Trauma-symptom profiles of adolescents in child welfare

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A B S T R A C T

In the province of Ontario (Canada), over 28,900 adolescents are investigated by child welfare agencies each year because of suspected maltreatment. Exposure to childhood maltreatment represents a major threat to the psychological well-being of young people, particularly in terms of trauma-related stress. The present study investigated trauma symptom profiles among 479 adolescents (13–17 years) involved with the Canadian child welfare system between 2003 and 2010. Latent profile analysis identified three profiles using self-report data from the Trauma Symptom Checklist for Children. Most adolescents (59%, n=281) were classified into the profile depicting minimal trauma-related symptoms, 30% (n=144) were characterized by moderate trauma-related symptoms, and 11% (n=54) were in the profile reflecting severe trauma-related symptoms. Several variables predicted profile membership. Greater severity of sexual abuse and female sex were associated with a greater likelihood of belonging to the severe trauma symptom profile than both the moderate and the minimal trauma symptom profiles. In addition, having societal ward status (compared to crown ward) was related to an increased likelihood of belonging to both the severe and moderate symptom profiles relative to the minimal symptom profile. This study provides some insight into the typologies of trauma experienced among child-welfare-involved adolescents and the set of factors which relate to the specific profiles. Findings are important for informing psychological assessment practices, as well as tailored interventions, for adolescents in the child welfare system.

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1. Introduction

According to the Ontario Incidence Study of Reported Abuse and Neglect (OIS-2013), it is estimated that 28,928 adolescents aged 12–15 years come into contact with child welfare each year in Ontario (Fallon et al., 2015). The OIS-2013 tracked 43,067 substantiated maltreatment investigations during the fall of 2013 among a representative sample of 17 child welfare agencies across the province of Ontario (Canada). Exposure to intimate partner violence was the most common form of maltreatment, representing 48% of all substantiated investigations, followed by neglect (24%), physical abuse (13%), emotional maltreatment (13%), and sexual abuse (2%; Fallon et al., 2015).

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Childhood maltreatment is a risk factor for the development of post-traumatic stress (PTS) symptoms. Current estimates of trauma-related symptomatology in the general population indicate that about 2.2% of adolescents manifest heightened PTS symptoms as measured by the Trauma Symptoms Checklist for Children (TSCC; Copeland, Keeler, Angold, & Costello, 2007). However, higher rates of PTS symptoms are found in adolescents in the child welfare system. In a nationally representative U.S. sample of 1848 child-welfare-involved children and young adolescents (ages 8–14) with varied maltreatment histories, Kolko et al. (2010) recorded heightened PTS symptoms for about 12% of the participants.

However, research also suggests that a substantial proportion of child-welfare-involved adolescents exhibit resilience (Guibord, Bell, Romano, & Rouillard, 2011), which is often conceptualized as positive adaptation and functioning following exposure to significant adversity (Masten & Wright, 1998). In a study examining the mental health outcomes of one hundred twenty-two 12- to 15-year-olds in the child welfare system in Ontario (Canada), findings indicated that slightly more than half (52.5%) displayed resilient functioning, which was defined as the absence of depressive symptoms or alcohol/drug use over the past year (Guibord et al., 2011). Even studies using more stringent definitions of resilience that require individuals to be functioning well across multiple domains (e.g., behavioral, social, and academic) have found that over half of the adolescents in child welfare exhibit resilience (Daining & DePanfilis, 2007; Jones, 2012). Because there is individual variability in the response to child maltreatment, empirical efforts have been made to understand the way certain socio-demographics, maltreatment-related, and welfare-related variables may influence the development of psychopathology (or lack thereof) in maltreated adolescents.

Studies of adolescents in child welfare that have examined the relation between various types of maltreatment and mental health outcomes have typically shown that psychological distress is highest among those adolescents who have experienced sexual abuse (Burns et al., 2004; McMillen et al., 2005). Sexual abuse may be associated with worse outcomes because it constitutes a gross violation of physical boundaries and often occurs alongside other forms of maltreatment (e.g., physical abuse, emotional neglect; Perez-Fuentes et al., 2013). Moreover, sexual abuse has specifically been linked to trauma-related symptoms in several general population studies (Boney-McCoy & Finkelhor, 1996; Kessler, Sonnega, Bremet, Hughes, & Nelson, 1995) as well as in studies with child-welfare-involved adolescents (Pettenko, Friend, Garrido, Taussig, & Culhane, 2012).

A substantial number of adolescents in child welfare experience multiple types of maltreatment (Richardson, Henry, Black-Pond, & Sloane, 2008; Trocmé et al., 2010). Results from the OIS-2013 indicated that 13% of newborn to 15-year-olds had experienced more than one type of maltreatment (Fallon et al., 2015). This finding is based on substantiated cases of child maltreatment. Though, whereas studies of child welfare samples using self-report questionnaires and/or interviews that do not require substantiation have typically yielded higher rates of multiple victimization (e.g., 72%; Lawrence, Carlson, & Egeland, 2006). Within the child welfare setting, some studies suggest a dose–response relationship, whereby those individuals experiencing more types of maltreatment show elevated levels of dysfunction relative to those experiencing only a single type (Griffin et al., 2011; McMillen et al., 2005).

Moreover, research on the relationship between sex and PTS indicates that females are more likely to suffer from trauma-related symptoms following childhood maltreatment (Keller, Salazar, & Courtney, 2010; Tolin & Foa, 2006). It has been suggested that females are more likely to ruminate following traumatic events, which increases their risk of developing trauma-related disorders (Ehlers & Clark, 2000). Moreover, females are at greater risk for sexual victimization in childhood (Dube et al., 2005), which has been strongly associated with the development of PTS (Tolin & Foa, 2006).

With respect to other demographics, such as ethnicity, research findings are mixed. Several studies suggest that, relative to their Caucasian counterparts, African American adolescents in child welfare typically exhibit fewer problem behaviours (Keller et al., 2001) and receive fewer mental health services (Garland, Landsverk, & Lau, 2003; Leslie, Hurlburt, James, Landsverk, & Slymen, 2005). Other studies, however, have not found any ethnic differences with regards to self-reported PTS (Keller et al., 2010; Kolko et al., 2010).

Research has also explored several child welfare-level predictors of psychological functioning, including the type of placement and number of placements. Compared to children living with their biological parents, children who are placed in non-kinship foster care or group homes show significantly higher rates of psychological difficulties (Burns et al., 2004; Keil & Price, 2006). Moreover, significantly more maltreated children in out-of-home care exhibit heightened PTS symptoms compared to those children who experienced maltreatment but remained in their homes (Kolko et al., 2010). In addition, research indicates placement instability is almost universally considered disadvantageous to children (Barber & Delfabbro, 2003). Multiple placements are associated with multiple school changes, difficulty maintaining attachment bonds with caregivers, and building new relationships within the home, school, and community (Barth et al., 2007). A greater number of placements have also been associated with more severe trauma symptoms among maltreated youth (Raviv, Taussig, Culhane, & Garrido, 2010).

Although extensive research has examined the well-being and functioning of child-welfare-involved adolescents, such studies have tended to rely on variable-centered approaches that describe the average behavior of a sample (Laursen & Hoff, 2006). While variable-centered analyses are informative, they underscore the importance of inter-individual variation. In contrast, person-centered mixture model approaches model population heterogeneity and identify distinctive subgroups or “profiles” of individuals within a sample that have similar psychological presentations (Laursen & Hoff, 2006). Hence, such analyses can provide a greater understanding of the diversity of psychological outcomes among maltreated adolescents in care.
Several person-centered research studies have attempted to identify subgroups of adolescents based on trauma-related symptomatology in a variety of populations, including community-based samples (Ayer et al., 2011; Breslau, Reboissin, Anthony, & Storr, 2005), female sexual abuse survivors (Au, Dickstein, Comer, Salters-Pedneault, & Litz, 2013), and youth involved in the juvenile criminal system (Vaughn, Freedenthal, Jenson, & Howard, 2007). The number of profiles identified across these studies has ranged from three to four, with at least one profile depicting adaptive functioning and at least one profile depicting poor functioning across a range of trauma-related symptoms. Profiles indicators have included self-reported post-traumatic-stress disorder (PTSD) symptoms either alone or in combination with other psycho-social measures (i.e., depressive symptoms, substance use, problem behaviours).

In terms of predictors of profile membership, most of these person-centered studies of trauma-exposed adolescents indicate female sex to be a common risk factor for the development of severe symptomatology. For instance, Breslau et al. (2005) examined a community sample of 1377 19–23 year olds exposed to traumatic events and found that females who experienced sexual assault reported the highest level of symptom severity, compared to either males with similar traumatic experiences or other individuals exposed to different traumatic events. Ayer et al. (2011) found similar results in a sample of 1119 trauma-exposed 12–17 year olds, where females reported greater severity of trauma-related symptoms compared to their male counterparts. In addition, results from a study on 723 youth (mean age = 15) in a juvenile correctional facility indicated that females were over-represented in the severe profile characterized by high rates of trauma symptoms, psychiatric symptoms (i.e., anxiety, obsessive-compulsive behavior, paranoia), substance use, and behavioral problems (Vaughn et al., 2007).

However, it is important to note that these studies focused on quite disparate populations whose trauma-related symptomatology had been measured in terms of PTSD symptoms and other mental health indicators such as depression, substance use, and problem behavior. Moreover, none of these studies specifically examined trauma-relevant profiles in child welfare-involved adolescents. Given that child welfare samples tend to have high rates of trauma exposure (e.g., Fallon et al., 2015; Trocmé et al., 2010), it seems important to explore trauma symptom profiles among this population.

1.1. Study objectives

Given the scarcity of trauma-related person-centered studies with adolescents in child welfare, our first objective was to build on the currently limited literature by examining trauma symptom profiles among child-welfare-involved 13–17-year-olds. Past person-centered studies involving trauma have mainly relied on PTSD symptoms and other mental health indicators which can add complexity to profile interpretation. Moreover, the samples used in previous person-centered studies were either quite specific (e.g., female sexual assault survivors, juvenile justice) or too broad (e.g., community-based samples), thereby making it difficult to generalize the results to the population of child-welfare-involved adolescents. As such, the current study restricted the profile indicators to trauma-related symptoms measured on the TSCC, and we aimed to identify profiles among a sample of adolescents served by child welfare. The second objective was to evaluate the relationship of those trauma symptom profiles to maltreatment experiences, socio-demographics, and child welfare variables. Considering the diversity of the studies investigating trauma symptom profiles among adolescents, the current analyses were largely exploratory. However, we expected to identify at least three profiles in our sample, each reflecting increasingly higher levels of trauma-related symptoms.

2. Methods

2.1. Data source

The Maltreatment and Adolescents Pathways (MAP) project is a longitudinal study of randomly-selected adolescents involved in child welfare between 2003 and 2010 across three large child welfare agencies in Toronto (Ontario, Canada; Wekerle et al., 2007, 2009). Adolescents were randomly selected from a master list of all active caseloads of 13–17-year-olds using random numbers. To be included in the study, adolescents were required to be the direct recipient of child welfare services and aged between 13 and 17 years at the time of the initial assessment. Adolescents with developmental delays, brief case openings (e.g., fewer than 6 months), limited case information (e.g., limited to only the name of the adolescent, date of birth, and name of the caseworker), and active crisis (e.g., suicidal) were excluded from the study. Participant recruitment occurred throughout the project’s 7-year duration.

Of those who were eligible, the initial response rate was 70%. Following their initial assessment, adolescents completed follow-up data collection sessions every 6 months for three years (i.e., initial, 6 months, 1 year, 1.5 years, 2 years, 2.5 years, and 3 years). Self-report data were gathered on a variety of health and well-being outcomes, such as drug and alcohol use, dating/sexual practices, friendships, physical health, psychological well-being, and maltreatment history. Ethical clearance was obtained from participating child welfare agencies and university research ethics boards. Adolescents aged 16 years and older provided their own consent, while legal guardians provided consent for adolescents under age 16 (for more detailed information about the MAP longitudinal study, see Wekerle et al., 2007, 2009).
2.2. Participants

While the MAP longitudinal study involves data collection every 6 months for 3 years, initial or Time 1 data (i.e., the time that the adolescent entered the study and completed his/her first data collection) was used for purposes of the current study. There were 561 adolescents who completed the initial data collection. However, 63 (11.62%) were removed from analyses because they were missing >10% of the data on our primary variables of interest. As such, our final sample was comprised of 479 adolescents. Participants and non-participants were compared on a number of demographic (e.g., sex, age, ethnicity) and child welfare (e.g., number and type of placements) variables by way of t-test or chi-squared analyses. No statistically significant differences were detected.

In our sample, there was an even distribution of male (45.9%) and female (54.1%) adolescents. The mean age was 15.8 years (SD = 0.96), and ethnicity was as follows: Caucasian (30.4%); African-Canadian (26%); and other (e.g., Latin; 14.7%). Note that 28.9% of adolescents reported having ≥2 ethnic backgrounds. In the five years prior to the initial assessment, adolescents changed placements an average of 2.10 times (SD = 1.41). At the initial assessment, most adolescents were living with foster parents (44%), followed by group home care (24.7%), other (e.g., kinship care, adoptive care; 20%), one or more biological parents (7.7%), and independent living (3.6%). In terms of child welfare status, most adolescents indicated having crown ward status (70.8%), followed by society ward status (14.1%), and interim care (10.7%), and voluntary care (4.5%). Adolescents with crown ward status have been permanently removed from their families and the government is their legal guardian. Adolescents with society ward status have also been removed from their homes, although they have been placed in the custody and care of child welfare for only a specified period of time. Likewise, interim care means the adolescent has been temporarily removed from the home and placed in the care of child welfare, but custody remains with the parent(s). Voluntary care means child welfare has become involved with a family because of difficulties that require assistance (e.g., help with learning to care for children); however, custody and care may remain with the parent (Child & Family Services Act, 1990). During their time in child welfare prior to the initial assessment, adolescents reported working with a mean number of three child welfare workers (SD = 1.82) and being involved in child welfare for an average of 5.75 years (SD = 4.26). The mean number of victimizations for the sample was 2.74 (SD = 1.55); 75.6% reported having experienced more than one type of maltreatment. In terms of maltreatment experiences, 76.4% reported having experienced emotional neglect, 65.8% emotional abuse, 59.7% physical neglect, 52.6% physical abuse, and 19.4% sexual abuse.

2.3. Measures

2.3.1. Trauma-related symptoms. The Trauma Symptom Checklist for Children (TSCC; Briere, 1996) was used to create the trauma symptom profiles. The TSCC is a 54-item self-report questionnaire that assesses post-traumatic symptomatology across six areas of functioning: anxiety (e.g., feeling nervous or jumpy inside); depression (e.g., feeling lonely); post-traumatic stress (e.g., scary ideas or pictures just pop into my head); dissociation (e.g., pretending I am someone else); anger (e.g., wanting to yell and break things); and sexual concerns (e.g., can’t stop thinking about sex). Adolescents rated how often they experience each symptom on a 4-point scale from 0 (never) to 3 (all the time). For the current study, we converted subscale scores to T-scores based on normative data for adolescent sex and age. Although the TSCC is typically administered to youth aged 8–16 years, Briere (1996) reported that 16-year-old TSCC norms can be applied with 17-year olds. In the current study, internal consistency for the TSCC subscales was high, with Cronbach alphas ranging from .85 (sexual concerns) to .93 (anger).

2.3.2. Maltreatment variables. Potential maltreatment predictors of trauma symptom profiles were examined using the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003). The CTQ is a 28-item self-report measure that assesses the frequency of five types of maltreatment: physical abuse (e.g., people in my family hit me so hard that it left me with bruises or marks); sexual abuse (e.g., someone tried to touch me in a sexual way, or tried to make me touch them); emotional abuse (e.g., I felt that someone in my family hated me); physical neglect (e.g., I had to wear dirty clothes); and emotional neglect (e.g., my family was a source of strength and support [reverse]). Thinking about when they were growing up as a child, adolescents rated how often they experienced each item on a 5-point scale from 1 (never true) to 5 (very often true). Items are summed to create severity scores for each maltreatment type. All the positively-worded items were reversed scored to represent a higher degree of maltreatment. In the current study, internal consistency was moderate to high, with Cronbach alphas ranging from .70 (physical neglect) to .92 (sexual abuse). In addition, multiple victimization was conceptualized as the occurrence of more than one type of maltreatment. The number of times each adolescent scored greater than 2 on each of the respective maltreatment subscales was computed to create a multiple victimization scores. This variable ranged from 0 to 5, with higher scores indicating a greater number of different victimization experiences.

2.3.3. Socio-demographic and child welfare variables. Adolescents provided information on their sex and ethnic background. Given the low frequencies for most racial/ethnic groups (e.g., Pacific Islander, Middle Eastern), we classified this variable into four main categories, namely Caucasian, African-Canadian, multi-ethnic (combination of two or more), and other minorities. Adolescents also provided information on number of placement changes over the past 5 years, their current placement type (i.e., foster care, group home, independent living, or other), and child welfare-status (i.e., crown ward, society ward, interim care, voluntary care).
2.4. Statistical analysis

Adolescents in the final sample (N=479) had at most 5% missing data across all study variables, with 386 participants having complete data. Results from the Little MCAR test were not significant ($\chi^2(327) = 359.87, p = .102$), indicating that the missing data were not inconsistent with the notion of missing completely at random. Missing data on the TSCC and CTQ were imputed using the fully conditional Markov Chain Monte Carlo (MCMC) method in SPSS 23.0. The MCMC method can handle arbitrary missing data patterns, and it assumes an iterative approach that fits a single variable using all other variables in the model as predictors and then imputes missing data for the single variable being fit. The method continues for each variable in the model to the maximum number of iterations specified, which was 10 in the current study. Table 1 indicates that the mean level of trauma-related symptoms across the six TSCC subscales ranged from 4.32 to 6.77. The mean level of maltreatment across the five CTQ subscales ranged from 7.15 to 13.35.

Latent profile analysis (LPA) was used to establish the optimal number of trauma symptom profiles of child-welfare-involved adolescents. LPA is an extension of latent class analysis where patterns of values on a set of continuous indicators are believed to co-occur within distinct, meaningful groups or profiles (Hagenaars & McCutcheon, 2002). Successive profile models are compared to decide upon the best fitting model, which is presumed to represent distinct typologies within the data. LPA model parameters were estimated using maximum likelihood estimation (MLE) based on the expectation-maximization (EM) algorithm. Such a method produces a log-likelihood value (LL value) based on a predetermined set of estimated starting values for the model parameters, with LL values close to 0 indicating better model fit (Lomax & Hahs-Vaughn, 2013). All analyses were conducted using Mplus 7.3 (Muthén & Muthén, 1998–2012). Scores on the six TSCC subscales were used as indicators for these analyses. To avoid problems with local maxima (i.e., false maximum likelihoods), the models were estimated using multiple random sets of start values (Hipp & Bauer, 2006). In this study, 1000 random sets of starting values and 500 iterations were predeterined in Mplus to avoid such problems.

The optimal number of profiles was chosen based on the goodness of fit indices and interpretability of the latent profiles. The Akaike information criterion (AIC; Akaike, 1974), Bayesian information criterion (BIC; Schwartz, 1978), and the sample size adjusted BIC (SSA-BIC; Sclove, 1987) were used to assess the fit of the individual models. Lower values of these statistics indicate better model fit. However, because these criteria tend to show better fit as the number of classes increases, we also made use of the Lo–Mendell–Rubin Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001) to compare the fit of nested models that differ by one class. A p-value associated with statistical significance (typically $\alpha < .05$) indicates that the model with K classes is superior to a simpler model with K-1 classes.

Finally, the entropy index was used to compare the classification accuracy of each model based on posterior class probabilities for each profile. Entropy values closer to 1 indicate more optimal classification certainty (Ramaswamy, Desarbo, Reibstein, & Robinson, 1993). However, the LMR-LRT test and lower information criterion values were taken to be the most robust indicators of model fit in the model selection process. Individual posterior probabilities (i.e., the degree of membership of each case in each class/profile) and Conditional Response Means (CRMs; i.e., the means of each latent profile indicators) were also examined to determine the relative interpretability of the profiles within each model.

Table 1
Descriptive statistics for adolescent-reported trauma-related and maltreatment variables after imputation (N=479).

<table>
<thead>
<tr>
<th>Trauma-related variables</th>
<th>Mean (SD)</th>
<th>Theoretical range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>4.51 (5.17)</td>
<td>0–27</td>
</tr>
<tr>
<td>Depression</td>
<td>5.30 (5.88)</td>
<td>0–27</td>
</tr>
<tr>
<td>Anger</td>
<td>6.23 (6.41)</td>
<td>0–27</td>
</tr>
<tr>
<td>Post-traumatic stress</td>
<td>6.77 (6.59)</td>
<td>0–30</td>
</tr>
<tr>
<td>dissociation</td>
<td>6.60 (6.64)</td>
<td>0–30</td>
</tr>
<tr>
<td>Sexual concerns</td>
<td>4.32 (5.06)</td>
<td>0–30</td>
</tr>
<tr>
<td>Maltreatment variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>11.32 (5.76)</td>
<td>5–25</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>9.89 (5.55)</td>
<td>5–25</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>7.15 (4.68)</td>
<td>5–25</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>13.35 (5.81)</td>
<td>5–25</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>9.33 (4.02)</td>
<td>5–23</td>
</tr>
</tbody>
</table>

M = mean; SD = standard deviation.
Table 2: Model fit indices and average profile probabilities for the 1-, 2-, 3-, 4- and 5-profile solutions.

<table>
<thead>
<tr>
<th>Fit statistics</th>
<th>Profile 1</th>
<th>Profile 2</th>
<th>Profile 3</th>
<th>Profile 4</th>
<th>Profile 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>−2Log L</td>
<td>−9187.65</td>
<td>−8308.37</td>
<td>−7960.69</td>
<td>−7757.69</td>
<td>−7671.67</td>
</tr>
<tr>
<td>AIC</td>
<td>18,399.30</td>
<td>16,654.73</td>
<td>15,973.38</td>
<td>15,581.38</td>
<td>15,423.34</td>
</tr>
<tr>
<td>BIC</td>
<td>18,449.36</td>
<td>16,733.99</td>
<td>16,081.85</td>
<td>15,719.05</td>
<td>15,590.21</td>
</tr>
<tr>
<td>SSA-BIC</td>
<td>18,411.28</td>
<td>16,673.69</td>
<td>15,999.32</td>
<td>15,614.31</td>
<td>15,463.25</td>
</tr>
<tr>
<td>Entropy</td>
<td>.97</td>
<td>.92</td>
<td>.93</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>LMR-LRT test</td>
<td>1,718.78</td>
<td>679.62</td>
<td>396.81</td>
<td>168.15</td>
<td></td>
</tr>
<tr>
<td>LMR-LRT p-value</td>
<td>.0023</td>
<td>.018</td>
<td>.066</td>
<td>.062</td>
<td></td>
</tr>
</tbody>
</table>
| −2Log L = log-likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; SSA-BIC = sample adjusted Bayesian information criterion; LMR-LRT test = Lo–Mendell–Rubin likelihood ratio test.

Table 3: 3-Profile model conditional response means.

<table>
<thead>
<tr>
<th>TSCC scales</th>
<th>Minimal (n = 281; 58.7%)</th>
<th>Moderate (n = 144; 30.0%)</th>
<th>Severe (n = 54; 11.3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>1.47 (0.14)</td>
<td>6.20 (0.40)</td>
<td>15.79 (0.80)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.81 (0.18)</td>
<td>7.60 (0.52)</td>
<td>17.26 (0.84)</td>
</tr>
<tr>
<td>Anger</td>
<td>2.87 (0.28)</td>
<td>8.93 (0.54)</td>
<td>16.39 (1.06)</td>
</tr>
<tr>
<td>Post-traumatic stress</td>
<td>2.68 (0.22)</td>
<td>9.53 (0.54)</td>
<td>20.63 (0.81)</td>
</tr>
<tr>
<td>Dissociation</td>
<td>2.67 (0.24)</td>
<td>9.06 (0.51)</td>
<td>20.39 (0.89)</td>
</tr>
<tr>
<td>Sexual concerns</td>
<td>2.16 (0.20)</td>
<td>5.59 (0.38)</td>
<td>12.15 (1.20)</td>
</tr>
</tbody>
</table>

M = mean; SD = standard deviation.

3. Results

3.1. Latent profile analysis

Table 2 summarizes the fit indices for the latent profile models that were tested. The 2-profile solution was superior to the 1-profile solution, as evidenced by the statistical significance of the LMR-LRT test. Despite the higher entropy value of the 2-profile model, the 3-profile solution provided a better model fit based on the lower AIC, BIC, and SSA-BIC values as well as a statistically significant LMR-LRT value. Compared to the 3-profile solution, the 4-profile model had lower AIC, BIC, and SSA-BIC values and a slightly higher entropy value, all of which indicate better model fit. However, the LMR-LRT indicated that the addition of one extra class to the 3-profile model did not significantly improve the fit of the model. Moreover, one of the classes of the 4-profile model contained only a small percentage of individuals (N = 18; 3.8%). A 5-profile model was also assessed; however, a lower entropy value together with a non-significant LMR-LRT test did not provide any support for this model. Thus, the 3-profile solution was deemed the optimal model. The 3-profile model yielded adequate classification with average posterior probabilities of profile membership varying from .954 to .989 and with very low cross-probabilities (ranging from .00 to .05), thereby indicating a good distinction among the three profiles. The large majority of adolescents (n = 281; 58.6%) were classified into Profile 1. Profile 2 was composed of 144 adolescents (30.1%), while 54 adolescents (11.3%) were classified into Profile 3.

Table 3 reports the CRMs for each of the TSCC subscales across the three profiles. The first profile was characterized by low CRMs, indicating that this group of adolescents reported experiencing low levels of trauma-related symptoms. The second profile was characterized by average CRMs, indicating that this group tended to experience mild-to-moderate trauma-related symptoms. The third profile was characterized by markedly higher CRMs, indicating that this group reported the most severe trauma-related symptoms. We labeled the first profile (58.6%) as the Minimal Trauma Symptom profile, the second profile (30.1%) as the Moderate Trauma Symptom profile, and the third profile (11.3%) as the Severe Trauma Symptom profile.

Fig. 1 plots the 3-profile model separately as a function of adolescent sex. Raw scores for each of the TSCC subscales were converted into standardized T-scores and plotted separately for females and males as the TSCC provides normative data by sex and age. For the Minimal Trauma Symptom profile and the Moderate Trauma Symptom profile, the scores across all the TSCC subscales were below the clinical cut-off for both females and males. For Severe Trauma Symptom profile, scores across all the TCC subscales were above the clinical cut-off for both females and males.

3.2. Predictor analysis

Table 4 presents the results of the multinomial regression model showing the relationships of the maltreatment, demographic, and child welfare predictors with latent profile membership. Focusing on the Moderate Trauma Symptom profile relative to the Minimal Trauma Symptom profile, child welfare status was found to be the only statistically significant predictor (after controlling for the effects of all other variables in the model). Having society ward status (compared to crown
Fig. 1. 3-Profile model T-score conversions for TSCC scales for males and females.

Note. The percentages in the figure represent the proportions of the total samples by gender. The percentages for the three groups, if gender is combined, are as follows: minimal trauma symptoms (58.7%), moderate trauma symptoms (30.0%), and severe trauma symptoms (11.3%).

Table 4
Maltreatment, demographic, and child welfare predictors of profile membership.

<table>
<thead>
<tr>
<th></th>
<th>Profile 2 vs. Profile 1</th>
<th>Profile 3 vs. Profile 1</th>
<th>Profile 3 vs. Profile 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
<td>OR</td>
</tr>
<tr>
<td><strong>Maltreatment variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>1.06</td>
<td>[0.98–1.14]</td>
<td>1.04</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>1.00</td>
<td>[0.94–1.08]</td>
<td>1.00</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>1.04</td>
<td>[.97–1.11]</td>
<td>1.15**</td>
</tr>
<tr>
<td>Physical neglect</td>
<td>.98</td>
<td>[.92–1.04]</td>
<td>.97</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td>1.08</td>
<td>[.99–1.18]</td>
<td>1.10</td>
</tr>
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<td>Multiple victimization</td>
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<td>[.86–1.58]</td>
<td>1.30</td>
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<tr>
<td>Sexa</td>
<td>1.58</td>
<td>[.93–2.69]</td>
<td>.38*</td>
</tr>
<tr>
<td><strong>Ethnicityb</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Black</td>
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<td>[.68–2.60]</td>
<td>1.96</td>
</tr>
<tr>
<td>Mixed</td>
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<td>[.43–1.59]</td>
<td>1.93</td>
</tr>
<tr>
<td>Other (i.e., Latin)</td>
<td>1.34</td>
<td>[.30–3.65]</td>
<td>2.13</td>
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<tr>
<td>Number of placements</td>
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<td>[.88–1.33]</td>
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<tr>
<td><strong>Placement typec</strong></td>
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<td>[.30–3.65]</td>
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<td>Group home</td>
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<td>[.18–2.32]</td>
<td>.37</td>
</tr>
<tr>
<td>Other (i.e., kinship, adoptive)</td>
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<td>[.31–3.73]</td>
<td>.20</td>
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<tr>
<td><strong>Child welfare statusd</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Society ward</td>
<td>2.34**</td>
<td>[1.08–5.06]</td>
<td>5.58**</td>
</tr>
<tr>
<td>Voluntary care</td>
<td>.64</td>
<td>[.12–3.54]</td>
<td>4.89</td>
</tr>
</tbody>
</table>

OR = odd ratio; 95% CI = 95% confidence interval; a = reference category is “female”; b = reference category “White/Caucasian”; c = reference category is “living with at least a biological parent”; d = reference category is “Crown Ward”.

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

ward) predicted an increased likelihood of belonging to the Moderate Trauma Symptom profile relative to the Minimal profile (OR = 2.34, 95% CI [1.08–5.06], p < .01).

Turning to the Severe Trauma Symptom profile in comparison with the Minimal profile, statistically significant predictors included childhood sexual abuse, sex and child welfare status. Higher scores on the sexual abuse subscale of the CTQ predicted a greater likelihood of belonging to the Severe Trauma Symptom profile relative to the Minimal profile (OR = 1.15, 95% CI [1.05–1.25], p < .01). For sex, being male was predictive of a decreased likelihood of belonging to the Severe Trauma Symptom profile relative to the Minimal profile (OR = 0.38, 95% CI [0.14–0.99], p < .05). With respect to child welfare variables, having
society ward status (compared to crown ward) predicted an increased likelihood of belonging to the Severe Trauma Symptom profile relative to the Minimal profile (OR = 5.58, 95% CI [1.78–17.49], p < .01).

To compare the Severe Trauma Symptom profile relative to the Moderate profile, the multinomial regression was re-parametrized by specifying the Moderate Trauma Symptom profile as the reference category. Findings indicated that higher scores on the sexual abuse subscale of the CTQ predicted a greater likelihood of belonging to the Severe Trauma Symptom profile relative to the Moderate profile (OR = 1.10, 95% CI [1.02–1.19], p < .05). Male sex was also predictive of a decreased likelihood of belonging to the Severe Symptoms profile relative to the Moderate profile (OR = 0.24, 95% CI [0.09–0.63], p < .01).

4. Discussion

The current study had two objectives, namely to first identify trauma-related symptom profiles of child-welfare-involved adolescents and then to examine the association of maltreatment, demographic, and child welfare characteristics with profile membership. The analyses in this paper were mainly exploratory given limited past research using this analytic approach to study trauma experienced by adolescents in child welfare. We expected to identify at least three profiles depicting increasing levels of trauma-related symptoms.

Results were in line with expectations in that the best-fitting latent profile model was one which included three distinct trauma symptom profiles. The largest profile (59%) for child welfare-involved adolescents was characterized by minimal trauma-related symptoms, followed by a profile characterized by a more moderate level of trauma symptoms (30%), and finally a severe symptomatology profile (11%). These results are consistent with previous person-centered studies on maltreated youth that have identified three profiles ranging from resilience to severe risk (Ayer et al., 2011; Breslau et al., 2005). Also in line with previous findings, a profile containing a small proportion of adolescents (11%) in our study tended to score above the TSCC clinical cut-off, which is analogous to what has been found in previous (albeit limited) research. For instance, Kolko et al. (2010) found that 11.7% of their overall sample of child welfare-involved adolescents scored in the clinical range on the post-traumatic symptoms subscale of the TSCC. However, the TSCC is a self-report measure of trauma-related symptoms, so it is difficult to assess the extent to which adolescents might either be over- or under-reporting difficulties.

In the current study, the percentage of individuals in the Minimal Trauma Symptom profile was similar (59%) to those identified in previous person-centered studies that have investigated community-based samples of trauma-exposed youth (53–60%, Ayer et al., 2011; 43%, Breslau et al., 2005) and adolescent female sexual assault survivors (44%, Au et al., 2013). However, lower percentages were reported in a study that examined adolescents in the juvenile system (29%; Vaughn et al., 2007). It seems that the unique challenges faced by adolescents in the juvenile system (e.g., criminal activity; more severe psychopathology; Fazel, Doll, & Långström, 2008) would understandably lead to greater difficulties across various domains of functioning, thereby contributing to lower rates of mental well-being. In this study, resilience was conceptualized as the presence of low levels of trauma-related symptoms in a high-risk group of adolescents in child welfare. However, resilience is a broad concept that can take on different definitions. For instance, resilient functioning can also be defined as the presence of positive outcomes across different domains of functioning which serves to demonstrate individuals’ capacity to cope with adversity (Daining & DePanfilis, 2007). Future research should attempt to integrate various measures of resilient functioning by including indicators of well-being as well as protective factors (i.e., social support, social activities).

For the second objective involving profile predictors, exposure to childhood sexual abuse emerged as significant. Adolescents who experienced more severe sexual abuse were at increased risk of belonging to the Severe Trauma Symptom profile compared to both the Minimal Trauma Symptoms and the Moderate Trauma Symptom profiles. These results are in line with a host of studies demonstrating that sexual abuse is associated with a range of adverse initial and longer-term outcomes (Burns et al., 2004). Sexual abuse differs significantly from other forms of maltreatment (e.g., emotional abuse, physical neglect) in terms of early traumatic sexualisation, betrayal, and/or significant societal stigmatization (Finkelhor, 1979). Sexual abuse might also result in more severe trauma-related distress because it often occurs alongside other forms of maltreatment (Perez-Fuentes et al., 2013). Indeed, in the current study, 63.4% (59 out of 93) adolescents who reported sexual abuse also endorsed all other types of maltreatment. It is also important to note that the T-scores of adolescents in the Severe Trauma Symptom profile differed most from the T-scores of the TSCC normative sample on the dissociation and sexual concerns subscales. Dissociation, as well as preoccupation and/or anxiety about sex, are often higher for individuals with sexual abuse histories relative to other types of child maltreatment (Briere & Elliott, 2003). From a clinical standpoint, results from the current study contribute to the growing awareness and recognition of the detrimental effects of sexual abuse as well as the need for tailored interventions.

Among the demographic variables, sex was a significant predictor of profile membership. In this study, females were more likely to be classified into the Severe Trauma Symptom profile compared to both the Minimal Trauma Symptoms and the Moderate Trauma Symptoms profiles. Such findings indicate that heightened trauma-related distress is reported among female adolescents in child welfare. These results are in line with previous findings from other person-centered studies that have focused on trauma-related symptoms among adolescents. For instance, previous research on trauma-exposed adolescents from different community-based samples indicate that females reported greater severity of trauma-related symptoms compared to their male counterparts and, as such, were classified in profiles indicating more severe disturbance (Ayer et al., 2015; Breslau et al., 2005). In addition, results from a study on adolescents in a juvenile correctional facility showed that a greater proportion of females were classified in the severe profile (Vaughn et al., 2007). These findings...
support the notion that female sex plays an important role in influencing adolescents' vulnerability to post-traumatic stress symptoms, which could help guide the diagnosis and treatment of trauma-exposed youth.

Among the child welfare variables, child welfare status was found to be a significant predictor of profile membership. Having society ward status (compared to crown ward) was predictive of an increased likelihood of belonging to both the Severe and the Moderate Trauma Symptom profiles than the Minimal profile. This is a novel finding that may suggest the need for continued support for adolescents placed in the temporary care of child protection services. Contrary to crown wards who are permanently removed from their family homes, society wards are placed in the care of the child welfare agency for a specified period, while parents maintain their legal rights. However, adolescents with society ward status may have the disadvantage of being in “legal limbo” as they have no certainty as to whether they will stay in care permanently or whether they will ultimately rejoin their family home. It is possible that the instability inherent in such a situation may lead to a negative impact on their psychological functioning. In contrast to society wardship, youth who are crown wards may also be eligible to receive continued and intensive care for an extensive period of time considering their permanent removal from the family home. This could contribute to better outcomes for this group of child welfare-involved adolescents. However, additional research is needed to replicate these findings and investigate the possible reasons for such differences.

With respect to other predictors, our findings failed to show a statistically significant effect of placement type and number of placements on adolescents’ trauma symptoms. Such results stand in contrast with previous findings from variable-centered research that have focused on trauma symptomatology, indicating that significantly more maltreated children in out-of-home care exhibit heightened PTS symptoms compared to children who experienced maltreatment but remained in their homes (Kolko et al., 2010). Similarly, we failed to find any significant effect of ethnicity on profile membership among the group of child-welfare-involved adolescents. However, because of the multivariate nature of our analyses, the effects of each potential predictor of profile membership need to be considered in light of the presence of the other predictors. As such, it is possible that after accounting the effects of other variables in the model, any potential effects of those predictors were no longer significant. Hence, additional person-centered research is needed to further validate the current results.

It is important to note that some of the contrasting findings may reflect methodological variation among studies. In past person-centered studies, adolescents were classified into profile types characterized by positive adjustment if they displayed favourable outcomes across a varying set of trauma indicators (e.g., PTSD symptoms, depression, behavioural problems). In contrast, profiles in the present study were generated exclusively from measures of trauma-related symptomatology as measured by the TSCC. Moreover, differences in sample composition and predictors used to validate the profiles might also account for the variability in results. Whereas the current study examined adolescents residing in child welfare, past person-centered studies of trauma have broadened their analyses to a large variety of adolescents ranging from community-based samples to adolescents in the juvenile system. Despite those differences, some of the findings from past research (i.e., the role of adolescent sex) were replicated in our study, thereby generalizing these previous results to the child welfare population.

Finally, it is possible that the categorization of TSCC continuous scores to generate profiles may have reduced our power to detect statistically significant predictors. Despite this limitation, latent profile analyses could be regarded as having several advantages over other variable-centered techniques, such as multiple regression. Namely, the profiles that are generated by latent profile analyses represent distinct subgroups of individuals that are homogenous with respect to a specific cluster of symptoms, given their scores on the selected profile indicators. Even though similar subgroups can be obtained by splitting the sample based on median (or mean) total scores, in latent profile analyses, the proportion of individuals in each of the profiles is determined by a different stochastic process that involves a more sophisticated estimation method. Moreover, such findings could be regarded as being more clinically relevant and useful than simply knowing that trauma levels increase as the value of some predictor changes. Researchers are encouraged to build on these relatively new data analytic techniques and examine if the profiles replicate either alone or in combination with additional indicators of trauma symptoms.

At a conceptual level, our findings are in line with the ecological model (Bronfenbrenner, 1979) in that they indicate that variables more proximal to an individual exert a greater influence compared to more distal variables. However, it may be that other systemic variables, such as the quality of the placement and experiences within the caregiving environment, would better explain the variation in psychological adjustment among child-welfare-involved adolescents. Therefore, further research is certainly needed to determine unique factors associated with trauma symptoms and their configurations among adolescents in child welfare.

4.1. Limitations

There are several limitations to the current study. First and foremost, this study relied solely on information provided by the adolescents. As such, it is possible that there were some inaccuracies in the reporting of psychological difficulties and/or maltreatment histories. Therefore, future research might report from other informants, such as the primary caregiver or child welfare worker, that could be compared to the adolescent self-report data. Another limitation is that the data are cross-sectional so causal attributions cannot be made. Moving forward, longitudinal methods could be utilized to examine profile stability and change over time. The long range for data collection (i.e., 2003–2010) is also a potential limitation, as changes in Ontario child welfare have occurred during this time that might affect the care offered to adolescents in care. For example, child welfare policy changes in 2006 promoted a greater focus on more strengths-based, inclusive, and collaborative approaches to service delivery (OACAS, 2006). Finally, the current study relied on secondary data so we were limited in the types of predictor variables that could be included in our analyses. Future work may consider examining how
characteristics across multiple levels of analysis (e.g., genetic, cognitive, social factors), as well as information from child protection records, might relate to trauma symptom profiles among child-welfare-involved adolescents.

4.2. Clinical implications

The majority of adolescents in this study showed minimal trauma-related symptomatology, thereby indicating their potential for resilient functioning. However, it should not be assumed that child-welfare-involved adolescents do not require clinical intervention. Instead, it would seem that these interventions need to be tailored to the needs of the adolescent. For this group of adolescents, alternative supports such as scheduled check-ins and skills training (e.g., resume writing, university applications) may help to promote competence in other domains (e.g., academics, employment; Keller, Cusick, & Courtney, 2007) and provide continued support. Results also suggest that a subgroup of adolescents demonstrate severe trauma-related symptoms. For these adolescents, trauma-focused interventions could be employed to address intra- and inter-personal functioning, reduce stress, and foster the use of adaptive coping (Black, Woodworth, Tremblay, & Carpenter, 2012).

Findings that maltreatment type, adolescent sex, and child welfare status were related to profile membership also have important implications. From both child welfare and clinical perspectives, this suggests that it is critical to consider how these factors may place adolescents at increased risk for psychological distress, which is informative for purposes of prognosis and treatment planning. For instance, adolescents who experienced sexual abuse were found to be at greatest risk for moderate to severe trauma symptoms. These findings indicate the need to focus attention on trauma-related symptoms for in cases where these types maltreatment have occurred. Moreover, female adolescents seem to be particularly susceptible to exhibiting trauma-related symptoms. However, it also important not to overlook the possibility that males may exhibit a different profile of symptoms than those captured by the TSCC scale. For instance, past research has indicated that males tend to “act out” or externalize their distress following childhood maltreatment (Moylan et al., 2010). It is important to consider such sex-related differences in the presentation of trauma symptoms for both screening and treatment planning.

Similarly, increased attention could be directed toward monitoring the functioning of adolescents who have society wardship as they may be in a particularly vulnerable situation given the increased uncertainty of their future placements. However, it is possible that other factors that were not assessed in this study may play a role in the development trauma-related symptoms. Nevertheless, these findings underscore the importance of understanding adolescents’ unique presentations so that their needs may be adequately addressed by individuals who play an instrumental role in their lives, such as child welfare workers, caregivers, and mental health professionals.

References


