A Latent Profile Analysis of Posttraumatic Stress and Depressive Symptoms in Adolescents

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Abstract

This study examines how posttraumatic stress (PTS) and depressive symptoms co-occur during early adolescence. Data for participants in the present study were drawn from the National Survey of Child and Adolescent Well-Being. A latent profile analysis (LPA) was conducted on the data from 818 adolescents aged 11 to 14 who self-identified as Black, Latino, or White. A three-class solution was selected as an optimal fit for the data based on fit indices and ease of interpretation. The LPA indicated that PTS and depressive symptoms tended to co-occur in a dimensional manner, with the classes differing only in terms of the severity level of symptoms endorsed. No unique PTS or depression classes were supported. The three classes were thus named as minimal distress, moderate distress, and severe distress. Risk and protective factors associated with membership to each latent class were assessed using multinomial logistic regression. Gender and relational factors had the strongest associations with latent class membership. These results suggest that categorical measures of PTS and depression do not accurately represent how these constructs occur in early adolescence. In addition, several important factors are associated with severity of PTS and depressive symptoms and could be used to target interventions.

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A Latent Profile Analysis of Posttraumatic Stress and Depressive Symptoms in Adolescents

Adolescents are frequently exposed to at least one traumatic event during their childhood. For example, in a community sample of adolescents, over 40% had experienced at least one traumatic event before the age of 18 (Giaconia et al., 1995). Youth exposure to trauma is associated with a range of posttraumatic reactions including affective, behavioral, cognitive, and physiological changes (Armsworth & Holaday, 1993). Perhaps the most commonly studied reaction to trauma is posttraumatic stress (PTS) and the associated mental disorder diagnosis of posttraumatic stress disorder (PTSD). However, evidence suggests that depression also occurs at rates similar to PTS after a trauma (Bryant et al., 2010). The relationship between PTS and depressive symptoms is not well understood and there is considerable debate on the latent structure of these two constructs. The purpose of this study is to provide a better understanding of co-occurring PTS and depression using person-centered and variable-centered methods. First, background literature on PTS and depression will be reviewed separately to summarize each construct. Next, research that has examined both PTS and depression simultaneously will be reviewed to outline current conceptualizations of how these two mental health constructs are associated with each other. Following this, risk and resiliency factors that may be associated with PTS and depressive symptoms will be reviewed. In particular, demographic factors, exposure to violence factors, and relational factors will all be considered.

PTS

PTSD is classified as a mental disorder under the chapter of trauma- and stress-related disorders in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013). An essential diagnostic criterion for PTSD requires exposure to a traumatic event. Examples of traumatic events that may lead to adolescent PTSD include: exposure to family violence, community violence, natural disasters, war, and severe medical conditions (Davis & Siegel, 2000). DSM-5 criteria for PTSD requires that individuals have symptoms classified under four symptom clusters that are present for over a month. The four DSM-5 PTSD symptom clusters are: intrusion symptoms, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity. As DSM-5 criteria do not allow for PTSD to be measured with a dimensional scale, researchers using these criteria nearly always use a dichotomous, presence or absence approach to classifying PTSD.

To properly assess PTS in children and adolescents, it is important to use developmentally sensitive criteria. Research suggests that PTSD in preschool children may be expressed differently from PTSD in adults and that separate diagnostic criteria is warranted (Scheeringa, Zeanah, & Cohen, 2011; Scheeringa, Zeanah, Myers, & Putnam, 2003). Accordingly, DSM-5 criteria for PTSD now include separate criteria for children aged 6 years and younger. However, the question remains whether PTSD might present differently in adolescents. While research on this age group is not as comprehensive as it is for preschool children, research suggests that school-aged children and adolescents may also benefit from modification of the DSM-5 diagnostic criteria (Scheeringa et al., 2011).

When assessing PTSD in youth aged 7 to 14, symptom clusters of PTSD aggregated differently depending on youth age (Carrion, Weems, Ray, & Reiss, 2002). Specifically, re-experiencing/intrusion symptoms were more closely associated with avoidance and arousal symptoms in the later stages of puberty compared to earlier stages (Carrion et al., 2002). This suggests that there are differences in symptom expression from childhood to adolescence, perhaps due to developmentally insensitive diagnostic criteria. To the author's knowledge, studies comparing PTS in adolescence and adulthood have not been done. Therefore, due to potential developmental differences in the presentation of PTS, researchers are cautioned when attempting to generalize results regarding PTS outside of the developmental group that was studied.

PTSD is a concern for mental health professionals due to its prevalence in adolescent populations. In terms of overall prevalence rates, 3.7% of adolescent boys and 6.3% of adolescent girls met 6-month criteria for PTSD using a national household probability sample (Kilpatrick et al., 2003). Of those adolescents who were exposed to a trauma, 14.5% developed PTSD (Giaconia et al., 1995). When specifically examining physical abuse, 18% of boys and 50% of girls who had been physically abused met criteria for PTSD, after taking into account both caregiver and child reports (Ackerman, Newton, McPherson, Jones, & Dykman, 1998). When assessed from childhood to young adulthood, 32.7% of substantiated child abuse and neglect victims who had been physically abused met criteria for lifetime PTSD (Widom, 1999). Adolescents who developed PTSD had more impairment in multiple domains including: more behavioral-emotional problems, more interpersonal problems, less academic achievement, more

health problems, and were at an increased risk for other mental disorders (Giaconia et al., 1995).

While the presence or absence of a diagnosis of PTSD is one way to measure PTS, other researchers measure the severity level of PTS symptoms. PTS symptoms are symptoms of PTSD that may or may not reach clinical levels. By measuring PTS symptoms, it is possible for researchers to examine a range of PTS reactions. For example, a clinical sample of children and adolescents found that 22% of traumatized youth met full criteria for PTSD, 32% had some PTS symptoms but did not meet full criteria for PTSD, and 46% had no symptoms of PTS (Silva et al., 2000). In this sample, witnessing IPV and being physically abused were both predictive of PTS symptom severity (Silva et al., 2000). Lifetime prevalence of PTSD was 9% for Danish adolescents, but an additional 14.1% of the adolescents had subclinical levels of PTSD (Elklit, 2002). Of the traumas experienced by these adolescents, childhood maltreatment (including physical abuse), rape, death in the family, and having a serious illness contributed the most to the development of PTS symptoms (Elklit, 2002). Taken together, these findings suggest that there are a range of PTS symptoms experienced by traumatized youth that may be influenced by family violence. These findings call into question the dichotomous use of PTSD/no-PTSD as an outcome variable.

The distinction between measuring PTSD and measuring PTS symptoms is essentially a difference in the conceptualization of PTS. By assessing the presence or absence of PTSD (i.e. using DSM criteria), the researcher is assuming that the latent structure of PTS is best conceptualized using a categorical model. Categorical models of psychopathology assume that a disorder is qualitatively different from normality, having

distinct causes and outcomes (Coghill & Sonuga-Barke, 2012). In contrast, when researchers measure the severity level of PTS symptoms, they are adopting a dimensional model of PTS. Dimensional models of psychopathology view disorders as being quantitatively different from normality; disorders are extreme variants of normal processes (Coghill & Sonuga-Barke, 2012).

There are at least two primary considerations when determining whether a categorical or dimensional model of a disorder is more appropriate. One consideration is which model does the data empirically support? Common ways to assess this include statistical and mathematical approaches, such as factor analysis, latent class analysis, and taxometric analysis. This allows for the interpretation of the data, relatively free of researcher bias. While a comparison of these different statistical and mathematical approaches is beyond the scope of this paper (for a brief review see Coghill & Sonuga-Barke, 2012), each approach has its own strengths and weaknesses. Models that are supported by several different types of analyses are preferred, ideally replicated with different samples and measures.

Research examining the latent structure of PTS has supported dimensional models. Using two adult community samples, latent class analysis of the American Psychiatric Association's (1994) fourth-edition of the Diagnostic and Statistical Manual (DSM-IV) PTSD symptoms found support for a three-class solution (Breslau, Reboussin, Anthony, & Storr, 2005). The three classes were identified as no disturbance, intermediate disturbance, and pervasive disturbance, which largely support a dimensional model of PTS in which symptoms primarily differed in severity level. The exception to the dimensional model was that the pervasive disturbance class exhibited much greater

emotional numbing symptoms compared to the two less severe classes (Breslau et al., 2005). Therefore it is possible that there are both quantitative and qualitative differences when comparing individuals with low levels of PTS to individuals with high levels of PTS.

The latent structure of PTS in adolescents has also been assessed. For example, the latent structure of PTSD was assessed longitudinally in a national sample of adolescents and Ayer et al. (2011) found support for a three-class solution. The three classes supported in this study were labeled as: no disturbance, intermediate disturbance, and pervasive disturbance. These classes differed largely in terms of symptom severity level, supporting a dimensional model of PTSD. Importantly, the researchers did not find that numbing symptoms differentiated the most severe class from the less severe classes, which illustrates a clear difference from adult samples. The differences in the latent structure of PTSD for adolescents and adults suggest that the developmental stage of the participants should be considered as part of the analyses. Using taxometric approaches, Broman-Fulks et al. (2009) analyzed national data of 2,885 adolescents who were assessed for PTSD symptoms. Results from this study indicated that a dimensional model of PTS was appropriate and called into question the current categorical model of PTSD, as exemplified in the DSM-5. Overall, the strengths of these studies include large samples as well as advanced statistics. As research findings have supported a dimensional model of PTS using both adolescent and adult samples, this suggests that dimensional models of PTS may be more accurate than categorical models.

Another consideration when determining which model to use for conceptualizing a disorder is whether the model provides clinically meaningful information. Even if the

data suggest that PTS is a dimensional construct, if symptom severity below a certain threshold does not inform the researcher and/or clinician about outcomes such as level of impairment, type of support needed, or treatment prognosis, there is not much value in measuring the construct this way. One reason that researchers argue for the examination of PTS symptoms is that adolescents with subclinical levels of PTS may still be significantly impaired compared to adolescents with no PTS symptoms. For example, adolescents who were exposed to trauma, but who did not meet full criteria for PTSD, reported more behavioral-emotional problems, had worse academic performance, more suicide attempts, and poorer health compared to adolescents who were not exposed to trauma (Giaconia et al., 1995). This suggests that subclinical levels of PTS can still impair adolescent functioning. A limitation of this study was that it did not directly associate severity of PTS with negative outcomes.

Recent studies have directly shown an association between PTS symptoms and functional impairment. For example, using DSM-IV criteria for PTSD, youth who met diagnostic criteria for two symptom clusters had similar levels of internalizing problems as did youth who met diagnostic criteria for three symptom clusters (Carrion et al., 2002). In addition, youth who met diagnostic criteria for two or three symptom clusters had significantly more distress of symptoms, social impairment, school impairment, overall impairment, and were more likely to be viewed as clinically impaired, compared to youth meeting criteria for only one symptom cluster (Carrion et al., 2002). However, youth meeting diagnostic criteria for two or three symptom clusters did not significantly differ from each other in terms of the types of distress and impairment listed above (Carrion et al., 2002). Finally, an increase in both frequency and intensity of symptoms were

associated with more impairment (Carrion et al., 2002), indicating that this information may meaningfully contribute to the understanding of how PTS impacts youths' functioning. The results of Carrion and colleagues (2002) are noteworthy because their findings strongly suggest that measuring PTS using a categorical model does not provide the most accurate description of adolescent distress and functioning.

In summary, there are two different models that can be used to examine the structure of PTS: a categorical model and a dimensional model. Past research generally supports a dimensional model of PTS (e.g. Ayer et al., 2011; Broman-Fulks et al., 2009), but replication of these results with different samples is necessary.

Depression

Depression refers to a set of symptoms that reflect negative affectivity. Similar to the discussion of PTS, depression can be conceptualized using two separate models: a categorical model and a dimensional model. In the present study, the term *major depression* will be used when discussing the categorical model of depression based on DSM criteria. *Depressive symptoms* on the other hand will refer to a dimensional model of depression. Broadly speaking, depression is one of the most common forms of psychopathology for adolescents. Using modified DSM-III-R depression criteria, 18.2% of adolescents reported at least 5 symptoms of depression (Saluja et al., 2004). However, there were substantial differences within subgroups within this sample. While only 10.2% of adolescent boys reported depressive symptoms, 25.3% of adolescent girls reported the same (Saluja et al., 2004). When comparing adolescents from different racial/ethnic backgrounds, 14.6% of non-Hispanic African American adolescents, 18.4% of non-Hispanic White adolescents, and 21.7% of Hispanic adolescents of any race reported

depressive symptoms (Saluja et al., 2004). This demonstrates not only the substantial rate of depressive symptoms in adolescents but also how the rates can greatly differ across subgroups.

Youth depression is associated with a host of negative outcomes. For example, major depression in adolescence is associated with an increased risk of later development of major depression, anxiety disorders, nicotine dependence, alcohol use or dependence, suicide attempts, educational underachievement, unemployment, and early parenthood (Fergusson & Woodward, 2002). Adolescents with high levels of depressive symptoms missed more school and had higher rates of smoking, binging, and suicidal ideation (Glied & Pine, 2002). Child and adolescent depression is associated with an elevated risk for psychiatric hospitalization, psychiatric treatment, and being diagnosed with an affective disorder during adulthood (Harrington, Fudge, Rutter, Pickles, & Hill, 1990). As depression is associated with many negative outcomes, it is important to understand the structure of depression to help design and guide interventions.

Taxometric analyses have provided conflicting evidence regarding the latent structure of depression. When assessing major depression symptoms in a sample of children and adolescents, taxometric analyses for all depressive symptoms indicated that a dimensional model of depression was supported (Hankin, Fraley, Lahey, & Waldman, 2005). The dimensional model of depression was also supported when domains of depression (i.e. emotional distress versus involuntary defeat), gender (boys versus girls), reporter of depression (parental versus self-report), and age (children versus adolescents) were compared (Hankin et al., 2005). However this finding has not been replicated in other studies. In another study in which taxometric analysis was used, Richey and

colleagues (2009) found support instead for a categorical model of depression using three independent samples of children and adolescents.

Prisciandaro and Roberts (2009) examined two types of dimensional models of depression (one based on latent class analysis and one based on an additive depressive symptoms scale) and one categorical model of depression based on DSM-III-R criteria for major depressive episodes. When examining predictive validity, both of the dimensional models were more strongly related to outcomes such as role impairment, internalizing symptoms, and externalizing symptoms compared to the categorical model. This study provides strong support for a dimensional model of depression.

A longitudinal study, called the Christchurch Health and Development Study, followed a community cohort of children in New Zealand from birth until age 25. As part of this study, the children were assessed in adolescence (age 17 or 18) and in early adulthood (age 25). Using DSM-IV criteria for major depression, adolescents were separated into groups of depression levels labeled asymptomatic, subthreshold depression, or major depression (Fergusson, Horwood, Ridder, & Beautrais, 2005). Researchers found that both subthreshold and major depression in adolescence were associated with impairments in early adulthood, compared to being asymptomatic in adolescence, but generally outcomes for subthreshold and major depression did not differ from each other (Fergusson et al., 2005). Examples include early adulthood outcomes such as having an increased risk of suicidal ideation and endorsing more depressive symptoms. As this study did not find meaningful distinctions between the categories of subthreshold and major depression, this study does not support a categorical model of depression, at least when using DSM-IV criteria. In general, it appears as though

depression is best assessed with a dimensional model, but conflicting evidence requires further replication.

Comorbidity vs. Co-Occurring: The Use of Terminology

When examining psychopathologies that occur at the same time, it is important to discuss what terminology should be used. The term *comorbidity*, frequently used in the literature, comes from the field of medicine. Comorbidity indicates that an individual has at least two distinct diseases, for example if an individual had diabetes mellitus and hypertension. This concept is understandable in the medical field where diseases have unique etiologies, but the question remains if comorbidity is equally applicable to mental disorders. Indeed the concept of comorbidity has been heavily criticized, particularly when discussing childhood disorders (Krueger & Markon, 2006; Lilienfeld, 2004; Lilienfeld, Waldman, & Israel, 1994; Caron & Rutter, 1991).

It has been well established that childhood mental disorders are 'comorbid' at rates that greatly exceed chance, which suggests that these mental disorders are not entirely separate constructs. One review of the literature found that between 15.9% and 61.9% of children identified as anxious or depressed, have co-occurring anxiety and depressive disorders (Brady & Kendall, 1992). In children and adolescents diagnosed with a major depressive disorder or dysthymia, 30% to 75% have a co-occurring anxiety disorder (Angold & Costello, 1993). There are several reasons for this high rate of comorbidity including: overlapping diagnostic criteria, artificial separation of one underlying construct into two disorders, shared risk or etiological factors, one disorder being an early presentation of another disorder, and using categories when a dimensional model may be more appropriate (Caron & Rutter, 1991; Seligman & Ollendick, 1998).

Until these issues have been addressed, the use of the term comorbidity may be premature. Instead this paper will use the term co-occurring which will be used to mean the presence of psychopathologies that occur at the same time, without any supposition to the underlying construct of the disorders.

Co-occurring PTS and Depressive Symptoms

Co-occurring posttraumatic stress and depression have been heavily researched in several different contexts. For example, PTSD and major depression were assessed 1 week, 1 month, and 4 months post-trauma for adult survivors recruited from a general hospital's emergency room (Shalev et al., 1998). PTSD and major depression were found to co-occur in 44.5% of participants with PTSD at 1 month and 43.2% of participants with PTSD at 4 months. A separate study examined co-occurring PTSD and depression in a sample of women who were in treatment for marital problems and who were physically victimized by their spouses in the last year (Cascardi, O'Leary, & Schlee, 1999). Of the women meeting diagnostic criteria for either PTSD or major depression, 35.9% also met criteria for the other disorder. These studies point to the high likelihood of having co-occurring PTSD and major depression in adult populations.

Co-occurring PTS and depression in adolescence has not been studied as widely, but similar to the research using adult populations, there is a considerable rate of co-occurrence between the two. About forty seven percent (47.3%) of adolescent boys and seventy percent (70.6%) of adolescent girls with PTSD also met criteria for a major depressive episode (MDE; Kilpatrick et al., 2003). Physical assault, witnessed violence, sexual assault, and adolescent gender predicted co-occurring PTSD and MDE (Kilpatrick et al., 2003). However, none of these variables predicted PTSD only and just physical

assault and gender predicted MDE only. Therefore, co-occurring PTSD and MDE may indicate individuals with more severe trauma histories, moderated by gender. As part of a longitudinal study, adolescents were assessed for trauma, PTSD, and major depression, amongst other disorders (Giaconia et al., 1995). Of the adolescents with PTSD, 29.2% met criteria for major depression within the last year and 41.7% met criteria for major depression before the age of 18. Additionally, PTSD was found to precede or emerge at the same time as major depression in 70% of the cases (Giaconia et al., 1995). In a separate study, adolescents exposed to multiple traumas have more severe symptoms of both PTS and depression compared to adolescents exposed to a single trauma, when controlling for childhood adversity and everyday stressful life experiences (Suliman et al., 2009).

Using child-rated reports, Ackerman et al. (1998) found that PTSD significantly co-occurred with major depression, dysthymia, and separation anxiety. Using caregiver-rated reports, PTSD significantly co-occurred with major depression, dysthymia, separation anxiety, and overanxious disorder (generalized anxiety disorder; Ackerman et al., 1998). When analyzed with factor analysis, co-occurring disorders (such as PTSD, mood disorders, anxiety disorders, and behavior problem disorders) were grouped into 3 factors, the first factor including PTSD, mood, and anxiety disorders (Ackerman et al., 1998). This finding provides evidence that PTS and depression may not be separate constructs. However, other researchers have found that PTSD and major depression should not be considered a unitary construct. For example, Blanchard, Buckley, Hickling, and Taylor (1998) analyzed PTSD and major depression in an adult sample of motor-vehicle accident (MVA) victims. Using multivariate factor analysis, Blanchard et al.

(1998) found that PTSD and depression were independent but correlated constructs. These conflicting findings need to be addressed with further analyses.

A major limitation of previous research is the use of categorical models of PTS and depression. This is problematic as it may severely underestimate the rate of co-occurrence of PTS and depression, such as when an individual has elevated levels of PTS and/or depressive symptoms but fails to meet diagnostic criteria by one or two symptoms. Therefore dimensional models of co-occurring PTS and depression should also be assessed. A recent study by Au, Dickstein, Comer, Salters-Pedneault, and Litz (2013) examined co-occurring PTS and depressive symptoms in a sample of 119 women after they had experienced a sexual assault. Using latent profile analysis, Au et al. (2013) found that a four-class solution best fit the data across several time points. These classes were labeled as low, low-moderate, high-moderate, and severe. These classes only differed in terms of severity level of symptoms and each class had relatively equivalent levels of PTS and depressive symptoms. These findings support a dimensional model of co-occurring PTS and depressive symptoms, as no subgroups of primary PTS or depressive symptoms were found. However, there are some important limitations to these findings. One of the most important limitations is the generalizability of this study. By using a sample of adult women who had experienced a sexual assault, it is unclear if similar results would be found for individuals in other developmental stages (e.g. adolescence) and/or for those who had experienced other forms of trauma. Additionally, it is unclear which factors may be associated with membership to these latent classes.

Risk and resilience factors

When attempting to understand the variability in mental health outcomes, it is helpful to consider the concepts of risk and resilience. Resilience is characterized by normal development outcomes "in spite of serious threats to adaptation or development" (Masten, 2001, p. 228). Therefore, resilience factors refer to factors that generally decrease the likelihood of developing negative outcomes when presented with stressors. Risk factors on the other hand, increase the likelihood that an individual will develop negative outcomes in the presence of stressors. Often risk and resilience are treated as a trait of the child, when in fact it is likely more accurate to describe them as a process to be considered within the whole context of many different developmental influences (Sroufe, 1997).

Theory can explain how the developmental context can influence youth outcomes. For example, Bronfenbrenner's (1977) ecological systems theory describes how youth development can be influenced by many different "systems" working together. One of the several systems described by Bronfenbrenner (1977) is the microsystem, which details how youth are influenced by their immediate context such as interactions with their family members and peers. The present study will examine specific risk and resilience factors within an adolescent's microsystem and determine how these factors influence adolescent mental health. Below are the specific risk and resilience factors that may influence adolescent PTS and depressive symptoms, including family violence factors and relational factors. Each of these factors will be discussed in turn.

Family violence

Family violence is a term that encompasses many negative interpersonal behaviors that involve family members. One type of family violence is intimate partner violence (IPV), or violence amongst adult partners or ex-partners. It is estimated that 750,000 to 2.3 million individuals are victims of IPV each year (Rennison, 2003). Adult consequences of IPV include mental health problems, poor physical health, and physical injury (Golding, 1999; Coker et al., 2002). However, it is not only the adults involved who are negatively impacted by IPV. Children and adolescents can also be exposed to IPV in different ways. Exposure to IPV can include seeing, hearing, being directly involved (e.g. attempting to intervene) with a violent event, as well as dealing with the aftermath of a violent event, such as helping a parent who is injured or seeing the police arrest a family member (Edleson, 1999; Evans, Davies, & DiLillo, 2008). An estimated 10% to 20% of youth are exposed to IPV each year (Carlson, 2000). It is therefore critical to understand how this IPV exposure may affect adolescent development.

Children and adolescents exposed to IPV frequently develop a range of negative outcomes (Jaffe, Wolfe, & Wilson, 1990). These outcomes include mental health problems such as anxiety, substance abuse, and conduct problems (Fergusson & Horwood, 1998). The effects of IPV on child mental health problems, such as internalizing and externalizing problems, have been established over and above genetic and shared family variables (Jaffee, Moffitt, Caspi, Taylor, & Arseneault, 2002). A meta-analysis of the effects of IPV exposure on child and adolescent outcomes found that exposure to IPV was moderately related to internalizing and externalizing symptoms, and strongly related to PTS symptoms (Evans, Davies, DiLillo, 2008). There are also factors

that may moderate the impact of IPV exposure on adolescents, including adolescent age, gender, and social support (Evans et al., 2008; Carlson, 2000). Therefore, while there is strong evidence that IPV exposure affects adolescent mental health, it is possible that this exposure may be influenced by other factors.

Another form of family violence is child maltreatment, which includes child physical abuse, sexual abuse, and neglect. In 2001, Child Protective Services (CPS) substantiated approximately 903,000 children as victims of abuse or neglect (U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2003). As this is only the number of substantiated cases, the actual prevalence rate of child abuse and neglect is suspected to be much greater. One specific type of child maltreatment, physical abuse, is characterized by acts such as an adult hitting, kicking, beating, burning, or suffocating a child or adolescent (Hansen, Sedlar, & Warner-Rogers, 1999; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998).

Youth physical abuse is associated with a number of negative outcomes including PTS symptoms, anxiety and depression, aggression, school difficulties, and social withdrawal (Lansford et al., 2002). A study by Silverman, Reinherz, and Giaconia (1996) measured the effect of physical abuse before the age of 18 and its association with psychological functioning. For both males and females, physical abuse was associated with a significantly greater risk for major depression and PTSD at age 21 compared to non-physically abused peers (Silverman et al., 1996). In addition, 50% of physically abused males had two or more co-occurring mental disorders at age 21 compared to 15.2% of their non-physically abused peers (Silverman et al., 1996). Physically abused females had a 41.7% chance of having two or more co-occurring mental disorders at age

21 compared to 9.7% of their similar aged non-physically abused peers (Silverman et al., 1996). These findings indicate that physical abuse is associated with significant mental impairment that does not typically restrict itself to a single diagnosis. While physical abuse was associated with significantly greater depressive symptoms for females at age 15, no differences were detected for males at this age (Silverman et al., 1996). These results likely indicate gender differences in the reporting of depressive symptoms during adolescence, which need to be carefully considered. Adolescent physical abuse is associated with mental health outcomes such as having an increased risk of receiving a diagnosis of major depression, dysthymia, or conduct disorder as well as an increased risk of abusing drugs and smoking cigarettes (Kaplan et al., 1998).

It is important to study both IPV and youth physical abuse due to their high rate of co-occurrence. In a review of the spousal abuse and youth physical abuse literature, co-occurrence rates were conservatively estimated at 40% (Appel & Holden, 1998). However, the relative effects of IPV and physical abuse on child and adolescent outcomes have not been conclusive. For example, a meta-analysis examined the effects of family violence on child and adolescent psychosocial functioning, measuring outcomes such as internalizing symptoms, externalizing symptoms, social problems, and academic problems (Kitzmann, Gaylord, Holt, & Kenny, 2003). Results of the study did not provide evidence that psychosocial outcomes differed for child and adolescent witnesses when compared to physically abused children or physically abused witnesses (Kitzmann et al., 2003). Thus, while the presence or absence of violence in the home may differentiate child outcomes, being a victim of physical abuse compared to a witness of IPV may not necessarily be an important distinction.

However, not all researchers have replicated the finding that physical abuse and witnessing IPV are associated with equivocal outcomes. In a review of the literature of the impact of IPV and youth abuse, the authors conclude that findings are decidedly mixed, perhaps due to differences in samples and methodological factors related to the measurement of violence (Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008). In a sample of adolescents, a general construct of maltreatment, composed of exposure to IPV, physical abuse, sexual abuse, and neglect predicted internalizing and externalizing symptoms (Herrenkohl & Herrenkohl, 2007). Of the four constructs, only physical abuse and sexual abuse had specific associations with adolescent outcomes. Physical abuse was associated with externalizing symptoms, whereas sexual abuse was associated with both internalizing and externalizing symptoms (Herrenkohl & Herrenkohl, 2007). Furthermore, Israeli child witnesses of IPV had higher levels of internalizing and externalizing problems compared to nonwitnesses, but fewer problems compared to physically abused children (Sternberg, Lamb, Guterman, & Abbott, 2006).

One explanation for differential outcomes based on type of abuse experienced may be that specific outcomes such as externalizing problems are more closely associated with physical abuse (Herrenkohl et al., 2008). Social learning theory (Bandura, 1977) may offer an explanation for why this may be the case. Using this framework, youth who see physical violence modeled for them may then themselves engage in physical violence. However, findings are not clear with regards to the development other symptoms of trauma such as PTS and depression. Due to the importance of family violence in predicting traumatic responses, IPV and physical abuse will be assessed at two waves to determine how exposure to violence may predict trauma symptoms and be

concurrently associated with trauma symptoms. In addition, exposure to violence will be considered within the context of other potentially salient variables. Some of the most important immediate influences in adolescent development are family and peer influences (Cook, Herman, Philips, & Settersten, 2002). A literature review of the effects of domestic violence on youth has described the importance of adopting a resiliency framework, highlighting how constructs such emotional support and positive peer relationships can be instrumental in preventing psychosocial problems (Holt, Buckley, & Whelan, 2008). Therefore, it is important to understand how other factors may influence the impact of exposure to violence on PTS and depressive symptoms.

Parent emotional support

The importance of parental factors on adolescent development, including mental health outcomes, has long been established (e.g. Steinberg, 2011; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Repetti, Taylor, & Seeman, 2002). Vazsonyi and Belliston (2006) examined how different maternal and paternal parenting variables (closeness, support, monitoring, communication, conflict, and peer approval) were associated with depressive and anxiety symptoms in a large sample of adolescents from four different countries (the United States, Hungary, the Netherlands, and Switzerland). In all countries, parenting support and conflict had the strongest relationship with depressive and anxiety symptoms. Specifically, higher levels of parenting support and lower levels of parental conflict are associated with lower levels of adolescent depressive and anxiety symptoms. In addition, these effects held constant from middle to late adolescence suggesting that these parental influences are stable until at least late adolescence. Maternal emotional support will be included in the analyses as a resilience

factor to determine if it helps protect adolescents from developing PTS and depressive symptoms.

Peer loneliness and social dissatisfaction

While parental factors consistently impact child and adolescent development, peer factors become increasingly influential as children transition into adolescence (for a review see Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). Adolescents are increasingly expected to spend more time with their peers as they age, and failing to do so has been associated with negative outcomes. In this light, prosocial peer support is typically viewed as one of the most important resiliency factors for adolescents (Masten & Coatsworth, 1998; Fergus & Zimmerman, 2005). For example, in child survivors of Hurricane Andrew, perceived social support from classmates significantly predicted PTS symptoms (Vernberg, La Greca, Silverman, & Prinstein, 1996). Perceived availability of social support from friends has also been associated with fewer trauma-related symptoms (e.g. PTS, depression, fear, anger, dissociation) in non-sexually abused adolescents (Bal, Crombez, Van Oost, & Debourdeaudhuij, 2003). However, this same effect was not found for sexually abused adolescents (Bal et al., 2003), indicating that there may be limits to the protective nature of peer support.

If peer support is considered a resilience factor, then a lack of peer support (i.e. peer loneliness) can be conceptualized as a risk factor. When assessing the impact of peer and parental relationship risks on mental health, high levels of loneliness and low social acceptance predicted depressive symptoms approximately 7 years later when adjusting for covariates (Adam et al., 2011). In an 8-year longitudinal study, while peer-related loneliness at any single time point did not predict adolescent depressive symptoms,

prolonged loneliness was predictive of depressive symptoms (Qualter, Brown, Munn, & Rotenberg, 2010). Taken together, research findings suggest that peer influences, especially peer loneliness, are associated with negative mental health outcomes in adolescence. Therefore, this study will examine whether peer loneliness serves as a risk factor for PTS and depressive symptoms.

Study Objectives

The present study has two core objectives: (a) identify subgroups of adolescents with PTS and/or depressive symptoms; (b) determine risk and protective factors associated with these latent classes. Regarding study objective (a), the present study expects to replicate past research by supporting a dimensional model of co-occurring PTS and depressive symptoms. Regarding study objective (b), exposure to family violence and relational factors will both be examined. Family violence factors, measured by physical abuse and witnessed violence in the home, are expected to serve as risk factors for PTS and depression. When examining relational factors, caregiver emotional support is expected to serve as a protective factor and peer loneliness is expected to serve as a risk factor for PTS and depressive symptoms.

The present study will extend previous research by using a sample that has not previously been used, namely adolescents involved with the child welfare system. In addition, the present study will extend previous research by including all adolescents, not just adolescents who reported a trauma. This will be done because the presence of depression does not require exposure to a traumatic event and the possibility of a depression-only latent class needs to be examined. Theoretically, by including all adolescents, there should be a greater likelihood for the LPA to differentiate PTS-only

and depression-only latent classes. Results of the LPA can help determine the distinctiveness of PTS and depression as separate constructs. In addition, the model may aid in the interpretation of categorical versus dimensional conceptualizations of co-occurring PTS and depressive symptoms.

The theoretical basis for this study will be risk and resilience research (e.g. Masten, 2001) as well as ecological systems theory (Bronfenbrenner, 1977). An extension of ecological systems theory, is an ecological-transactional model as advocated by Cicchetti and Lynch (1993). This ecological-transactional model incorporates the nested systems outlined in ecological systems theory, but also emphasizes the role of change over time for both the youth and his or her context. This ecological-transactional model was specifically designed to understand the impact of community violence and child maltreatment on youth development, but has since been adapted to understand youth development more generally (Lynch & Cicchetti, 1998). The present study will use the ecological-transactional model as a framework by examining the association between PTS symptoms, depressive symptoms, risk factors, and resilience factors at two different time points.

Method

Participants

The present study is based on data from participants in the National Survey of Child and Adolescent Well-Being (NSCAW) dataset. NSCAW is a nationally representative, longitudinal study of youth and their families who came into contact with the child welfare system between October 1999 and December 2000 (Wave 1). The original study focused on families who were the subject of child abuse or neglect

investigations conducted by Child Protective Services (CPS) during Wave 1. Wave 3 of the study was conducted 18 months after the close of the CPS investigation conducted at Wave 1. Adolescent-reported information was not collected at Wave 2 (12 months after Wave 1) and thus Wave 2 information was not examined in the present study. Adolescents were included in the present study if they met three criteria: (a) they completed both the PTS and depression measures at Wave 3, (b) were 11 to 14 years old at Wave 1, and (c) identified as being Black and non-Hispanic/Latino (hereafter referred to as Black), White and non-Hispanic/Latino (hereafter referred to as White), or Hispanic/Latino of any race (hereafter referred to as Latino). Criterion (a) was included so that all adolescents in the study could be assigned into latent classes. This was important as latent class membership was required in order to assess risk and resilience factors associated with the latent classes. Criterion (b) was included so that PTS and depressive symptoms could be assessed during a single developmental period, namely early adolescence. There is evidence to suggest that the latent structure of PTS and depression may change as youth age (Ayer et al., 2011; Scheeringa et al., 2011; Carrion et al., 2002), thus only one developmental period was used in the current study. Criterion (c) was included to examine potential racial/ethnic differences in the severity level of PTS and depressive symptoms, after controlling for other relevant predictors such as socioeconomic status (SES). The final sample for this study consisted of 818 adolescents aged 11 to 14 years old (see Table 1 for the breakdown of participant age, gender, and race/ethnicity).

Measures

Demographic information. Adolescent age, gender, race, ethnicity, and family income were reported by the adolescent's primary caregiver. Adolescent race and ethnicity were recoded into Black non-Latino (Black), Latino of any race (Latino), and White non-Latino (White).

PTS symptoms. PTS symptoms were measured with the Trauma Symptom Checklist for Children (TSCC) Posttraumatic Stress (PTS) scale (Briere, 1996). The PTS scale contains 10 items that ask whether specific PTS symptoms happen to the youth. The TSCC-PTS scale is scored with a 4-point Likert-type scale (0 = never, 1 = sometimes, 2 = lots of times, 3 = almost all of the time). The TSCC was normed on a sample of 3008 racially and economically diverse youth (Briere, 1996). A review of the literature indicates that the TSCC is an excellent measure that demonstrates high internal consistency, strong construct validity, convergent and discriminant validity, and criterion validity (Strand, Sarmiento, & Pasquale, 2005). In the present study, PTS raw scores were converted to *T*-scores using the look-up tables in the Normative Data (Raw- to *T*-score Conversions) for TSCC Scales and Subscales chart (Briere, 1996). The TSCC-PTS scores demonstrated good internal consistency in the present study ($\alpha = 0.85$).

Depressive symptoms. Adolescent depressive symptoms were measured with the Child Depression Inventory (CDI; Kovacs, 1992). The CDI contains 27 items that assess the presence of depressive symptoms as indicated by five factors: Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem. Items are scored using a 3-point Likert-type scale (0 = absence of symptom, 1 = mild symptom, 2 = definite symptoms). Test-retest reliability for the CDI ranges from .38 to .87 depending

on the time interval and sample (Kovacs, 1992). The internal reliability of the CDI has been found to be adequate and not differ by race or gender, although scores did differ by age (Helsel & Matson, 1984). Evidence for discriminant validity is mixed, but significant differences have been found between normative and clinical groups (Kovacs, 1992). CDI raw scores were converted to *T*-scores using the look-up tables as found in Kovacs' CDI Profile Form published by Multi-Health Systems, Inc. The CDI had good internal consistency for the total score ($\alpha = 0.88$), while the internal consistency of the subscales ranged from 0.57 to 0.70.

Physical assault victimization. Physical assault victimization was measured with the Parent-Child Conflict Tactics Scale (CTS-PC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). The CTS-PC is measured with an 8-point Likert-type scale (1 = 1 time, 2 = 2 times, 3 = 3 to 5 times, 4 = 6 to 10 times, 5 = 11 to 20 times, 6 = more than 20 times, 7 = not in the past 12 months, 8 = never) to assess the frequency of specific acts of physical and psychological aggression. For this study, the Physical Assault scale was used which consists of three subscales: minor physical assault (corporal punishment), severe physical assault, and very severe physical assault. The scale measured the frequency of these different types of assault that occurred in the past year. The CTS-PC has moderate construct validity and low to moderate reliability (Straus et al., 1998). In the present sample, the CTS-PC had good internal consistency across waves (Wave 1 $\alpha = 0.89$; Wave 3 $\alpha = 0.90$).

Witnessed violence. Violence in the home witnessed by adolescents was measured with the Violence Exposure Scale for Children (VEX-R; Fox & Leavitt, 1995). The VEX-R measures both mild violence and severe violence. The VEX-R uses a 4-point

Likert scale and the intensity of the violence was scored as 'Never' = 0, 'One Time' = 1, 'A Few Times' = 2, and 'A Lot of Times' = 3. For this study, adolescent witnessed-violence scores were the averaged sum of the mild witnessed-violence and severe witnessed-violence intensity scores. The validity of the VEX-R was supported by its ability to discriminate between low-violence and high-violence school communities (Raviv, Raviv, Shimoni, Fox, & Leavitt, 1999). Children who reported more exposure to violence also reported higher levels of emotional distress (Raviv et al., 1999). Similarly, greater exposure to violence as rated with the VEX-R was associated with higher levels of distress symptoms in a sample of older children in foster care (Stein et al., 2001). The VEX-R demonstrated good internal consistency in the present study (Wave 1 $\alpha = 0.84$; Wave 3 $\alpha = 0.86$).

Parental emotional security. Parental emotional security was measured using the Rochester Assessment Package for Schools (RAPS-S; Lynch & Cicchetti, 1991; Wellborn & Connell, 1987). Using a Likert 4-point scale, adolescents rated how true statements were (1 = not at all true, 2 = not very true, 3 = sort of true, and 4 = very true). The Parental Emotional Security subscale was used, which consisted of 3 questions that assessed how true it was that the adolescent felt good, mad, or unhappy with his or her caregiver. Items were recoded so that higher scores indicated better adolescent emotional security with their caregiver. Parental emotional security was assessed at Wave 1 and Wave 3 to examine how it predicted and was concurrently associated with PTS and depressive symptoms. Internal consistency for this measure with the present sample was acceptable (Wave 1 $\alpha = 0.65$; Wave 3 $\alpha = 0.67$).

Loneliness/social dissatisfaction. Adolescent loneliness and social dissatisfaction was measured with a revised version of the Loneliness and Social Dissatisfaction Questionnaire for Young Children (Asher & Wheeler, 1985). The Loneliness and Social Dissatisfaction Questionnaire for Young Children is scored using a 15-item, 5-point Likert-type scale (1 = Never, 2 = Hardly Ever, 3 = Sometimes, 4 = Most of the Times, 5 = Always). Items 1, 3, 5, 7, 10, and 15 were reversed scored so that for the sum of all questions, higher scores indicated greater loneliness. Adolescent scores of loneliness were rated at Wave 1 and Wave 3. The Loneliness and Social Dissatisfaction Questionnaire for Young Children demonstrated good internal consistency in the present sample (Wave 1 $\alpha = 0.90$; Wave 3 $\alpha = 0.88$).

Statistical Analyses

Latent profile analysis

The present study used latent profile analyses, a person-centered approach, to examine co-occurring PTS and depressive symptoms. Person-centered analyses are useful for identifying variation within a sample where individuals can be grouped with other similar individuals (Laursen & Hoff, 2006). Individuals within a group should display similar patterns of responses on indicator variables and display different patterns of responses when compared to individuals assigned to different groups. The present study conducted a specific type of person-centered analysis called latent class analysis (LCA). When examining psychopathology, LCA allows researchers to examine how symptoms naturally present themselves based on symptom patterns. As noted in the introduction, many studies examining the structure of PTS and depression have used factor analysis (e.g. Blanchard et al., 1998). This is potentially problematic due to some of the

assumptions of factor analysis including the assumption of multivariate normality and the requirement for all variables to be continuous (Magidson & Vermunt, 2003). Variables are often measured with dichotomous, ordinal, or count scales, which calls into question the appropriateness of factor analysis as these variables will not be linear (Magidson & Vermunt, 2003). LCA on the other hand, makes no assumptions about linearity and can handle skewed data (Magidson & Vermunt, 2000). Another type of analysis that can measure groups of symptoms is cluster analysis. However, LCA has been demonstrated as being substantially more accurate than cluster analysis (Magidson & Vermunt, 2002). This is because LCA is based on a statistical model that allows for more formal criteria (discussed later) to compare different numbers of clusters or classes, which is not possible with cluster analysis (Magidson & Vermunt, 2000).

The purpose of LCA is to identify categorical latent class variables using observed response variables (class indicators). A specific type of LCA is LPA, which differs from LCA in that class indicators are continuous in LPA (e.g. rating symptoms of depression on a scale from 1 to 10) as opposed to categorical as in LCA (e.g. are the symptoms present or not present). However, both LCA and LPA are types of latent variable mixture models (LVMM), and the statistics are identical in the two types of analyses. Thus there is no real need to differentiate between the two. However, for the sake of clarity, this study will refer to the analyses conducted as LPA as the class indicators are measured on a continuous scale.

The basic formula for an LPA is

$$f(\mathrm{y}_i|\theta) = \sum_{k=1}^{K} \pi_k f_k\,(\mathrm{y}_i|\theta_k)\,, \tag{1}$$

where y_i is the cluster indicator, *K* is the number of clusters, and π_k is the prior probability of belonging to latent class *k*. The distribution of y_i given the model parameters θ is expressed as $f(y_i|\theta)$, and it is assumed that this distribution is a combination of class-specific values, or $f_k(y_i|\theta_k)$. The model parameter θ is composed of μ_k, which represents the class-specific means and Σ_k, which represents the class-specific covariance matrices. An important consideration of LPA is the assumption of local independence (also referred to as conditional independence), which assumes that all within-cluster covariances are equal to zero (i.e. that Σ_k are all diagonal matrices). This assumption means that correlations between latent class indicators are explained entirely by membership to a particular latent class.

An advantage of LPA over traditional cluster analysis is the availability of statistical indicators to determine the number of classes that best fit the data. LPA model parameters are estimated using maximum likelihood (ML) estimation using the expectation-maximization (EM) algorithm. This provides different estimated starting values for model parameters, which are tested with each set of values providing a likelihood value. The likelihood value is the probability of having the observed data using those parameter estimates. Parameter estimates with the highest likelihood value are chosen, as they indicate the estimates most likely to have provided the collected data. The logarithmic value of the likelihood (termed the log-likelihood or LL value), is typically used with values closest to 0 indicating the best fit.

When different models are being compared, a likelihood ratio test (LRT) is used to compare models with *K* and *K* – 1 classes but with identical parameterization. The log-likelihood difference test, which uses a chi-square difference distribution, has been

commonly used as an LRT. However, there are two significant weaknesses with using this chi-square LRT. First, the chi-square distribution does not work well in situations where some classes have low numbers of subjects assigned to them. Second, in these cases of cells with small samples, models are rarely rejected and thus the test offers no useful information (Nylund, Asparouhov, & Muthén, 2007).

The Lo-Mendell-Rubin likelihood ratio test (LMR; Lo, Mendell, & Rubin, 2001) is a significance test that approximates the LRT distribution. A *p*-value associated with this test that does not reach statistical significance (typically $\alpha = .05$) indicates that the model with $K - 1$ clusters is superior to the more complex model of K clusters. Another alternative to the classic LRT involves bootstrapping the LRT to obtain a *p* value that compares K with $K - 1$ classes (McLachlan & Peel, 2000). This method is referred to as the Bootstrapped Likelihood Ratio Test (BLRT) and has proven to be a good indicator of the correct number of classes in comparison to other significance tests (Nylund et al., 2007). Similar to the LMR, when the BLRT does not reach statistical significance, it suggests that a model with $K - 1$ classes is superior to a more complex model of K classes.

In addition to these LRT tests, statistical information criteria (IC) are used to determine the appropriate number of classes in LPA. One of the most well-known of these IC is the Bayesian Information Criterion (BIC; Schwartz, 1978). The BIC can be calculated using the log-likelihood,

$$\text{BIC} = -2LL + p\ln N, \tag{2}$$

where p is the number of parameters being estimated and N is the sample size. In addition, a sample size-adjusted BIC (aBIC) can be calculated which uses N^* (where N^*

= (N + 2)/24) instead of N in Eq. (2). Another IC that is commonly used is the Akaike's Information Criterion (AIC; Akaike, 1987) which is defined as

$$\text{AIC} = -2LL + 2p. \quad (3)$$

However, the AIC does not perform as well as either the BIC or aBIC and thus should not be used as the sole indicator of the correct number of classes (Nylund et al., 2007). The model with the lowest IC values is considered to be the best fit to the data.

Researchers take into account these LRT and IC values and combine them with substantive theory to interpret the best fit for the data in regards to the number of classes for the particular model. It is also encouraged that researchers graph their solutions to aid with their understanding of the differences between models. When a model with K classes does not offer much unique information in regards to the interpretability of the model or when a latent class has a very low number of participants assigned to that class, a simpler solution, $K - 1$ classes, is preferred. All these methods will be used to determine the most appropriate model for co-occurring PTS and depressive symptoms in the present sample.

There is some difficulty in conducting power analyses using LPA, but a study by Nylund and colleagues (2007) examined power and Type I error rates for both LCA and LPA structures using Monte Carlo simulations. These Monte Carlo simulations were tested with a range of latent class indicators and complexity of the structures and can provide a framework for the present analyses. Regarding LPA and Type I error rates, the LMR test was found to have error rates ranging from .06 to .03 depending on the complexity of the structure and how many items were used as class indicators, given a sample size of 500 participants (Nylund et al., 2007). The BLRT had Type I error rates

ranging from .03 to .01 depending on the complexity of the structure given a sample of 500 participants (Nylund et al., 2007). Therefore both of these tests have acceptably low Type I error rates given at least 500 participants. Power analyses indicated that both LMR and BLRT had power of 1.00 given 500 participants, no matter the complexity of the structure (Nylund et al., 2007). As the present study had a sample of 818 participants, it is likely that the LMR and BLRT will find the appropriate solution.

One of the purposes of conducting a LPA can be to assign individuals to latent classes. This is known as posterior class membership and the most common way to use this classification is with modal assignment, where individuals are assigned to the latent class they have the highest probability of belonging to (Vermunt & Magidson, 2004). After being assigned to a particular latent class, it is possible to conduct variable-centered analyses to determine how individuals in each class may differ in regards to specific variables. This approach combines both person-centered and variable-centered analyses.

LPA was run using Mplus Version 6.12 and the maximum number of latent classes was restricted to six classes. There are no strict guidelines about the maximum number of classes, but the restriction to six latent classes was chosen to maximize the interpretability of the different models and minimize capitalization on chance due to small sample sizes in each class. Adolescent depressive symptom scores were separated into the subscales available with the CDI: negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem. This was done to allow for increased variability in the analyses in relation to finding distinct subgroups within the sample. The measure for PTS symptoms did not have any subscales and thus only a total PTS symptom score was provided.

Multinomial logistic regression

Once the best model was selected, participants were assigned to the latent class they were most likely to be assigned to. Risk and resilience factors for latent class membership were then examined with multinomial logistic regression. Multinomial logistic regression was conducted in SPSS Version 21. The risk and resilience factors were examined using three different models. The first model examined only how demographic factors were associated with latent class membership. The second model examined the demographic factors and family violence factors (physical assault victimization and witnessing violence in the home). The third and final model examined demographic factors, family violence factors, and relational factors (parent emotional support and peer loneliness) simultaneously.

Results

Intercorrelations between the class indicators used in the LPA are available in Table 2. While all of the class indicators were significantly correlated with each other, none of the correlations was above .66, suggesting that each indicator conveyed some unique information. Model fit indicators from the LPA are available in Table 3. Not all indices provided a clear answer as to the correct number of classes. However, the 3-class solution was selected as the best fit due to the LMR and aLMR values and the interpretability of the model. While some have suggested that BLRT values are superior to other model indices (Nyland et al., 2007), BLRT values never reached significance in the present study and thus did not provide any information regarding the correct number of classes. Lower IC values represent improvement over models with higher IC values, but the IC values never reached an asymptotic low. Thus, while the 3-class model does

have support from past research and both LMR and aLMR values, the following results may need to be interpreted with caution.

Figure 1 shows a graphical representation of the 3-class solution. Estimated means for each class indicator, separated by class can be found in Table 4. The 3-class solution did not support any distinct PTS or depression classes. Instead, each class had relatively equivalent levels of PTS and depressive symptoms, and each class differed only in terms of intensity of PTS and depressive symptoms. This indicates that co-occurring PTS and depressive symptoms are most accurately described as being dimensional in nature. The three classes were labeled as mild, moderate, and severe. The mild class had the lowest PTS and depressive symptoms. The severe class roughly approximates a clinical class, with *T*-scores around the 60 to 65 range for both PTS and depressive symptoms. The moderate class had PTS and depressive symptoms that fell in between the mild and severe classes.

Posterior class membership was calculated and each adolescent was assigned to the class they were most likely to belong to (see Table 5). Once each adolescent was assigned to a latent class, multinomial logistic regression was performed to examine which factors were associated with class membership. Results of the multinomial logistic regression are separated for the mild versus the moderate classes (Table 6), the mild versus the severe classes (Table 7), and the moderate versus the severe classes (Table 8). An odd's ratio (OR) greater than 1 indicates that a one unit increase (if the variable is ordinal, interval, or ratio) or presence of that variable compared to a reference variable (if the variable is nominal) is associated with a greater likelihood of belonging to a class in comparison to the reference class. An OR less than 1 indicates a decrease in the

likelihood of belonging to a class compared to the reference class. For example, when comparing the mild and moderate classes in Table 6, the mild class is the reference class. Looking at Model 2, witnessing violence at Wave 3 was significantly associated with class membership. The specific OR value of 1.20 indicates that individuals who experienced a one unit increase in physical assault victimization were 1.2 times more likely to belong to the moderate class compared to the mild class. When examining the same model, gender was also a significant predictor of class membership, meaning that, compared to females, males were less than half as likely (OR = 0.49) to belong to the moderate class compared to the mild class.

When comparing the mild versus the moderate classes, gender was a consistent predictor of class membership, significantly associated with class membership in Models 1, 2, and 3. In these models, identifying as male was associated with a smaller likelihood of belonging in the moderate class compared to the mild class. Physical-assault victimization and witnessed violence at Wave 3 were both significantly associated with class membership in Model 2. For both of these factors, being exposed to family violence was associated with an increased likelihood of belonging to the moderate class versus the mild class. When examining Model 3, caregiver emotional support and peer loneliness at Wave 3 were both associated with class membership and the influence of the family violence factors were reduced to non-significant levels. Greater caregiver emotional support was associated with a smaller likelihood of belonging to the moderate versus the mild class. Increased peer loneliness was associated with a greater likelihood of belonging to the moderate versus the mild class.

When comparing the mild versus the severe class (Table 7), gender was again a consistent predictor of class membership across models. In Model 2, gender, identifying as Latino, physical victimization at Wave 3, and witnessing IPV at Wave 3 were all significantly associated with class membership. Men were less likely to belong to the severe class compared to the mild class. Adolescents who identified as Latino were more likely to belong to the severe class compared to the mild class. Greater physical assault and witness IPV at Wave 3 were associated with a greater likelihood of belonging to the severe class compared to the mild class. However, similar to before, when relational factors were added in Model 3, the influence of family violence factors were reduced to non-significant levels. In addition, identifying as Latino no longer was associated with class membership. Lastly, when comparing the moderate versus the severe class, while gender was associated with class membership in Model 1, only witness IPV was associated with class membership in Model 3. Witnessing more IPV at Wave 1 was associated with an increased likelihood of belonging to the severe compared to the moderate class.

Discussion

Results of the LPA demonstrated that PTS and depressive symptoms tended to co-occur at similar levels of symptom severity. For example, adolescents who had high levels of PTS symptoms also tended to have high levels of depressive symptoms, and vice versa. In addition, the latent classes differed only in terms of PTS and depressive-symptom severity level (i.e. mild, moderate, or severe); no qualitative differences were found between the classes. No primarily PTS class or primarily depressive classes were identified, which calls into question the distinctiveness of these two constructs. As

adolescents were not necessarily exposed to a traumatic event, a primarily depressive class might have been expected. It is important to note that the LPA findings do not signify that no adolescents reported a primarily depressive or primarily PTS profile. Instead, the LPA findings indicate that in general, a model where adolescents reported comparable levels of PTS and depressive symptoms best fit the data.

This dimensional model of co-occurring PTS and depressive symptoms is consistent with past research that has supported a dimensional model of co-occurring PTSD and depression symptoms (i.e. Au et al., 2013). A three-class solution best fit the present data and the classes were labeled as: mild, moderate, and severe. This solution differs slightly from the Au et al. (2013) study, where a four-class solution best fit the data. The difference in these findings may be due to the different developmental periods used, the different measures used, and/or the difference in requiring a traumatic event to occur or not. Regardless, both studies support a dimensional model of co-occurring PTS and depressive symptoms and together these studies suggest that this model is applicable from adolescence to adulthood, although further verification is needed.

DSM-5 criteria added "negative alterations in mood or cognition" as a cluster of symptoms for PTSD, supported by the work of the DSM-5 Trauma, PTSD, and Dissociative Disorders Sub-Work Group of the Anxiety Disorders Work Group (Friedman, Resick, Bryant, & Brewin, 2011). The decision to add this symptom cluster to the DSM-5 diagnosis of PTSD was based in part on a meta-analysis of the factor structure of PTSD by Yufik and Simms (2010). This meta-analysis concluded that PTSD was best conceptualized as a four-factor construct, with the separate factors identified as: Intrusions, Avoidance, Hyperarousal, and Dysphoria. A subsequent literature review also

supported a four-factor structure, with the fourth structure being either emotional numbing or dysphoria (Elhai & Palmieri, 2011). While this change remains controversial due to disagreement about whether disorders should include criteria that are not disorder-specific (Brewin, Lanius, Novac, Schnyder, & Galea, 2009), in general these studies suggest that researchers and clinicians already acknowledge that there is some overlap between PTSD and depressive symptoms. What remains unclear is how negative alterations in mood or cognition as related to PTSD differ from depression. The NSCAW data was collected before the DSM-5 PTSD criteria changes were made and thus it was not possible to address this controversy in the present study. However, it will be important for future studies to examine both DSM-5 PTSD and major depression symptoms and verify that analyses such as factor analysis, latent class analysis, and taxometric analysis support the distinction between the two disorders.

The present LPA findings contribute to the literature by using a developmental period that had not been previously examined (adolescence) and by not requiring the adolescents to have experienced a specific traumatic event as a study inclusion criterion. It is important to note that due to the at-risk nature of this sample (families who were referred to CPS) and the lack of direct measurement of general trauma exposure, it is unclear how many of the adolescents witnessed or experienced a traumatic event in their lifetime. Given the high risk these adolescents were in for exposure to violence, it is not surprising that roughly six percent of the adolescents were assigned to the severe class and reported PTS and depressive symptoms that approximated clinical levels.

Once adolescents were assigned to a latent class, multinomial logistic regression examined which factors were associated with latent class membership. Of the

demographic factors, only gender was associated with class membership in the final models. This is consistent with past research that has shown females to be at increased risk for both PTS and depressive symptoms (e.g. Kilpatrick et al., 2003; Tolin & Foa, 2006; Wade, Cairney, & Pevalin, 2002). Examination of both demographic and family violence factors simultaneously found that physical assault and witnessing violence at Wave 3 were associated with class membership when comparing the mild versus moderate classes and the mild versus severe classes. However, the influence of family violence factors on PTS and depressive symptoms was reduced to non-significant levels when also accounting for relational factors. Parent emotional support and peer loneliness at Wave 3 were both significantly associated with class membership when comparing the mild versus moderate classes and the mild versus severe classes in the final model accounting for all factors. These findings suggest that relational factors have a greater impact on co-occurring PTS and depressive symptoms compared to family violence factors.

It is surprising that family violence factors were not significantly associated with class membership in the final model, as past research has found that youth maltreatment is associated with PTS and depressive symptoms even in adulthood (Duncan, Saunders, Kilpatrick, Hanson, & Resnick, 1996; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2008). There are several reasons why this may have been found. One potential explanation is that adolescents were asked to self-report family violence that had occurred in the past year. While this is consistent with much of the literature, some researchers have found problems with the reliability with this type of reporting (Shaffer, Huston, & Egeland, 2008; Everson et al., 2008). Another possibility is that the study was

underpowered to detect significant results. While overall the sample size for this study is quite large, the severe class in particular is rather small, potentially making comparisons with this group difficult.

It is also important to consider whether family violence factors were not significantly associated with class membership because the classes used in this study do not optimally explain an adolescent's functioning. Instead, alternative models should be considered. One possibility is that co-occurring PTS and depressive symptoms may be best conceptualized as two separate scales that need to be considered simultaneously. Examples of this model exist with other forms of psychopathology. For example, the DSM-5 diagnosis of attention deficit/hyperactivity disorder (ADHD) is characterized by two dimensions of symptoms; inattention symptoms and hyperactivity-impulsivity symptoms. A comprehensive literature review and meta-analysis of DSM-IV ADHD symptom dimensions was conducted by Wilcutt and colleagues (2012) to help determine how ADHD should be conceptualized in the DSM-5. The findings of the literature review and meta-analysis indicated that ADHD might be best conceptualized as a single disorder with separate dimensional modifiers for inattention and hyperactivity-impulsivity symptoms (Wilcutt et al., 2012). A similar approach could be used for co-occurring PTS and depressive symptoms, which could potentially consist of a general traumatic disorder with PTS and depressive symptom dimensions.

Researchers have already suggested a similar model, known as developmental trauma disorder (van der Kolk, 2005) or complex PTSD (Cloitre et al., 2009). Developmental trauma disorder is conceptualized as a broad disorder with symptoms of affective and physiological dysregulation, attentional and behavioral dysregulation, self

and relational dysregulation, and PTSD (van der Kolk et al., 2009). Developmental trauma disorder is thought to arise when youth experience repeated traumatization, as is frequently the case with child maltreatment (van der Kolk, 2005). The dimensional model of co-occurring PTS and depressive symptoms found in this study then may fit as a piece of developmental trauma disorder, namely the affective dysregulation and PTSD symptoms. More work is clearly needed to determine best represents co-occurring PTS and depressive symptoms in adolescence.

While family violence factors were not significantly associated with latent class membership in the final model when comparing the moderate or severe classes to the mild class, relational factors were associated with latent class membership. Specifically, parental emotional support at Wave 3 served as a resilience factor; adolescents who had more parental emotional support also had less severe PTS and depressive symptoms. Parent emotional support at Wave 1 did not predict latent class membership, indicating that current emotional support is more important to adolescent psychological functioning compared to previous emotional support. It is possible that parent emotional support changes very little from one time point to another and so Wave 1 parent emotional support added very little unique information to the model. Future studies could assess how parent emotional support changes over time and how these changes affect adolescent symptomatology. It is also important to note that parent emotional support did not differentiate membership to the moderate and severe classes. This was consistent with the general finding of this study that few factors were associated with membership to the moderate versus severe classes.

Adolescent loneliness in peer relationships was associated with a greater likelihood of belonging to the moderate or severe classes compared to the mild class and therefore served as a risk factor for adolescent psychopathology. As adolescents age, they increasingly become more dependent on peer relationships for support (Parker et al., 2006). The present findings support the positive impact of peers on adolescent psychological functioning that other researchers have also found (e.g. Rubin et al., 2004; La Greca & Harrison, 2005). However, adolescent loneliness at Wave 1 was not predictive of latent class membership. Therefore, the present study does not clearly show whether loneliness exacerbates PTS and depressive symptoms, whether the symptomatology leads to loneliness, or whether a bidirectional effect is occurring. Future analyses using statistical models such as structural equation modeling may help elucidate this relationship.

Increased exposure to violence in the home at Wave 1 did predict a greater likelihood of belonging to the severe class compared to the moderate class. While this effect is in the direction initially hypothesized, it is interesting that exposure to violence at Wave 1 was the only factor associated with latent class membership. It is possible that earlier exposure to violence differentiates moderate and severe levels of PTS and depressive symptoms. However, as this was the only analysis that found a significant effect for witnessed violence in the home at Wave 1, there is concern that the results are due to spurious correlation. Future studies should replicate these findings before strong conclusions can be made. Overall, the lack of factors associated with membership to the moderate versus severe classes suggests that individuals with severe or moderate levels of co-occurring PTS and depressive symptoms have more similarities than differences. A

better understanding of qualitative and quantitative differences between levels of symptom severity needs to be clarified in future research.

The present study has several strengths. A primary strength of this study is the use of both person-centered and variable-centered analyses. Person-centered analysis, as used with LPA, allowed for the examination of heterogeneity in the presentation of PTS and depressive symptoms as they naturally co-occurred in this sample. Variable-centered analysis, as analyzed with multinomial logistic regression, examined whether different factors were associated with membership to specific latent classes. Another strength of this study is the use of longitudinal data as part of the multinomial logistic regression. This allowed for the examination of how different factors at different time points may influence adolescent psychopathology. A final strength of this study was the use of multiple influences from different ecological systems. In addition to demographic factors, different types of family violence were examined in conjunction with adolescent relationships with their parents and peers. No adolescent develops within a vacuum; thus, assessing the impact of different ecological systems over time is more likely to be an accurate representation of an adolescent's developmental context (Cicchetti & Lynch, 1993).

This study is not without limitations. The first limitation is that results of this study may not be generalizable given the specific population used in this study (adolescents whose families were subject to a CPS investigation). Another limitation is that the model fit indices of the LPA did not clearly suggest which solution was the best fit to the data. The three-class solution was selected due to the LMR values and simplicity of interpretation, although this should be replicated in a different sample, potentially with

different measures. This study examined entirely adolescent-rated information with the exception of the demographic data, which was rated by the adolescent's primary caregiver. This was done purposefully as informant agreement for adolescent psychopathology, particularly internalizing problems, tends to be low to moderate when comparing parent reports and adolescent self-reports (De Los Reyes & Kazdin, 2005). However, this also introduces the potential for adolescent bias. Certain adolescents may purposefully misrepresent themselves, perhaps due to distrust of the researchers, not believing that confidentiality will really apply, or not being aware of their own feelings and experiences. Therefore, future research should consider adding multiple sources of information and determine whether or how this contributes to our understanding of adolescent trauma symptoms.

While this study looked at physical assault and witnessing violence, other forms of violence exposure and maltreatment should be examined. Sexual abuse, neglect, and community violence are all associated with PTS and/or depression (Margolin & Gordis, 2000; Widom, 1999; Widom, DuMont, & Czaja, 2007) and therefore it is important to understand how these different experiences contribute to co-occurring PTS and depressive symptoms. Adolescents exposed to trauma have endorsed increased levels of anger and dissociation in addition to PTS and depression (Singer, Anglin, yu Song, & Lunghofer, 1995; Diseth, 2005; Flannery, Wester, & Singer, 2004). How PTS and depressive symptoms co-occur with these other trauma symptoms would be an important research question to examine. Additionally, the subjective distress associated with each traumatic experience may help explain PTS and depressive symptoms. Subjective distress

is also thought to be an important component of cognitive-behavioral treatment for childhood PTSD (Perrin, Smith, & Yule, 2000).

Other factors identified by theories such as the ecological systems theory (Bronfenbrenner, 1977) are also likely to be important for the presentation of PTS and depressive symptoms. Influences identified by the ecological systems theory include neighborhood and school factors. Examples of potential neighborhood factors include neighborhood problems and poverty (Simons et al., 2002; Eamon, 2002). Examples of potential school factors include perceived school safety and school satisfaction (Ozer & Weinstein, 2004; Eamon, 2002). No single study can look at all the influences on PTS and depressive symptoms at one time, yet there needs to be a better understanding with regards to which factors interact with each other to best predict adolescent functioning.

The present findings have important implications for interventions. Interventions that target only PTS or only depressive symptoms may not target all the psychological distress adolescents experience after a traumatic event. There may be an underlying construct that can best explain severity levels of both PTS and depressive symptoms and would be an appropriate target for intervention. For example, child maltreatment is associated with increased emotion dysregulation (Kim & Cicchetti, 2010). Past research has found that emotion dysregulation is associated with psychological problems such as PTSD, depressive symptoms, substance use, and suicide attempts (Bradley et al., 2011). Thus in the context of child maltreatment, it is important to understand how interventions that target emotion dysregulation influence PTS and depressive symptoms.

With the recognition of the importance of emotion dysregulation, several different treatments are now incorporating emotion regulation as a key component of treatment.

One example of such treatment is Trauma Affect Regulation: Guide for Education and Therapy (TARGET). TARGET is a type of therapy that focuses on emotion regulation skills, beyond what is typically taught in cognitive behavioral therapy (CBT) for PTSD. TARGET was compared with a relational supportive therapy (Enhanced Treatment as Usual; ETAU) in a sample of delinquent adolescent girls who met criteria for full or partial PTSD (Ford, Steinberg, Hawke, Levine, & Zhang, 2012). In comparison to ETAU, TARGET led to greater change in PTSD and anxiety symptoms, posttraumatic cognitions, and emotion regulation (Ford et al., 2012). ETAU instead was associated with greater change in hope and anger (Ford et al., 2012). These findings suggest that emotion regulation skills are important in reducing PTSD symptoms in adolescent delinquent girls. How TARGET works with different samples of adolescents and with other symptoms, such as depressive symptoms, still remains to be determined.

Given the strength of the association between relational factors and co-occurring PTS and depressive symptoms, these factors may also be important targets for interventions. For example, interventions targeting the family, particularly increasing the emotional connection between parents and their children, may be an effective way to reduce adolescent psychopathology. A review of the literature for family therapy found that this type of treatment was effective in reducing child abuse, depression, and anxiety (amongst other forms of psychopathology) in children and adolescents (Carr, 2009). To the author's knowledge, however, no treatment study has examined how strengthening the relationship between adolescents and their parents is directly associated with a reduction in PTS symptoms.

Peer loneliness may also be an appropriate target for interventions aimed at reducing adolescent PTS and/or depressive symptoms. Very little research has been done on adolescent peer loneliness interventions, yet there is some support that childhood interventions can promote positive peer interactions (Greco & Morris, 2001; Beidel, Turner, & Young, 2006). Adolescents who are lonely may have poor social skills that prevent them from having successful interactions with their peers. Social skills training interventions have been shown to decrease the number of internalizing problems adolescents endorse compared to a wait-list control group (Harrell, Mercer, & DeRosier, 2009). How peer interventions influence adolescent PTS symptoms is still unclear and should be examined in the future.

In summary, the present study assessed co-occurring PTS and depressive symptoms in a sample of at-risk adolescents. Using LPA, PTS and depressive symptoms were found to generally co-occur with relatively similar levels of severity and no primarily PTS or depression classes were identified. These findings call into question models of PTS and depressive symptoms that suppose distinct underlying processes for these two forms of psychopathology. Additionally, demographic, family violence, and relational factors were tested for their relative association with latent class membership. Relational factors and gender appear to be the strongest and most consistent indicators of co-occurring PTS and depressive symptoms. It is hoped that a better understanding of how PTS and depressive symptoms co-occur can lead to more effective interventions for adolescents who experience these psychological difficulties.

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Table 1.
Demographic information.

Variable	%
Total N = 818	
Age	
11	25.3
12	22.5
13	26.2
14	26.0
Gender	
Female	57.9
Race/ethnicity	
Black	34.6
Latino	16.5
White	48.9

Table 2

Summary of Intercorrelations for Adolescent PTS and Depressive scores.

	1	2	3	4	5	6
1. CDI Negative Mood	-					
2. CDI Interpersonal Problems	.46**	-				
3. CDI Ineffectiveness	.55**	.44**	-			
4. CDI Anhedonia	.66**	.46**	.53**	-		
5. CDI Negative Self-Esteem	.66**	.43**	.52**	.58**	-	
6. TSCC PTS	.45**	.21**	.29**	.46**	.37**	-

Note. CDI = Child Depression Inventory; TSCC PTS = Trauma Symptom Checklist for Children - Post Traumatic Stress scale.

** $p < .01$

Table 1

LPA Model Fit Indexes of Co-Occurring PTS and Depressive Symptoms

Classes	AIC	BIC	SSABIC	LMR	p-value	aLMR	p-value	BLRT	p-value	Entropy
2	19239.25	19328.68	19268.34	1626.63	0.00	1592.71	0.00	1626.63	0.00	0.93
3	**18746.82**	**18869.20**	**18786.63**	**506.43**	**0.00**	**495.87**	**0.00**	**506.43**	**0.00**	**0.91**
4	18605.17	18760.49	18655.70	155.65	0.16	152.41	0.17	155.65	0.00	0.90
5	18476.26	18664.54	18537.51	142.90	0.33	139.92	0.34	142.90	0.00	0.90
6	18345.92	18567.14	18417.89	144.34	0.15	141.33	0.15	144.34	0.00	0.92

Note. Bolded values indicate the selected class.

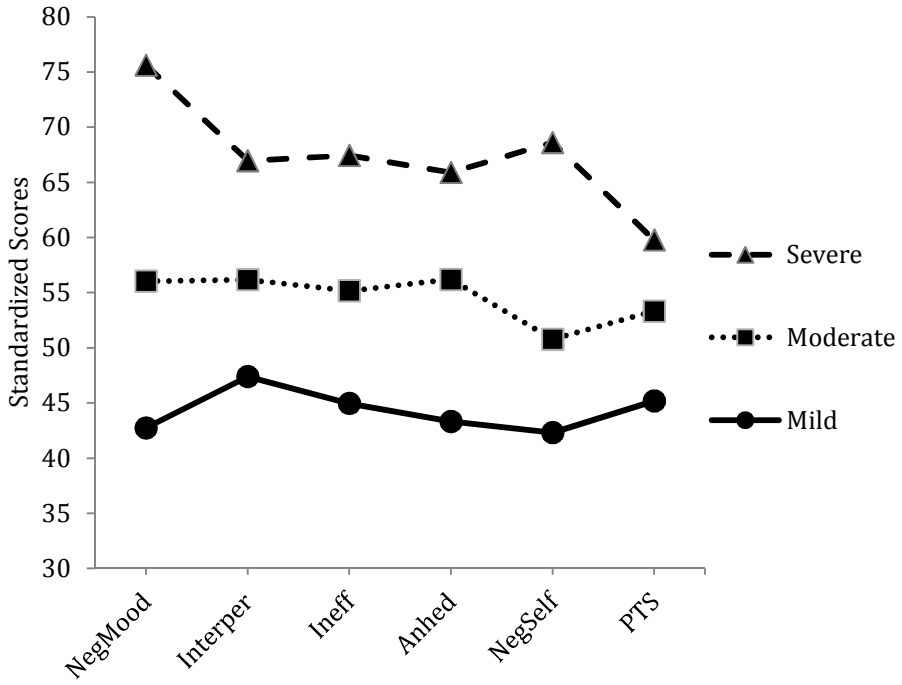

Figure 1. Estimated class mean standardized scores. NegMood = CDI subscale Negative mood; Interper = CDI subscale Interpersonal problems; Ineff = CDI subscale Ineffectiveness; Anhed = CDI subscale Anhedonia; NegSelf = CDI subscale Negative Self-Esteem; PTS = Post-Traumatic Stress Disorder section of the Trauma Symptom Checklist for Children

Table 4

Means and standard deviations for class indicators separated by class.

	Mean (SD)					
Latent Class	NegMood	Interper	Ineff	Anhed	NegSelf	PTS
Minimal	42.73 (5.16)	47.39 (6.72)	44.96 (7.89)	43.32 (5.71)	42.31 (4.14)	45.18 (7.41)
Moderate	56.04 (8.01)	56.18 (11.64)	55.17 (10.43)	56.19 (7.35)	50.77 (7.80)	53.32 (10.25)
Severe	75.63 (8.22)	66.96 (15.22)	67.44 (11.06)	65.90 (8.43)	68.61 (10.55)	59.78 (9.48)

Note. SD = Standard deviation, NegMood = CDI subscale Negative mood; Interper = CDI subscale Interpersonal problems; Ineff = CDI subscale Ineffectiveness; Anhed = CDI subscale Anhedonia; NegSelf = CDI subscale Negative Self-Esteem; PTS = Post-Traumatic Stress Disorder section of the Trauma Symptom Checklist for Children.

Table 5

Posterior class probabilities for class membership.

Latent Class	N	%
Minimal	580	70.9
Moderate	184	22.5
Severe	54	6.6

Table 6

Multinomial Logistic Regression Comparing the Mild and Moderate Classes

	Model 1		Model 2		Model 3	
Variable	OR	95% CI	OR	95% CI	OR	95% CI
Demographic factors						
Age	1.04	[0.88, 1.22]	1.02	[0.86, 1.22]	0.98	[0.79, 1.21]
Gender (male)[a]	0.54**	[0.37, 0.79]	0.49**	[0.32, 0.74]	0.41**	[0.25, 0.68]
Race/ethnicity[b]						
Black	0.80	[0.53, 1.21]	0.74	[0.46, 1.17]	0.77	[0.45, 1.32]
Latino	1.33	[0.86, 2.18]	1.38	[0.81, 2.36]	1.42	[0.75, 2.66]
SES	0.97	[0.85, 1.11]	0.94	[0.82, 1.09]	0.88	[0.74, 1.05]
Family violence factors						
Physical victimization W1			1.00	[0.99, 1.01]	1.00	[1.00, 1.01]
Physical victimization W3			1.03**	[1.01, 1.04]	1.01	[1.00, 1.03]
Violence/crime witnessed W1			0.92	[0.80, 1.04]	0.87	[0.74, 1.02]
Violence/crime witnessed W3			1.20**	[1.05, 1.38]	1.11	[0.94, 1.30]
Relational factors						
Caregiver emotional support W1					0.86	[0.59, 1.26]
Caregiver emotional support W3					0.38***	[0.25, 0.56]
Peer loneliness W1					1.00	[0.98, 1.03]
Peer loneliness W3					1.08***	[1.05, 1.10]

Note. OR = odds ratio; CI = confidence interval.

Note. The mild class is serving as the reference group. [a] Reference group is female. [b] Reference group is White.

** $p < 0.01$; *** $p < 0.001$.

Table 7

Multinomial Logistic Regression Comparing the Mild and Severe Classes

	Model 1		Model 2		Model 3	
Variable	OR	95% CI	OR	95% CI	OR	95% CI
Demographic factors						
Age	1.25	[0.94, 1.66]	1.29	[0.93, 1.78]	1.45	[0.97, 2.16]
Gender (male)[a]	0.18***	[0.35, 0.84]	0.20**	[0.08, 0.54]	0.16***	[0.05, 0.53]
Race/ethnicity[b]						
Black	0.76	[0.35, 1.64]	0.57	[0.23, 1.43]	0.72	[0.25, 2.04]
Latino	2.11	[0.96, 4.63]	2.56*	[1.07, 1.60]	2.60	[0.89, 7.55]
SES	1.22	[0.97, 1.53]	1.22	[0.94, 1.58]	1.20	[0.88, 1.64]
Family violence factors						
Physical victimization W1			0.99	[0.97, 1.01]	0.98	[0.96, 1.01]
Physical victimization W3			1.03**	[1.01, 1.05]	1.00	[0.98, 1.03]
Violence/crime witnessed W1			1.12	[0.92, 1.35]	1.19	[0.94, 1.50]
Violence/crime witnessed W3			1.31**	[1.07, 1.60]	1.19	[0.93, 1.52]
Relational factors						
Caregiver emotional support W1					0.94	[0.51, 1.75]
Caregiver emotional support W3					0.21***	[0.11, 0.38]
Peer loneliness W1					1.02	[0.98, 1.06]
Peer loneliness W3					1.08***	[1.04, 1.13]

Note. OR = odds ratio; CI = confidence interval.

Note. The mild class is serving as the reference group. [a] Reference group is female. [b] Reference group is White.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 8

Multinomial Logistic Regression Comparing the Moderate and Severe Classes

	Model 1		Model 2		Model 3	
Variable	OR	95% CI	OR	95% CI	OR	95% CI
Demographic factors						
Age	1.20	[0.88, 1.22]	1.26	[0.89, 1.77]	1.48	[1.00, 2.21]
Gender (male)[a]	0.33*	[0.37, 0.79]	0.42	[0.15, 1.17]	0.40	[0.12, 1.30]
Race/ethnicity[b]						
Black	0.96	[0.42, 2.18]	0.77	[0.29, 2.04]	0.93	[0.33, 2.69]
Latino	1.33	[0.86, 2.18]	1.85	[0.74, 4.66]	1.83	[0.63, 5.36]
SES	1.58	[0.68, 3.68]	1.30	[0.99, 1.71]	1.36	[1.00, 1.87]
Family violence factors						
Physical victimization W1			0.99	[0.97, 1.01]	0.98	[0.95, 1.01]
Physical victimization W3			1.00	[0.99, 1.02]	0.99	[0.95, 1.01]
Violence/crime witnessed W1			1.22	[0.99, 1.50]	1.37*	[1.07, 1.75]
Violence/crime witnessed W3			1.09	[0.89, 1.34]	1.08	[0.84, 1.38]
Relational factors						
Caregiver emotional support W1					1.09	[0.59, 2.00]
Caregiver emotional support W3					0.55	[0.30, 1.05]
Peer loneliness W1					1.02	[0.98, 1.06]
Peer loneliness W3					1.01	[0.97, 1.05]

Note . OR = odds ratio; CI = confidence interval.

Note . The moderate class is serving as the reference group. [a] Reference group is female. [b] Reference group is White.

* $p < 0.05$