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Posttraumatic symptom profiles among adult survivors of childhood sexual abuse: A longitudinal study

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ABSTRACT

In the present study, our aim was to examine longitudinal posttraumatic stress symptom (PTSS) trajectories in a Norwegian sample of adults who had experienced sexual abuse during childhood, and to identify predictors of PTSS-trajectory belongingness. The sample consisted of 138 adult survivors of childhood sexual abuse (96.4% women, mean age = 42.9 years, mean age at the first abuse = 5.9 years), recruited from support centers for sexual abuse survivors. The majority (78.3%) reported penetrative abuse, and a large proportion of the sample reported that the perpetrator was a biological parent (38.4%) or someone they trusted (76.1%), reflecting a high severity level of the abusive experiences. Latent Profile Analyses revealed the best overall fit for a two PTSS-trajectories model; one trajectory characterized by sub-clinical and decreasing level of PTSS (54.9%), and the other by high and slightly decreasing level of PTSS (45.1%). Increased odds for belonging to the trajectory with clinical level symptoms was found among those who reported higher levels of exposure to other types of childhood maltreatment (OR = 3.69, $p = 0.002$), sexual abuse enforced by physical violence (OR = 3.04, $p = 0.003$) or threats (OR = 2.56, $p = 0.014$), very painful sexual abuse (OR = 2.73, $p = 0.007$), or who had experienced intense anxiety, helplessness or fear during the abuse (OR = 2.97, $p = 0.044$). Those in the trajectory with clinical level PTSS reported lower levels of perceived social support and more relational difficulties compared to those in the sub-clinical PTSS trajectory. In conclusion, different longitudinal PTSS trajectories can be found among adult survivors of childhood sexual abuse. Significant predictors of PTSS-trajectory belongingness are discussed alongside their potential implications for preventive efforts and clinical interventions.

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1. Introduction

Childhood sexual abuse occurs at alarming rates worldwide, with prevalence rates ranging between 8 and 31% for women and 3–17% for men (Barth, Bermetz, Heim, Trelle, & Tonia, 2013; Finkelhor, 1994; Pereda, Guilera, Forns, & Gómez-Benito, 2009a, 2009b; Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011). In Norwegian representative population studies, the prevalence of unwanted sexual intercourse among women has been reported to be 11.4% before age 16 (the age of consent to sexual activity in Norway) (Steine et al., 2012), while the prevalence of a broader spectrum of unwanted sexual contact has been found to be 18.3% before age 16, and 21.2% before age 18 (the age that defines the end of childhood, according to the United Nations Convention on the Rights of the Child) (Steine et al., 2012; Thoresen & Hjemdal, 2014). The burden of sexual abuse for those victimized is evident from a massive body of literature linking childhood sexual abuse to altered neurobiology and stress physiology (Andersen et al., 2008; Bremner et al., 1997; Hulme, 2011; Stein, Koverola, Hanna, Torchia, & McClarty, 1997; Vythilingam et al., 2002), increased stress-sensitivity later in life (Kendler, Kuhn, & Prescott, 2004), life-long increased risk of multiple mental and somatic disorders and health problems (Beichtman, Zucker, Hood, DaCosta, & Akman, 1991; Chen et al., 2010; Fergusson, McLeod, & Horwood, 2013; Finkelhor, 1990; Jumper, 1995; Kendall-Tackett, Williams, & Finkelhor, 1993; Maniglio, 2009; Paras et al., 2009), as well as death by suicide (Cutajar et al., 2010; Ford & Gomez, 2015; Plunkett et al., 2001). In addition to the immense human costs, childhood sexual abuse is associated with significant societal economic costs in the form of increased health care utilization among those victimized (Hulme, 2000; Walker, Unutzer et al., 1999).

Posttraumatic stress symptoms (PTSS) are characterized by re-experiencing the trauma, avoidance of trauma-related stimuli, and negative alterations of cognition, mood, arousal and reactivity following exposure to a stressor (American Psychiatric Association, 2013). PTSS are among the most frequently reported symptoms among childhood sexual abuse survivors (Chen et al., 2010; Fergusson et al., 2013; Kendall-Tackett et al., 1993; Paolucci, Genius, & Violato, 2001). However, in line with findings from studies of posttraumatic stress following other adverse events (de Jong et al., 2001; Harvey & Bryant, 1998; Xue et al., 2015), not all sexually abused individuals develop these symptoms (Kendall-Tackett et al., 1993; Paolucci et al., 2001). Several meta-analyses have examined predictors of posttraumatic symptomatology in order to identify risk and protective factors. However, the majority of these studies have been conducted in samples of combat veterans or victims of other trauma types (e.g. natural disasters, crime, accidents), whereas samples of sexual abuse survivors have been scarce (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2008). Although some risk factors have been found to reliably predict posttraumatic stress disorder (PTSD)-symptom severity across different trauma populations (e.g. previous history of childhood abuse or other adversities); other risk factors (e.g. age at trauma) show heterogeneous effects for different trauma types, suggesting that a general risk-factor model across different trauma populations is not justified (Brewin et al., 2000). This highlights the need for studies examining risk and protective factors in sexually abused samples specifically.

Of the previously conducted studies in sexually abused samples, some have reported statistical correlates of PTSS cross-sectionally among children and adolescents. Hébert and colleagues found that repeated sexual abuse and lower levels of perceived maternal or peer support were associated with increased risk of reaching clinical levels of PTSS among 694 sexually abused individuals from a representative sample of 8194 high school students (Hébert, Lavoie, Blais, & team, 2014). In a sample of 90 children reported to authorities due to sexual abuse, Wolfe and colleagues found that abuse involving threats and force by the perpetrator, and abuse of longer duration, was associated with increased risk of fulfilling diagnostic criteria of PTSD, and that a close relationship to the perpetrator was associated with higher posttraumatic symptom scores (Wolfe, Sas, & Wekerle, 1994).

In addition to these cross-sectional studies, a few studies have examined posttraumatic symptoms longitudinally among adolescents or adults with childhood sexual abuse histories. In a follow-up study of 100 adolescents who had recently disclosed sexual abuse, Bal, De Bourdeaudhuij, Crombez, and Van Oost (2005) found that lack of crisis support following the abuse was associated with more symptoms, including posttraumatic stress, six months later, whereas the type or severity of the abuse did not account for differences in symptomatology (Bal et al., 2005). Trickett, Noll, and Putnam (2011) found higher PTSS scores among sexually abused compared to non-abused women in a 23-year longitudinal study of 84 women who had experienced intrafamily sexual abuse. However, they did not report on predictors for levels of PTSS specifically (Trickett et al., 2011). In a sample of 987 women and men from the Christchurch Health and Development Study birth cohort, Fergusson and colleagues found that sexual abuse before the age of 16 years was associated with higher levels of PTSS at age 30 years compared to those without sexual abuse histories, and that those who had experienced penetrative abuse had the highest PTSS scores (Fergusson et al., 2013).

1.1. Posttraumatic symptom trajectories

All of the abovementioned studies reported PTSS outcomes for the study samples as a whole, without exploring whether different symptom severity sub-groups could be identified. While these studies are effective in showing that childhood sexual abuse increases the life-long risk for PTSS, they reveal little about potential heterogeneity in symptom trajectories. More knowledge on different PTSS severity sub-groups and predictors of sub-groups in sexually abused samples is of both theoretical and practical importance, as it may advance our understanding of differences in posttraumatic stress symptomatology in this group. Such knowledge may for instance aid identification of sub-groups of individuals who are at higher

risks for more severe long-term symptomatology, which may call upon differentiated preventive and treatment efforts. Yet, to our knowledge no studies to date have examined longitudinal PTSS trajectories in samples consisting solely of adults who specifically experienced sexual abuse in childhood. In contrast, several studies on children with a broader range of maltreatment histories have been conducted. Nugent et al. (2009) identified two latent posttraumatic classes over a 3-year period in 201 maltreated children and adolescents from families reported to authorities due to family violence. One resilient class characterized by minimal symptoms (60.7%) and one persistent symptoms class characterized by stable moderately high symptom levels (39.3%) were identified. The child's current age and the number of maltreatment types experienced were positively associated with being in the persistent symptoms class. Moreover, 29% of the sample had experienced sexual abuse, and there was a non-statistically significant trend for these children to belong to the persistent symptoms class (Nugent et al., 2009). Miller-Graff and Howell (2015) identified three PTSS trajectory classes in a sample of 1178 children with maltreatment histories; one stable high symptom class (5.6%), one class with high but improving clinical symptoms (24.8%) and one class with stable low symptom levels (69.6%). The two high-symptom classes reported more physical and emotional abuse, and were significantly more likely to have child protective service reports of abuse and neglect compared to the low-symptom group. No significant effects were found for sexual abuse, which the authors hypothesized was due to the low number of children (n = 135) reporting this experience (Miller-Graff & Howell, 2015). Finally, Maikovich and colleagues found no gender differences in PTSS and trajectories in a sample of 389 children and adolescents reported to child protective services for alleged sexual abuse, but did not report on specific symptoms trajectories (Maikovich, Koenen, & Jaffee, 2009).

Thus, although the number of symptom trajectories varied between the two studies reporting symptom trajectories, both reported a group of subjects displaying high symptom levels and a group of people with relatively low symptom levels. Additionally, both of these studies reported a higher risk of belonging to higher-symptom sub-groups for those who had experienced a higher presence or degree of other childhood adversities. None of the studies included social support as a predictor, making the role of social support for posttraumatic symptom trajectories a highly understudied topic.

1.2. Study aims and hypotheses

Based on the lack of previous studies investigating PTSS-trajectories and predictors of these among adults who were sexually abused in childhood, the aim of the present study was to 1) examine characteristics of longitudinal PTSS-trajectories, and 2) examine predictors of PTSS-trajectory belongingness, in a sample of adults who had been sexually abused in childhood. Informed by previous studies on symptom trajectories among maltreated children (Miller-Graff & Howell, 2015; Nugent et al., 2009), we hypothesized that at least two PTSS-trajectories would be found in our sample; one high-symptom and one low-symptom trajectory. We also hypothesized that a higher degree of other types of childhood maltreatment would be associated with belonging to a more severe PTSS-trajectory. Based on findings from previous cross-sectional and longitudinal studies in sexually abused samples (Bal et al., 2005; Fergusson et al., 2013; Hébert et al., 2014; Wolfe et al., 1994), we also hypothesized that subjects who had experienced abuse involving physical force, threats, violence, a close relationship to the perpetrator (Wolfe et al., 1994), penetrative abuse, a lower age at first abusive incident (Fergusson et al., 2013) and those reporting lower levels of perceived social support (Bal et al., 2005; Hébert et al., 2014) would have an increased risk for belonging to a more severe PTSS-trajectory. Additionally, we wanted to explore the role of other abuse characteristics and current social and relational factors that might be associated with PTSS-severity. These factors included whether or not a) the perpetrator was a trusted person, b) the victim had been manipulated by the perpetrator, c) the perpetrator was someone the victim also received positive attention/care from, d) the victim had reacted to the abuse with intense anxiety, helplessness or fear, e) the abuse was very painful, f) the abuse caused serious physical injury/disease/infections, g) other people were present during the abuse, h) one had been commanded to participate in the abuse, i) the abuse had been recorded/photographed, as well as j) the degree of current relational difficulties.

2. Methods

2.1. Procedure

The study is based on data from the project "*Longitudinal Investigation of Sexual Abuse* (LISA)", which entails a collaboration between the University of Bergen and four of the largest support centers for sexual abuse survivors in Norway. These support centers provide low threshold help in terms of information, free individual consultations, support groups, talks and social events to victims of sexual abuse, and are situated in every county in Norway. In 2009 and 2011, users of the centers were invited to participate in the study. The invitation was sent via postal mail, along with information about the study emphasizing the confidential and voluntary nature of participation, a questionnaire, as well as a pre-paid return envelope. All participants were allocated a unique code attached to their names to enable longitudinal measurement. In order to ensure confidentiality of the participants, the questionnaires were mailed to the participants by employees at the centers. These employees were the only ones who had the list linking the names and codes of the study participants. Waves two and three of the study were carried out approximately two and four years after the first data collection, respectively. The study was conducted in line with the Declaration of Helsinki, and was approved by the Research Ethics committee of Western Norway (approval number 264.08), the Norwegian Directory of Health, and by the Norwegian Social Science Data Services.

2.2. Post-Traumatic stress symptoms (PTSS)

PTSS were assessed using the Impact of Event Scale-Revised (IES-R), a 22-item questionnaire measuring core symptoms of post-traumatic stress: Intrusion of trauma-related memories/emotions, avoidance of trauma-related stimuli, and hyperarousal (Weiss & Marmar, 1997). Participants indicate the extent to which they have experienced trauma-related distress during the past seven days. Examples of items are "*Any reminder brought back feelings about it*", "*I was aware that I still had a lot of feelings about it, but I didn't deal with them*", and "*Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart*". Response categories (coded from 0 to 4) are "not at all", "a little bit", "moderately", "quite a bit", and "extremely", providing total scores ranging from 0 to 88, where a higher score indicates more pronounced PTSS. Moreover, a score of $\geq$ 33 indicates clinically significant posttraumatic stress symptomatology (Weiss & Marmar, 1997). The scale has shown good psychometric properties, including for the validity of the use of its sum-score (Creamer, Bell, & Failla, 2003; Weiss, 2004). Cronbach's α for the IES-R sum score in the current sample was 0.95 in waves 1 and 2, and 0.96 in wave 3, respectively.

2.3. Covariates

2.3.1. Demographics. An open-ended question assessed the respondents' current age. Since 96.4% of the respondents were women, gender was not included as a predictor variable in the current study.

2.3.2. Characteristics of the abuse, perpetrator and victim. Selection of the variables describing the characteristics of the abuse was based on their association with PTSD-symptom severity in previous studies. The respondent's age at the first abusive incident was assessed through an open-ended question. Dichotomous variables (1 = yes; no = 0) were created based on whether the perpetrator was a *biological parent*; the perpetrator was someone the victim had *trusted*; use of *threats* (of being rejected, sent away, or that oneself or a loved one would be harmed if they told anyone about the abuse), *manipulation* (told that the abuse was one's own fault or that it was normal), *violence* (the victim was attacked, held in place, or subjected to violence by the perpetrator), *positive attention or care* from the perpetrator(s) (someone who provided care, attention, gifts/money, or attractive leisure activities, and whether or not the abuse involved *penetration* (vaginal, anal or oral penetration of penis/fingers/objects). Additionally, a sum score comprising other aspects of the abuse was created, based on how many of the following adverse aspects related to the abuse they had experienced: 1) the child had reacted to the abuse with intense anxiety, helplessness or fear, 2) the abuse caused serious physical injury, 3) the abuse caused diseases or infections, 4) the abuse was particularly painful, 5) other people had been present during the abuse, 6) the child was commanded to participate in abusive acts, 7) the abuse was video recorded/photographed. This sum score ranged from 0 to 7.

2.3.3. Other childhood adversities. Abuse or neglect during childhood was assessed using the short form of the Childhood Trauma Questionnaire (CTQ-SF) (Bernstein & Fink, 1998) which provides a measure of the presence and frequency of five types of childhood maltreatment: 1) physical abuse (e.g., being hit hard enough to leave bruises), 2) physical neglect (e.g. did not have enough to eat), 3) emotional abuse (e.g. was called names or felt hated by one's own family), 4) emotional neglect (e.g. did not feel loved), and 5) sexual abuse (e.g. was touched sexually or made to do sexual things). Response categories (coded from 1 to 5) are "never true", "rarely true", "sometimes true", "often true", and "very often true". Total scores range from 5 to 25, with higher scores reflecting more childhood maltreatment. Additionally, qualitative thresholds reflecting the severity of the maltreatment have been established, comprising the categories "None", "Low", "Moderate" and "Severe" childhood maltreatment. In the present study, a cumulative trauma score based on these categories was used, where respondents were classified as either "*No childhood maltreatment*" (coded as "0"), "*1-5 childhood maltreatment types at low level*" (coded as "1"), "*1-2 childhood maltreatment types at moderate to severe level*" (coded as "2"), or "*3-5 childhood maltreatment types at moderate to severe level*" (coded as "3"). Since all study participants had experienced sexual abuse, none scored "0" on this childhood maltreatment variable. The CTQ-SF has shown good psychometric properties (Bernstein et al., 2003), amongst other in a Norwegian clinical sample (Dovran et al., 2013). Cronbach's α for the total scale was 0.85 in the current sample.

2.3.4. Current social and relational factors.. Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS), a 12-item questionnaire addressing perceived social support from family, friends, and significant others at the current time. The MSPSS provides a continuous score ranging from 12 to 84, with higher scores indicating higher levels of perceived social support. The MSPSS has shown good test-retest and internal reliabilities and moderate construct validity (Zimet, Dahlem, Zimet, & Farley, 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). Chronbach's α in the current sample was 0.92.

Finally, a non-validated measure of *relational difficulties* was included. The variable was based on five items assessing the person's subjectively experienced relational difficulties in general at the current time "I have difficulties trusting others", "I find it difficult to engage in close relationships with others", "I find it difficult to grow fond of others", "I attach to others easily" (reversed) and "I believe that others like me/are fond of me" (reversed). Response categories (coded from 1 to 5) were

"strongly disagree", "disagree", "neither disagreeing nor agreeing", "agree", and "strongly agree". Possible scores ranged from 5 to 25, with higher scores reflecting more relational difficulties. Cronbach's α for the total scale was 0.78.

2.4. Statistical analyses

2.4.1. Latent profile analysis. In order to identify different PTSS-trajectories, latent profile analyses were carried out in the statistical software Mplus version 7.31, using the built-in maximum-likelihood estimation for handling of missing data. Latent profile analysis is a person-centered analysis that assigns individuals with similar patterns of observed data to latent groups, or *profiles*, in a probabilistic way. A total of four models were assessed, ranging from a one-class to a four-class model. Model fit for each of the three classes was evaluated using the Akaike and Bayesian Information Criterion (AIC; BIC), entropy, and the Vuon-Lo-Mendell-Rubin likelihood ratio test (VLM-LRT). First, AIC and BIC values, both for which a lower value indicates a better fit between the actual data and the proposed model, were compared between each of the proposed models. Then, VLM-LRT and entropy were evaluated. A statistically significant VLM-LRT indicates a better fit for the higher-number class model when comparing two models. Entropy provides an estimate of classification accuracy, with values closer to 1.0 reflecting higher classification accuracy. After comparing the estimated models on the abovementioned parameters, the model with the most satisfactory parameters were visually inspected and evaluated in terms of interpretability, parsimony and coherence.

2.4.2. Latent profiles and changes over time. Repeated measures ANOVA were used to examine changes within and between the latent PTSS- trajectories over time.

2.4.3. Latent profiles and associations with covariates. The association between covariates and the latent profiles were estimated using the 3-stepped approach recommended by Vermunt (Vermunt, 2010) and implemented in Mplus as the 'R3STEP'-procedure (Muthén & Muthén, 1998-2012). The covariates included a*ge at first abuse*, *biological parent perpetrator*, *trust*, *threats*, *violence*, *manipulation*, *positive attention*, *penetrative abuse*, *cumulative childhood adversities (CTQ-SF)*, and *other abuse aspects*. The procedure yields logistic regression estimates for the association between covariates and latent profiles. In the present study, the models were estimated for each covariate separately, as well as collectively in one model effectively adjusting the covariates for each other. The resulting odds ratios (OR) with *p*-values are presented.

2.4.4. Latent profiles and associations between current social and relational factors. The association between current social and relational factors and latent profiles were estimated using the automatic Bolck-Croon-Hagenaars-procedure (BCH) implemented in Mplus (Bakk & Vermunt, 2016; Bolck et al., 2004; Muthén & Muthén, 1998–2012). This procedure estimates the mean of the distal continuous outcome across latent classes, as well as providing test statistics for equality across means. The BCH-procedure was performed separately for MSPSS and the scale measuring relational difficulties.

3. Results

3.1. Study participants

3.1.1. Overall response rates. In the first wave of the study in 2009, 458 people responded to the survey, representing a response rate of 32.7%. In 2011, an additional 79 new center users were enrolled, increasing the number of participants in wave 1–537. Of these, 263 participants (48.9%) responded to wave 2 and 193 (73.4% of the wave 2 participants) to wave 3. Since wave 1 respondents were invited to participate in wave 3 regardless of whether or not they had responded to wave 2, the number of people who responded to all three waves of the study was somewhat lower (n = 144). Independent samples *t*-tests revealed that those who responded to all three study waves were older than those who did not respond to all threes waves (42.9 versus 37.9 years, t (df = 242.9) = 4.1, $p < 0.001$), but they did not differ significantly on levels of PTSS, perceived social support, relational problems, age at first abuse or CTQ-total score.

3.1.2. Present study sample. Only participants who responded to all three study waves were included in the present study (N = 144). Six persons who were 18 years or older the first time they experienced sexual abuse were excluded from the analyses, due to the focus on childhood sexual abuse in the present study. This resulted in a final sample of 138 childhood sexual abuse survivors, aged 19–71 years (mean (M) = 42.9 years, standard deviation (SD) = 11.6 years). The majority were women (96.4%). The average number of years passed from

first-time abuse to disclosing the abuse was 20.9 years in the present longitudinal sample, compared to 17.2 years in the total sample (Steine et al., 2016). The most frequently reported highest education level achieved in the sample was undergraduate degree at a university/college (28.9%), followed by high school (27.4%), graduate degree at a university/college (18.5%), professional vocational education (14.1%), primary school (10.4%), and not completed primary school (0.7%). The most frequently reported work status was a recipient of disability/occupational rehabilitation pension (47.4%), followed by full time employed (24.8%), part-time employed (15.3%), student (5.1%), unemployed (4.4%), retired (2.2%), and home maker (0.7%). Mean age at first abusive incident was 5.9 years (SD = 3.5 years, range = 0–16 years). The majority (61.6%) reported having been abused by more than one perpetrator. The five most frequently reported perpetrators were biological parents

Table 1
Descriptive Statistics of Main Variables in the Study.

Continuous variables	M	SD	Range	95% CI
Age at first abusive incident	5.9	3.5	0–16	5.4–6.6
PTSD-symptom score (IES-R), wave 1	41.1	19.9	0–87	37.6–44.7
PTSD-symptom score (IES-R), wave 2	35.7	20.8	0–83	31.9–39.5
PTSD-symptom score (IES-R), wave 3	34.0	21.0	0–81	30.2–37.7
Perceived social support (MSPSS), wave 1	53.9	14.0	12–84	51.5–56.3
Relational difficulties	15.9	4.3	6–25	15.1–16.6

Categorical variables	Yes
Penetrative abuse	78.3%
Perpetrator was a trusted person	76.1%
Manipulated by perpetrator	71.7%
Positive attention/care from perpetrator	66.7%
Abuse was very painful	49.3%
Abuse involved physical force/violence	46.4%
Threatened by perpetrator	39.1%
Biological parent perpetrator	38.4%
Other people present during abuse	27.5%
Reacted with intense anxiety/helplessness/fear	10.5%
Commanded to participate in abuse	9.4%
Abuse caused serious physical injury	6.5%
Abuse was recorded/photographed	6.5%
Abuse caused disease/infections	5.1%

M = Mean.
SD = Standard Deviation.
95% CI = 95% Confidence Interval.

Table 2
Latent Profile Modelling Fit Indices for Impact of Event Scale (IES-R) Sum Scores (N = 138).

Classes	AIC	BIC	Sample-size adjusted BIC	Entropy	VLMR-LRT	BLRT
2 classes	**3411.544**	**3440.817**	**3409.180**	**0.901**	**<0.0001**	**<0.0001**
3 classes	3382.839	3423.821	3379.529	0.825	=0.5107	<0.0001
4 classes	3350.604	3403.295	3346.349	0.857	=0.0077	<0.0001

Bold indicates the model chosen for further analyses.

(38.4%), other relatives (28.3%), other known person (26.1%), siblings (21.0%), and grandparents (18.1%). Only 10.1% reported having had an unknown perpetrator. The majority of the sample (65.4%) reported having gone in therapy in order to deal with sequelae of the abuse during the past two years when this was assessed in the first data collection wave; however utilization of therapeutic services between the three data collection time points was not assessed. Descriptive statistics for the variables used in the statistical analyses are provided in Table 1.

3.2. Latent profile analysis

Comparisons between different models suggested that a two-profile model yielded the best overall fit (Table 2). A four-profile model was also considered due to the significant VLMR-LRT value when comparing four versus three groups. Visual inspection of the models showed that both the two- and the four-profile model yielded clinically meaningful symptom profiles with regards to the traditionally used cut-off score of $\geq$ 33 on the IES-R-sum. However, there was no substantive difference between the two models, and despite its somewhat higher BIC value the two-profile model was preferred due to its somewhat higher entropy value (.901 compared to 0.857 for the four-profile model) as well as due to a very low number of subjects in some profiles in the four-profile model. The group means in the two-profile model were above versus below the cut-off score of 33, indicating clinically significant versus non-clinically significant posttraumatic stress symptomatology, respectively. The two profiles of PTSS-trajectories were labeled as "sub-clinical and decreasing" (54.9%) and "high and slightly decreasing" (45.1%) (see Fig. 1).

3.2.1. Post-hoc analyses. We performed post-hoc logistic regression analyses implementing the previously described 3-stepped procedure (Vermunt, 2010) in Mplus (Muthén & Muthén, 1998–2012) to examine whether PTSS-trajectory belongingness was associated with differences in age, levels of work functioning, highest education level achieved, or stability of marital status across the three study waves. Level of work functioning was categorized based on whether respondents reported being recipients of disability or work assessment pension in either three, two, one, or none of the study waves (coded as "3", "2", "1", and "0", respectively). A dichotomous variable was created for the highest education level achieved (any college or professional/vocational degree, coded as "1", versus high school only/not completed high school, coded as "0"). A dichotomous variable was also created for marital status stability across the three study waves (married/cohabited/in

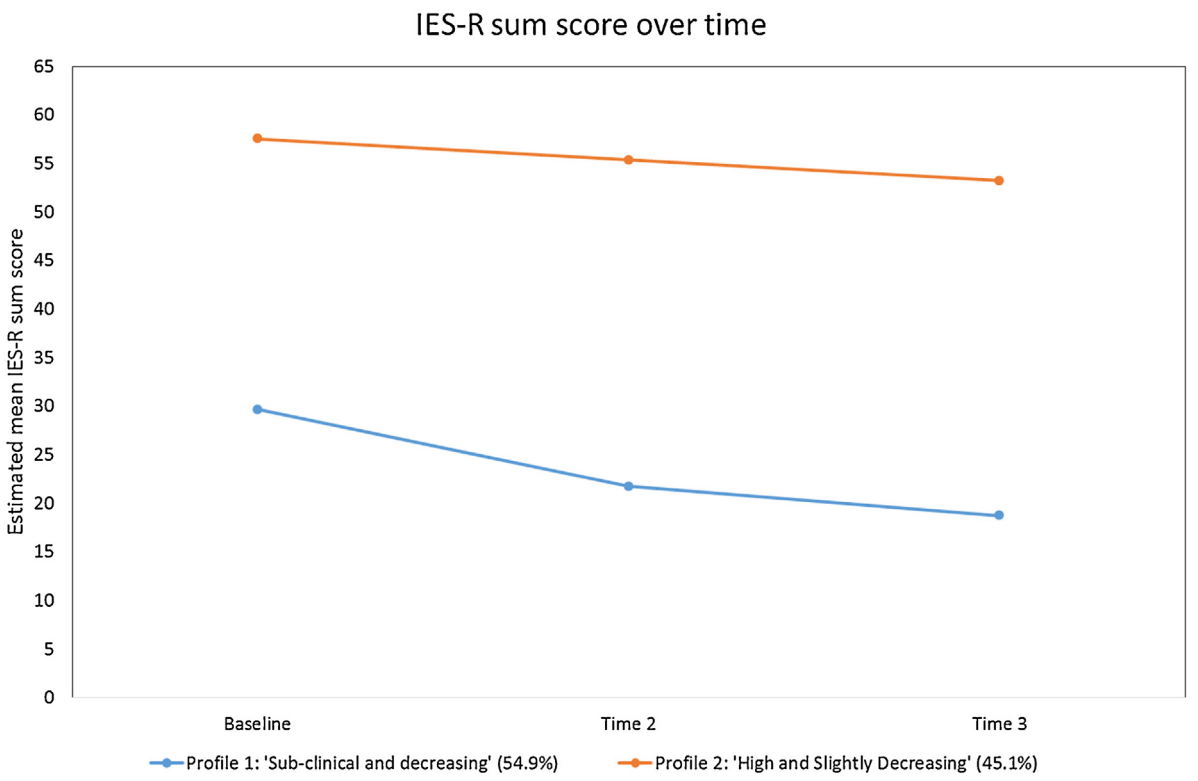

Fig. 1. Estimated Mean IES-R Sum Scores Across Time for Two Latent Profiles: 'Sub-Clinical and Decreasing' and 'High and Slightly Decreasing' (N = 138).

Table 3
Repeated Measures ANOVA: Main Effects of Class Membership and Time, and Class-by-Time Interaction.

		MS	p-value	p-value for Box's conservative F
Main effects				
	Class membership	101305.213	**<0.001**	N/A
	Time	**2011.721**	**<0.001**	**<0.001**
Class-by-time interaction		**513.721**	**=0.006**	**=0.025**

Bold indicates significant associations ($p < 0.05$).
Box's conservative F test assesses the F ratio with reduced degrees of freedom.

relationships across all waves, coded as "1", versus all others, coded as "0"). Finally, we used ANOVAs to determine whether distinct PTSS-patterns could be found for the two trajectories on PTSS-subscale mean scores (intrusion, avoidance and hyperarousal), and on the total number of above-zero IES-R scores from all three data time points.

Logistic regression analyses revealed that the odds of belonging to the "high and slightly decreasing" trajectory did not differ based on age (OR = 0.02, $p = 0.348$), highest education level achieved (OR = −0.17, $p = 0.650$), nor on the stability of marital status across the three study waves (OR = −0.37, $p = 0.312$). However, lower levels of work functioning was associated with an increased odds for being in the "high and slightly decreasing" as compared to the "sub-clinical and decreasing" trajectory (OR for trend = 0.629, $p < 0.001$). No distinct patterns were found for the two trajectories with regards to PTSS-subscale scores or the number of IES-R positive scores. On all these parameters, the "high and slightly decreasing" trajectory had statistically significantly higher scores compared to the "sub-clinical and decreasing" trajectory.

3.2.2. Latent profiles and changes over time. Repeated measures ANOVA showed that the differences in mean PTSS-scores between the two profiles were statistically significant (p-value for Box's conservative F = 0.001). There was a significant class by time interaction effect, in which the decrease in symptoms for the "sub-clinical and decreasing" group was significantly greater than the decrease in the "high and slightly decreasing" group (p-value for Box's conservative F = 0.025) (Table 3).

3.2.3. Latent profiles and associations with covariates. The logistic regression analysis revealed increased odds of being in the "high and slightly decreasing" symptom trajectory group for those who had experienced a higher number of childhood maltreatment types (*cumulative trauma*) (OR for trend = 3.69, $p = 0.002$), meaning that each unit of increase in the cumulative trauma variable was associated with a 3.69 times higher odds of belonging to the "high and slightly decreasing" trajectory

Table 4
Associations between Posttraumatic Stress Symptom Trajectory Belongingness and Covariates (IES-R sum Score).

	Estimate			Adjusted estimate[a]		
	OR	CI (95%)	p-value	OR	CI (95%)	p-value
Age	1.02	0.98–1.05	0.348	n/a		
Childhood maltreatment cumulative risk score	**3.69**	**1.63–8.34**	**0.002**	**4.41**	**1.51–12.82**	**0.007**
Abuse involved physical force/violence	**3.04**	**1.45–6.37**	**0.003**	**3.47**	**1.26–9.60**	**0.016**
Threatened by perpetrator	**2.56**	**1.21–5.39**	**0.014**	1.10	0.37–3.26	0.858
Penetrative abuse	2.26	0.90–5.67	0.082	1.03	0.34–3.16	0.958
Other abuse aspects	**1.49**	**1.00–2.20**	**0.047**	1.08	0.70–1.65	0.733
Manipulated by perpetrator	1.21	0.55–2.67	0.637	1.21	0.48–3.01	0.685
Biological parent perpetrator	1.08	0.52–2.23	0.840	0.72	0.26–1.94	0.512
Age at first abusive incident	1.01	0.91–1.12	0.859	1.12	0.98–1.28	0.088
Positive attention/care from perpetrator	0.91	0.43–1.93	0.809	0.98	0.36–2.66	0.968
Perpetrator was a trusted person	0.79	0.34–1.80	0.571	0.88	0.29–2.64	0.819

OR = Odds Ratio.
Bold indicates significant associations ($p < 0.05$).
CI (95%) = 95% Confidence Intervals.
Missing information on aspects of the abuse ranging from 0 to 13 (range 0–9.4%; in. the adjusted estimate).
[a] All self-reported aspects of abuse entered into model simultaneously.

group. There was also an increased odds of being in the "high and slightly decreasing" trajectory for those who had experienced abuse involving *violence* (OR = 3.04, $p = 0.003$), *threats* (OR = 2.56, $p = 0.014$), as well as for those with higher sum scores on the *other abuse aspects* variable (OR for trend = 1.49, $p = 0.047$). Post-hoc sensitivity analyses were carried out to elucidate if any particular items of the *other abuse aspect* variable were underlying their statistically significant association with the symptom groups (results described in text only). Two items; having reacted to the abuse with intense anxiety, helplessness and fear (OR = 2.97, $p = 0.044$), and that the abuse was very painful (OR = 2.73, $p = 0.007$), were individually associated with an increased likelihood of belonging to the high-symptoms group.

3.2.4. Latent profiles and associations between current social and relational factors. Comparisons of perceived social support and relational difficulties across the two latent PTSS-profiles revealed that subjects in the "high and slightly decreasing" symptom profiles reported lower levels of perceived social support (mean difference = 8.45, $p = 0.001$) and more relational difficulties (mean difference = 2.69, $p < 0.001$) compared to subjects in the "sub-clinical and decreasing" symptom profile (Table 4).

4. Discussion

The aim of the present study was to examine potential latent PTSS-trajectories in a longitudinal study of adults who experienced childhood sexual abuse. We identified two symptom trajectory groups: One characterized by a high PTSS-mean score exceeding a threshold indicative of clinically significant PTSS, and the other with a group mean falling below this threshold. Both trajectories showed a significant decrease in PTSS over the four-year time period of the study, however the decrease was greater for people in the lower symptoms trajectory. Those in the higher symptoms trajectory were more likely to have experienced more physical and emotional maltreatment during childhood, abuse involving threats, physical force/violence, very painful abuse, and having reacted to the abuse with intense anxiety, helplessness and fear. They also had significantly lower perceived social support levels and more relational problems presently, as measured at the first data collection time point.

4.1. Posttraumatic symptom trajectory groups

We identified two PTSS- trajectory groups in our sample; one characterized by high PTSS-scores with a slight decrease over time, and the other by sub-clinical PTSS with a clearer decrease in symptoms over time. We regard it as likely that they reflect qualitatively different groups from a clinical point of view, given the higher PTSS scores and lower levels of work-related functioning among people in the "high and slightly decreasing" trajectory compared to those in the "sub-clinical and decreasing" trajectory. The number of the PTSS- trajectory groups identified in our study is consistent with the study of Nugent et al. (2009), who found two symptom classes, one characterized by low symptoms levels and the other by high symptom levels, in their three-year follow up of children and adolescents with maltreatment experiences. The proportion of people in each subgroup in the present study (54.9% and 45.1% in the «sub-clinical and decreasing» and «high and slightly decreasing» subgroups, respectively) is also similar to their findings (60.7% and 39.3% in the low and high symptom subgroup, respectively). The characteristics of the symptom trajectories in our sample differed considerably from those identified in their study, however. While a high-symptom trajectory was identified in both studies, we did not find a low-symptom trajectory. On the contrary, the «low-symptom» profile in our sample was characterized by mean scores

falling within the range considered to be sub-clinical PTSS-levels. The lack of a low-symptom trajectory in our sample is likely related to the nature of our sample. As Table 1 and the descriptive statistics result section illustrate, the present sample had experienced very severe sexual abuse: The majority had experienced abuse involving penetration (78.3%) by a perpetrator who was someone they trusted (76.1%) – for more than a third of the sample this was a biological parent (38.4%) – the majority had been abused by more than one perpetrator (61.6%), and the abuse had started at a very early age (mean age 5.9 years). Moreover, as a group, the sample had also experienced high exposure to other forms of childhood maltreatment. Furthermore, the time period from abuse onset until first disclosure of the abuse was very long in the present sample (20.9 years), and delayed disclosures of sexual abuse have been associated with a more severe symptomatology in several previous studies (Ruggiero et al., 2004; Wyatt & Newcomb, 1990), including the overall study sample from which the present longitudinal sample stemmed (Steine et al., 2016). Finally, the fact that they were users of support centers may itself be indicative of experiencing significant distress. Thus, given the high prevalence of very severe childhood sexual abuse, as well as emotional and physical maltreatment, the high symptom levels in our sample are not surprising. It is likely that a lower symptom trajectory group would have been detected had we recruited our sample from the general population. A limitation of the present study therefore, is that the trajectories identified are not likely to be typical, and thus cannot be generalized to populations of people who experienced less severe sexual abuse or other types of trauma. Nevertheless, our findings show that different longitudinal PTSS trajectories may exist even within samples characterized by exposure to very severe childhood abuse.

4.2. Changes in symptom profiles across time

The lower symptom decrease across time in the «high and slightly decreasing» trajectory group may indicate that the posttraumatic symptomatology among subjects in this category had become persistent, and thus more resistant to change, compared to the symptoms of subjects in the «sub-clinical and decreasing» trajectory. The resistance may perhaps be due to the presence of other childhood adversities and lower social support levels among subjects in this group, both of which are known to be associated with more severe posttraumatic symptomatology (see later discussion points). However, the differential change patterns between the two trajectories are difficult to interpret since we did not control for other factors that could affect PTSS levels in the sample, such as more recent exposure to adverse or traumatic events, or the use of psychotropic medications. In order to overcome this limitation, future studies should control for factors that might affect posttraumatic symptomatology.

4.3. The role of polyvictimization for PTSS-trajectory

The strongest predictor of belonging to the «high and slightly decreasing» trajectory in the present study was higher levels of exposure to other types of maltreatment during childhood, or *polyvicitimization* (Finkelhor, Ormrod, & Turner, 2009). This finding is in line with previous studies that have examined longitudinal PTSS-trajectories in maltreated children (Miller-Graff & Howell, 2015; Nugent et al., 2009), and indicates that exposure to more adverse childhood events precipitates a more severe long-term PTSS-trajectory. Moreover, this finding is in line with numerous large-scale studies reporting a dose-response relationship between the number of adversities experienced during childhood and the severity of a wide range of symptoms and disorders later in life (Anda et al., 2006; Chapman et al., 2004; Clark, Caldwell, Power, & Stansfeld, 2010; Cloitre et al., 2009; Koskenvuo, Hublin, Partinen, Paunio, & Koskenvuo, 2010; Schilling, Aseltine, & Gore, 2008; Turner, Finkelhor, & Ormrod, 2010; Walker, Gelfand et al., 1999). The known interrelatedness of childhood sexual abuse with other types of childhood maltreatment (Clark et al., 2010; Kessler et al., 2010; Turner et al., 2010), and the well-documented cumulative negative effects of polyvictimization on later physical and mental health, highlights the need for preventive efforts aimed at a broad spectrum of childhood maltreatments. Such interventions should aim at detecting sexual, physical, emotional abuse as well as other adversities at an early stage in order to protect children from ongoing victimization to these often hidden crimes (Priebe & Svedin, 2008). The more severe PTSS-trajectory among those with more childhood polyvictimization may also have implications for case formulations and treatment of patients with such histories, especially in light of the finding that the PTSS in this group might be more resistant to change.

4.4. Abuse characteristics and PTSS-trajectory belongingness

In addition to higher levels of polyvictimization, two abuse characteristics- abuse involving violence and threats from the perpetrator(s) – were associated with an increased risk of belonging to the "high and slightly decreasing" PTSS-trajectory. This finding is in line with a previous cross-sectional study linking sexual abuse involving force and threats to a more severe PTSS (Wolfe et al., 1994). Both of these abuse characteristics seem to correspond to the DSM-5 diagnostic criterion A for posttraumatic stress disorder, which states that fulfillment of PTSD- diagnostic criteria requires a history of exposure to "*death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence*" (American Psychiatric Association, 2013). Similarly, the two items of the "other abuse aspects" variables that were associated with belonging to the "high and slightly decreasing" PTSS-trajectory – that the abuse had been very painful, and having reacted to the abuse with intense anxiety, helplessness or fear- correspond to PTSD-criterion A of DSM-5 and DSM-IV-TR, respectively

(American Psychiatric Association, 2000, 2013). Overall, these findings lend support to the notion that these aspects of the stressful/traumatic event are especially important contributors to long-term PTSS.

None of the other abuse, perpetrator or victim characteristics (age at first abuse, biological parent perpetrator, trust, manipulation, positive attention, penetrative abuse, and the rest of the items of the "other abuse aspects" variable) were statistically significant predictors of PTSS-trajectory group belongingness in the present study. The lack of association of penetrative abuse with PTSS severity is particularly surprising and inconsistent with findings from a previous longitudinal study (Fergusson et al., 2013), but may be due to the fact that the majority (78.3%) of the sample had experienced penetrative abuse, restricting the variability on this variable (see Table 1). The same could be true for the variables trust, manipulation and positive attention, which was reported by 76.1%, 71.7% and 66.7% of the sample, respectively. Since all subjects had experienced sexual abuse during childhood, the range in the age at first abuse variable was also limited. Alternatively, it could be that these variables, as well as the other abuse characteristics that did not show statistically significant effects with PTSS severity in the present or previous studies (Bal et al., 2005; Paolucci et al., 2001), are unrelated to PTSS severity. In order to advance the understanding of this issue, further studies are warranted.

4.5. Perceived social support and relational problems

At the group level, those in the "high and slightly decreasing" symptom profile reported significantly lower levels of perceived social support than did those in the "sub-clinical and decreasing" symptom profile. The association between lower perceived social support level and more severe PTSS is consistent with a large body of evidence linking lower social support levels to more severe symptomatology in adult survivors of childhood sexual abuse (Burgess & Holmstrom, 1978; Hyman, Gold, & Cott, 2003; Lueger-Schuster et al., 2015; Runtz & Schallow, 1997). The higher symptoms profile group also reported more relational problems compared to those in the lower symptom profile group, which seems in line with studies linking better quality of social relationships to more positive mental and physical health outcomes (Broadhead et al., 1983; Cohen, 2004; House, Landis, & Umberson, 1988; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Umberson & Montez, 2010). Although we do not know the nature of the association between lower perceived support/more relational problems and more severe PTSS in the present study, several potential mechanisms may be in play.

One interpretation is that lower social support levels lead to more severe PTSS following sexual abuse or later life adversities, either directly (e.g. through reduced direct positive effect of social support) or indirectly (e.g. through reduced buffering effect when the person experiences stress), as proposed by theoretical models describing social support (Cohen, 2004; Cohen & Wills, 1985). This interpretation is supported by findings showing that lack of support following crisis is predictive of more PTSS at later follow-ups (Bal et al., 2005). Another interpretation however, is that a more severe posttraumatic symptomatology negatively interferes with social relationships to a larger extent than a less severe posttraumatic symptomatology, leading to more relational problems, hence reduced social support over time. This interpretation is supported by findings that levels of PTSS predict the degree of psychosocial impairment among survivors of childhood sexual or physical abuse (Cloitre, Miranda, Stovall-McClough, & Han, 2005). In fact, longitudinal studies of other trauma populations indicate that both of these potential processes may operate at different times, as more social support has been found to predict less PTSS in the short-term, whereas more PTSS was found to predict less social support in the long-term (Kaniasty & Norris, 2008). Although perceived social support and relational problems were measured in the first data collection wave in the present study, and thus preceded the two follow-up measures of PTSS, we do not know anything about the relationship between these variables before our study participants entered the study. Further, we cannot rule out potential third variables or mechanisms underlying the association between social support and posttraumatic symptomatology. One example of particular relevance is the finding by numerous general population studies showing that a history of sexual abuse itself is a predictor of reporting less emotional support from friends, family or spouses later in life, as well as of a smaller network size (Golding, Wilsnack, & Cooper, 2002). This may indicate that experiencing sexual abuse affects the person's ability to establish or maintain supportive relationships, or the way relationships are perceived. In this case, sexual abuse may bring about both lower social support levels and PTSS. This line of thought is supported by studies showing that childhood sexual abuse or other types of maltreatment disrupts the development of capacities important for preserving good and stable relationships, such as emotion regulation (Burns, Jackson, & Harding, 2010; Stevens et al., 2013; Walsh, DiLillo, & Scalora, 2011), and is also associated with later antisocial traits and behavior (Bergen, Martin, Richardson, Allison, & Roeger, 2004; Cubellis, Peterson, Henninger, & Lee, 2016), all of which are likely to negatively interfere with social and relational functioning. Thus, lower perceived social support levels in this group may reflect an actual lack of support resulting from impaired social and relational capabilities that in turn were generated from the abuse they experienced during childhood (Herman, 1997). Yet another potential explanation is that the posttraumatic stress and other mental health problems found at increased rates among people victimized by childhood sexual abuse, such as depression, may fuel social withdrawal, which in turn may deprive them from the various positive direct and stress-buffering effects of social support. Depression and other trauma-related symptoms may also lead to social behaviors that undermine support from others (e.g. less social responsiveness, lack of interest in others, a focus on their own negative experiences- behaviors that are often seen in depressed people), or to behaviors and symptoms that are too distressing for potential support sources to handle (e.g. anger, bitterness, self-harm behaviors, suicide attempts), resulting in their withdrawal (see for example Allen, 2001; chapters 9 and 11, for an elaborated discussion).

Despite these difficulties in determining the nature of the association of social support/relational problems with PTSS in our study, the broader evidence linking social support to better health has clinical implications of importance. Specifically, it indicates that the person's perceived social support levels might be a vital target of intervention among patients with more severe PTSS. Such interventions might take the form of increasing their ability to build supportive relationships if such are lacking (e.g. skills training to increase social competence) (Allen, 2001), or the ability to elicit or utilize social support if healthy relationships are already present in the person's life. Indeed, a focus on strengthening the individual's social and interpersonal competencies is among the recommended interventions in treatment guidelines for complex posttraumatic stress, and is regarded as an important means to improve functioning in day-to-day life, as well as for building confidence and motivation for treatment (Cloitre et al., 2012). Other potential intervention avenues may be addressing trauma-related problems that undermine support or fuel interpersonal stress, and helping the client disengaging from strained relationships whenever relevant (Allen, 2001).

4.6. Strengths, limitations and future directions

Strengths of the present study include its longitudinal design and the use of a sample consisting solely of childhood sexual abuse survivors and as such representing a novel contribution to the field, as well as the probabilistic and person-centered approach to examining PTSS-symptom trajectories.

Our study has however some limitations that should be noted. Firstly, the sample size was relatively small, which partly affected the PTSS-symptom trajectory model chosen. Secondly, the study participants were users of support centers for sexual abuse survivors, who are not likely to be representative for the population of sexual abuse survivors in general. Thirdly, the representativeness of the sample may be further limited by the low response rate, and the severity of sexual abuse they had experienced. In light of these methodological limitations, our findings should ideally be replicated in larger, representative samples of sexual abuse survivors. Fourthly, we cannot rule out biases in the reporting of childhood maltreatment experiences, given that these experiences were assessed using retrospective self-report measures. Finally, we examined symptom trajectories over a 4-year period only. Thus, due to the lack of information about posttraumatic symptomatology during childhood, inferences regarding stability of the symptom trajectories from childhood to adulthood cannot be made based on the present study. In order to elucidate the stability of PTSS trajectories over time, longitudinal studies following a sample of sexual abuse survivors from childhood to adulthood are warranted. In light of these limitations our findings should be replicated in larger samples, preferably in longitudinal, prospective studies of sexual abuse survivors from the general population.

5. Conclusions

In the present study, two latent PTSS-trajectories were identified in a sample of adult support center users who experienced sexual abuse and high levels of other maltreatment types during childhood. Increased odds of belonging to the high-symptom trajectory profile were found for those who had experienced more additional types of childhood maltreatment, abuse involving threats, physical force/violence, very painful abuse, and who had reacted to the abuse with intense anxiety, helplessness or fear, indicating that these factors can bring about a more severe long-term PTSS-trajectory, and highlighting the need for preventive efforts aimed at a broad range of childhood maltreatment. Moreover, people in the higher symptoms trajectory reported lower levels of perceived social support and more relational problems currently, representing potential avenues for clinical interventions.

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