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## Extending poly-victimization theory: Differential effects of adolescents' experiences of victimization on substance use disorder diagnoses upon treatment entry

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### Abstract

**Background:** Although victimization is a known contributor to the development of substance use disorders, no research has simultaneously examined how characteristics of victimization experienced over time, such as the type of abuse, the presence of poly-victimization, closeness to perpetrator(s), life threat or fear, and negative social reactions to disclosing victimization, cluster into profiles that predict substance use disorders.

**Objective:** The aim of the current study is to assess how profiles of victimization and trauma characteristics are associated with substance use disorders and assess potential gender differences.

**Participants and Setting:** Participants were 20,092 adolescents entering substance use treatment.

**Methods:** We used latent class and multi-group latent class analysis to extract classes of victimization and associated characteristics. Emergent classes were used to predicted substance use disorder status at treatment intake.

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Contributors' statement

Dr. Davis conceptualized and designed the study, carried out the analyses, wrote the Methods and Results sections and helped draft the Introduction and Discussion, and reviewed and revised the manuscript.

Dr. Dworkin and Dr. Helton helped conceptualize and design the study, drafted the initial Discussion and Introduction, and reviewed and revised the entire manuscript.

Dr. Prindle helped conceptualize and design the study, aided in analyses and interpretation of results, edited the initial Methods and Results sections, and reviewed and revised the entire manuscript.

Mr. Patel helped draft the initial Results section, created tables and figures, and reviewed and revised the entire manuscript. Dr. Dumas helped conceptualize theoretical contributions, reviewed and revised the entire manuscript.

Ms. Miller helped edit and draft the newly revised manuscript, contributed to conceptualization of theoretical models, and revised the entire manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Conflict of interest

The authors have no conflicts of interest relevant to this article to disclose.

**Results:** Five classes were extracted: *poly-victimization + high harmful trauma characteristics, sexual abuse + negative social reaction and perceived life threat, emotional abuse + trusted perpetrator, physical abuse and low all*. Similar classes were found for the multi-group model. In both the overall and female-specific models, the *poly-victimization + high harmful trauma characteristics* class was more severe than all other classes in terms of opioid use disorder, tobacco use disorder, and dual diagnosis. Other class differences were found across gender.

**Conclusions:** Adolescents entering treatment can be distinguished by their profiles of victimization experiences and associated characteristics, and these profiles evidence different associations with substance use disorder diagnoses. Results point to a need for more nuanced assessment of victimization experiences and gender-specific interventions.

## Keywords

PTSD; Childhood trauma; Substance use; Addiction treatment; Adolescence

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## 1. Introduction

Epidemiological research indicates that 10% of adolescents in the United States aged 12 to 17 report illicit drug use, with nearly 1.1 million adolescents (4.4%) meeting criteria for a substance use disorder (SAMHSA, 2017). Experiencing victimization is a major risk factor for substance use disorders. In general, adolescents who have experienced childhood victimization (including physical assault, sexual assault, and/or witnessing violence) are more likely to have a substance use disorder or seek substance use disorder treatment than youth who have not experienced victimization, with some differences in risk identified as a function of victimization type (Kilpatrick et al., 2000; Tonmyr, Thornton, Draca, & Wekerle, 2010). Increasingly, the literature has moved away from a sole focus on differences in outcomes by victimization type and has, instead, identified that exposure to multiple episodes or different types of victimization over time (i.e., *poly-victimization*) is more important as a risk factor for the development of a substance use disorder (Davis, Ingram, Merrin, & Espelage, 2018; Davis, Dumas et al., 2018; Ford, Hartman, Hawke, & Chapman, 2008; Ford, Elhai, Connor, & Frueh, 2010). Although the research on poly-victimization has revealed that expanding the empirical focus beyond a single characteristic of victimization can advance understanding of risk, this body of literature has minimally examined other characteristics of victimization that have been found to be predictive of behavioral and psychological problems. These characteristics include the chronicity or frequency of victimization exposure over time (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018), the relationship or closeness to the perpetrator (Freeman, Collier, & Parillo, 2002), the presence of life threat or fear of being injured (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012), and the presence of negative social reactions to disclosing victimization (Bick, Zajac, Ralston, & Smith, 2014). Theoretically, considering all of these characteristics of victimization simultaneously may reveal important profiles of experiences of victimization and provide additional information on risk for future substance use disorder diagnoses. In addition, although rates of substance use disorders for male and female adolescents are similar (4.5% and 4.0%, respectively) (Kilpatrick et al., 2000; SAMHSA, 2017), research indicates that gender differences exist in the development and course of adolescent substance

use disorders (McHugh, Votaw, Sugarman, & Greenfield, 2017). This emphasizes the need for attention to gender differences in investigating aspects of victimization that afford risk for substance use outcomes. Thus, the aim of this study is two-fold. First, we aim to extend theoretical and empirical lens of poly-victimization by considering both direct experiences and associated characteristics of trauma. Second, we aim to understand how emergent profiles of trauma and associated characteristics are associated with substance use and related disorders (e.g., alcohol use disorder, opioid use disorder, and dual diagnosis).

### 1.1. Victimization and substance use disorders

Early theoretical work on the effect of victimization on long-term outcomes considered victimization in terms of narrow categories of experiences, such as physical abuse, sexual abuse, dating violence, or exposure to violence between parents or caregivers (Finkelhor, Ormrod, & Turner, 2007a, 2007b, 2007c). These specific types of childhood victimization have been linked to distinct substance use outcomes (Manly et al., 2001), although findings are mixed. For example, a meta-analysis found similar risk for substance use outcomes associated with emotional and physical abuse, but did not compare these abuse types to sexual abuse (Norman et al., 2012). In contrast, the National Survey of Adolescents found similar rates of alcohol and drug use disorders as a function of physical versus sexual abuse (Kilpatrick et al., 2000), and the National Longitudinal Study of Adolescent Health found similar rates of adolescent binge drinking as a function of physical versus sexual abuse (Shin, Edwards, & Heeren, 2009).

In contrast to this focus on differences in single types of victimization exposure, poly-victimization theory asserts that youth who experience multiple (or chronic) victimization types are more likely to have concurrent or long-term behavioral/psychological problems (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018; Ford et al., 2010, 2008), and investigating only one type of victimization exposure can lead to an underestimation of the relationship between victimization and psychological/behavioral outcomes and an overestimation of the effect of any single victimization type (Butcher, Holmes, Kretschmar, & Flannery, 2016). Among 12- to 17-year-olds in a nationally-representative study, 22% reported four or more types of victimization with 54% of female and 46% of male adolescents characterized as highly poly-victimized (Finkelhor et al., 2007b). Prior research has found that youth in poly-victimization classes have a 3–5 times higher risk of substance use disorders (Ford et al., 2010) and have significantly steeper increases in high-risk drinking over the course of adolescence and young adulthood (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018) compared to youth in classes characterized by less chronic or varied forms of trauma. Others have found that experiencing both physical and sexual abuse is associated with higher risk of substance use than either type of abuse individually (Tonmyr et al., 2010), with some evidence for gender differences in these effects. For example, in a study of adolescents, experiencing both sexual and physical abuse was associated with higher risk of substance use than experiencing either type of abuse alone, and male adolescents reporting this combination of abuse were more likely to use drugs than female adolescents with the same abuse history (Moran, Vuchinich, & Hall, 2004). In a study of adolescents entering substance use treatment, there were gender differences in experience of multiple victimization types, with 33% of female and 7% of male adolescents

reporting three types of victimization, and 16% of female and no male adolescents reporting four types of victimization (Titus, Dennis, White, Scott, & Funk, 2003).

Further, consistent with poly-victimization theory's emphasis on the need to expand the search for risk factors beyond the type of victimization alone, it is important to avoid focusing solely on the presence or absence of poly-victimization as a risk factor. Instead, considering various characteristics of victimization experiences that may increase risk for deleterious outcomes may add additional information and variance in how we define poly-victimization. There are multiple characteristics of victimization experiences (e.g., known/trusted perpetrator, perceived life threat, negative social reactions to disclosing abuse) that may magnify the harm of victimization and therefore further distinguish youth in terms of their risk for substance use outcomes. Despite empirical evidence for their harm, which we review in the following section, studies of poly-victimization have generally not considered these victimization characteristics.

**1.1.1. Trusted perpetrator**—According to betrayal trauma theory (Freyd, 1996), experiencing childhood abuse perpetrated by a *trusted adult or someone else close to the victim*, such as a caregiver, is more psychologically harmful than other forms of abuse (Delker & Freyd, 2014; Goldsmith, Freyd, & DePrince, 2012). For example, in a small college sample, experiencing more traumas by perpetrators with whom the victim knew was indirectly associated with higher rates of problematic substance use (Delker & Freyd, 2014). Likewise, a study of community women at high risk for drug use found that individuals who experienced family-perpetrated child sexual abuse were more likely to report crack use than those who experienced other types of abuse (Freeman et al., 2002). Further, there are gender differences in perpetrator type—a study of adolescents entering substance use treatment found that 61% of female adolescents versus 13% of male adolescents indicated that they had experienced victimization perpetrated by a trusted person (Titus et al., 2003). However, to our knowledge, gender differences in associations of perpetrator closeness to substance use disorder outcomes have not been investigated.

**1.1.2. Perceived life threat**—Perceived life threat has been identified as a correlate of posttraumatic stress disorder (PTSD) among both adults (Ozer, Best, Lipsey, & Weiss, 2003), children and adolescents (Trickey et al., 2012). Little is known, however, about how it relates to substance use among adolescents. The only related studies, to our knowledge, have examined life threat during natural disasters, and have failed to find significant associations (Rowe, La Greca, & Alexandersson, 2010). However, it is possible that these associations differ when considering multiple types of trauma experiences or pathological levels of substance involvement. Several studies have indicated gender differences in experiences of victimization involving life threat in substance-abusing samples (Titus et al., 2003), such that among adolescents entering substance use treatment 41% of female adolescents versus 13% of male adolescents reported perceived life threat following victimization (Titus et al., 2003).

**1.1.3. Negative social reactions**—Finally, the degree to which adolescents receive *negative reactions to disclosure* of their victimization may also affect substance use outcomes. In adult samples, negative social reactions to disclosure of victimization (e.g., disbelief) are consistently associated with worse psychological outcomes (Ullman, 2010),

including substance use problems (Peter-Hagene & Ullman, 2014). In a study of adult survivors of childhood sexual abuse, a negative response by someone they told was associated with 3.65 higher odds of a lifetime drug use disorder diagnosis and 2.20 higher odds of lifetime alcohol use disorder diagnosis (Bulik, Prescott, & Kendler, 2001). Similarly, a study of children and mothers found that the presence of maternal disbelief (reported by either the mother or child) was associated with an increased number of illicit drugs tried by the child (Bick et al., 2014). Despite this evidence for the harm of negative social reactions, no research has examined negative reactions in relation to substance use disorder outcomes within a polyvictimization framework.

## 1.2. Poly-Victims as heterogeneous classes

One way in which prior literature has attempted to understand heterogeneity in victimization experiences is through mixture modeling (e.g., latent class analysis, growth mixture modeling). These techniques allow researchers to identify groups (or classes) of individuals who share common experiences of victimization. This allows for a more nuanced and targeted investigation of differential outcomes for mental health functioning. For example, Nooner et al. (2010) found four classes of sexual and physical abuse among adolescents, with results indicating that those who have experienced both types of abuse being more likely to have a substantiated child protective services report. Villodas et al. (2012) used mixture modeling to assess changes in youth's experiences of maltreatment types during childhood, finding youth in maltreated classes were more likely to be re-victimized during later developmental periods, and often by similar maltreatment patterns. Others have used similar methodologies and identified a range of heterogeneous classes of poly-victims. For example, Ford et al. (2010) identified four classes characterized by poly-victimization including abuse victims, physical assault, and community violence exposure. All poly-victimization classes were more likely to have psychiatric disorders (e.g., post-traumatic stress disorder) and had higher rates of delinquency compared to single victimization types. Others have echoed findings that youth who experience multiple victimization types are at increased odds of having both internalizing and externalizing problems (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018; Hazen, Connelly, Roesch, Hough, & Landsverk, 2009; Pears, Kim, & Fisher, 2008). One limitation of these studies, however, is that they did not consider other potentially important characteristics of abuse (e.g., chronicity, negative reactions to disclosure). It is possible that youth who endorse multiple victimization types (e.g., poly-victims) are more likely to also endorse high levels of these trauma characteristics and these experiences may affect their functioning.

## 1.3. The current study

The current study examines how emergent latent classes of victimization and associated characteristics predict substance use and related disorders among adolescents being screened for substance use disorder treatment. We extend prior work (Butcher et al., 2016; Finkelhor et al., 2007a) by considering both poly-victimization and other trauma-related characteristics as potential risk factors for substance use disorder diagnoses. We also examine potential gender differences in both experience of victimization and characteristics as well as prevalence of substance use disorders. We hypothesize that the presence of two or more profiles of victimization will be differentiated by characteristics of trauma (i.e., trauma type,

degree of poly-victimization, fear for life, trusted perpetrator, negative social reactions) (H1). Additionally, we hypothesize that youth in classes with high endorsement of theoretically-harmful trauma characteristics (i.e., presence of poly-victimization, life threat, trusted perpetrator, negative social reactions) will evidence higher odds of having all substance use disorders being explored (i.e., alcohol, cannabis, tobacco, illicit, poly-substance use disorders, dual diagnoses) (H2). We also hypothesize that profiles of trauma characteristics will differ for male and female adolescents entering treatment (H3). Finally, we hypothesize that after stratifying profiles of trauma by gender, females in classes with high endorsement of theoretically-harmful trauma characteristics will evidence higher odds of having a substance use disorder than their male peers (H4).

## 2. Method

### 2.1. Procedures and participants

Participants were adolescents being screened for substance use disorder treatment.

Human subjects approval was received by the Institutional Review Board prior to all analysis. Data were obtained from Chestnut Health Systems, a substance use and mental health treatment provider with a research arm housed under the Global Appraisal of Individual Needs (GAIN) Coordinating Center. Data were collected by treatment agency staff on adolescents between September 2002 and December 2013. Participants were referred from various sources including the juvenile justice system, school referral, parents, and self-referral. To be included in the current study, youth from the larger GAIN data set ( $N = 26,556$ ) had to be between ages of 12 and 17 at baseline ( $N = 20,092$ ).

Our final analytic sample size was 20,069. On average, participants were 15.5 ( $SD = 1.21$ ) years old. The sample was mostly male (73%;  $n = 14,811$ ) and diverse with 36.1% identifying as white ( $n = 7,261$ ), 29.9% Hispanic ( $n = 6,014$ ), 15.4% African American ( $n = 3,089$ ) or mixed race ( $n = 3,086$ ), and 3.2% as other ( $n = 634$ ). About a third (32.4%) met DSM criteria for substance abuse and 5.5% met criteria for substance dependence. Many participants had not, themselves, initiated treatment (19.4% were court-mandated to be in treatment). Overall, 26.1% reported emotional abuse, 31.5% reported physical abuse, 6.6% reported sexual abuse, and 54.6% reported no maltreatment of any type. Further, 29.0% reported victimization occurring multiple times or over a long period of time, 23.3% reported the perpetrator was a family member or trusted individual, 16.1% reported fearing for their life or injury, and 10.1% reported that when disclosing, no one believed or helped them. See Table 1 for more details.

### 2.2. Measures

The GAIN (Dennis et al., 2004) originated as a collaborative effort between clinicians, researchers, and policymakers to create a standardized assessment tool for individuals receiving substance use and mental health services. It provides tools for initial screenings, brief interventions and referrals, clinical assessments, placement recommendations, and program/evaluation services. The GAIN assessment tool (GAIN-I) is a comprehensive, structured interview with over 100 scales situated within eight main sections including:

background, substance use, physical health, risk behaviors, mental health, environment, legal, and vocational. At baseline, the GAIN utilizes a calendar or personalized anchor system to increase reliability of items referring to past 90 day and past year, which has been shown to be as reliable as time line follow back methods (Dennis et al., 2004). Staff members at each site were certified in standardized data collection procedures using the GAIN instrument. Each site went through extensive training (2–3 months for certification) to administer the GAIN that included practice sessions, observations, and supervised administration. Overall, the GAIN has good reliability (detailed description of psychometrics, scoring, and interpretation of all variables can be found at the GAIN Coordinating Center website) and excellent internal consistency with agreement with blind psychiatric diagnoses (Jasiukaitis & Shane, 2001).

**2.2.1. Victimization and characteristics of trauma**—Each participant was asked a series of questions referring to their exposure to a variety of violent and traumatic events. Specific to the current study, we extracted four dichotomous items that reflected endorsing a history of sexual abuse, emotional abuse, and physical abuse. Reliability across the trauma questionnaire for adolescents was excellent ( $\alpha = 0.92$ ). Sexual abuse and emotional abuse were single items asking if anyone had ever *“pressured or forced you to participate in sexual acts against your will, including your sexual partner, a family member, or a friend”* and *“abused you emotionally, that is, did or said things to make you feel very bad about yourself or your life?”* Physical abuse was derived from two items that asked has anyone ever *“attacked you with a gun, knife, stick, bottle, or other weapon”* and *“hurt you by striking or beating you to the point that you had bruises, cuts, or broken bones or otherwise physically abused you.”* For physical abuse, participants could receive a code of “1” if either of the physical abuse items were endorsed.

We also extracted four additional dichotomous items addressing characteristics of trauma experiences. In particular, each participant was asked about the chronicity of abuse (*“did these previous things happen several times over a long period of time?”*), closeness of the perpetrator (*“did these things happen where one or more of the people involved was a family or close family friend, professional, or someone else you trusted”*), fear for life/injury (*“were you afraid for your life or that you might be seriously injured”*) and negative reactions to disclosure of abuse (*“people you told did not believe or help you”*).

**2.2.2. Substance use diagnoses**—Six dichotomous variables were used to measure past year substance use diagnosis outcomes. The GAIN utilizes a clinical interview consistent with DSM-IV (American Psychiatric Association, 2000) criteria for substance use disorders. For the current study, we used diagnostic criteria to identify individuals who entered treatment with an alcohol, cannabis, opiate, and/or tobacco use disorder. We also included two indicators that identified poly-substance use diagnosis (e.g., having two or more substance use disorders) and dual-diagnosis (e.g., having concurrent substance use and mental health disorders). The GAIN has good reliability across adolescents for diagnoses ranging from  $\alpha = 0.84$ –0.89.

### 2.3. Analytic plan

We utilized latent class analysis (LCA) in Mplus version 8 (Muthén & Muthén, 1998–2017) to address H1. LCA is a technique that identifies heterogeneity within a sample (or groups) and classifies individuals based on probability of item endorsement. We used dichotomized childhood trauma and trauma characteristic items in our LCA to assess variation across both exposure and experience of violence when youth were entering substance use disorder treatment (H1). We fit models ranging from one to six classes and examined fit statistics to determine if adding an additional class improved model fit. To assess model fit, we used decreases in the negative two log likelihood ( $-2LL$ ), Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), and the sample size adjusted Bayesian Information Criteria (aBIC). Further, we utilized non-significant Vuong-Lo-Mendell-Rubin Likelihood Ratio Test (VLR), the Lo-Mendell-Rubin adjusted likelihood ratio test (LRT), and the bootstrapped likelihood ratio test (BLRT) to indicate that a  $k - 1$  class solution is a better fit to the data.

To address H2, we assessed how emergent class membership was related to each type of substance use disorder. That is, after determining the optimal number of classes, participants were assigned to a class based on posterior class membership probability. Membership status was then used as a predictor in a series of logistic regression models predicting diagnostic status.

To address H3, we estimated a multi-group latent class analysis (MG-LCA). First, we estimated models for male and female adolescents separately to ensure a similar class solution could be extracted for each. Once confirmed, we used sex (male or female) as our grouping variable. MG-LCA allows the estimation of emergent classes for both male and female adolescents, simultaneously. Using the same procedure outlined above, we estimated models with one to six classes. Once the optimal number of classes was estimated, we tested for measurement invariance by: 1) estimating a model allowing differences in item thresholds and fixing class probabilities across groups and 2) a model allowing differences in item thresholds and class probabilities. Significant difference in negative two log likelihood indicates better model fit for freed parameters across groups. Once the best fitting model was established, the same procedure was followed to test H4. That is, we allowed emergent classes across male and female adolescents to predict each substance use and related disorder simultaneously.

All models controlled for age, gender (female reference; except the MG-LCA with sex as the grouping variable), race (nonwhite reference), socioeconomic status, and prior substance use disorder treatment. Missing data was minimal ( $n = 58$ ; 0.003%) and was adjusted for using maximum likelihood estimator in *Mplus*.

## 3. Results

### H1. Overall Class Enumeration

Results from our model fitting for the overall LCA are presented at the top of Table 2. Although the lowest BIC and aBIC values are in the 6-class solution, plotted aBIC values evidence an “elbow” at the 5-class solution, indicating that the 5-class solution is where



values decrease and begin to plateau. Further, the VLMRT values are non-significant at the 6-class solution, with LRT values approaching non-significance. Prior studies indicate that a  $k-1$  solution fits the data best when the log likelihood ratio test is non-significant, further supporting the 5-class solution. Finally, entropy can be considered in conjunction with other factors as an indicator of model fit, as values with higher entropy values indicate that classes are more distinct from each other. Compared to the 6-class solution (entropy = 0.83), the 5-class solution (entropy = 0.87) has slightly higher values. Finally, when observing the 6-class solution's plotted probabilities, the additional extracted class was nearly identical to an already existing class. Thus, given the fit criteria and observed probabilities, we chose the 5-class solution.

Fig. 1 presents the item probability plot that was used to interpret and label the five emergent classes. The “*poly-victimization + high harmful trauma characteristics*” class represented 9.3% ( $n = 1868$ ; male: 680, female: 1188) of the sample and had the highest probability of experiencing emotional (93.0%), physical (88.9%), and sexual abuse (39.5%) over a sustained duration of time (95.5%) relative to other classes. In addition, this class also demonstrated the highest likelihood of being abused by a family member or trusted individual (80.4%), fearing for their life or injury (66.8%), and negative social reactions (49.8%). In contrast, the “*low all*” (50.3%;  $n = 10,075$ ; male: 8,323, female: 1754) class had the lowest probability of endorsing all childhood trauma types and characteristics (ranging from 0.3% for sexual abuse to 7.6% for physical abuse). The “*sexual abuse + negative social reaction and perceived life threat*” class represented the lowest proportion of adolescents (2.4%;  $n = 472$ ; male: 146, female: 326) and had the highest probability of experiencing childhood sexual abuse (99.8%) relative to other classes. This class also had the second highest likelihood of harmful trauma characteristics. The “*emotional abuse + trusted perpetrator*” (11.0%;  $n = 2209$ ; male: 1,041, female: 1083) class demonstrated a high likelihood of experiencing emotional abuse (99.5%) and relatively low endorsement of other abuse types. Youth in this class also high endorsement of abuse by a trusted individual or family member (73.4%) and abuse that happened over a sustained period of time (77.4%). Finally, the “*physical abuse*” (27.0%;  $n = 5408$ ; male: 4,450, female: 968) class had the highest likelihood of endorsing physical abuse items (100%) and moderate endorsement of other types of abuse (range 10.9%–27.7%). Youth in this class had a lower likelihood of the perpetrators being a family member or trusted individual (19.8%), fearing for their life (27.7%), and not being trusted after disclosing the abuse (10.9%).

## H2. Substance Use and Related Disorders – Overall

Because we were primarily interested in youth who experienced high levels of victimization (e.g., poly-victimization) and heightened endorsement of trauma characteristics, we used the emergent *poly-victimization + high harmful trauma characteristics* class as the reference group. That is, all odds ratios are inverted ( $\frac{1}{OR}$ ) so that values above 1 indicate higher odds for the *poly-victimization + high harmful trauma characteristics* class.

Odds ratios and associated confidence intervals are provided in Table 3 (H2).

Results indicate that adolescents in the *poly-victimization + high harmful trauma characteristics* class had higher odds of all substance use and related disorders compared to the low all class. Youth in the *poly-victimization + high harmful trauma characteristics* class had higher odds of being diagnosed with an alcohol use disorder (OR = 1.18, 95% CI [1.10–1.26]) relative to the *physical abuse* class, but no differences were found for alcohol disorder compared to youth in the *sexual abuse + negative social reaction and perceived life threat* (OR = 1.08; 95% CI [0.93,1.23]) or *emotional abuse + trusted perpetrator* (OR = 1.05; 95% CI [0.95,1.14]) classes. We found no differences for cannabis use disorder. Youth in the *poly-victimization + high harmful trauma characteristics* class had higher odds of being diagnosed with an opioid use disorder compared to the *sexual abuse + negative social reaction and perceived life threat* (OR = 1.24, 95% CI [1.09–1.39]), *physical abuse* (OR = 1.42, 95% CI [1.29–1.56]), and the *emotional abuse + trusted perpetrator* (OR = 1.31, 95% CI [1.15–1.47]) classes. Similar results were found for both tobacco use disorder and dual diagnosis, with the *poly-victimization + high harmful trauma characteristics* class having higher odds compared to all other classes. Finally, the *poly-victimization + high harmful trauma characteristics* class had higher odds of having a poly-substance use disorder compared to the *emotional abuse + trusted perpetrator class* (OR = 1.11, 95% CI [1.02–1.19]), with no other comparisons showing significant differences.

### H3. Results for Gender-Specific LCAs

Results from our model fitting for the MG-LCA are presented in the bottom of Table 2. The lowest BIC, aBIC, and AIC were found for the five-class (typical test statistics such as VLRT, LRT, and BLRT are not available for MG-LCA), suggesting the five-class model fit the data best for both male and female adolescents. Figs. 2a and b present gender specific item probability plots. Both plots demonstrate similar item endorsement probabilities to the overall LCA results. However, there were several key differences between the male and female plots.

**3.1. Female LCA**—Emergent classes for female adolescents ( $n = 5252$ ) shared similar profiles as the overall model (see Fig. 2a). For example, female adolescents also evidenced a *poly-victimization + high harmful trauma characteristics* class that represented 18.7% ( $n = 984$ ) of the sample. The *low all* class represented 42.0% ( $n = 2211$ ) of female adolescents entering treatment. Further, 7.0% ( $n = 369$ ) of the sample was represented by female adolescents who experienced primarily *sexual abuse + negative social reaction and perceived life threat* which, like the overall model, had relatively high endorsement of other trauma characteristics. Finally, 22.0% ( $n = 1173$ ) were classified into the profile representing high endorsement of *emotional abuse + trusted perpetrator*, and 9.8% ( $n = 513$ ) were classified into the profile representing high rates of *physical abuse*.

**3.2. Male LCA**—Emergent classes for male adolescents ( $n = 14,782$ ) were slightly different from our overall model and the female adolescent model. For example, male adolescents had a *poly-victimization + high harmful trauma characteristics* class, representing 8.2% ( $n = 1205$ ) of male adolescents; however, it had low endorsement of sexual abuse (13.0%). The majority of male adolescents were in the *low all* class (50.0%;  $n = 7275$ ). Interestingly, only 0.1% ( $n = 103$ ) of male adolescents were represented by the

sexual abuse + trusted perpetrator *class*. Notably, unlike both the overall model and the female adolescent model, male adolescents in the sexual abuse class had very low levels of potentially-harmful trauma characteristics, but high levels of closeness to the perpetrator, something we did not observe in the female adolescent classification. The *physical abuse + high chronicity* class represented 34.4% ( $n = 5079$ ) of male adolescents, and the *emotional abuse* class represented 7.6% ( $n = 1125$ ) of male adolescents.

#### H4. Gender Differences in Substance Use Disorder Diagnoses

Table 4 displays the odds ratio and associated confidence intervals for substance use and related disorders for female and male adolescents. For both male and female adolescents, membership in the *poly-victimization + high harmful trauma characteristics* class was associated with higher odds of being diagnosed with all substance use and related disorders compared to the low all class. With respect to alcohol disorder, no significant differences were found for male adolescents, indicating alcohol use disorders at treatment entry are equivalent across abuse classes. However, a significant difference was found for female adolescents in the *poly-victimization + high harmful trauma characteristics* class compared to the *emotional abuse + trusted perpetrator class* (OR = 1.25; 95% CI [1.09,1.41]), with no significant differences found for physical or sexual abuse classes. With respect to cannabis use disorder, we found male adolescents in the *poly-victimization + high harmful trauma characteristics* class had lower odds of being diagnosed with a cannabis use disorder compared to male adolescents in the *sexual abuse + trusted perpetrator* class (OR = 0.87; 95% CI [0.76, 0.99]), whereas female adolescents in the *poly-victimization + high harmful trauma characteristics* class had higher odds of having a cannabis use disorder compared to the *emotional abuse + trusted perpetrator* class (OR = 1.20; 95% CI [1.05,1.35]). No other differences were found for male and female adolescents for cannabis use disorder. Furthermore, with respect to opioid use disorder, we found male adolescents in *poly-victimization + high harmful trauma characteristics* class had higher odds of having an opioid use disorder compared to male adolescents in the *emotional abuse* class (OR = 1.20; 95% CI [1.02,1.38]), whereas significant differences were found among female adolescents in the *poly-victimization + high harmful trauma characteristics* class compared to all other emergent classes (*sexual abuse + negative social reaction and perceived life threat*: OR = 1.48; 95% CI [1.28,1.68]; *physical abuse* OR = 1.42; 95% CI [1.12,1.73]; *emotional abuse + trusted perpetrator* OR = 1.67; 95% CI [1.38,1.96]). A similar pattern was found with respect to tobacco use disorder, with differences only emerging between *poly-victimization + high harmful trauma characteristics* and youth in the emotional abuse class for male adolescents (OR = 1.29; 95% CI [1.19,1.38]), whereas significant differences were found among female adolescents in the *poly-victimization + high harmful trauma characteristics* class and all other emergent abuse classes (*sexual abuse + negative social reaction and perceived life threat*: OR = 1.33; 95% CI [1.20,1.45]; *physical abuse* OR = 1.24; 95% CI [1.06,1.42]; *emotional abuse + trusted perpetrator* OR = 1.49; 95% CI [1.33,1.64]). Interestingly, male adolescents in the *poly-victimization + high harmful trauma characteristics* class were more likely to have a poly-substance use disorder (OR range 1.17–1.30) or a dual diagnosis (OR range 1.18–1.48) compared to both the *sexual abuse + trusted perpetrator and emotional abuse* classes. However, for female adolescents, the only emergent difference for poly-

substance use disorder was between the *poly-victimization + high harmful trauma characteristics* and emotional abuse + trusted perpetrator ( $OR = 1.17$ ; 95% CI [1.02,1.31]), whereas females in the *poly-victimization + high harmful trauma characteristics* class had higher odds of a dual diagnosis compared to all other emergent abuse classes ( $OR$  range 1.41–1.69).

## 4. Discussion

The current study sought to extend poly-victimization theory (Finkelhor et al., 2007a) by incorporating a broad range of characteristics of victimization including, but not limited to, the presence of poly-victimization among youth entering substance use disorder treatment. Attending to the complexity of victimization experiences by considering a range of characteristics of victimization revealed an incrementally more nuanced set of risk profiles. In support of H1, our findings indicate that adolescents entering treatment evidenced five distinct victimization profiles that are divergent across multiple characteristics of victimization (rather than only, for example, trauma type or the presence of poly-victimization). Youth in profiles with high endorsement of theoretically harmful trauma-related characteristics (i.e., presence of chronic abuse, known perpetrator, fear for life/injury, negative reactions to disclosure) and experiencing multiple-victimization types (i.e., poly-victimization) evidenced higher odds of nearly all substance use disorder diagnoses compared to youth classified as single victimization and/or low endorsement of trauma related characteristics, consistent with H2. Finally, we found notable gender differences across emergent profiles (consistent with H3) and their diagnostic presentations (consistent with H4) that have important implications for screening and treatment development.

### 4.1. The importance of considering characteristics of victimization

There are a multitude of explanations as to why some youth experience one or more types of victimization including distal factors such as location/environment and neighborhood (Cicchetti & Lynch, 1993) and more proximal factors that pertain to characteristics of the family or the child themselves (Finkelhor et al., 2007a, 2007b, 2007c; Finkelhor, Turner, Hamby, & Ormrod, 2011). Thus, for some youth, victimization and trauma may be situated as a chronic condition versus a single event. In recent studies, researchers have attempted to better understand the variability of victimization by assessing classes (or groups) of victimization and incorporating additional information such as location of the victimization (Butcher et al., 2016), developmental timing of the victimization (Villodas et al., 2012), and the co-occurrence of multiple victimization types over time (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018). In nearly all of these instances, youth who have experienced multiple types of victimization have worse social, psychological, and physiological outcomes.

The current study extends the literature on poly-victimization by incorporating important, context-specific, characteristics about the traumatic event. Consistent with poly-victimization theory, our findings found continued support for a group of high-risk youth entering substance use disorder treatment who have experienced multiple victimization types (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018; Finkelhor, Ormrod, Turner, &

Hamby, 2005; Ford et al., 2008; Ford, Hawke, Alessi, Ledgerwood, & Petry, 2007; Turner, Finkelhor, & Ormrod, 2010). However, in an attempt to extend poly-victimization theory, the youth who were classified as “poly-victims” also endorsed the highest rates of theoretically-harmful victimization characteristics: known/trusted perpetrator, negative social reactions, and perceived life threat. Unsurprisingly, adolescents in the *poly-victimization + high harmful trauma characteristics* class were more likely to evidence all diagnoses relative to the low all class, consistent with past research demonstrating the harm of poly-victimization (Davis, Dumas et al., 2018; Davis, Ingram et al., 2018; Davis, Dumas, Wagner, & Merrin, 2016; Ford et al., 2010, 2008). In addition, across both the overall and female-specific models, the *poly-victimization + high harmful trauma characteristics* class was more severe than all other classes in terms of opioid use disorder, tobacco use disorder, and dual diagnosis.

These results also indicate that, even when adolescents entering substance use disorder treatment report experiences predominately involving a single type of abuse, classes can be distinguished by associated trauma characteristics. We identified three type-specific classes: one which included only experiences of *physical abuse* and the other two which included single abuse types and one or more theoretically harmful associated characteristics (*sexual abuse + negative social reaction and perceived life threat*; *emotional abuse + trusted perpetrator*). The *sexual abuse + negative social reaction and perceived life threat* class had higher rates of negative social reactions relative to other classes, consistent with research indicating that survivors of sexual abuse are particularly likely to be stigmatized and not believed when they disclose (Ullman, Starzynski, Long, Mason, & Long, 2008). Somewhat unsurprisingly, adolescents in the *emotional abuse + trusted perpetrator* class were especially likely to report perpetration by someone to whom they had a close relationship, and were more likely to report chronic victimization over time. Thus, it may be important to also consider context specific trauma characteristics even if youth are only reporting a single abuse type.

Although poly-victimization theory focuses primarily on the chronicity and variation of victimization as the mechanism of harm, these findings indicate that poly-victimization likely exists in the presence of other victimization characteristics that would be expected to combine and accumulate in ways that lead to more deleterious outcomes (Felitti et al., 1998). For example, trusted perpetrators may be more likely to have repeated access to the same victim, increasing the likelihood multiple victimization experiences. In addition, as youth experience multiple forms of victimization, their disclosures may be increasingly met with disbelief, which could offer a further channel via which poly-victimization leads to negative outcomes.

#### 4.2. Gender differences in classes and outcomes

Further, we found that class profiles varied by gender across both victimization type and trauma characteristics, consistent with H3. First, in the overall model, although more female than male adolescents were classified into the *poly-victimization + high harmful trauma characteristics* (19% vs. 8%, respectively), *sexual abuse + negative social reaction and perceived life threat*, (7% vs. 0.1%, respectively), and *emotional abuse + trusted perpetrator*

(22% vs. 8%, respectively) classes, more male than female adolescents were classified into the *physical abuse* (34% vs. 10%, respectively) and *low all* (42% vs. 50%) classes. This is consistent with research indicating higher rates of overall victimization, poly-victimization (Dierkhising, Ford, Branson, Grasso, & Lee, 2018), sexual victimization, and emotional victimization among female adolescents and higher rates of physical victimization among male adolescents (Finkelhor, Turner, Shattuck, & Hamby, 2015). Although similar classes were found for females when compared to the full sample model, there were some notable gender differences in these profiles. For example, male adolescents in the *poly-victimization + high harmful trauma characteristics* class had lower rates of sexual abuse (13%) than adolescents in the overall model (40%) or the female only model (62%). This is similar to previous research showing male rates of sexual abuse to be a third of female rates (Pereda, Guilera, Forns, & Gómez-Benito, 2009). Further, males in the *sexual abuse* class had the highest levels of *trusted perpetrator*. This was different from the female adolescent model, in which *emotional abuse* was associated with higher endorsement of *trusted perpetrator*. This may indicate slight variation in closeness of perpetrator for male and female adolescents and an avenue for further research. Finally, although few male adolescents were classified as belonging in the *sexual abuse class*, low rates of negative social reactions and life threat were observed in this class. This was somewhat surprising, given evidence for intense stigma directed toward male survivors of sexual victimization (Sorsoli, Kia-Keating, & Grossman, 2008; Ullman & Filipas, 2005). However, because we did not separately assess disclosure, it is difficult to ascertain if male adolescents reported lower rates of negative social reactions because they were less likely to disclose their abuse (Sorsoli et al., 2008). Thus, findings indicate that, while including trauma-related characteristics is key to differentiating victimization classes, they may vary by gender.

#### 4.3. Clinical implications

These findings have several important clinical implications for adolescents entering substance use disorder treatment. First, they emphasize the importance of assessing not just the types of victimization experienced, but also characteristics of those experiences. For example, it may be useful to consider how negative social reactions to abuse disclosure may affect substance use, especially among poly-victimized adolescents or female adolescents exposed to sexual abuse. Therapists could explore how these experiences contribute to cognitions regarding substance use or interfere with access to social supports that could be protective against substance use. Similarly, for poly-victimized or emotionally-abused adolescents, understanding how abuse perpetrated by a trusted offender affects outcomes may be important to assess. Second, our findings provide support for expanded screening regarding past traumas. That is, clinicians may wish to screen for similar trauma associated characteristics in order to determine treatment plans and the type of treatment clients should receive. Third, they highlight the need for gender-responsive intervention development for adolescents entering substance use disorder treatment. Female adolescents were more likely to be characterized into the *poly-victimization/harmful trauma characteristics and sexual abuse class*. This may account for some gender differences in substance use disorders observed in past studies. Indeed, female adolescents generally have more severe substance use problems (McHugh et al., 2017), more episodes of subsequent treatment following initial entry (Grella, Scott, Foss, Joshi, & Hser, 2003), and higher rates of dropout

(Fernández-Montalvo, López-Goñi, Azanza, Arteaga, & Cacho, 2017). However, male adolescents were especially likely to be characterized into the *physical abuse + high chronicity* class. Intervention and treatment planning might need to include special attention to poly-victimization, sexual abuse, and potentially harmful characteristics of abuse seen in these classes (e.g., negative social reactions) for female adolescents, and physical abuse for male adolescents. Thus, youth who experienced the co-occurrence of multiple types of victimization *and* experienced multiple associated trauma characteristics may require more intensive or tailored services.

#### 4.4. Strengths and limitations

This study had several notable strengths including its large sample size and use of sophisticated analytic techniques to simultaneously consider multiple aspects of victimization. However, it was not without limitations. Although the use of a treatment sample improves our ability to inform treatment decisions and affords increased sample sizes for substance use disorders that are rare in the general population, it is not necessarily generalizable to victimized adolescents as a whole. Future research should investigate gender-specific associations between victimization characteristics and substance use disorders in large general-population samples of adolescents. Second, we do not have inter-rater agreement data between clinicians. This information would allow us to understand how exchangeable clinicians are with respect to using the GAIN. Third, we only investigated characteristics of victimization experiences, and did not investigate other traumas which adolescents may be exposed (e.g., natural disasters, motor vehicle accidents, witnessing domestic violence between parents). Fourth, we did not explore frequency or chronicity in associated trauma characteristics. Future research should investigate how chronic or repeated trauma related characteristics are related to psychological outcomes.

#### 4.5. Conclusion

To conclude, our study highlights the importance of considering both poly-victimization and associated characteristics of victimization in understanding the symptom presentation of adolescents entering substance use disorder treatment. The current study adds to literature and theory on poly-victimization by demonstrating how trauma characteristics differentiate across victimization classes. This indicates a need for a more nuanced and detailed assessment of victimization for youth entering substance use disorder treatment, as those who experience co-occurring victimization and associated characteristics may require more intensive services. We also found important differences in profiles and substance use outcomes by gender, evidencing the need for gender-responsive assessment to inform service delivery. Future research and practice may consider screening for trauma characteristics, especially for female adolescents who report multiple experiences of victimization, to inform treatment and service related decisions.

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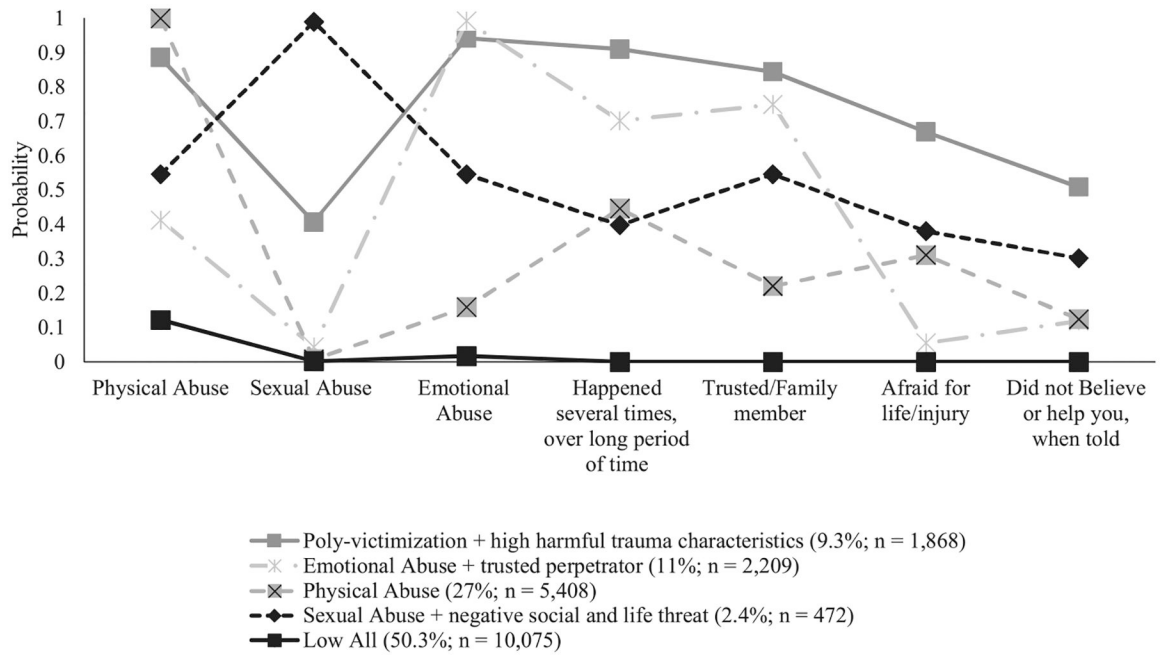
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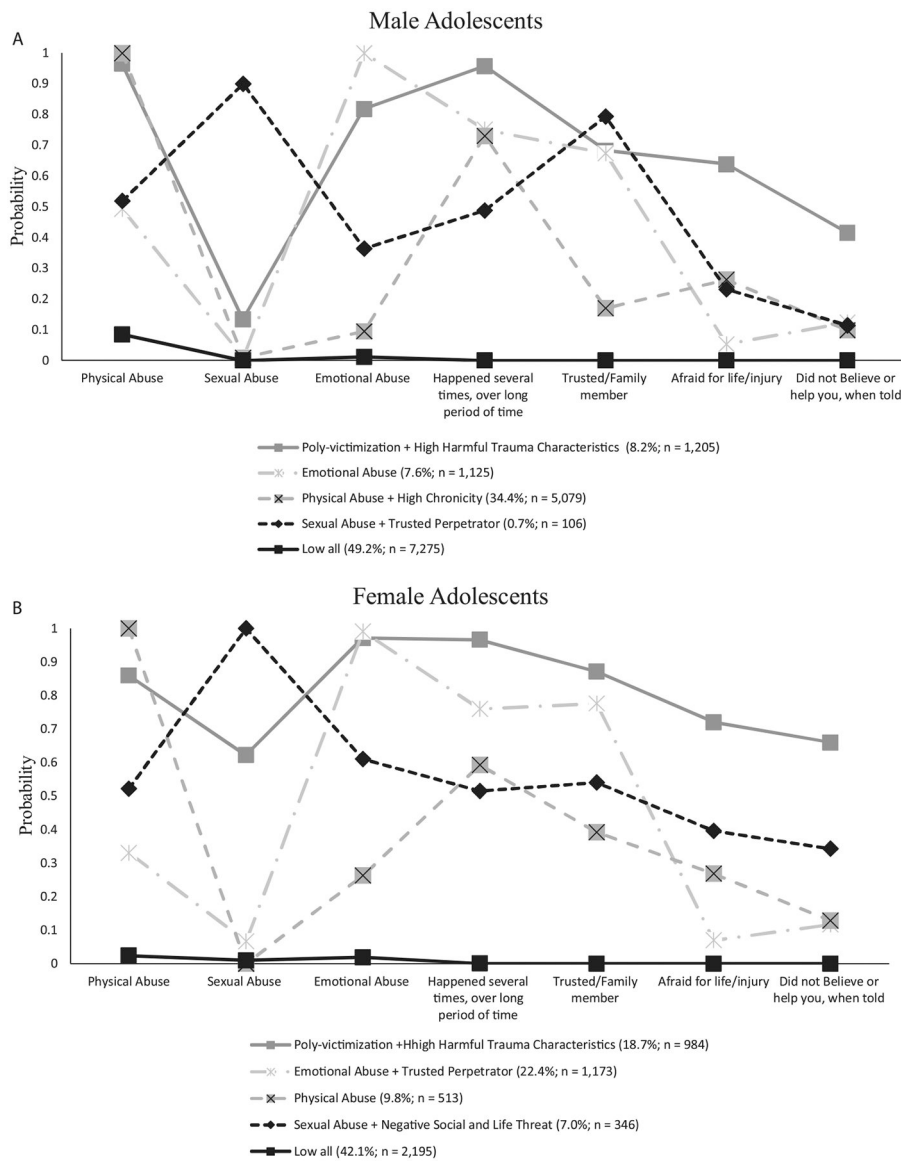


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**Fig. 1.** Item probability plot for victimization and associated trauma characteristics for the overall (gender-mixed) model.



**Fig. 2.** a Item probability plots for victimization and associated trauma characteristics for male adolescents. b Item probability plots for victimization and associated trauma characteristics for female adolescents.

**Table 1**

Baseline characteristics.

	<b>Total Sample (N = 20,092) M (SD) or n (%)</b>	<b>Male Adolescents (n = 14,811)</b>	<b>Female Adolescents (n = 5,528)</b>
<i>Demographics</i>			
Age, in years	15.57 (1.21)	15.6 (1.19)	15.4 (1.25)
Female, n (%)	5,258 (26.2%)	-	-
nonwhite n (%)	12,809 (63.8%)	9,815 (66.3%)	2,994 (56.9%)
SES <sup>a</sup>	261.9 (1,202.5)	279.3 (1367.5)	210.6 (440.5)
<i>Victimization n (%)</i>			
Physical Abuse	9,448 (47.1%)	7,297 (50.4%)	1,985 (37.8%)
Sexual Abuse	1,377 (6.9%)	305 (2.1%)	1,072 (20.4%)
Emotional Abuse	5,233 (26.1%)	2,716 (18.3%)	2,517 (47.9%)
<i>Associated Trauma Characteristics</i>			
Chronicity of abuse	8,038 (40.1%)	5,720 (38.6%)	2,318 (44.1%)
Closeness of the perpetrator	4,670 (23.3%)	2,509 (16.9%)	2,161 (41.1%)
Fear for life/injury	3,220 (16.0%)	2,181 (14.7%)	1,039 (19.8%)
Negative reactions to disclosure	2,019 (10.1%)	1,145 (7.7%)	874 (16.6%)
<i>Substance Use and Related Disorders</i>			
Prior substance use treatment	6,318 (31.5%)	4,661 (31.5%)	1,657 (31.5%)
Alcohol use disorder	3,139 (15.6%)	2,074 (14.0%)	1,065 (20.3%)
Marijuana use disorder	6,046 (30.1%)	4,580 (30.9%)	1,466 (27.9%)
Opioid use disorder	2,067 (10.3)	1,373 (9.3%)	694 (13.2%)
Tobacco use disorder	14,323 (71.4%)	10,509 (71.0%)	2,814 (72.5%)
Poly-substance use diagnosis	720 (3.6%)	559 (3.8%)	161 (3.1%)
Dual diagnosis	12,182 (60.7%)	8,619 (58.2%)	3,563 (67.8%)

<sup>a</sup>This scale is used as the primary measure of social economic status. Interpretative ranges are based on percent of poverty line (for a given year/ family size): 0–50% very poor, 50–99% poor, 100–299% working class, 300%–999% upper middle class, 1000% and above upper class.

**Table 2**

Fit statistics for latent class analysis.

No. of classes	-2LL	AIC	BIC	aBIC	Entropy	VLMRT	<i>p</i>	LRT	<i>p</i>	BLRT	<i>p</i>
Overall Model											
1	140149.65	140163.65	140218.99	140196.75							
2	112430.93	112460.93	112579.53	112531.86	0.93	27718.71	0.001	27373.37	0.001	27718.73	0.001
3	107218.04	107264.04	107445.89	107372.79	0.86	5121.89	0.001	5147.93	0.001	5212.89	0.001
4	105970.92	106032.92	106278.02	106179.50	0.84	1247.12	0.001	1231.58	0.001	1247.12	0.001
<b>5</b>	<b>105599.03</b>	<b>105677.03</b>	<b>105985.37</b>	<b>105861.43</b>	<b>0.87</b>	<b>371.89</b>	<b>0.001</b>	<b>367.26</b>	<b>0.001</b>	<b>317.89</b>	<b>0.001</b>
6	105461.00	105555.00	105926.60	105777.23	0.83	138.03	0.400	136.31	0.030	138.30	0.040
Multi-group model											
1	157814.09	157844.09	157962.66	157915.00							
2	129167.76	129229.76	129474.82	129376.30	0.93	-	-	-	-	-	-
3	125909.30	126003.31	126374.84	126225.98	0.91	-	-	-	-	-	-
4	124922.02	125048.02	125546.45	125345.83	0.88	-	-	-	-	-	-
<b>5</b>	<b>124541.49</b>	<b>124699.49</b>	<b>125323.99</b>	<b>125072.94</b>	<b>0.90</b>	-	-	-	-	-	-
6	124405.00	124595.00	125345.97	125044.09	0.87	-	-	-	-	-	-

*Note:* Note: -2LL = negative 2 log likelihood; AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; aBIC = sample size adjusted Bayesian Information Criteria; VLMRT = Vuong-Lo-Mendell-Rubini Likelihood Ratio Test; LMR = Lo-Mendell-Rubin test; BLRT = Bootstrapped loglikelihood ratio test.

In the multi-group model, typical class structure test statistics are not available. Thus, we used reductions in -2LL and aBIC values to determine the best fitting model.

**Bold** indicates best fitting model.

**Table 3**

Odds ratios for substance use and related disorders for the overall (gender – mixed) LCA.

Poly-victimization + high harmful trauma characteristics VS.								
Substance use and related disorders	Emotional Abuse + Trusted Perpetrator		Physical Abuse		Sexual Abuse + Negative Social Reaction and Perceived Life Threat		Low All	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Alcohol use disorder	1.05	[0.95–1.14]	<b>1.18</b>	<b>[1.10–1.26]</b>	1.08	[0.93–1.23]	<b>1.41</b>	<b>[1.34–1.49]</b>
Marijuana use disorder	0.99	[0.90–1.08]	1.04	[0.96–1.12]	1.08	[0.94–1.23]	<b>1.08</b>	<b>[1.01–1.15]</b>
Opioid use disorder	<b>1.31</b>	<b>[1.15–1.47]</b>	<b>1.42</b>	<b>[1.29–1.56]</b>	<b>1.24</b>	<b>[1.09–1.39]</b>	<b>1.97</b>	<b>[1.89–2.05]</b>
Tobacco use disorder	<b>1.18</b>	<b>[1.08–1.27]</b>	<b>1.20</b>	<b>[1.12–1.29]</b>	<b>1.24</b>	<b>[1.09–1.39]</b>	<b>1.97</b>	<b>[1.89–2.05]</b>
Poly-substance use diagnosis	<b>1.11</b>	<b>[1.02–1.19]</b>	1.07	[1.00–1.14]	1.04	[0.91–1.17]	<b>1.67</b>	<b>[1.60–1.74]</b>
Dual diagnosis	<b>1.29</b>	<b>[1.18–1.40]</b>	<b>1.20</b>	<b>[1.10–1.30]</b>	<b>1.31</b>	<b>[1.14–1.47]</b>	<b>2.74</b>	<b>[2.65–2.83]</b>

Note: OR = odds ratio; 95% CI = 95% confidence interval.

All odds ratios are in reference to the *poly-victimization + high harmful trauma characteristics* class. Thus, values above 1 indicate Higher odds of the specific disorder for the poly-victimization + high harmful trauma characteristics class compared to the relevant Class.

**Bold** indicates the confidence interval does not include 1.

**Table 4**

Odds ratios for substance use and related disorders for the MG-LCA.

<b>Poly-victimization + high harmful trauma characteristics VS.</b>									
<b>Substance use and related disorders</b>	<b>Emotional Abuse</b>		<b>Physical Abuse + High Chronicity</b>		<b>Sexual Abuse + Trusted Perpetrator</b>		<b>Low All</b>		
	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>	
<b>Male Adolescents</b>									
Alcohol use disorder	1.04	[0.94 – 1.14]	1.21	[0.83 – 1.59]	0.95	[0.82 – 1.07]	<b>1.30</b>	<b>[1.20 – 1.40]</b>	
Marijuana use disorder	1.01	[0.92 – 1.09]	0.97	[0.65 – 1.29]	<b>0.87</b>	<b>[0.76 – 0.99]</b>	1.02	[0.93 – 1.10]	
Opioid use disorder	<b>1.20</b>	<b>[1.02 – 1.38]</b>	1.01	[0.38 – 1.64]	1.08	[0.85 – 1.32]	<b>1.47</b>	<b>[1.29 – 1.66]</b>	
Tobacco use disorder	<b>1.29</b>	<b>[1.19 – 1.38]</b>	1.27	[0.94 – 1.60]	1.09	[0.96 – 1.21]	<b>2.07</b>	<b>[1.98 – 2.17]</b>	
Poly-substance use diagnosis	<b>1.30</b>	<b>[1.22 – 1.38]</b>	1.13	[0.82 – 1.43]	<b>1.17</b>	<b>[1.06 – 1.28]</b>	<b>1.93</b>	<b>[1.84 – 2.01]</b>	
Dual diagnosis	<b>1.48</b>	<b>[1.36 – 1.60]</b>	1.28	[0.89 – 1.66]	<b>1.18</b>	<b>[1.02 – 1.33]</b>	<b>3.28</b>	<b>[3.16 – 3.40]</b>	
<b>Female Adolescents</b>									
	<b>Emotional Abuse + Trusted Perpetrator</b>		<b>Physical Abuse</b>		<b>Sexual Abuse + Negative Social Reaction and Perceived Life Threat</b>		<b>Low All</b>		
Alcohol use disorder	<b>1.25</b>	<b>[1.09–1.41]</b>	1.13	[0.95–1.31]	1.08	[0.96–1.20]	<b>1.33</b>	<b>[1.22–1.44]</b>	
Marijuana use disorder	<b>1.20</b>	<b>[1.05–1.35]</b>	1.17	[1.00–1.34]	1.09	[0.98–1.21]	<b>1.33</b>	<b>[1.23–1.43]</b>	
Opioid use disorder	<b>1.67</b>	<b>[1.38–1.96]</b>	<b>1.42</b>	<b>[1.12–1.73]</b>	<b>1.48</b>	<b>[1.28–1.68]</b>	<b>1.65</b>	<b>[1.47–1.83]</b>	
Tobacco use disorder	<b>1.49</b>	<b>[1.33–1.64]</b>	<b>1.24</b>	<b>[1.06–1.42]</b>	<b>1.33</b>	<b>[1.20–1.45]</b>	<b>2.23</b>	<b>[2.12–2.34]</b>	
Poly-substance use diagnosis	<b>1.17</b>	<b>[1.02–1.31]</b>	1.00	[0.84–1.16]	1.09	[0.98–1.20]	<b>1.67</b>	<b>[1.57–1.77]</b>	
Dual diagnosis	<b>1.69</b>	<b>[1.52–1.86]</b>	<b>1.44</b>	<b>[1.25–1.64]</b>	<b>1.41</b>	<b>[1.27–1.56]</b>	<b>3.06</b>	<b>[2.93–3.18]</b>	

Note: *OR* = odds ratio; *95% CI* = 95% confidence interval.

All odds ratios are in reference to the *poly-victimization + high harmful trauma characteristics* class. Thus, values above 1 indicate Higher odds of the specific disorder for the poly-victimization + high harmful trauma characteristics class compared to the relevant Class.

**Bold** indicates the confidence interval does not include 1.