMJ, 342*(7796), 1-8. https://doi.org/10.1136/bmj.d738

Kwapil, T. R., Gross, G. M., Silvia, P. J., & Barrantes-Vidal, N. (2013). Prediction of psychopathology and functional impairment by positive and negative schizotypy in the Chapmans' ten-year longitudinal study. *Journal of Abnormal Psychology, 122*(3), 807-815. https://doi.org/10.1037/a0033759

Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2010). Does physical abuse in early childhood predict substance use in adolescence and early adulthood? *Child Maltreatment, 15*(2), 190-194. https://doi.org/10.1177/1077559509352359

Lenzenweger, M. F. (1994). Psychometric high-risk paradigm, perceptual aberrations, and schizotypy: An update. *Schizophrenia Bulletin, 20*(1), 121-135. https://doi.org/10.1093/schbul/20.1.121

Lenzenweger, M. F. (2010). *Schizotypy and schizophrenia: The view from experimental psychopathology* [eBook edition]. Guilford Publications. https://ebookcentral.proquest.com/lib/rit/reader.action?docID=554839#

Lenzenweger, M. F. (2018). Schizotypy, schizotypic psychopathology and schizophrenia. *World Psychiatry, 17*(1), 25-26. https://doi.org/10.1002/wps.20479

Lensvelt-Mulders, G., van der Hart, O., van Ochten, J. M., van Son, M. J. M., Steele, K., & Breeman, L. (2008). Relations among peritraumatic dissociation and posttraumatic stress: A meta-analysis. *Clinical Psychology Review, 28*, 1138-1151. https://doi.org/10.1016/j.cpr.2008.03.006

Lobbestael, J., Arntz, A., & Bernstein, D. P. (2010). Disentangling the relationship between different types of childhood maltreatment and personality disorders. *Journal of Personality Disorders, 24*(3), 285-295.

Macfie, J., Cicchetti, D., & Toth, S. L. (2001). The development of dissociation in maltreated preschool-aged children. *Development and Psychopathology, 13*(2), 233-254. https://doi.org/10.1017/s0954579401002036

Marmar, C. R., Weiss, D. S., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Kulka, R. A., & Hough, R. L. (1994). Peritraumatic dissociation and posttraumatic stress in male Vietnam

theater veterans. *The American Journal of Psychiatry, 151*(6), 902-907. https://doi.org/10.1176/ajp.151.6.902

Marzillier, S. L. & Steel, C. (2007). Positive schizotypy and trauma-related intrusions. *The Journal of Nervous and Mental Disease, 195*(1), 60-64. https://doi.org/10.1097/01.nmd.0000252383.28760.39

Mash, E. J. & Barkley, R. A. (2014). *Child psychopathology* (3rd ed.). New York, NY: The Guilford Press.

Medrano, M. A., Hatch, J. P., Zule, W. A., & Desmond, D. P. (2002). Psychological distress in childhood trauma survivors who abuse drugs. *The American Journal of Drug and Alcohol Abuse, 28*(1), 1-13. https://doi.org/10.1081/ADA-120001278

Meehl, P. E. (1962). Schizotaxia, schizotypy, schizophrenia. *American Psychologist, 17*, 827-838. https://doi.org/10.1037/h0041029

Merckelbach, H. & Giesbrecht, T. (2006). Subclinical dissociation, schizotypy, and traumatic distress. *Personality and Individual Differences, 40*, 365-374. https://doi.org/10.1016/j.paid.2005.07.007

Merckelbach, H., Rassin, E., & Muris, P. (2000). Dissociation, schizotypy, and fantasy proneness in undergraduate students. *Journal of Nervous and Mental Disease, 188*(7), 428-431. https://doi.org/10.1097/00005053-200007000-00006

Meyer-Lindenberg, A., Kohn, P. D., Kolachana, B., Kippenhan, S., McInerney-Leo, A., Nussbaum, R., Weinberger, D. R., & Berman, K. F. (2005). Midbrain dopamine and prefrontal function in humans: Interaction and modulation by COMT genotype. *Nature Neuroscience, 8*(5), 594-596. https://doi.org/10.1038/nn1438

Millon, T. & Davis, R. D. (1996). Disorders of personality: DSM-IV and beyond. Wiley

Miyake, N., Thompson, J., Skinbjerg, M., & Abi-Dargham, A. (2011). Presynaptic dopamine in schizophrenia. *CNS Neuroscience & Therapeutics, 17*(2), 104-109. https://doi.org/10.1111/j.1755-5949.2010.00230.x

Moore, T. S., Lingford-Hughes, A., Barnes, T. R., Jones, P. B., Burke, M., & Lewis, G. (2007). Cannabis use and risk of psychotic or affective mental health outcomes: A systematic review. *The Lancet, 370*(9584), 319-328. https://doi.org/10.1016/S0140-6736(07)61162-3

Moormann, P. P., Albach, F., Bermond, B., van Dijke, A., de Jong, J., Wineke, J., Metta, K., & Karanafti, A. (2011). Gender differences in the impact of child sexual abuse on alexithymia, dissociation and self. In E. A. Kalfoglou (Ed.), *Sexual abuse – Breaking the silence* (pp. 75-92). IntechOpen. https://doi.org/10.5772/26047

Moritz, S. & Mass, R. (1997). Reduced cognitive inhibition in schizotypy. *British Journal of Clinical Psychology, 36*(3), 365-376. https://doi.org/10.1111/j.2044-8260.1997.tb01244.x

Muenzenmaier, K. H., Seixas, A. A., Schneeberger, A. R., Castille, D. M., Battaglia, J., & Link, B. G. (2015). Cumulative effects of stressful childhood experiences on delusions and hallucinations. *Journal of Trauma & Dissociation, 16*(4), 442-462. https://doi.org/10.1080/15299732.2015.1018475

Nelson, M. T., Seal, M. L., Pantelis, C., & Phillips, L. J. (2013). Evidence of a dimensional relationship between schizotypy and schizophrenia: A systematic review. *Neuroscience and Biobehavioral Reviews, 37*, 317-327. http://dx.doi.org/10.1016/j.neubiorev.2013.01.004

Newbury, J. B., Arseneault, L., Moffitt, T. E., Caspi, A., Danese, A., Baldwin, J. R., & Fisher, H. L. (2018). Measuring childhood maltreatment to predict early-adult psychopathology:

Comparison of prospective informant-reports and retrospective self-reports. *Journal of Psychiatric Research, 96,* 57-64. https://doi.org/10.1016/j.jpsychires.2017.09.020

Park, S., Püschel, J., Sauter, B. H., Rentsch, M., & Hell, D. (2002). Spatial selective attention and inhibition in schizophrenia patients during acute psychosis and at a 4-month follow-up. *Biological Psychiatry, 51*(6), 498-506. https://doi.org/10.1016/s0006-3223(01)01278-1

Patihis, L. & Lynn, S. J. (2017). Psychometric comparison of Dissociative Experiences Scales II and C: A weak trauma-dissociation link. *Applied Cognitive Psychology, 31*(4), 392-403. https://doi.org/10.1002/acp.3337

Perona-Garcelán, S., García-Montes, J. M., Rodríguez-Testal, J. F., López-Jiménez, A. M., Ruiz-Veguilla, M., Ductor-Recuerda, M. J., del Mar Benítez-Hernández, M., Arias-Velarde, M. A., Gómez-Gómez, M. T., & Arias-Velarde, M. A. (2014). Relationship between childhood trauma, mindfulness, and dissociation in subjects with and without hallucination proneness. *Journal of Trauma & Dissociation, 15,* 35-51. https://doi.org/10.1080/15299732.2013.821433

Peters, E. R., Pickering, A. D., & Hemsley, D. R. (1994). 'Cognitive inhibition' and positive symptomatology in schizotypy. *British Journal of Clinical Psychology, 33*(1), 33-48. https://doi.org/10.1111/j.2044-8260.1994.tb01092.x

Pope, C. A. & Kwapil, T. R. (2000). Dissociative experiences in hypothetically psychosis-prone college students. *Journal of Nervous and Mental Disease, 188*(8), 530-536. https://doi.org/10.1097/00005053-200008000-00009

Powers, A. D., Thomas, K. M., Ressler, K. J., & Bradley, B. (2011). The differential effects of child abuse and posttraumatic stress disorder on schizotypal personality disorder.

Comprehensive Psychiatry, 52, 438-445. https://doi.org/10.1016/j.comppsych.2010.08.001

Raine, A. (1991). The SPQ: A scale for the assessment of schizotypal personality based on DSM-III-R criteria. *Schizophrenia Bulletin, 17*(4), 555-564. https://doi.org/10.1093/schbul/17.4.555

Rasmussen, I. S., Arefjord, K., Winje, D., & Dovran, A. (2018). Childhood maltreatment trauma: A comparison between patients in treatment for substance use disorders and patients in mental health treatment. *European Journal of Psychotraumatology, 9*, 1-10. https://doi.org/10.1080/20008198.2018.1492835

Read, J. & Bentall, R. P. (2012). Negative childhood experiences and mental health: Theoretical, clinical and primary prevention implications. *The British Journal of Psychiatry, 200*, 89-91. https://doi.org/10.1192/bjp.bp.111.096727

Read, J. & Fraser, A. (1998). Abuse histories of psychiatric inpatients: To ask or not to ask? *Psychiatric Services, 49*(3), 355-359. https://doi.org/10.1176/ps.49.3.355

Read, J., Perry, B. D., Moskowitz, A., & Connolly, J. (2001). The contribution of early traumatic events to schizophrenia in some patients: A traumagenic neurodevelopmental model. *Psychiatry, 64*(4), 319-345. https://doi.org/10.1521/psyc.64.4.319.18602

Roche, S. M. & McConkey, K. M. (1990). Absorption: Nature, assessment, and correlates. *Journal of Personality and Social Psychology, 59*(1), 91-101. https://doi.org/10.1037/00223514.59.1.91

Rogosch, F. A., Oshri, A., & Cicchetti, D. (2010). From child maltreatment to adolescent cannabis abuse and dependence: A developmental cascade model. *Development and Psychopathology, 22*(4), 883-897. https://doi.org/10.1017/S0954579410000520

Rosales, J. (2021). *Childhood maltreatment, mental health, and interpersonal conflict in current adult relationships* [Undergraduate honors thesis, University of Northern Colorado]. Scholarship & Creative Works @ Digital UNC. https://digscholarship.unco.edu/honors/49

Rössler, W., Hengartner, M. P., Angst, J., & Ajdacic-Gross, V. (2011). Linking substance use with symptoms of subclinical psychosis in a community cohort over 30 years. *Addiction, 107*, 1174-1184. https://doi.org/10.1111/j.1360-0443.2011.03760.x

Rössler, W., Riecher- Rössler, A., Angst, J., Murray, R., Gamma, A., Eich, D., van Os, J., & Ajdacic Gross, V. (2007). Psychotic experiences in the general population: A twenty-year prospective community study. *Schizophrenia Research, 92*, 1-14. https://doi.org/10.1016/j.schres.2007.01.002

Sar, V., Taycan, O., Bolat, N., Özmen, M., Duran, A., Öztürk, E., & Ertem-Vehid, H. (2010). Childhood trauma and dissociation in schizophrenia. *Psychopathology, 43*, 33-40. https://doi.org/10.1159/0002555961

Schalinski, I. & Teicher, M. H. (2015). Type and timing of childhood maltreatment and severity of shutdown dissociation in patients with schizophrenia spectrum disorder. *PLoS ONE, 10*(5), 1-18. https://doi.org/10.1371/journal.pone.0127151

Schauer, M. & Elbert, T. (2010). Dissociation following traumatic stress: Etiology and treatment. *Journal of Psychology, 218*(2), 109-127. https://doi.org/10.1027/0044-3409/a000018

Schenkel, L. S., Rothman-Marshall, G., Schlehofer, D. A., Towne, T. L., Burnash, D. L., & Priddy, B. M. (2014). Child maltreatment and trauma exposure among deaf and hard of hearing young adults. *Child Abuse & Neglect, 38*, 1581-1589. http://dx.doi.org/10.1016/j.chiabu.2014.04.010

Schenkel, L. S., Spaulding, W. D., DiLillo, D., & Silverstein, S. M. (2005). Histories of childhood maltreatment in schizophrenia: Relationships with premorbid functioning, symptomatology, and cognitive deficits. *Schizophrenia Research, 76*(2-3), 273-286. https://doi.org/10.1016/j.schres.2005.03.003

Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57*(1), 1-10. https://doi.org/10.1037/a0018082

Sideli, L., Fisher, H. L., Murray, R. M., Sallis, H., Russo, M., Stilo, S. A., … Di Forti, M. (2015). Interaction between cannabis consumption and childhood abuse in psychotic disorders: Preliminary findings on the role of different patterns of cannabis use. *Early Intervention in Psychiatry, 12*(2), 1-8. https://doi.org/10.1111/eip.12285

Sijbrandij, M., Engelhard, I. M., Opmeer, B. C., van de Schoot, R., Carlier, I. V. E., Gersons, B. P. R., Olff, M. (2012). The structure of peritraumatic dissociation: A cross validation in clinical and nonclinical samples. *Journal of Traumatic Stress, 25*(4), 475-479. https://doi.org/10.1002/jts.21716

Steine, I. M., Winje, D., Krystal, J. H., Bjorvatn, B., Milde, A. M., Grønli, J., Nordhus, I. H., & Pallesen, S. (2017). Cumulative child maltreatment and its dose-response relation with adult symptomatology: Findings in a sample of adult survivors of sexual abuse. *Child Abuse & Neglect, 65*, 99-111. http://dx.doi.org/10.1016/j.chiabu.2017.01.008

Sugar, J. & Ford, J. D. (2012). Peritraumatic reactions and posttraumatic stress disorder in psychiatrically impaired youth. *Journal of Traumatic Stress, 25*, 41-49. https://doi.org/10.1002/jts.21668

Sun, P., Alvarez-Jimenez, M., Simpson, K., Lawrence, K., Peach, N., & Bendall, S. (2018). Does dissociation mediate the relationship between childhood trauma and hallucinations, delusions in first episode psychosis? *Comprehensive Psychiatry, 84*, 68-74. https://doi.org/10.1016/j.comppsych.2018.04.004

Tabachnick, B. G. & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson

Teicher, M. H., Ito, Y., Glod, C. A., Andersen, S. L., Dumont, N., & Ackerman, E. (1997). Preliminary evidence for abnormal cortical development in physically and sexually abused children using EEG coherence and MRI. *Annals of the New York Academy of Sciences, 821*(1), 160-175. https://doi.org/10.1111/j.1749-6632.1997.tb48277.x

Teicher, M. H., Samson, J. A., Polari, A., & McGreenery, C. E. (2006). Sticks, stone, and hurtful words: Relative effects of various forms of childhood maltreatment. *The American Journal of Psychiatry, 163*(6), 993-1000. https://doi.org/10.1176/ajp.2006.163.6.993

Tellegen, A. & Atkinson, G. (1974). Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. *Journal of Abnormal Psychology, 83*(3), 268-277. https://doi.org/10.1037/h0036681

Trzepacz, P. T. & Baker, R. W. (1993). *The psychiatric mental status examination* [ProQuest Ebook Central version]. Retrieved from https://ebookcentral.proquest.com/lib/rit/reader.action?docID=273164

U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth, and Families, Children's Bureau. (2020). Child maltreatment 2018 [Online].

van der Kolk, B. A., van der Hart, O., & Marmar, C. R. (1996). Dissociation and information processing in posttraumatic stress disorder. In van der Kolk, B. A., McFarlane, A. C., &

Weisaeth, D. (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (pp. 303-327). Guilford Press.

van Os, J., R. J., Linscott, Myin-Germeys, I., Delespaul, P., & Krabbendam, L. (2009). A systematic review and meta-analysis of the psychosis continuum: Evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. *Psychological Medicine, 39*(2), 179-195. https://doi.org/10.1017/S0033291708003814

van Winkel, R. & GROUP Investigators. (2015). Further evidence that cannabis moderates familial correlations of psychosis-related experiences. *PLoS ONE, 10*(9), 1-19. https://doi.org/10.1371/journal.pone.0137625

Varese, F., Barkus, E., & Bentall, R. P. (2012). Dissociation mediates the relationship between childhood trauma and hallucination-proneness. *Psychological Medicine, 42*, 1025-1036. https://doi.org/10.1017/S0033291711001826

Velikonja, T., Fisher, H. L., Mason, O., & Johnson, S. (2015). Childhood trauma and schizotypy: A systematic literature review. *Psychological Medicine, 45*, 947-963. https://doi.org/10.1017/S0033291714002086

Verdoux, H., Maurice-Tison, S., Gay, B., van Os, J., Salamon, R., & Bourgeois, M. I. (1998). A survey of delusional ideation in primary-care patients. *Psychological Medicine, 28*(1), 127-134. https://doi.org/10.1017/s0033291797005667

Vonderlin, R., Kleindienst, N., Alpers, G. W., Bohus, M., Lyssenko, L., & Schmahl, C. (2018). Dissociation in victims of childhood abuse or neglect: A meta-analytic review. *Psychological Medicine, 48*, 2467-2476. https://doi.org/10.1017/S0033291718000740

Walker, E. & DiForio, D. (1997). Schizophrenia: A neural diathesis-stress model. *Psychological Review, 104*(4), 667-685. https://doi.org/10.1037/0033-295X.104.4.667

Waller, N. G., Putnam, F. W., & Carlson, E. B. (1996). Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. *Psychological Methods, 1*(3), 300-321. https://doi.org/10.1037/1082-989X.1.3.300

Waller, N. G. & Ross, C. A. (1996). The prevalence and biometric structure of pathological dissociation in the general population: Taxometric and behavior genetic findings. *Journal of Abnormal Psychology, 106*(4), 499-510. https://doi.org/10.1037/0021-843X.106.4.499

Warmingham, J. M., Handley, E. D., Rogosch, F. A., Manly, J. T., & Cicchetti, D. (2019). Identifying maltreatment subgroups with patterns of maltreatment subtype and chronicity: A latent class analysis approach. *Child Abuse & Neglect, 87*, 28-39. https://doi.org/10.1016/j.chiabu.2018.013

Weathers, F., Litz, B., Keane, T., Palmieri, T., Marx, B. P., & Schnurr, P. (2013). The PTSD Checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov

Weinreb, L., Savageau, J. A., Candib, L. M., Reed, G. W., Fletcher, K. E., & Hargraves, J. L. (2010). Screening for childhood trauma in adult primary care patients: A cross-sectional survey. *Primary Care Companion to the Journal of Clinical Psychiatry*, *12*(6), 1-14. https://doi.org/10.4088/PCC.10m00950blu

Widom, C. S. (1999). Posttraumatic stress disorder in abused and neglected children grown up. *American Journal of Psychiatry*, *156*(8), 1223-1229. https://doi.org/10.1176/ajp.156.8.1223

Wilkinson, G. S. (1993). *Wide Range Achievement Test* (3rd ed.). Wilmington, DE: Wide Range.

Williams, J., Bucci, S., Berry, K., & Varese, F. (2018). Psychological mediators of the association between childhood adversities and psychosis: A systematic review. *Clinical Psychology Review, 65*, 175-196. http://doi.org/10.1016/j.cpr.2018.05.009

World Health Organization. (2016, September). *Child maltreatment*. https://www.who.int/news-room/fact-sheets/detail/child-maltreatment

Table 1

Demographic Information of Participants

Variables	Mean (*SD*)
Age	19.44 (2.80)
	N (%)
Gender	
Male	169 (47.5%)
Female	187 (52.5%)
Race	
Caucasian	240 (67.4%)
Asian/Asian American	55 (15.4%)
Latino/Hispanic	22 (6.2%)
Pacific Islander	1 (0.3%)
Black/African American	23 (6.5%)
Other	15 (4.2%)

Table 2

Descriptive Statistics of Main Variables

	N	***M***	***SD***	***SE***	**Range**
Measure					
CTQ-SF	356	41.21	15.29	0.81	25-109
PDEQ	356	18.08	10.08	0.53	10-50
DES-II	356	19.97	15.31	0.81	0-76.79
SPQ	356	27.42	14.15	0.75	0-67

Table 3

Correlations Among Main Study Variables

	1	2	3	4	5	6
1. CTQ-SF	-					
2. PDEQ	.65***	-				
3. DES-II	.46***	.61***	-			
4. SPQ	.39***	.51***	.67***	-		
5. Cannabis Use Between Age 12 and 16 Frequency	.29***	.29***	.19***	.15**	-	
6. Cannabis Use Between Age 17 and Present Frequency	.27***	.26***	.20***	.18***	.58***	-

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4

Gender Differences in CM, Peritraumatic Dissociation, Trait Dissociation, and Schizotypy

Measure	Females	Males	Analysis
	Mean (*SD*)	Mean (*SD*)	*t* (*p*)
CTQ-SF	44.58 (16.19)	37.47 (13.31)	4.55 (.000)
PDEQ	19.73 (10.79)	16.25 (8.92)	3.32 (.001)
DES-II	23.08 (16.40)	16.53 (13.23)	4.16 (.000)
SPQ	28.53 (13.97)	26.19 (14.29)	1.57 (.119)

Table 5

Cannabis Use Frequency Between Age 12 and 16 and Between Age 17 and Present

Frequency	Age 12 - 16	Age 17+
	N (%)	N (%)
Never	306 (85.96)	234 (65.73)
Once or twice	22 (6.18)	35 (9.83)
About once a year	1 (0.28)	2 (0.56)
A few times a year	11 (3.09)	29 (8.15)
About once/twice a month	9 (2.53)	25 (7.02)
About once a week	3 (0.84)	11 (3.09)
More than once a week	3 (0.84)	16 (4.49)
Every day	1 (0.28)	4 (1.12)

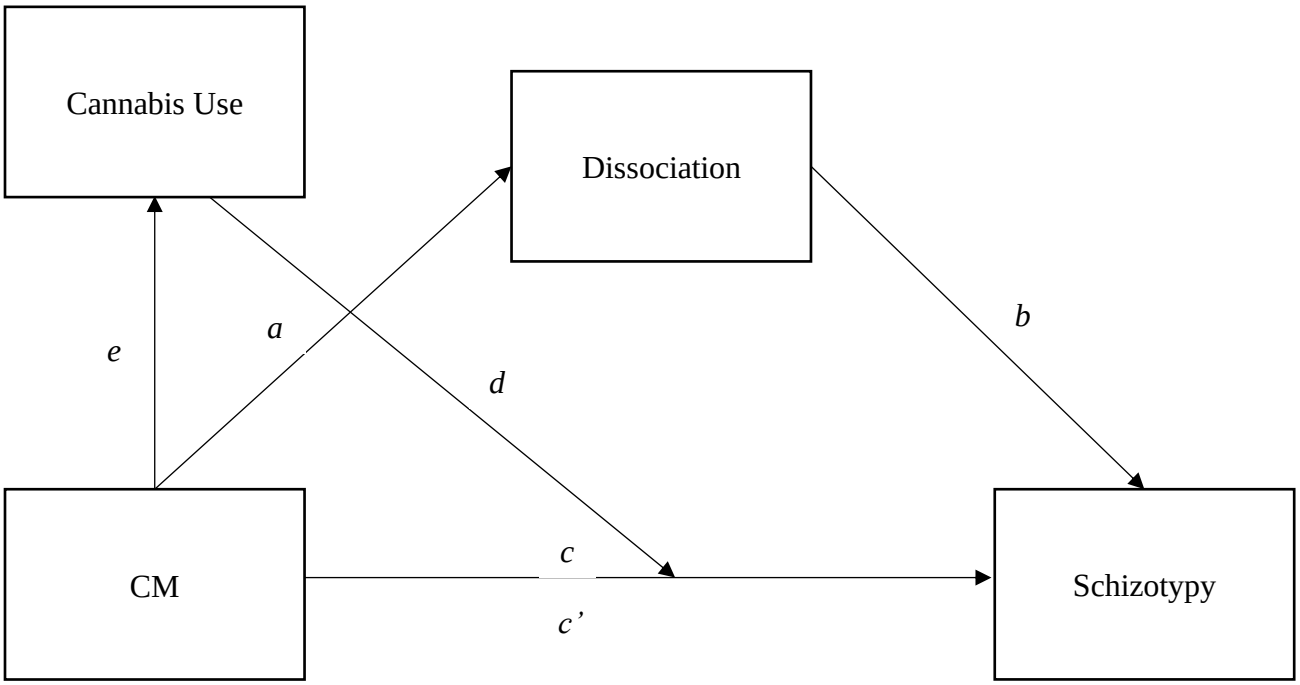
Table 6

Mean Differences in CM, Peritraumatic Dissociation, Trait Dissociation, and Schizotypy Between Individuals That Used Cannabis Versus Those That Did Not

Used Cannabis Between Age 12 and 16				
	Yes	No	*t*	*p*
	M (*SD*)	*M* (*SD*)		
CTQ-SF	50.88 (21.02)	39.62 (13.54)	3.67	.001
PDEQ	24.44 (12.77)	17.04 (9.19)	3.93	.000
DES II	26.40 (16.95)	18.92 (14.80)	3.24	.001
SPQ	31.90 (13.29)	26.69 (14.17)	2.43	.016
Used Cannabis Between Age 17 and Present				
CTQ-SF	45.83 (17.97)	38.79 (13.10)	3.83	.000
PDEQ	20.79 (10.95)	16.67 (9.32)	3.54	.000
DES II	22.79 (14.70)	18.51 (15.45)	2.52	.012
SPQ	31.22 (12.17)	25.44 (14.72)	3.95	.000

Figure 1

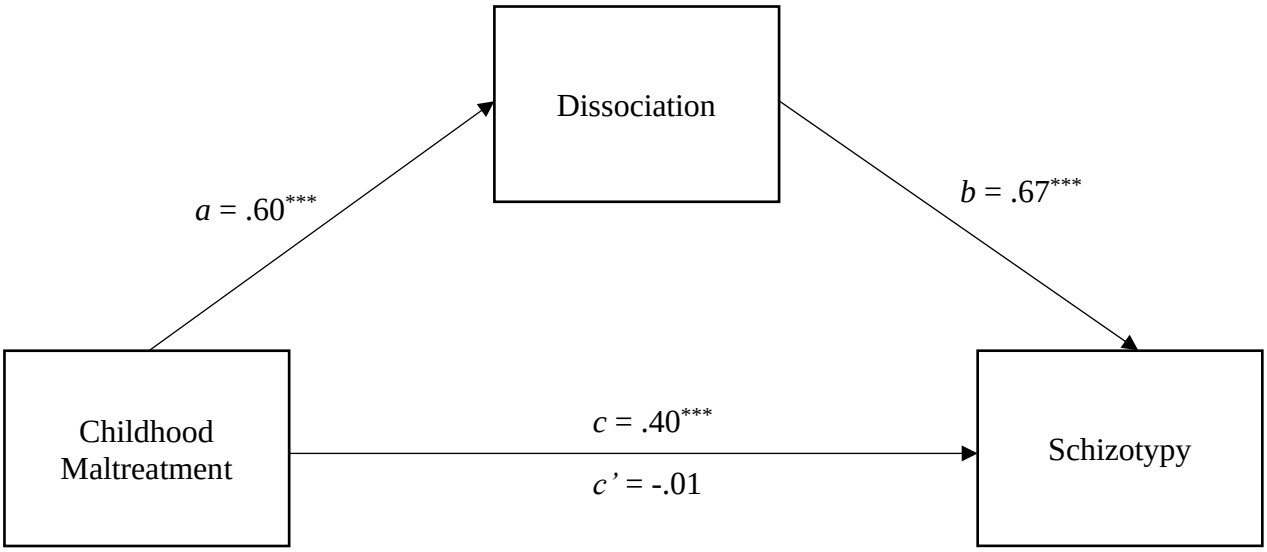
Conceptual Model Indicating the Study's Hypotheses



Note. c = Hypothesis 1a) More severe CM will be associated with elevated schizotypy scores
a = Hypothesis 1b) More severe CM will be associated with greater peritraumatic dissociation and trait dissociation
b = Hypothesis 1c) Peritraumatic dissociation and trait dissociation will be associated with elevated schizotypy
e = Hypothesis 2) CM will be associated with increased adolescent cannabis use
c' = Hypothesis 3a) Dissociation (both peritraumatic dissociation and trait dissociation) will mediate the relationship between CM and schizotypy
d = Hypothesis 3b) Cannabis use will moderate the relationship between CM and schizotypy, such that the interaction between CM and cannabis use will predict higher schizotypy scores over and above the individual main effects of CM and cannabis use

Figure 2

Simple Mediation Model with Composite Dissociation Score as the Proposed Mediator

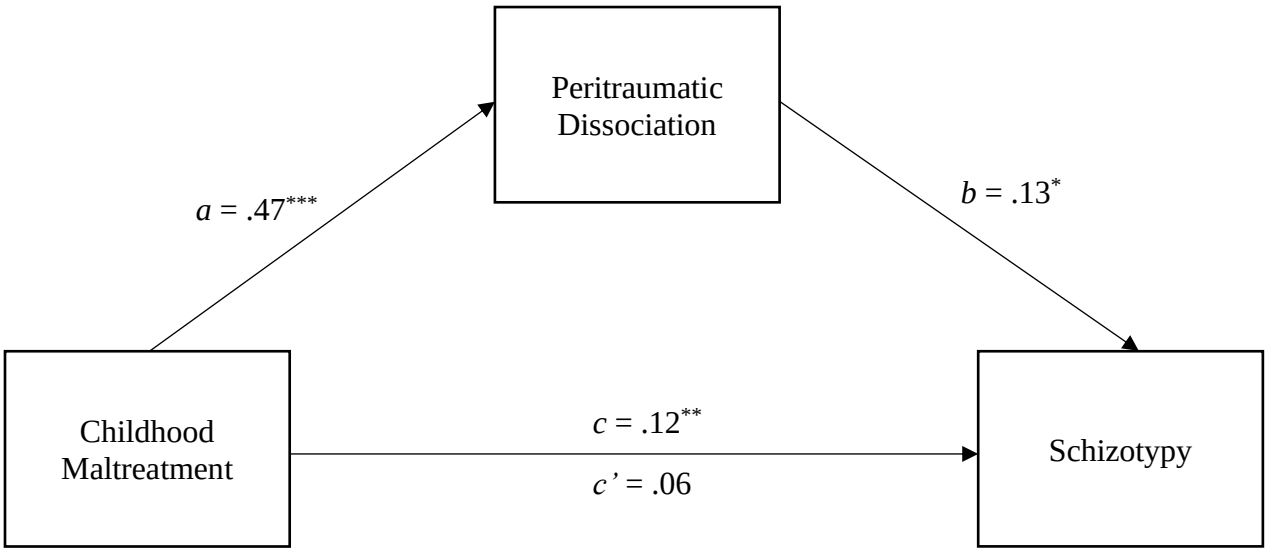


Note. Values are standardized regression coefficients. *a* = the effect of CM on dissociation (both peritraumatic and trait); *b* = the effect of dissociation on schizotypy, adjusted for CM; *c* = the total effect of CM on schizotypy; *c'* = the direct effect of CM on schizotypy, adjusted for dissociation.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Figure 3

Simple Mediation Model with Peritraumatic Dissociation Score as the Proposed Mediator, Controlling for Trait Dissociation

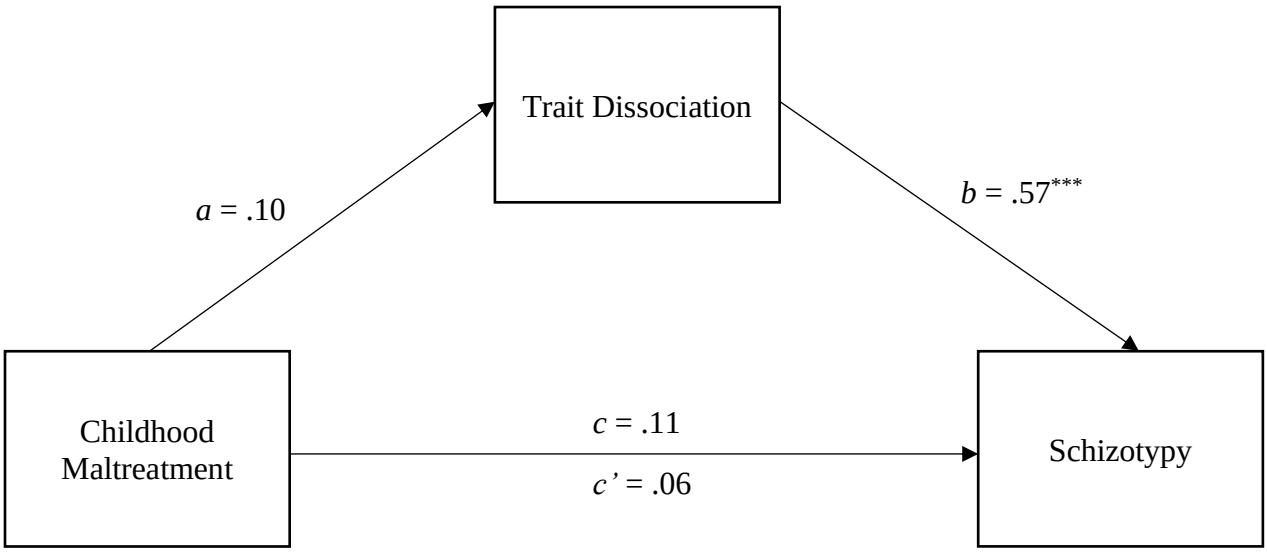


Note. Values are standardized regression coefficients. *a* = the effect of CM on peritraumatic dissociation; *b* = the effect of peritraumatic dissociation on schizotypy, adjusted for CM; *c* = the total effect of CM on schizotypy; *c'* = the direct effect of CM on schizotypy, adjusted for peritraumatic dissociation.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Figure 4

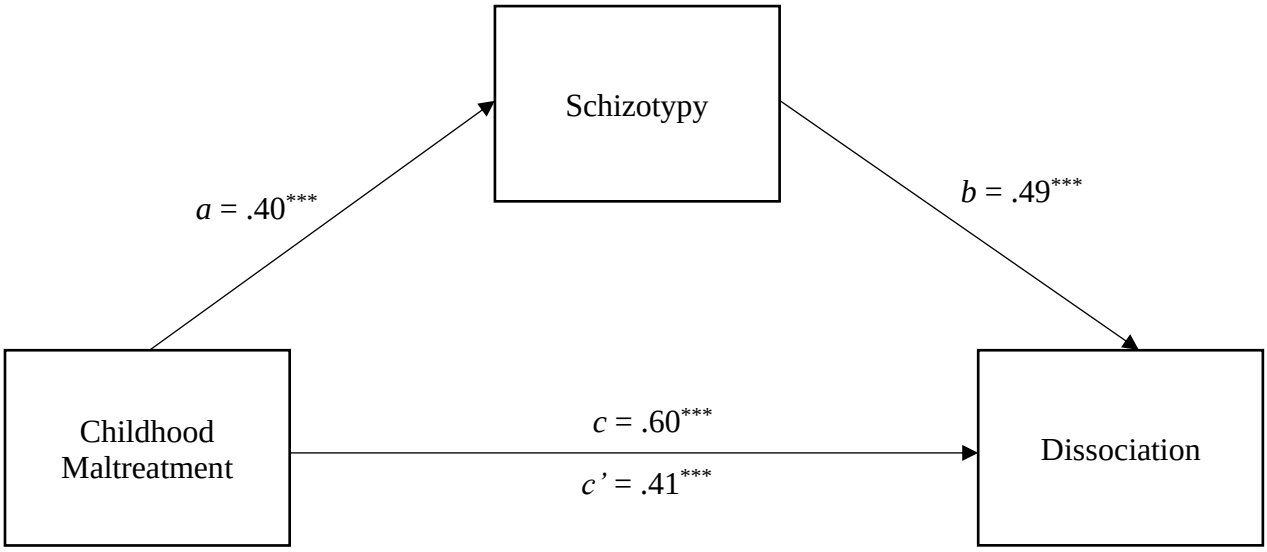
Simple Mediation Model with Trait Dissociation Score as the Proposed Mediator, Controlling for Peritraumatic Dissociation



Note. Values are standardized regression coefficients. *a* = the effect of CM on trait dissociation; *b* = the effect of trait dissociation on schizotypy, adjusted for CM; *c* = the total effect of CM on schizotypy; *c'* = the direct effect of CM on schizotypy, adjusted for trait dissociation.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Figure 5

Simple Mediation Model with Schizotypy as the Proposed Mediator and the Composite Dissociation Score as the Outcome

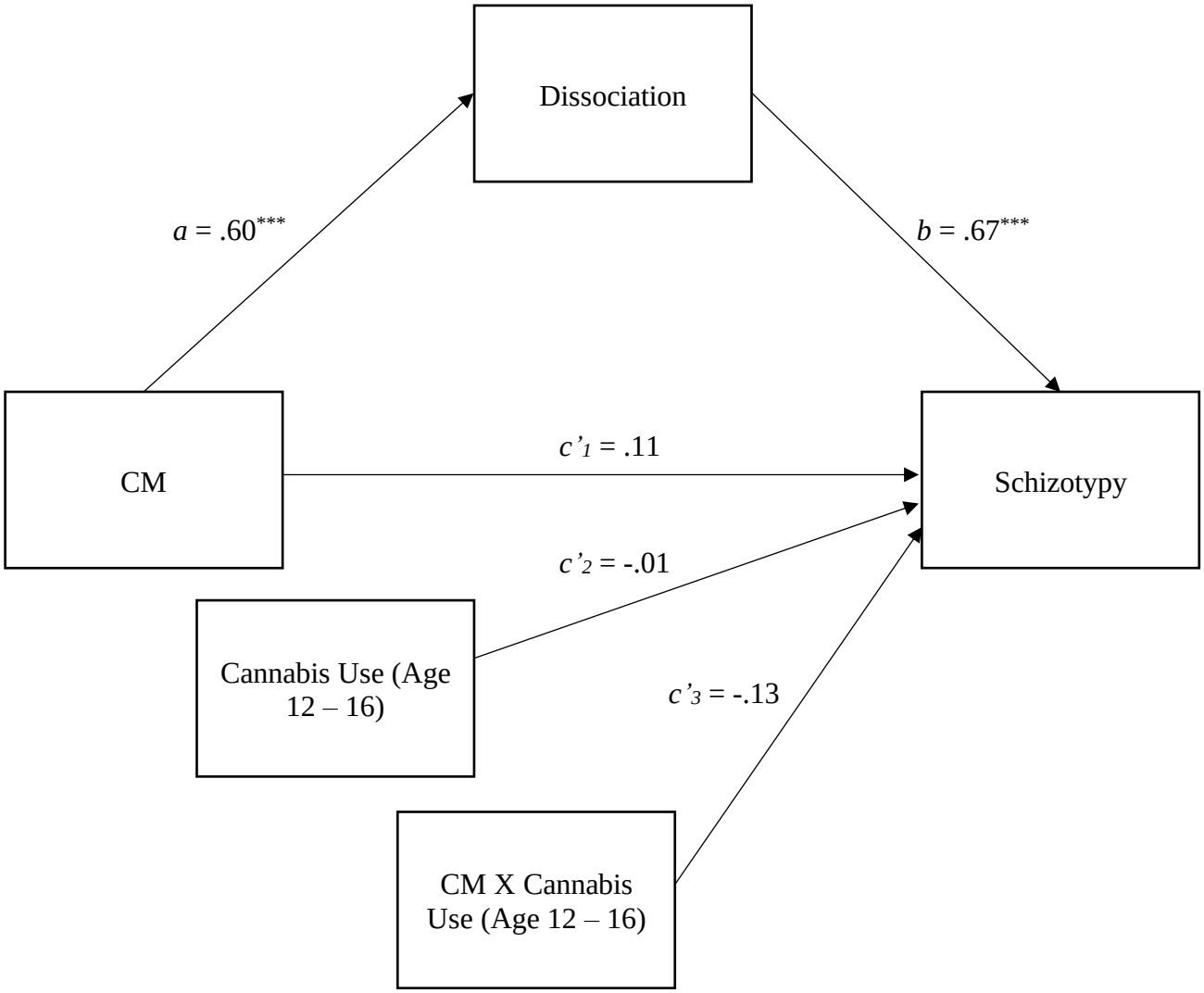


Note. Values are standardized regression coefficients. *a* = the effect of CM on schizotypy; *b* = the effect of schizotypy on dissociation (both peritraumatic and trait), adjusted for CM; *c* = the total effect of CM on dissociation; *c'* = the direct effect of CM on dissociation, adjusted for schizotypy.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Figure 6

Conditional Process Statistical Model with Cannabis Use in Early to Mid-Adolescence as the Proposed Moderator

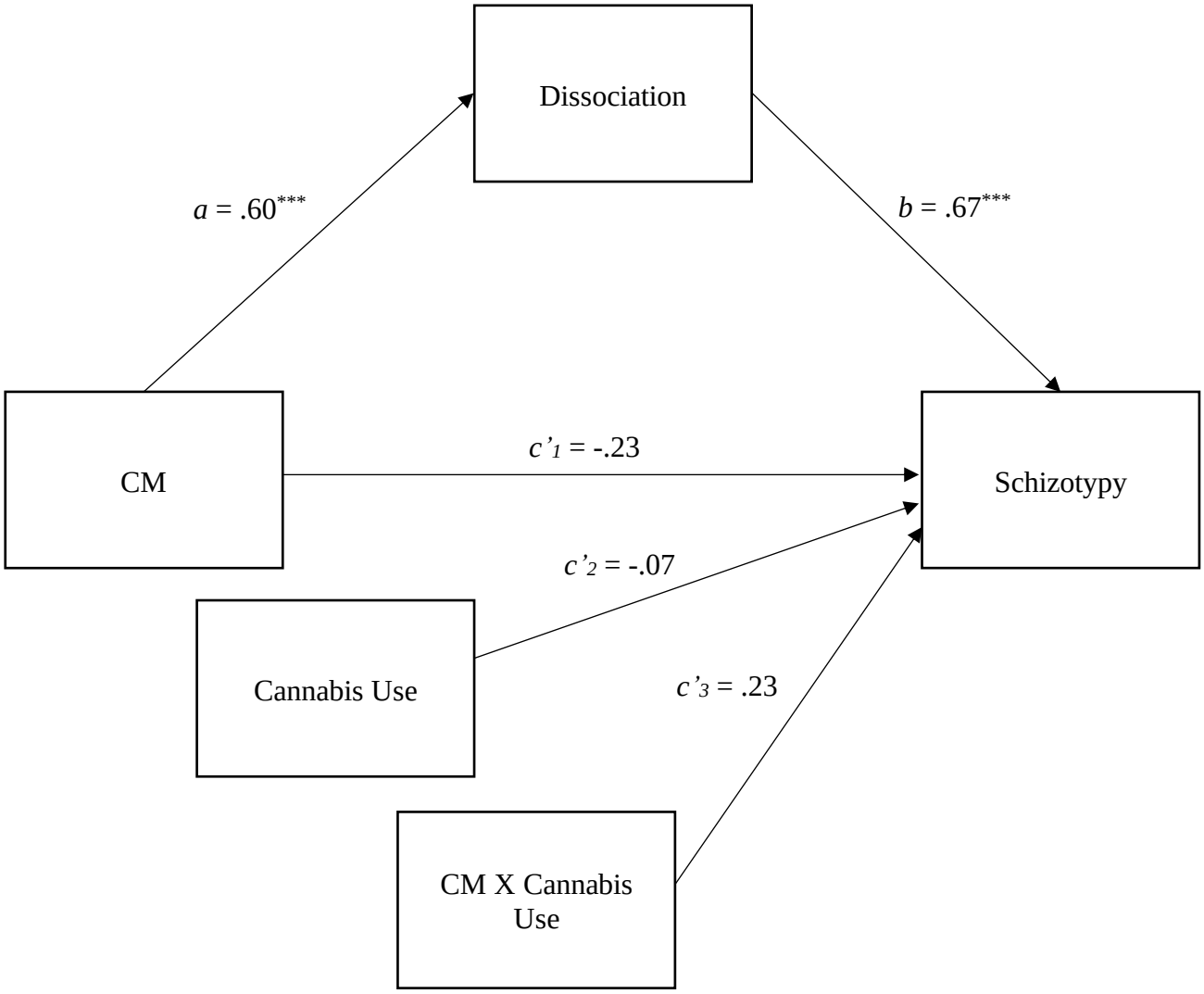


Note. Values are standardized regression coefficients.

*p < .05. **p < .01. ***p < .001.

Figure 7

Conditional Process Statistical Model with Cannabis Use Between Late Adolescence and Young Adulthood as the Proposed Moderator



Note. Values are standardized regression coefficients.

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Appendix

Attention Check Items

1. For this item, please select response four to indicate your attention. (Likert)

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

2. I make frequent trips to the moon.

Never True	Rarely True	Sometimes True	Often True	Very Often True
0	1	2	3	4

3. Please select response two on this question. (Likert)

Never True	Rarely True	Sometimes True	Often True	Very Often True
0	1	2	3	4

4. I ride an elephant to class. (Likert or T/F)

Yes No

5. For this item, please select “rarely or never”. (Likert, adjust wording according to the descriptors in the Likert scale for surrounding items)

Never True	Rarely True	Sometimes True	Often True	Very Often True
0	1	2	3	4

6. I eat lug nuts for breakfast. (Likert or T/F)

Yes No

7. Please select response three on this item (Likert)

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

8. In the past week I have traveled to China, built a house, and wrote a book. (T/F)

Completely Completely

disagree						agree
1	2	3	4	5	6	7

9. ROYGBIV is an acronym that stands for the colors of the light spectrum in their order: red, orange, yellow, green, blue, indigo, violet. Please type the word purple in the blank. Which of the ROYGBIV colors is your favorite? (blank for answer)

_____

10. Sometimes I feel warm or cool. (T/F or agree-disagree Likert scale)

Yes No

Demographics Form

Age:

Gender: Female Male

Major:

GPA:

Ethnicity:
Asian American/Asian
Black/African American
Latino/Hispanic (nonwhite)
Pacific Islander
White/ Caucasian
Other

Year level (circle closest one to your year in school): 1st 2nd 3rd 4th

Mother's Education: pick highest obtained (circle one):

High School Some College 2-year college degree 4-year college degree Masters Degree Doctorate (MD, Ph.D, etc.)

Mothers Occupation:

Father's Education:

High School Some College 2-year college degree 4-year college degree Masters Degree Doctorate (MD, Ph.D., etc.)

Fathers Occupation:

Parents Income Level (circle one; best guess if not certain): below 20,000; 21,000-40,000, 41,000-60,000, 61,000-80,000, 81,000-100,000, above 100,000

Depression

Have you ever been diagnosed with depression? Yes No

Is so when (approximate age)?

Are you currently taking medication for depression? Yes No

If so, how long have you been taking medication for depression?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Anxiety Disorder

Have you ever been diagnosed with an anxiety disorder? Yes No

If so when (approximate age)?

Are you currently taking medication for anxiety? Yes No

If so, how long have you been taking medication for anxiety?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Bipolar Disorder

Have you ever been diagnosed with bipolar disorder? Yes No

If so when (approximate age)?

Are you currently taking medication for bipolar disorder? Yes No

If so, how long have you been taking medication for bipolar disorder?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Substance Abuse

Have you ever been diagnosed with a substance use disorder (SUD)? Yes No

If so when (approximate age)?

Are you currently taking medication for a SUD? Yes No

If so, how long have you been taking medication for a SUD?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Post Traumatic Stress Disorder (PTSD)

Have you ever been diagnosed with PTSD? Yes No

If so when (approximate age)?

Are you currently taking medication for PTSD? Yes No

If so, how long have you been taking medication for PTSD?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Autism Spectrum Disorder (ASD)

Have you ever been diagnosed with an ASD? Yes No

If so when (approximate age)?

Are you currently taking medication for an ASD? Yes No

If so, how long have you been taking medication for ASD?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

ADHD

Have you ever been diagnosed with ADHD? Yes No

If so when (approximate age)?

Are you currently taking medication for ADHD? Yes No

If so, how long have you been taking medication for ADHD?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Schizophrenia or Schizoaffective Disorder (S/SAD)

Have you ever been diagnosed with S/SAD

If so when (approximate age)?

Are you currently taking medication for S/SAD? Yes No

If so, how long have you been taking medication for S/SAD?

Less than 6 months, 6 months- 1 year, 1-3 years, longer than 3 years

Medications you are currently taking:

What medications are you currently taking?

Name of medication:_____

Dose (e.g. how many total milligrams do you take per day)? _____

Family History

Has your *mother* ever been diagnosed with (select all that apply): Depression Anxiety Bipolar Substance Use Disorder PTSD ASD ADHD Schizophrenia/Schizoaffective Disorder

Has your *father* ever been diagnosed with (select all that apply): Depression Anxiety Bipolar Substance Use Disorder PTSD ASD ADHD Schizophrenia/Schizoaffective Disorder

Has your *sister/brother* ever been diagnosed with (select all that apply): Depression Anxiety Bipolar Substance Use Disorder PTSD ASD ADHD Schizophrenia/Schizoaffective Disorder

Hearing Status/Sign Questions

What is your hearing status? Deaf, hard-of-hearing, or hearing? (Select One)

Childhood Trauma Questionnaire Short Form (CTQ-SF)

These questions ask about some of your experiences growing up as a child and a teenager. Although these questions are of a personal nature, please try to answer as honestly as you can. For each question, select the response that best describes how you feel. The scale ranges from 0, which does not describe you very well, to 4, which describes you very well to the corresponding statement.

When I was growing up:

1) I didn't have enough to eat.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

2) I knew there was someone to take care of me and protect me.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

6) I had to wear dirty clothes.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

7) I felt loved.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

8) I thought that my parents wished I had never been born.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

10) There was nothing I wanted to change about my family.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

13) People in my family looked out for each other.

0 1 2 3 4

Never True Rarely True Sometimes True Often True Very Often True

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

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

15) I believe that I was physically abused.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

16) I had the perfect childhood.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

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

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

18) I felt that someone in my family hated me.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

19) People in my family felt close to each other

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

20) Someone tried to touch me in a sexual way, or tried to make me touch them.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

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

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

22) I had the best family in the world.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

23) Someone tried to make be do sexual things or watch sexual thins.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

24) Someone molested me.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

25) I believe that I was emotionally abused.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

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

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

27) I believe I was sexually abused.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

28) My family was a source of strength and support.

1 2 3 4 5

Never True Rarely True Sometimes True Often True Very Often True

29) How old (age in years) were you the first time you experienced this/these event(s)?*

_____

30) How old (age in years) were you the last time you experienced this/these events(s)?*

_____

31) Overall, how many instances of trauma/mistreatment/abuse (physical or sexual abuse and/or physical or emotional neglect) did you experience?*

1 incident 1-5 incidents 6-10 incidents 11-20 incidents over 20 incidents

*Denotes questions that were added in and are not part of the CTQ-SF

Peritraumatic Dissociative Experiences Questionnaire (PDEQ)

Please complete the items below by selecting the number that best describes the experiences you had had during and immediately after the most traumatic occurrence of maltreatment experienced while growing up. If an item does not apply to your experience, please select "not at all true."

1. I had moments of losing track of what was going on. I “blanked out” or “spaced out” or in some way felt that I was not part of what was going on.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

2. I found that I was on “automatic pilot.” I ended up doing things that I later realized I hadn’t actively decided to do.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

3. My sense of time changed. Things seemed to be happening in slow motion.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

4. What was happening seemed unreal to me, like I was in a dream, or watching a movie or play.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

5. I felt as though I were a spectator watching what was happening to me, as if I were floating above the scene observing it as an outsider.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

6. There were moments when my sense of my own body seemed distorted or changed. I felt disconnected from my own body, or it was unusually large or small.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

7. I felt as though things that were actually happening to others were happening to me – like I was in danger when I really wasn’t.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

8. I was surprised to find afterwards that a lot of things happened at the time that I was not aware of, especially things I ordinarily would have noticed.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

9. I felt confused; That is, there were moments when I had difficulty making sense of what was happening.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

10. I felt disoriented; That is, there were moments when I felt uncertain about where I was or what time it was.

Not at all true	Slightly true	Somewhat true	Very true	Extremely true
1	2	3	4	5

Dissociative Experiences Scale II (DES II)

This questionnaire asks about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you are not under the influence of alcohol or drugs. To answer the questions, please determine to what degree each experience described in the question applies to you and select the number to show what percentage of the time you have the experience. 100% means 'always,' 0% means 'never' with 10% increments in between.

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realizing that they don't remember what has happened during all or part of the trip. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

3. Some people have the experience of finding themselves in a place and have no idea how they got there. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

4. Some people have the experience of finding themselves dressed in clothes that they don't remember putting on. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

6. Some people sometimes find that they are approached by people that they do not know, who call them by another name or insist that they have met them before. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they

were looking at another person. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

8. Some people are told that they sometimes do not recognize friends or family members. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

10. Some people have the experience of being accused of lying when they do not think that they have lied. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

12. Some people have the experience of feeling that other people, objects, and the world around them are not real. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

13. Some people have the experience of feeling that their body does not seem to belong to them. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

19. Some people find that they sometimes are able to ignore pain. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they have just mailed a letter or have just thought about mailing it). Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

25. Some people find evidence that they have done things that they do not remember doing. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

28. Some people sometimes feel as if they are looking at the world through a fog, so that people and objects appear far away or unclear. Select the number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

Schizotypal Personality Questionnaire (SPQ)

Please answer each item by selecting either yes or no.

1. Do you sometimes feel that things you see on the TV or read in the newspaper have a special meaning for you?

Yes No

2. I sometimes avoid going to places where there will be many people because I will get anxious.

Yes No

3. Have you had experiences with the supernatural?

Yes No

4. Have you often mistaken objects or shadows for people, or noises for voices?

Yes No

5. Other people see me as slightly eccentric (odd).

Yes No

6. I have little interest in getting to know other people.

Yes No

7. People sometimes find it hard to understand what I am saying.

Yes No

8. People sometimes find me aloof and distant.

Yes No

9. I am sure I am being talked about behind my back.

Yes No

10. I am aware that people notice me when I go out for a meal or to see a film.

Yes No

11. I get very nervous when I have to make polite conversation.

Yes No

12. Do you believe in telepathy (mind-reading)?

Yes No

13. Have you ever had the sense that some person or force is around you, even though you cannot see anyone?

Yes No

14. People sometimes comment on my unusual mannerisms and habits.

Yes No

15. I prefer to keep to myself.

Yes No

16. I sometimes jump quickly from one topic to another when speaking.

Yes No

17. I am poor at expressing my true feelings by the way I talk and look.

Yes No

18. Do you often feel that other people have got it in for you?

Yes No

19. Do some people drop hints about you or say things with a double meaning?

Yes No

20. Do you ever get nervous when someone is walking behind you?

Yes No

21. Are you sometimes sure that other people can tell what you are thinking?

Yes No

22. When you look at a person, or yourself in a mirror, have you ever seen the face change right before your eyes?

Yes No

23. Sometimes other people think that I am a little strange.

Yes No

24. I am mostly quiet when with other people.

Yes No

25. I sometimes forget what I am trying to say.

Yes No

26. I rarely laugh and smile.

Yes No

27. Do you sometimes get concerned that friends or co-workers are not really loyal or trustworthy?

Yes No

28. Have you ever noticed a common event or object that seemed to be a special sign for you?

Yes No

29. I get anxious when meeting people for the first time.

Yes No

30. Do you believe in clairvoyancy (psychic forces, fortune telling)?

Yes No

31. I often hear a voice speaking my thoughts aloud.

Yes No

32. Some people think that I am a very bizarre person.

Yes No

33. I find it hard to be emotionally close to other people.

Yes No

34. I often ramble on too much when speaking.

Yes No

35. My "non-verbal" communication (smiling and nodding during a Y N conversation) is poor.

Yes No

36. I feel I have to be on my guard even with friends.

Yes No

37. Do you sometimes see special meanings in advertisements, shop windows, or in the way things are arranged around you?

Yes No

38. Do you often feel nervous when you are in a group of unfamiliar people ?

Yes No

39. Can other people feel your feelings when they are not there ?

Yes No

40. Have you ever seen things invisible to other people ?

Yes No

41. Do you feel that there is no-one you are really close to outside of your immediate family or people you can confide in or talk to about personal problems?

Yes No

42. Some people find me a bit vague and elusive during a conversation.

Yes No

43. I am poor at returning social courtesies and gestures.

Yes No

44. Do you often pick up hidden threats or put-downs from what people say or do?

Yes No

45. When shopping do you get the feeling that other people are taking notice of you?

Yes No

46. I feel very uncomfortable in social situations involving unfamiliar people.

Yes No

47. Have you had experiences with astrology, seeing the future, UFOs, ESP or a sixth sense?

Yes No

48. Do everyday things seem unusually large or small?

Yes No

49. Writing letters to friends is more trouble than it is worth.

Yes No

50. I sometimes use words in unusual ways.

Yes No

51. I tend to avoid eye contact when conversing with others.

Yes No

52. Have you found that it is best not to let other people know too much about you?

Yes No

53. When you see people talking to each other, do you often wonder if they are talking about you?

Yes No

54. I would feel very anxious if I had to give a speech in front of a large group of people.

Yes No

55. Have you ever felt that you are communicating with another person telepathically (by mind-reading)?

Yes No

56. Does your sense of smell sometimes become unusually strong?

Yes No

57. I tend to keep in the background on social occasions.

Yes No

58. Do you tend to wander off the topic when having a conversation.

Yes No

59. I often feel that others have it in for me.

Yes No

60. Do you sometimes feel that other people are watching you?

Yes No

61. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?

Yes No

62. I attach little importance to having close friends.

Yes No

63. Do you sometimes feel that people are talking about you?

Yes No

64. Are your thoughts sometimes so strong that you can almost hear them?

Yes No

65. Do you often have to keep an eye out to stop people from taking advantage of you?

Yes No

66. Do you feel that you are unable to get "close" to people?

Yes No

67. I am an odd, unusual person.

Yes No

68. I do not have an expressive and lively way of speaking.

Yes No

69. I find it hard to communicate clearly what I want to say to people.

Yes No

70. I have some eccentric (odd) habits.

Yes No

71. I feel very uneasy talking to people I do not know well.

Yes No

72. People occasionally comment that my conversation is confusing.

Yes No

73. I tend to keep my feelings to myself.

Yes No

74. People sometimes stare at me because of my odd appearance.

Yes No

Cannabis Use Questions

1. Have you ever smoked/used cannabis (marijuana)?
Yes
No

2. How old were you when you first tried cannabis (age in years)?
_____

17. Did you use cannabis between the ages of 0 and 11?
Yes
No

18. How often did you use cannabis between the ages of 0 and 11?
Every day
More than once a week
About once a week
About once/twice a month
A few times a year
About once a year
Once or twice

22. Did you use cannabis between the ages of 12 and 16?
Yes
No

23. How often did you use cannabis between the ages of 12 and 16?
Every day
More than once a week
About once a week
About once/twice a month
A few times a year
About once a year
Once or twice

27. Did you use cannabis from the age of 17 and onwards?
Yes
No

28. How often have you used cannabis since the age of 17?
Every day
More than once a week
About once a week
About once/twice a month
A few times a year
About once a year

Once or twice