A Longitudinal Investigation of Trauma Exposure, Retraumatization, and Post-Traumatic Stress of Justice-Involved Adolescents

Final Report
27 March 18

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Disclaimer: "This project was supported by Grant # 2016-MU-MU-0070 awarded by the Office of Juvenile Justice and Delinquency Prevention, Office of Justice Programs, U.S. Department of Justice. The opinions, findings, and conclusions or recommendations expressed in this publication/program/exhibition are those of the author(s) and do not necessarily reflect those of the Department of Justice."

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ABSTRACT

BACKGROUND. The strong link between trauma exposure and delinquency is a recurring research finding (Dierkhising et al., 2013). Justice-involved adolescents experience disproportionately high rates of trauma exposure with some studies reporting trauma exposure among justice-involved adolescents at a rate that is two to three times higher than that of the general population (Baglivio et al., 2014; Grevstad, 2010). Despite concerted attention to the issue of trauma exposure among justice-involved adolescents, critical questions remain regarding trauma exposure and the development of trauma-related psychological distress among justice-involved adolescents.

OBJECTIVES. Based on the extensive levels of trauma exposure and the need to provide effective trauma-informed services to justice-involved youth, the purpose of this study was to provide greater understanding of trauma exposure, retraumatization, and trauma-related psychological distress among justice-involved adolescents.

METHODS. The evolution of exposure to violence and psychological distress among adolescents were examined using a sample 1,354 male and female youths who completed a baseline assessment and 10 follow-up interviews over a seven-year period as part of the Pathways to Desistence study. After examining descriptive and bivariate analyses, latent class analysis was utilized to analytically identify a taxonomy based on adolescents' patterns of exposure to violence as well as to explore the association between the analytically-identified exposure to violence patterns and various psychological symptoms. Additionally, latent growth models were analyzed examining: (a) changes in exposure to violence over time, (b) changes in psychological distress over time, (c) the contemporaneous, parallel processes of changes in

exposure to violence and psychological distress over time, and (d) differences in the evolution of violence exposure and psychological distress across sex and race/ethnicity.

RESULTS. Examining exposure to violence connections to various types of psychological symptoms, the strongest associations were found between exposure to violence and depression, hostility, paranoid ideation, and psychotic symptoms. Associations between the level and trajectories of exposure to violence and psychological distress remained consistent over the study period. On average, both exposure to violence and psychological distress among this sample of justice-involved youth slightly decreased over time. While these findings show a general decrease in exposure to violence and psychological distress in over time, they do not support the notion that exposure to violence and psychological distress improves or worsens similarly for all justice-involved youth. For example, findings indicated justice-involved Caucasian and Hispanic youth experienced a significant decrease in exposure to violence that was not experienced by African American youth.

IMPLICATIONS. Future research is critically needed to investigate the effectiveness of trauma-informed care modalities in reducing trauma-related psychological distress for justice-involved youth. Additionally, research is needed on the effectiveness of treatment modalities targeting various facets of psychological distress common among justice-involved youth such as trauma-related anger. Practitioners treating justice-involved youth who have witnessed and/or experienced violence should take care not to mislabel anger, hostility, and aggression as symptoms of Oppositional Defiant Disorder or Conduct Disorder as they may be trauma-related symptoms indicative of Trauma- and Stressor-Related Disorders.

BACKGROUND AND BRIEF REVIEW OF THE RELEVANT LITERATURE

Trauma Exposure of Justice-Involved Adolescents

Exposure to traumatic events is defined as (1) experiencing a serious injury to yourself or witnessing a serious injury to or the death of someone else, (2) facing imminent threats of serious injury or death to yourself or others, or (3) experiencing a violation of personal physical integrity (National Child Traumatic Stress Network [NCTSN], 2016). Trauma exposure may result from experiencing acute traumatic events that are brief and occur at a particular place and time such as a school shooting, gang-related violence in the community, serious accidents, sudden or violent loss of a loved one, or physical or sexual assault (NCTSN, 2016). Trauma exposure may also occur due to chronic traumatic situations that repeatedly experienced over long periods such as physical and sexual abuse, domestic violence, or political violence (NCTSN, 2016).

Adolescents rank among the more highly victimized segments of the U.S. population. According to the National Crime Victimization Survey (NCVS), in the 10-year period from 1993 to 2003, youth between the ages of 12 and 17 were victims of violent crime at a rate two and a half times greater than adults (83.8 per 1,000 compared with 32.0 per 1,000; Baum, 2005). This NCVS trend continued in 2012 and 2013 when individuals between the ages 12 and 17 years reported higher rates of violent victimization than persons in all other age groups (Truman & Langton, 2014). In comparison to adolescents in the general population, justice-involved adolescents are at greater risk of trauma exposure (Dierkhising et al., 2013). Justice-involved youth are more likely to have experienced child maltreatment (Barrett, Katsiyannis, Zhang, & Zhang, 2014). Additionally, justice-involved adolescents are more likely to report multiple forms of trauma (Abram et al., 2004), with one-third reporting exposure to multiple types of trauma every year (Dierkhising et al., 2013). Justice-involved youth detained in juvenile detention or

residential treatment facilities are considered the most vulnerable youth as detention typically is reserved for those adolescents for which all other possible interventions have not been effective (Dierkhising et al., 2013; Justice Policy Institute, 2009). Practices and general conditions commonly observed in detention facilities may continue to expose previously traumatized youth to further trauma or abuse, resulting in retraumatization (Dierkhising, Lane, & Natsuaki, 2014; Lambie & Randell, 2013; Mendel, 2011). Surveys of detained youth indicate that exposure to trauma and abuse while detained is not an uncommon occurrence with reports of placement in solitary confinement (exceeding 24 hours), denial of food and psychological abuse, sexual assault, physical fights between detained youth, excessive use of force by staff, and exposure to violence by staff against other youth (Dierkhising et al., 2014).

Consequences of Exposure to Trauma during Adolescence

Exposure to trauma during adolescence has enduring effects (Macmillan, 2001; Putnam, 2006; Saunders, 2003). Experiencing trauma affects every sphere of an adolescent's life—undermining positive beliefs about self-efficacy, destroying expectations of finding safety in the world, and weakening the ability to form intimate attachments (Herman, 1992; Macmillan, 2001). Post-traumatic stress (PTS) is described as a consequence of exposure to traumatic events or situations that overwhelms an adolescent's ability to cope with what they have experienced (NCTSN, 2016). Adolescents respond to trauma in various ways. Some present with signs of intense emotional dysregulation —disturbed sleep, difficulty paying attention and concentrating, anger and irritability, withdrawal, repeated and intrusive thoughts, and extreme distress—when confronted by anything that reminds them of their traumatic experiences (i.e., triggers). Some develop mental health disorders such as posttraumatic stress disorder (PTSD), depression, anxiety, and a variety of behavioral disorders (NCTSN, 2016).

Grounded in our expanding knowledge of the consequences of trauma, the newest edition of *The Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) extended the diagnostic criteria for posttraumatic stress disorder (PTSD) to include new criteria marked by the presence of trauma-related shame, guilt, or anger (American Psychiatric Association, 2013). One new criterion of PTSD states the trauma-related negative alterations in cognitions and moods may be evidenced by:

> Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad", "No one can be trusted") …. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others…Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame) ("Trauma- and Stressor-Related Disorders," DSM-5, 2013).

An additional new criterion of PTSD relates to trauma-related arousal and reactivity which may be expressed not only as irritable or aggressive behavior but also as self-destructive or reckless behavior (DSM-5, 2013). These newly added PTSD criteria are unmistakably relevant to understanding and treating trauma of justice-involved adolescents.

Prevalence, Patterns, and Consequences of Retraumatization

Numerous studies have examined the intersection of various types of traumatic experiences among adolescent victims, documenting the clustering of physical abuse, sexual abuse, and neglect; physical and sibling abuse; physical and psychological abuse; community and family violence; child maltreatment and sexual exploitation; child maltreatment and sexual assault; and child physical abuse and dating violence (Classen, Palesh, & Aggarwal, 2005; Fang & Corso, 2007; Macmillan, 2001; Reid, 2012). Studies have found that abused or victimized youth often endure multiple victimizations (Finkelhor, Ormrod, Turner, & Hamby, 2005; Menard & Huizinga, 2001). Finkelhor, Ormond, and Turner (2007) suggested that the observed clustering of various types of traumatic experiences may be a result of the "contagion from one

form of victimization to another" (p. 150), implying that there may be a snowballing effect of traumatic experiences, with each escalating the risk for future experiences of trauma.

Justice-involved youth often enter the juvenile justice system with a history of child maltreatment, with studies indicating 42% of justice-involved youth also report contact with the child welfare system or child protective services (Dierkhising et al., 2013; Herz, Ryan, & Bilchik, 2010). In research regarding victimization of justice-involved youth, child maltreatment was found to be predictive of abuse while incarcerated (Dierkhising et al., 2014; Mendel, 2011). These findings regarding abuse of incarcerated youth support the notion that certain victimizations, such as child maltreatment (e.g., neglect, psychological, sexual, or physical abuse) may function as gateway victimizations, which due to their traumatic impact generate susceptibility to more severe types of abuse and victimization (Finkelhor et al., 2007, p. 162). Experiencing multiple or repeated traumatic experiences often results in more severe difficulties related to psychosocial functioning, including aggression, delinquency, substance use, and interpersonal problems (e.g., Chen, 2009; De Bellis, 2001; Fagan, 2005; Finkelhor et al, 2007; Lauritsen & Laub, 2007; Kilpatrick & Saunders, 2000; Reid & Piquero, 2016; Reid, Richards, Loughran, & Mulvey, 2017; Reid & Sullivan, 2009).

RESEARCH QUESTIONS AND OBJECTIVES

The overall goal of this study was to provide greater understanding of trauma exposure, retraumatization, and the development of trauma-related psychological distress among justice-involved adolescents. The study utilized eleven waves of data collected between 2000 and 2012 from 1,354 justice-involved adolescents and their caregivers from two study sites as part of the Pathways to Desistance study (Mulvey, 2012) to accomplish three specific objectives:

(1) *describe the prevalence and patterns of trauma exposure as well as the types of psychological symptoms most strongly associated with trauma exposure*;

(2) *identify and describe trajectories of trauma exposure and trauma symptoms across the adolescent period from ages 16-23 years among justice-involved adolescents*;

(3) *test whether the trajectories of trauma exposure and trauma symptoms are related over time and examine differences in trajectories across sex and race/ethnicity.*

STUDY METHODS AND ANALYTIC TECHNIQUES

Sample and Data Collection Procedures

The study utilized 10 waves of data collected between 2000 and 2003 from 1,354 male and female participants of a prospective, longitudinal study called the Pathways to Desistance study. All study participants had been found guilty of a serious offense in U.S. juvenile or adult court in Philadelphia County, PA (Philadelphia) or Maricopa County, AZ (Phoenix). There were many more male participants (86.4%) in the study than female (13.6%) participants. The youths ranged in ages from 14 to 18 years (M = 16.04, SD = 1.14).

There were more African American (41%, n = 561) than Caucasian American (20%, n = 274) participants. Of the participants, 34% (n = 454) were Hispanic (regardless of race) and 5% (n = 65) reported their race/ethnicity as other. Following a baseline assessment, study participants were interviewed at 6-month intervals for three years and annually thereafter for an additional four years, providing a total of 10 follow-up assessments over a seven-year period. Additional information regarding youth recruitment, supplementary descriptions of the total sample, and detailed explanations of data collection procedures are available in Schubert et al. (2004).

Measures

Trauma Exposure. Trauma exposure was based on youth responses gathered during 10 follow-up waves using a modified version of the Exposure to Violence (ETV) Inventory (Selner-O'Hagan, Kindlon, Buka, Raudenbush, & Earls, 1998). The exposure to violence measure contains two subscales. One subscale (experiencing exposure to violence) included six items documenting experienced violence (e.g. "Have you ever been shot?"). The second subscale (witnessing exposure to violence) contained seven items documenting witnessed or observed violence (e.g., "Have you ever seen someone else being shot?"). The factor structure of the experiencing violence and witnessing violence subscales were found to be acceptable (experiencing violence – NFI= .95; NNFI= .94; CFI=.96; RMSEA= .07; witnessing violence - NFI=.96, NNFI=.96, CFI=.98, RMSEA=.04).

Psychological Distress. Youth scores on the Brief Symptom Inventory (BSI) scales measured youth psychological distress at each of the 10 follow-up waves (Derogatis & Melisaratos, 1983). BSI is a 53-item self-report inventory in which participants rate the extent to which they have been bothered (0 ="not at all" to 4="extremely") in the past week by various symptoms including nine subscales related to somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Youth score on each subscale is the mean of the individual items which comprise the subscale. The reliability and validity of the BSI have been examined in numerous studies and the inventory is generally considered an adequate measure of certain dimensions of symptoms and psychological distress (Skeem et al., 2006). General psychological distress (PsyD), scored as the Global Severity Index (GSI), was measured using the mean of youth scores across the nine subscales. The reliability and validity of the BSI have been examined in numerous studies and

the inventory is generally considered an adequate measure of psychological symptoms and distress (Skeem et al., 2006). The GSI had good internal consistency with the Cronbach's alpha ranging from .95 to .96 across all waves of data collection.

Analytic Plan

Bivariate analyses examined the associations between bivariate analyses of ETV items and symptom subscales at the baseline assessment. In addition, associations between youth ETV scores and global PsyD were examined across all follow-up waves.

Following the bivariate analyses of ETV items and symptom subscales, latent class analysis (LCA) was utilized to analytically identify a taxonomy based on adolescents' patterns of responses to ETV items. LCA permits the exploration of ETV among justice-involved trafficked youth using a person-focused technique to assess the presence of types of ETV youth rather than simply presenting the overall prevalence of ETV. The benefit of this individual-centered analytic approach is its potential for offering a fuller portrayal of ETV experiences of youth by probabilistically sorting this population into mutually exclusive classes, providing information on the distinguishing qualities of the various groups (Lanza, Collins, Lemmon, & Schafer, 2007).

The first step of the LCA involved determining which latent class model provided the best fit to the observed patterns of ETV in the data. To accomplish this, a series of models was estimated with Mplus (Muthén & Muthén, 1998-2012). Comparisons of several model fit indicators were made to ascertain which latent class model provided the best fit to the observed patterns in the data. A combination of criteria from several indices was used to determine best model fit including: (a) lower values of the Bayesian Information Criterion (BIC) indicated superior classification quality; (b) values closer to 1 on the "entropy" statistic (which ranges from 0 to 1) indicated a clearer delineation of classes; (c) higher level of concurrence between

the predicted and actual classification of cases in each of the derived classes indicated better classification; (d) the Lo-Mendell-Rubin (LMR) test signified whether a given *k* class model fits better than a *k-1* class model; and (e) the bootstrapped likelihood ratio test (BLRT), which is similar to the LMR, tests whether a given *k*-class model demonstrates a superior fit compared to a *k-1* class model by using bootstrapped samples to estimate the log likelihood difference test statistic. The LMR and BLRT provided a *p*-value denoting whether fit improved between the *k* and *k-1* class models, with lower values signifying better fit in *k* (Nylund, Asparouhov, & Muthén, 2007).

After the identification of the appropriate number of latent classes, the relative prevalence of each class was provided through the estimation of the percentage of participants who belong to each class. LCA also produces conditional item probabilities, which reflect the likelihood of responding "yes to an item, given membership in a particular class. The modeling process also conditionally classified youth by identifying probabilities of class membership for each youth based on his or her observed response patterns and the model estimates. These probabilistic assignments draw on the individuals modal class membership. To gain a fuller understanding of the trauma-related symptomology, the average level of the various types of symptoms were compared across the classes.

Supported by the results of bivariate analyses, the association between ETV and global PsyD was further explored using parallel-process latent growth curve modeling, which is an extension of latent growth curve modeling (LGM). LGM is an application of structural equation modeling (SEM) that is useful for measuring change using longitudinal data. With LGM, two latent factors are specified by factor loadings of repeated measures. First, the intercept factor represents the level of the construct at time zero (i.e., first follow-up period). Second, the slope

factor represents the direction and rate at which the variable changes. In this way, LGM uses longitudinal data to: (1) estimate the mean trend or slope of a variable over time, (2) test whether the level or intercept of a variable is related to the rate of change, and (3) examine whether the level and/or rate of change are associated with relevant risk factors or key outcomes (Preacher et al. 2008). As an extension of SEM, LGM retains the advantages of SEM including the ability to evaluate the suitability of proposed models using several model fit indices (Preacher et al. 2008). For this study, Mplus Version 7.2 was utilized (Muthén and Muthén 1998-2012) and models were assessed based on results of tests designed to evaluate different aspects of model fit. First, a non-significant chi-square suggests that that the hypothesized LGM model fits the data adequately. As the chi-square statistic is sensitive to sample size, the normed chi-square (NC) that divides the model chi-square value by the degrees of freedom was also computed. NC values of 3 or less suggest good model fit (Kline 2011). Also, a Root Mean Square of Approximation (RMSEA) of .06 or less suggests adequate model fit (Hu and Bentler 1999; Kline 2011).

Parallel-process LGM extends LGM by testing whether the level or change over time in one variable is related to the level or change over time in another variable, or in our case whether the level or change over time in ETV is related to the level or change over time in PsyD. Lastly, due to past research regarding in racial and sex differences in exposure to violence rates, multi-group LGM was employed to examine differences across sex and race/ethnicity.

FINDINGS

Descriptive and Bivariate Analyses

The mean number of ETV (out of 13 items) for the study sample youth was 5.34 (*SD* = 2.99), with a range of 0 to 13. As shown on Table 1, the majority of youth reported witnessing

someone being chased, beaten up, attacked with a weapon, or shot at. Almost one-half (49%) witnessed someone being shot at and hit and 30% witnessed someone killed by violence. In terms of experiencing violence, being chased, beaten up, attacked with a weapon, and being shot at were experienced by over 30% of youth. The remaining ETV items were less frequently reported. The least commonly endorsed items were witnessing rape (6%) and being raped or sexually assaulted (5%).

The results of the bivariate analyses assessing relationships between ETV items and symptom subscales revealed that most associations between ETV and the symptom subscales were statistically significant with low to moderate strength (see Table 2). The strongest bivariate associations between ETV items and symptom subscales were found between ETV items and hostility and paranoid ideation. Strongest associations were observed between symptom subscales and ETV items of witnessing a chase, witnessing rape, or witnessing someone being attacked with a weapon. Personal victimization of being chased, beaten, or being attacked with a weapon had the strongest associations with symptom subscales. The weakest associations were observed between symptom subscales and being shot.

Additionally, ETV scores were significantly associated with global PsyD at all follow-up waves. The correlation coefficients between the two measures ranged from .19 to .24 and were all statistically significant ($p < .001$).

Table 1. *Descriptive Statistics of Exposure to Violence and Symptom Subscales* (*N* = 1354)

Exposure to Violence Items	% YES	
1. Ever see anyone chased thought could be hurt	74.1	
2. Ever see someone else get beaten up	85.6	
3. Ever see someone else being raped	6.1	
4. Ever see someone attacked with a weapon	65.7	
5. Ever see someone else shot at	65.4	
6. Ever see someone else get shot and hit	49.1	
7. Ever see someone killed from violence	30.1	
8. You ever chased thought could be hurt	43.6	
9. You ever been beaten up by another	32.6	
10. You ever been raped or sexually attacked	5.6	
11. You ever been attacked with a weapon	30.8	
12. You ever been shot at	38.3	
13. You ever been shot and hit	6.4	
Symptom Subscales	*M(SD)*	Range
1. Somatization	.36(.57)	0-4
2. Obsessive-Compulsive	.72(.76)	0-4
3. Interpersonal Sensitivity	.44(.63)	0-4
4. Depression	.60(.74)	0-4
5. Anxiety	.46(.64)	0-4
6. Hostility	.75(.78)	0-4
7. Phobic Anxiety	.23(.47)	0-4
8. Paranoid Ideation	.90(.79)	0-4
9. Psychoticism	.52(64)	0-4

Table 2. *Correlation Matrix of Exposure to Violence Items and Symptom Subscales of Psychological Symptoms*

	Exposure to Violence Items (see Table 1 for number and description)												
Symptom Subscales	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Somatization	.11**	.08*	.20**	.14**	.06	.06	.09*	.13**	.16**	.16**	.11**	.06	.02
2. Obsessive-Compulsive	.12**	.12**	.15**	.15**	.09*	.10**	.12**	.16**	.17**	.16**	.15**	.12**	.06
3. Interpersonal Sensitivity	.05	.06	.13**	.10**	.02	.03	.04	.09*	.15**	.15**	.08*	.04	.05
4. Depression	.12**	.11**	.12**	.14**	.11**	.13**	.12**	.15**	.19**	.15**	.15**	.16**	.09*
5. Anxiety	.12**	.08*	.14**	.13**	.03	.05	.06	.14**	.17**	.16**	.12**	.09*	.05
6. Hostility	.20**	.14**	.19**	.22**	.15**	.14**	.16**	.21**	.22**	.11**	.22**	.16**	.09*
7. Phobic Anxiety	.09*	.05	.08*	.09*	.02	.04	.05	.10**	.12**	.10**	.08*	.02	.01
8. Paranoid Ideation	.18**	.13**	.20**	.20**	.17**	.14**	.13**	.22**	.23**	.13**	.20**	.18**	.10**
9. Psychoticism	.15**	.12**	.15**	.17**	.10**	.11**	.12**	.15**	.17**	.15**	.17**	.13**	.09*

Note: * $p < .01$, ** $p < .001$.

Latent Class Analysis

By making comparisons across several model fit indicators of two-, three-, four-, and five-class models, a determination was made that the four-class model best fit the data (Table 3). In particular, the Bayesian Information Criterion for the four-class model was the much lower for the four-class model than the three-class model, indicating superior fit. In considering the five-class model, the BIC was narrowly lower, the entropy was lower, and mean probabilities of class membership were not as strong as in the four-class model. Collectively, the indicators, while suggesting some degree of fit for multiple specifications, converged around the four-class model.

Table 3. *Comparative Model Fit Statistics for Iterative Latent Class Analysis (N = 1354)*

Model	Log Likelihood	Bayesian Information Criterion	Entropy	Lo-Mendel-Rubin Adjusted Test	Bootstrapped Likelihood Ratio Test (BLRT)	Mean LC Probabilities – Likely Class Membership
2 Class	-7955.68	16106.06	.84	2633.56 (.000) ^	2659.65 (.000) ^	.96, .95
3 Class	-7769.65	15834.95	.75	368.41 (.085) ^	372.06 (.000) ^	.94, .85, .90
4 Class	-7592.81	15582.21	.78	350.23 (.000) ^	353.70 (.000) ^	.91, .86, .90, .84
5 Class	-7539.72	15576.98	.75	105.14 (.034) ^	106.18 (.000) ^	.84, .88, .84, .82, .89

^ *H_0: k-1 Class best fit*

Within the four-class model, youth placed in the first identified and largest class (29.1%) had the lowest or very close to the lowest estimated probability of all ETV items. This class was labeled the *Minimally Exposed to Violence* class.

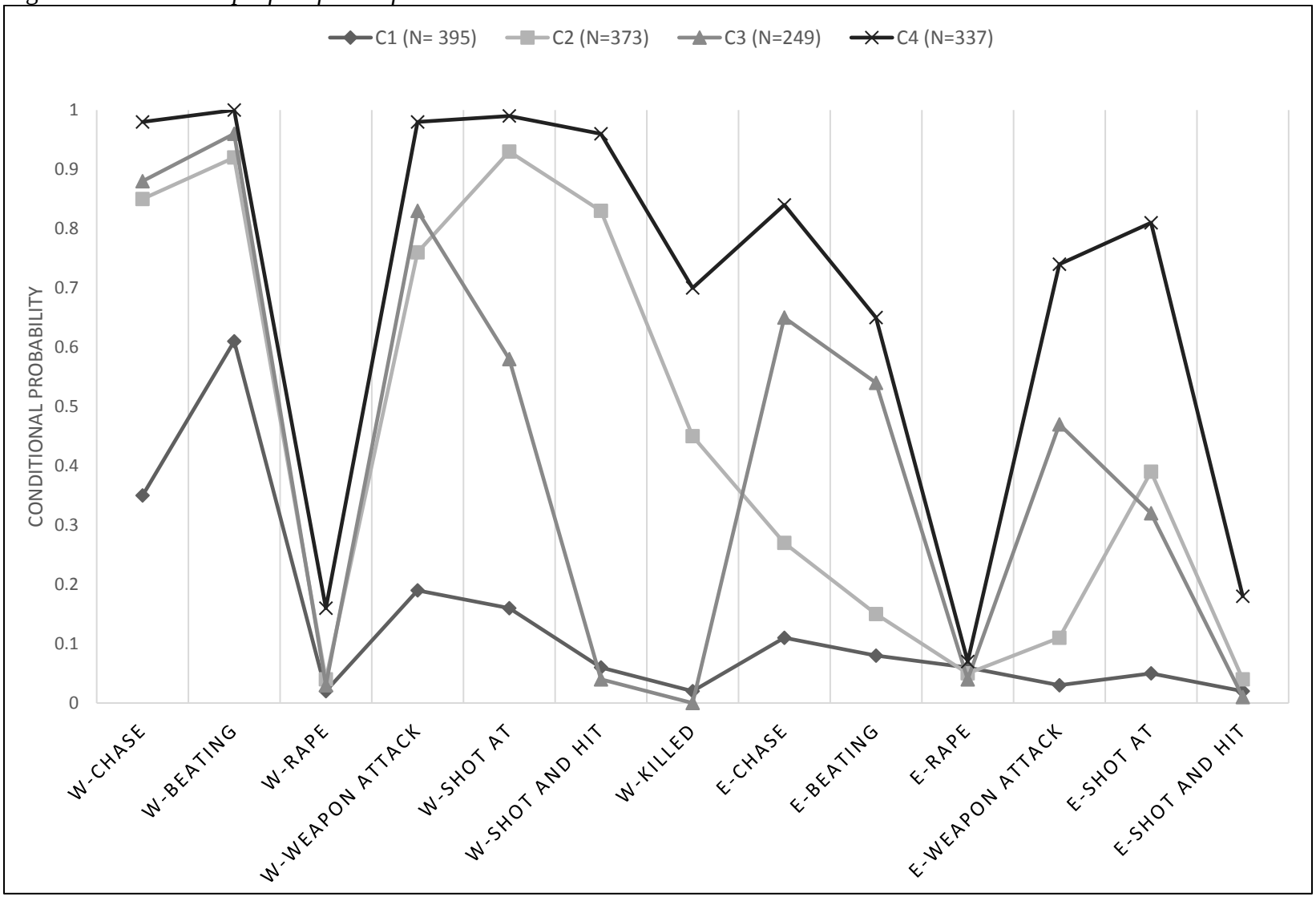
Members of the second identified class (27.5%) had high estimated probabilities of witnessing all forms of ETV including gun violence but the lowest estimated probabilities of experiencing any form of ETV except for "being shot at" and "being shot at and hit" in comparison with the two remaining classes. This class was labeled the *Witnesses of Gun and Non-Gun Related Violence*.

Members of the third identified class (18.3%) had high estimated probabilities witnessing and experiencing all types of violence except gun-related violence. This class was labeled *Exposed to Non-Gun Related Violence*. In comparison to the second and fourth class, this class was less likely to witness or experience gun-related violence.

Members of the fourth identified class (24.9%) had the highest estimated probabilities of having witnessed and experienced all types of violence in comparison to the other three classes. This class was labeled *Exposed to Gun and Non-Gun Related Violence*.

When comparing the average level of the various types symptom subscales across the four classes, the results indicated there were significant differences in the level of all symptom subscales (Table 4). In comparison to the *Minimally Exposed to Violence* class, all other classes had significantly higher scores on the symptom subscales measuring depression, hostility, paranoid ideation, and psychoticism. In comparison to the *Minimally Exposed to Violence* class, the *Exposed to Non-Gun Related Violence* and the *Exposed to Gun and Non-Gun Related Violence* had significantly higher scores on the subscales of somatization, obsessive-compulsive, anxiety, phobic anxiety symptoms. In comparison to the *Minimally Exposed to Violence* class, the *Exposed to Gun and Non-Gun Related Violence* had significantly higher scores on the interpersonal sensitivity subscale.

Figure 1. *Latent class profiles for the four-class model*



Note: W=Witnessed, E=Experienced

Table 4. One-Way ANOVA of Symptom Subscales by Four-Class Latent Model (N = 1261)

		SS	*df*	*MS*	*F*
Somatization	Between Groups	9.20	3	3.06	9.68*
	Within Groups	398.52	1258	.31	
	Total	407.73	1261		
Obsessive-Compulsive	Between Groups	28.75	3	9.58	17.24**
	Within Groups	699.41	1258	.55	
	Total	728.17	1261		
Interpersonal Sensitivity	Between Groups	6.76	3	2.25	5.74*
	Within Groups	493.72	1258	.39	
	Total	500.49	1261		
Depression	Between Groups	30.82	3	10.27	19.30**
	Within Groups	669.56	1258	.53	
	Total	700.39	1261		
Anxiety	Between Groups	14.57	3	4.85	12.20**
	Within Groups	500.88	1258	.39	
	Total	515.46	1261		
Hostility	Between Groups	67.37	3	22.46	40.54**
	Within Groups	696.93	1258	.55	
	Total	764.31	1261		
Phobic Anxiety	Between Groups	3.68	3	1.22	5.62*
	Within Groups	274.53	1258	.21	
	Total	278.21	1261		
Paranoid Ideation	Between Groups	61.28	3	20.42	35.64**
	Within Groups	720.96	1258	.57	
	Total	782.24	1261		
Psychoticism	Between Groups	23.46	3	7.82	19.71*
	Within Groups	499.16	1258	.39	
	Total	522.63	1261		

Note: * $p < .01$, **$p < .001$.

Latent Growth Models

Supported by the results of the bivariate analysis, separate models were estimated to evaluate the LGM of ETV and LGM of global PsyD. The LGM of ETV evidenced fair fit to the data ($\chi^2(45) = 161.92$, $p = .00$; NC = 3.59; RMSEA = .04 with 90% CI [.04 -.05]). The R^2 values of the observed indicators were all statistically significant, ranging from .25 to .41. The estimated mean of the intercept was 1.19 ($SE = .04$; $p < .001$) indicating that average ETV level at Wave 1 was significantly different from zero. The variance of the intercept factor was 0.95 ($SE = .10$, $p < .001$) indicating significant individual differences in ETV at Wave 1. The estimated mean of the slope for ETV was significant, indicating that there was change over time. The estimated mean of the slope was -.02 ($SE = .008$, $p < .05$), indicating that the mean level of ETV in this sample decreased on average about two one-hundreds of a unit on the measure of ETV for each time period. The variance of the slope factor was 0.02 ($SE = .004$, $p < .001$), indicating significant individual differences in the rate of change of ETV over time. There was a negative correlation between the intercept and slope factors, - 0.05 ($SE = .004$, $p < .001$), suggesting that individuals with higher levels of ETV values at Wave 1 tended to have larger decreases in ETV over time. Additionally, those with lower levels of ETV at Wave 1 tended to have more positive or increasing slopes in ETV over time.[1]

The model fit indicators of the LGM of global PsyD also evidenced adequate fit to the data ($\chi^2(50) = 123.80$, $p < .001$; NC = 2.48; RMSEA = .03 with 90% CI [.03 -.04]). The R^2 values of the observed indicators were all statistically significant, ranging from .28 to .58. The

[1] The LGM of ETV was also run controlling for proportion of time spent in secure detention during each follow-up wave, with no significant impact on the estimated mean of intercept 1.10 ($SE = .06$; $p < .001$) or negative correlation between intercept and slope factors - 0.05 ($SE = .01$, $p < .001$). However, while the estimated mean of the slope was similar -.01 ($SE = .009$, $p = .20$), the decrease in ETV no longer reached statistical significance.

estimated mean of the intercept was 0.42 (*SE* = .01; $p < .001$) indicating that the average symptomology Wave 1 was significantly different from zero. The variance of the intercept factor was 0.11 (*SE* = .01; $p < .01$) indicating significant individual differences in level of symptomology at Wave 1. The estimated mean of the slope for PsyD was -.01 (*SE* = .001; $p < .001$), indicating that the mean level of symptomology in this sample decreased about one one-hundreds of a unit on the measure of symptomology for each time period. The variance of the slope factor was also significant, indicating significant individual differences in the rate of change of symptomology over time.

Next, the parallel-process LGM was estimated in order to evaluate the associations between the intercepts and slopes of the key constructs – ETV and PsyD (see Table 5). The parallel-process LGM evidenced fair fit to the data ($\chi^2(196) = 579.58$ $p < .001$; NC = 2.96; RMSEA = .04 with 90% CI [.035 -.042]). The R^2 values of the observed indicators were all statistically significant, ranging from .29 to .58. The estimated means of the intercepts and slopes of the parallel-process LGM were similar to the estimates of the separate models reported above (see Table 3). For this model, covariances were also specified between each pair of latent growth factor variables. Significant covariance was found between youths' initial level of ETV and their initial level of PsyD (*estimate* = 0.15, *SE* = .02; $p < .001$) as well as between youth rate of change in ETV and youth rate of change in PsyD (*estimate* = .001, *SE* = .000; $p < .001$). Finally, variances of the latent growth factors for both ETV and PsyD were statistically significant, confirming significant between-person differences in both initial level and rate of change in ETV and PsyD.[2]

[2] Controlling for the proportion of time spent in secure detention during each follow-up wave did not impact any of the latent growth factors or the covariance between ETV and PsyD with one exception. As with the LGM of ETV, the estimated mean of the slope of ETV was similar -.01 (*SE* = .009, $p = .35$); however, the decrease was no longer statistically significant.

Table 5. *Parallel-Process LGM of Exposure to Violence and Psychological Distress*

	Estimate	SE	Critical-ratio
Exposure to Violence			
Means			
Level (Intercept)	1.205	.037	32.51*
Trend (Slope)	-.010	.004	3.94*
Covariances:			
Trend with Level	-.040	.008	4.96*
Variances			
Level (Intercept)	1.098	.094	11.73*
Trend (Slope)	.007	.001	7.07*
Psychological Distress			
Means			
Level (Intercept)	.422	.011	38.87*
Trend (Slope)	-.009	.001	8.43*
Covariances			
Trend with Level	-.005	.001	5.93*
Variances			
Level (Intercept)	.114	.011	10.03*
Trend (Slope)	.001	.000	7.39*
Exposure to Violence with Psychological Distress			
Covariances			
Level (Intercept)	.145	.018	7.88*
Trend (Slope)	.001	.000	6.07*
Model fit: $\chi^2(196) = 579.58$ $p < .001$; NC = 2.96; RMSEA = .04 with 90% CI [.035 -.042]			

Note: * $p < .001$

Lastly, multi-group models were analyzed to identify differences in these trajectories across sex and race/ethnicity. The multi-group parallel-process LGM with male and female groupings, revealed that the variance of change in ETV was not statistically significant for female youth (*estimate* = .001, *SE* = .002; $p = .50$) while variance of change remained significant for male youth (*estimate* = .008, *SE* = .001; $p < .001$), indicating that there were not significant between-person differences in the rate of change in ETV for female youth. The multi-group parallel-process LGM revealed a key important difference across race/ethic groups. Caucasian

and Hispanic youth, on average, had a decrease in ETV over time (Caucasian *estimate* = -.02, *SE* = .01; $p < .05$; Hispanic *estimate* = -.03, *SE* = .01; $p < .001$). However, the decrease in ETV was not observed in African American youth (*estimate* = .01, *SE* = .01; $p = .20$).

CONCLUSION

The current study added to our understanding of the development and association between exposure to violence and psychological distress. Several important findings emerged from our investigation. Examining exposure to violence connections to various types of psychological symptoms, the strongest associations were found between exposure to violence and depression, hostility, paranoid ideation, and psychotic symptoms. Psychotic symptoms in this non-clinical sample of youth are most likely indicative of social alienation and withdrawal from others (Derogatis & Melisaratos, 1983). These findings support and highlight the importance of the expansion of criteria of PTSD through the addition of trauma-related negative cognitions and moods including negative beliefs about self and others, blaming self and others for traumatic incidents, and negative emotions such as anger, shame, and fear (DSM-5, 2013).

An important and expected finding from this study was that associations between the level and trajectories of exposure to violence and psychological distress remained consistent. On average, both exposure to violence and psychological distress among this sample of justice-involved youth slightly decreased over time. While these findings show a general decrease in exposure to violence and psychological distress in over time, they do not support the notion that exposure to violence and psychological distress improves or worsens similarly for all justice-involved youth. Importantly, the trajectories of exposure to violence and psychological distress both had an inverse developmental pattern – that is, youth with lower initial levels of violence exposure and psychological distress were more likely to experience increases in these problems

over time, while those with higher initial levels were more likely to experience decreases over time.

When exploring differences across male and female youth, the multi-group analysis showed that the rate of change in exposure to violence decreased similarly for the female group while significant between-person differences remained with the male group. When examining trajectories across race/ethnicity, findings indicated justice-involved Caucasian and Hispanic youth experienced a significant decrease in exposure to violence that was not experienced by African American youth.

DISCUSSION

Several limitations of this study should be noted as they provide direction for future research on exposure to violence and psychological distress. While longitudinal data from justice-involved youth has seldom been used to explore these problems and the study findings broaden our understanding of their development, the sample was not representative of all types of justice-involved youth. The sample was comprised of serious youthful offenders primarily of Hispanic or African American heritage. Exposure to violence and psychological distress may develop differently among justice-involved youth who have committed less serious offenses. Notably, the study findings found significant variation in the trajectories of exposure to violence and psychological distress that may be explained by individual, familial, or environmental risk or protective factors. Further research studies should focus on explaining between-person variation.

IMPLICATIONS FOR POLICY, PRACTICE AND FUTURE RESEARCH

Future research is critically needed to investigate the effectiveness of trauma-informed care modalities in reducing trauma-related psychological distress. A budding body of research has started to build an evidence base of programs that may be effective in addressing trauma and related behavioral and emotional problems for diverse youth who are at risk of coming into contact with the justice system (for review, see McCoy, Leverso, & Bowen, 2016). More research is needed on the effectiveness of these treatment modalities with youth who have extensive involvement in the juvenile justice system. Additionally, research is needed on the effectiveness of treatment modalities targeting various facets of psychological distress common among justice-involved youth such as trauma-related anger. For example, there is a critical need to develop a better measure of trauma-related anger in order to more fully assess and track trauma-related anger symptoms (Sullivan, Jones, Hauenstein, & White, 2017). Absent a sufficient measure of trauma-related anger, it is not possible to evaluate treatment effectiveness.

When examining treatment of trauma-related symptoms in youth with disabilities, clinicians and researchers have reported a phenomenon labeled "diagnostic overshadowing" that occurs when youth engage in agitated and aggression behaviors (Mevissen & de Jongh 2010, p. 309). Practitioners often overlook psychological distress in these youth by attributing severe behavioral disturbances as part of the intellectual disability rather than recognizing these behaviors as a consequence of trauma related to PTSD (Mevissen & de Jongh 2010, p. 309). Similarly, practitioners treating justice-involved youth who have witnessed and/or experienced violence may mislabel anger, hostility, and aggression as symptoms of Oppositional Defiant Disorder or Conduct Disorder rather than symptoms of a Trauma- and Stressor-Related Disorder (DSM-5, 2013), resulting in misdiagnosing and inadequate treatment planning.

The key findings of this study indicate that violence exposure and psychological distress are persistently linked and decrease over time for justice-involved adolescents. Yet, the level and change in exposure to violence and psychological distress are not the same for all youth. As a notable example of this, African American youth did not experience the same rate of decline in violence exposure over time as Caucasian and Hispanic youth. Future research should incorporate a more quasi-experimental approach which can compare justice-involved youth with similarly situated youth who are equally at-risk yet are not involved in the justice system to compare justice involvement as a more formal intervention which does or does not directly affect exposure to violence. We advocate for a matched sample strategy using existing longitudinal data to test this.

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