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## **Patterns of Adverse Childhood Experiences in Juveniles Who Sexually Offended**

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**Abstract:** Juveniles who sexually offended (JSOs) are differentially burdened with adverse childhood experiences (ACEs). The present study used Latent Class Analysis (LCA) to derive subtypes of JSOs according to their patterns of 10 different ACEs. An extensive file analysis of 322 male JSOs ( $M = 14.14$ ,  $SD = 1.94$ ) revealed five subtypes with (a) multiple (9.0%), (b) mainly family related (17.1%), (c) mainly peer related (21.7%), (d) mainly neglectful (18.6%), and (e) little/no (33.5%) ACEs. Differences among ACE subtypes with regard to several offense and victim characteristics (e.g., the use of penetration or violence, the choice of a child, a male, a stranger, or multiple victims) were examined. Whereas no differences were found for the use of physical violence or the choice of male, stranger, or multiple victims, binary logistic regressions revealed associations of the multiple-ACE subtype with the choice of a child victim, the family-ACE subtype with the use of penetration as well as further nonsexual delinquency, the peer-ACE subtype with the use of penetration and the choice of a child victim, and the neglect-subtype with the choice of a child victim. Additional analyses including single ACE categories instead of LCA-derived subtypes supported these results. Findings highlight the need for a comprehensive consideration of ACEs in research and clinical work to understand developmental pathways to juvenile sexual offending.

DOI: <https://doi.org/10.1177/1079063217697135>

Posted at the Zurich Open Repository and Archive, University of Zurich

ZORA URL: <https://doi.org/10.5167/uzh-143858>

Journal Article

Accepted Version

Originally published at:

Barra, Steffen; Bessler, Cornelia; Landolt, Markus A; Aebi, Marcel (2018). Patterns of Adverse Childhood Experiences in Juveniles Who Sexually Offended. *Sexual Abuse : Journal of Research Treatment*, 30(7):803-827.

DOI: <https://doi.org/10.1177/1079063217697135>

A multitude of findings confirm the far-reaching distinct and cumulated effects of a wide range of intra- and extra-familial ACEs on one's neurobiological, psychological, and social development (e.g., Ballard et al., 2015; Felitti et al., 1998; Finkelhor, Shattuck, Turner, & Hamby, 2015; Teicher & Samson, 2016). Adolescents involved in the justice system were found particularly affected by ACEs with considerably higher prevalence rates of abuse and neglect than community samples (Abram et al., 2004; Aebi, Linhart, et al., 2015; Baglivio et al., 2014). The experience of abuse and neglect in early childhood has been seen as crucial to explain later criminal and violent behaviors for decades (e.g., Widom, 1989). In their recent review, Sood and Berkowitz (2016) emphasize the variety of "biological, individual, familial, social, and economic factors" (p. 2) that have contributed to the etiology of juvenile violence in prior research. At the same time, the authors highlight the role of early and current adversities in both intra- and extra-familial contexts. From a neurobiological perspective, ACEs may impair brain structures related to impulse control and emotion-regulation (e.g., prefrontal cortex; Teicher & Samson, 2016), resulting in higher probabilities of engaging in violent behavior (Fox, Perez, Cass, Baglivio, & Epps, 2015).

Juveniles who sexually offended (JSOs) display a specific subgroup among delinquent youths with respect to ACEs in general and sexual victimization in particular. Besides elevated rates of intrafamilial forms of violence as well as emotional and physical neglect, JSOs reported sexual victimization with five times higher odds compared to other juvenile offenders (Seto & Lalumière, 2010). The latter finding goes along with theories that underscore the prominent role of sexual victimization in the etiology of sexual coercion (e.g., Aebi, Landolt, et al., 2015; Ryan, Lane, Davis, & Isaac, 1987). However, by focusing on sexual victimization alone, other forms of ACEs that are prevalent among JSOs, e.g., emotional and physical neglect (Righthand & Welch, 2001), or peer bullying (Hendriks &

Bijleveld, 2004), may be given too little attention. One ACE type does, in fact, rarely occur in isolation, but most JSOs can be considered polyvictimized (Rasmussen, 2013).

Within JSO-samples, prevalence rates of ACEs vary considerably, and JSOs perform a wide range of assaults with diverse offense and victim characteristics. However, this heterogeneity within JSO-samples has usually not been respected in comparisons of ACEs between JSOs on the whole and adolescents without sexual offenses. Thus, researchers may have fallen short on detecting differences related to specific JSO subtypes that may be of relevance for etiological assumptions and intervention planning (Fanniff & Kolko, 2012; Van Wijk et al., 2006). Few studies have compared the occurrence of ACEs in theoretically defined subgroups of JSOs based on victim and offense characteristics. For instance, elevated rates of physical and sexual abuse were found in JSOs who used penetration (Burton, 2003; Fehrenbach, Smith, Monastersky, & Deisher, 1986). Regarding victim choice, JSOs with child victims were found to be more often exposed to a multiplicity of ACEs, i.e., to sexual victimization, peer bullying, and caregiver changes. In contrast, JSOs with peer/adult victims were more frequently burdened with witnessing intrafamilial violence, having criminal family members, family financial deprivation, and lacks in parental supervision (Fanniff & Kolko, 2012; Gunby & Woodhams, 2010; Hendriks & Bijleveld, 2004). However, the approach to contrast theoretically derived dichotomous JSO-subgroups has given rise to concerns about its validity (Aebi, Vogt, Plattner, Steinhausen, & Bessler, 2012).

Despite their coexistence, most research on ACEs has focused on their isolated effects (Charak & Koot, 2015). The multiplicity of ACEs is usually accounted by building a cumulated score as proposed by the original ACE study (Felitti et al., 1998), although this score falls short on taking the types of ACEs and their mutual dependency into account (Berzenski & Yates, 2011; Teicher & Samson, 2016). Thus, person-oriented approaches like Latent Class Analysis (LCA) appear fruitful in research on ACEs (Roesch, Villodas, &

Villodas, 2010). LCA accounts for the number, the types, and the mutual dependencies of ACEs by extracting exclusive homogeneous subtypes out of heterogeneous samples based on individual ACE patterns. Few studies have examined ACEs using LCA. Although the majorities in both juvenile community and offender samples had been assigned to low ACE classes, studies revealed particular subtypes of adolescents burdened with multiple ACEs, whereas single ACEs were rare (Aebi, Linhart, et al., 2015; Ballard et al., 2015; Ford, Grasso, Hawke, & Chapman, 2013).

To our best knowledge, no previous study has applied LCA to examine distinct ACE patterns in JSOs despite the abovementioned advantages. Still, the usage of advanced statistical approaches to identify which JSOs are most burdened with ACEs and what kinds of ACEs relate to different offense characteristics is of importance for both research and intervention purposes: It offers a basis to examine specific etiological pathways and to deduce specific treatment and prevention approaches in order to reduce the occurrence of juvenile sexual delinquency.

Meeting the lack of person-oriented approaches to examine ACEs in JSOs, we (a) analyzed the patterns of multiple intra- and extra-familial ACEs in a large sample of male JSOs, and (b) related derived subtypes to offense severity (use of penetration and physical violence) and victim choice (child victim).

LCA was expected to reveal subtypes of JSOs that differed regarding the number and the categories of ACEs. Based on previous findings, we expected to find a low-ACE subtype, a multiple-ACE subtype, and a specific sexual victimization subtype. Relying on research promoting dose-response-relationships between ACEs and outcome severity (Anda et al., 2006; Duke, Pettingell, McMorris, & Borowsky, 2010; Maas, Herrenkohl, & Sousa, 2008), the multiple-ACE subtype was expected to relate to indicators of offense severity analogous

to a cumulated ACE score. Choosing a child victim was also expected to be associated with the multiple-ACE subtype, as well as the sexual victimization subtype.

Besides common indicators of juvenile delinquent and risk behaviors, such as low socio-economic status (SES) and age (e.g., DeLisi, Neppl, Lohman, Vaughn, & Shook, 2013; Kipping, Smith, Heron, Hickman, & Campbell, 2015), we added foreign nationality as a covariate because Switzerland has been shown to have high rates of migration, and previous research indicated that juveniles with foreign nationalities were overrepresented in the Swiss justice system (Killias, 2009). Moreover, further European studies showed that JSOs with foreign nationalities differed from domestic adolescent delinquents in regard to social and health adversities (e.g., Aebi et al., 2012; Bauer et al., 2011; Colins et al., 2013). Furthermore, prior non-sexual violent delinquency was considered because general violent offending had been related to both ACEs and sexual coercion (e.g., Fox et al., 2015; Seto & Lalumière, 2010). Thus, the specific associations between ACEs and offense characteristics were analyzed over and above the effects of a general tendency to violence.

## **Methods**

### **Procedures**

We intended to analyze the juridical and medical files of all adolescents who had been convicted for a sexual offense (except convictions for pornography only) according to the Swiss penal law between January 2007 and September 2014 in the German-speaking part of Switzerland. Juvenile justice authorities of three cantons (states) refused to participate (concerning about 16.9% of convictions according to official national statistics). Files were analyzed between February and December 2015. Data extraction was guided by a specifically-developed documentation system based on an adaptation of the Forensic Psychiatric Documentation System (Nedopil, Grassl, & Mende, 1986). It had been modified

for juveniles and complemented for assessing ACEs following existing instruments (see below). Data were collected by an experienced forensic psychologist, a doctoral student of forensic psychology, and a psychology Master's student. To assess inter-rater reliability, the two forensic psychologists independently double-rated 30 randomly selected cases stratified by file content (presence vs. absence of psychiatric/psychological expert opinion) and residential area (urban vs. rural). Cohen's kappa ( $\kappa$ ) and the intraclass correlation coefficient (ICC; two-way random-based approach on single measure, absolute agreement) were calculated for nominal and metric variables, respectively. Based on the recommendation by Landis and Koch (1977) as well as Fleiss (1981), values above .60 were considered substantial. Study procedures were approved by the local ethics committees and the justice departments of each canton involved.

### **Sample**

Case files of 687 JSOs (males:  $n = 673$ , 98.0%; females:  $n = 14$ , 2.0%) were analyzed. In order to assure data accuracy on developmental and criminal histories and to reliably derive ACEs, the present study was based only on those files that contained anamnestic information from psychiatric/psychological expert opinions, therapeutic documentations, and/or clarification reports referring to a JSO's health and social development. At the beginning of the trial, the judicial institution in charge commissioned the respective reports from a forensic or clinical psychiatrist or psychologist, psychotherapist, or social worker, or demanded them from prior involved professionals in order to gain a comprehensive picture of a JSO's development. Respective information was incorporated in the decision-making process about awarding penalties and/or interventions. The proportion of female JSOs in the respected cases was too small for statistical analyses ( $n = 3$ , 0.3%), so their data were excluded. The final sample consisted of 322 male JSOs aged 8.50 to 18.50 years at the time of the first sexual assault that had led to a conviction during the abovementioned time period

( $M = 14.14$  years,  $SD = 1.94$  years). Most of these convictions involved one sexual coercive act ( $n = 148$ , 48%), whereas the mean number was 7.34 (range = 1 – 560;  $Mdn = 2$ ).

## Measures

**Adverse Childhood Experiences (ACEs).** The present study included ACEs that had occurred before a JSO's first sexual assault that had led to a conviction during the abovementioned time period. The assessment of ACEs was guided by the definitions of the ten ACE-types introduced in the German version (Isele et al., 2014) of the Maltreatment and Abuse Chronology of Exposure (MACE) scale (Teicher & Parigger, 2015; see Table 1). Because non-contact sexual abuse, e.g., sexual harassment via internet or exposure to pornography, displays a growing type of sexual coercion (Mohler-Kuo et al., 2014) not covered by the MACE scale, additional information from the Childhood Sexual Abuse Questionnaire (CSAQ; Mohler-Kuo et al., 2014) was incorporated to code whether a JSO had experienced sexual victimization himself. An ACE was dichotomously coded as present when information in the case files pointed to its overall occurrence. ACEs were summed up to a cumulated score ranging from 0 to 10 ( $ICC = .86$ ).

First analyses of the MACE scale point to satisfactory convergent and divergent validities compared to the Child Trauma Questionnaire (CTQ; Bernstein et al., 1994) and the Adverse Childhood Experience (ACE) scale (Felitti et al., 1998), and several psychiatric symptom measures, respectively (Isele et al., 2014; Teicher & Parigger, 2015). Good to excellent ( $r > .50$ ) test-retest reliabilities have been proven for self-reported MACE subscales (Teicher & Parigger, 2015). As one of the first studies using the CSAQ, Aebi, Landolt, et al. (2015) mentioned moderate agreement ( $\kappa = 0.41$ ,  $p = .001$ ) with the Juvenile Victimization Questionnaire (Hamby, Finkelhor, Ormrod, & Turner, 2004), which, however, comprises fewer items on sexual victimization than the CSAQ. No studies have yet implemented

validity and reliability ratings for the MACE categories in file reviews. The present inter-rater reliabilities, however, point to their applicability for this kind of data collection (see Table 1).

**Offense severity and victim choice.** Penetration was coded present when at least one of the convicted sexual assaults included (attempted) vaginal and/or anal penetration ( $\kappa = .87$ ). Physical violence during the convicted sexual assaults was assessed on a 4-point Likert-scale with 0 (= *no violence*), 1 (= *restrained/beat victim once*), 2 (= *bodily harm with temporary marks*), and 3 (= *bodily harm requiring medical care*; ICC = .64). When the use of violence differed among multiple convicted sexual assaults, ratings referred to the assault with the highest degree of violence. A JSO was considered to have had a child victim when at least one of his victims was three or more years younger than him and not older than 12 years ( $\kappa = .93$ ). That way, a victim's age and the age difference between victim and perpetrator were simultaneously taken into account as suggested by prior research (Skubic Kemper & Kistner, 2010). Former studies have used a cut-off of 12 years for child victims, and the Swiss penal code requires an age difference of at least three years for the definition of sexual acts against a child (e.g., Aebi et al., 2012).

**Covariates.** Age at the time of the first sexual assault that had led to a conviction during the abovementioned time period (ICC = .90) and foreign nationality ( $\kappa = 1.00$ ) were directly coded from the case files. Analogous to prior research from Switzerland (e.g., Aebi et al., 2012; Killias, 2009), foreign nationality was coded present when the JSO did not have a Swiss nationality. This definition included that both parents were of non-Swiss origin, and neither the JSO nor his family had yet been naturalized. SES was defined by categorizing the occupations of each JSO's caregivers on a scale from 1 (= *executive manager*) to 9 (= *unskilled worker*) as proposed by the International Standard Classification of Occupations (ISCO-08) guidelines (International Labour Organization, 2012). SES was coded as low when both caregivers were unskilled workers or unemployed, or when one caregiver was an



unskilled worker or unemployed while information about the occupational status of the other was missing ( $\kappa = .79$ ). Prior non-sexual violent delinquency was coded present when charges had been pressed against a JSO for prior perpetration of bodily assault, affray, or robbery at least once before the onset of the convicted sexual delinquency ( $\kappa = .89$ ).

### **Statistical Analyses**

LCA with robust maximum likelihood estimation was performed in Mplus 7.31 (Muthén & Muthén, 1998-2015). Each JSO was assigned to the latent class for which his membership probability was highest based on individual response patterns to assessed ACEs. An index which quantifies the clearness of these assignments is the entropy value. For the present approach, an entropy value of at least .80 is recommended (Clark & Muthén, 2009). To identify the model that fitted the data best, solutions with gradually increasing numbers of latent classes were compared to each other on several parameters. For the present study, the Akaike Information Criterion (AIC; Akaike, 1974), the Bayesian Information Criterion (BIC; Schwarz, 1978), and the sample-size adjusted Bayesian Information Criterion (aBIC; Sclove, 1987) were included as fit indicators. The model with the smallest fit indicators shows the best balance of fit and parsimony. Furthermore, significant test statistics of the Lo-Mendell-Rubin Likelihood Ratio Test (LMR LRT; Lo, Mendell, & Rubin, 2001) and the Bootstrapped parametric Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000), which compare a model with  $k$  classes to a model with  $(k-1)$  classes, indicate that the inclusion of an additional latent class has enhanced model fit. The aBIC appeared superior over the AIC and BIC for categorical models and the BLRT outperformed the LMR LRT (Nylund, Asparouhov, & Muthén, 2007). Additionally, the interpretability of the latent classes was taken into account for model selection (Nylund et al., 2007). To avoid biased results due to local instead of global maxima, 5000 random starts were implemented. Further analyses were conducted in IBM SPSS 23. Besides group comparisons (ANOVAs, Kruskal-Wallis-tests, t-tests, Games-

Howell-tests, Chi<sup>2</sup>-tests), binary logistic regressions were performed including ACE-subtypes, age, low SES, foreign nationality, and prior non-sexual violent delinquency.

## Results

### Sample characteristics

The minority of JSOs ( $n = 90$ , 28.0%) had foreign nationalities, most commonly from the Balkan States (Serbia, Montenegro, Kosovo, Macedonia, Albania;  $n = 28$ , 8.5%), followed by Turkey ( $n = 14$ , 4.3%), Italia ( $n = 9$ , 2.8%), Portugal ( $n = 8$ , 2.5%), and Germany ( $n = 6$ , 1.9%). Further 17 foreign nationalities were found, each representing less than 1% of the JSOs. Forty-six JSOs (14.3%) were from families with low SES. Foreign nationality and low SES were not statistically related,  $\chi^2(1) = .82$ ,  $p = .36$ . Thirty-six JSOs (11.2%) showed histories of prior non-sexual violent delinquency. Besides, prior charges had been pressed against 12 JSOs (3.7%) for sexual assaults ( $\kappa = 1.0$ ), 54 JSOs (16.8%) for property crimes (including theft and property damage;  $\kappa = .67$ ), and 13 JSOs (4.0%) for drug-related crimes ( $\kappa = 1.0$ ). The majority of the sample ( $n = 243$ , 75.5%) did not have any prior charges from these categories, 52 (16.1%) had charges from one, 19 (5.9%) from two, 7 (2.2%) from three, and one (0.3%) from all four categories. For about one third of the sample ( $n = 96$ , 29.8%) current convictions included non-sexual crimes as well.

The JSOs considered for the present study were slightly younger than the 351 excluded male JSOs ( $M = 14.82$ ,  $SD = 1.89$ ),  $t(670) = 4.56$ ,  $p < .001$ , who were more often of foreign nationality ( $n = 150$ , 42.9%),  $\chi^2(1) = 16.01$ ,  $p < .001$ , as well as from families with low SES ( $n = 51$ , 24.2%),  $\chi^2(1) = 5.58$ ,  $p < .001$ . The present sample showed more offenses that included penetration ( $n = 191$ , 59.3%) than excluded JSOs ( $n = 114$ , 32.5%),  $\chi^2(1) = 48.81$ ,  $p < .001$ , as well as more cases involving a child victim ( $n = 158$ , 49.1% vs.  $n = 77$ , 21.9%),  $\chi^2(1) = 54.40$ ,  $p < .001$ . No difference was found for the use of physical violence ( $U$

= 53,946.00,  $p = .25$ ). Missing anamnestic information from excluded JSOs prohibited group comparisons regarding prior crime histories.

### **Subtypes of adverse childhood experiences**

Prevalence rates of the ten ACEs varied between 8.4% (witnessing violence towards siblings) and 60.2% (emotional neglect; Table 1). LCA-solutions with one to nine classes were compared to each other (Table 2).

[Insert tables 1 and 2.]

The aBIC was smallest for the five-class solution. The significant LMR LRT and BLRT indicated that choosing five classes significantly enhanced model fit compared to a four-class model. The entropy value represented a clear class assignment in the five-class model. The five classes were interpretable straightforwardly (see below). The AIC favored the six-class solution. However, neither LMR LRT nor BLRT were significant, indicating that the six-class model does not prepare a significantly better fit to the data than the five-class model. The smallest BIC was found for the two-class solution. Its choice, however, was not supported by LMR LRT or BLRT.

Taking into account the above-mentioned superiority of the aBIC over AIC and BIC, the results of LMR LRT and BLRT, and the interpretability of the latent classes, the five-class model was selected for further analyses (Figure 1).

[Insert Figure 1.]

LCA identified a multiple-ACE subtype ( $n = 29$ , 9.0%) with 7.55 ACEs on average, a family-ACE subtype ( $n = 55$ , 17.1%) with 5.42 ACEs on average, a neglect-only subtype ( $n =$

60, 18.6%) with 2.92 ACEs on average, a peer-ACE subtype ( $n = 70$ , 21.7%) with 2.66 ACEs on average, and a low-ACE subtype ( $n = 108$ , 33.5%) with 0.55 ACEs on average. An ANOVA with Games-Howell post-hoc tests revealed that all ACE-subtypes differed from each other on their mean cumulated ACE score ( $p < .001$ ) with the exception of the neglect-only and the peer-ACE subtypes ( $p = .53$ ).

A two-class solution would have only differentiated between JSOs with high and JSOs with low item response probabilities on each ACE. The four- and the six-class models would have displayed similar class compositions compared to the five-class solution. However, the four-class model would have lacked a multiple-ACE subtype, whereas the six-class model would have additionally indicated a separate class with medium to high item response probabilities on the items representing parental abuse (parental verbal abuse, parental non-verbal emotional abuse, and parental physical abuse) but low item response probabilities on emotional and physical neglect (data not shown).

### **Relations to offense severity and victim choice**

Differences among ACE-subtypes were found in the proportions of JSOs who used penetration and had chosen a child victim (Table 3) but not for the use of physical violence,  $\chi^2(4) = 4.81$ ,  $p = .31$ . The adjusted residuals showed that the low-ACE subtype was associated with fewer penetrations and child victims. The family-ACE subtype was associated with more penetration, the peer-ACE subtype with a more frequent choice of a child victim. Binary logistic regressions were performed on the outcome variables that differed among subtypes (Table 4). The low-ACE subtype served as reference group. The multiple-ACE subtype was associated with the choice of a child victim. The neglect-only subtype was associated with the choice of a child victim, too. The family-ACE subtype was associated with penetration. The peer-ACE subtype was associated with penetration and the choice of a child victim. The relation between using penetration and choosing a child victim

was not significant for this subtype,  $\chi^2(1) = 0.16$ ,  $p = .69$ , although more JSOs from the peer-ACE subtype used penetration against children than against peers/adults ( $n = 17$  vs.  $n = 10$ ). Equivalent regression analyses were conducted entering the cumulated score instead of the ACE-subtypes. The cumulated score was associated with penetration and the choice of a child victim.

[Insert tables 3 and 4.]

### Discussion

The present study examined the heterogeneity among JSOs by empirically deriving subtypes based on their ACE-patterns and comparing these subtypes in regard to their relations to offense severity and victim choice. LCA revealed five subtypes that differed in the number and the types of ACEs. In about one third of the JSOs low levels of ACEs were found, leaving 66.5% with high probabilities for the occurrence of several ACEs. This displays a higher rate compared to community and other juvenile offender samples (Aebi, Linhart, et al., 2015; Ballard et al., 2015; Ford et al., 2013). Three moderate ACE-subtypes differed insofar as one was characterized by abuse and neglect in the family context, one by family-neglect only, and one by elevated scores on peer-bullying. Almost one-tenth of the sample contained highly affected poly-victims with ACEs from intra- and extra-familial contexts. Taken together, these findings underscore the heterogeneity of JSOs concerning ACEs and prove that the majority of these adolescents are highly burdened (Rasmussen, 2013).

Despite prior research underscoring sexual victimization as a major risk factor for sexual perpetration (e.g., Aebi, Landolt, et al., 2015), the majority of JSO was not found sexually abused and the prevalence rate of sexual victimization in the present JSOs appeared comparable to other community and criminal youth samples (Mohler-Kuo et al., 2014; Seto

et al., 2010). Sexual victimization (a) only showed low to medium prevalence probabilities in the latent classes, and (b) never occurred in isolation. This was contrary to our assumption of a specific sexual-victimization subtype, yet consistent with the finding that sexual victimization commonly coexists with other adversities (e.g., Aebi, Linhart, et al., 2015). However, comparisons of prevalence rates between the present and other samples are limited due to different methods of data collection. ACE rates from self-reports are usually higher than those extracted from other sources, e.g., because psychological and medical reports might only mention more severe cases (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2015). Although the present case files included information from external sources and the JSOs themselves, we cannot exclude the possibility that some JSOs had not been asked about sexual victimization. In fact, a recent prospective study that relied on official maltreatment reports found that only a small number of juveniles who had conducted sexual assaults showed a history of sexual victimization. Moreover, poly-victimization appeared to play a more important role in sexual offending than sexual victimization on its own (Leach, Stewart, & Smallbone, 2016).

The present study found that distinct ACE-subtypes differed in their relations to offense severity and victim choice. Respective findings may build a foundation for the development of differentiated etiological hypotheses to be examined by future research. The neglect-only subtype showed elevated odds of having had a child victim. Neglected children who had experienced parental disinterest rather than loving care have been shown to develop anxious attachment styles that go along with deficient social competence and may lead to an incapacity to establish close relationships with peers (Finzi, Ram, Har-Even, Shnit, & Weizman, 2001; Miner, Knight, Berg, Romine, & Netland, 2010). Thus, aiming at satisfying intimate needs, neglected JSOs may target children out of fear of being refused by peers (Miner et al., 2010). The family-ACE subtype was associated with elevated offense severity

in terms of using penetration. Those JSOs had experienced active (most likely physical) abuse by their caregivers. This finding corresponds to prior research linking abusive experiences to the development of an avoidant attachment style, which again predicted elevated severity of sexual coercion (Finzi et al., 2001; Smallbone & Dadds, 2000).

The peer ACE subtype was related to both the choice of a child victim and penetration. Bullied adolescents are less popular in their social peer networks and struggle more often with self-esteem issues than their peers (de Bruyn, Cillessen, & Wissink, 2010; Hawker & Boulton, 2000). In addition to the fact that their isolated position hinders the establishment of age-appropriate intimate contacts, they may seek to overcome perceptions of intra- and inter-personal insufficiency by targeting children over whom they can exercise power and control (Drapeau, Beretta, de Roten, Koerner, & Despland, 2008). The relation between the peer-ACE subtype and using penetration may partly be dependent on the higher rate of choosing a child victim in bullied JSOs. Their superordinate position over the child may facilitate JSOs to include more severe forms of sexual coercion without resistance (Aebi et al., 2012). However, the relation between the two outcome variables did not reach statistical significance. Peer-ACEs appear to display a severe stressor associated with elevated offense severity in JSOs independent of victim choice.

The multiple-ACE subtype was associated with targeting a child victim. This result converges with findings about the various burdens in JSOs with child victims regarding both intra- and extra-familial adversities (e.g., Gunby & Woodhams, 2010). Negative experiences in multiple contexts may elevate the negative self-perceptions associated with single ACE-categories (e.g., peer-ACEs) and contribute to a generalized feeling of powerlessness and loss of control. Thus, the desire to regain power and control may be amplified in polyvictims (Ryan, 1989; Turner, Shattuck, Finkelhor, & Hamby, 2015). As mentioned above, this goal

may be easier to reach by approaching children instead of peers or adults (Drapeau et al., 2008).

The multiple-ACE subtype did not relate to the use of penetration. This finding was somewhat unexpected, as theories on dose-response relationships would suggest that elevated ACE scores would relate to enhanced outcome severity (e.g., Duke et al., 2010). In fact, the cumulated ACE score was associated with both, the choice of a child victim and the use of penetration. These opposing findings might be partly due to insufficient statistical power of the multiple-ACE subgroup based on its limited sample size. Nevertheless, the approach to consider multiple ACEs by relying on cumulated ACE scores only is challenged by the present results. The peer-ACE subtype, for example, is characterized by significantly fewer ACEs compared to the family-ACE subtype, although both significantly relate to offense severity. Thus, a cumulated approach to respect the coexistence of ACEs may not be informative enough to explain certain outcomes but the actual types of ACEs may matter (Teicher & Samson, 2016). Results point especially to the importance of considering ACEs in the peer-context, as the peer-ACE subtype was the only latent class that related to both penetration and victim choice.

After all, the use of physical violence was the only outcome that did not differ among ACE-subtypes. This result was surprising taking into account findings that highlight the positive relations between ACEs and violent behavior (e.g., Duke et al., 2010; Maas et al., 2008). However, because definitions of violence differ among studies, comparability is complicated. Furthermore, the degree of violence during a sexual offense might be better explained by factors not covered in the present study, such as the degree of control a JSO has over his victim (Hunter, Hazelwood, & Slesinger, 2000).

Besides ACEs, several covariates were associated with the outcome variables. The odds of involving penetration and those of choosing a child victim were higher for younger



JSOs, whereas JSOs with foreign nationalities and those with prior non-sexual violent delinquency had reduced odds of perpetrating against a child. These results go along with those by Aebi et al. (2012) who found that JSOs with child victims were younger and showed elevated offense severities compared to those with peer or adult victims; the latter were more often of foreign nationality and showed histories of prior general delinquency more frequently. Those results underscore that in addition to ACEs, demographic and prior criminal factors need to be considered in the explanation of juvenile sexual offending.

The present study has several strengths that consolidate the reliability of the results. First, findings are based on an extensive file analysis of a large sample of JSOs. Whereas most studies in the field solely rely on self-reported ACEs (Seto & Lalumière, 2010), the consideration of files that contain both self-reports and records from external sources appears fruitful to counteract biased prevalence estimations (Stoltenborgh et al., 2015). By only including files with mental health or social worker reports, a valid assessment of ACE was approximated. As requested by prior research (e.g., Teicher & Samson, 2016), a multiplicity of ACEs were taken into account, and their coexistence was respected not only by building a cumulated score but by the advanced statistical, person-oriented approach of LCA. As such, both the number and the types of ACEs could be examined simultaneously. Relations between ACE-subtypes and offense severity and victim choice were analyzed over and above the influence of often-cited covariates of juvenile offending.

On the other hand, some limitations need to be considered in interpreting the results. First, the availability of data for the present study was narrowed because the underlying information from the case files had not been originally collected for research purposes. The consideration of anamnestic information depended on the justice institutions' decisions to obtain respective reports. These might have been more often demanded for those cases believed to be more concerning. In fact, included JSOs differed from excluded JSOs, e.g., in

terms of younger age, more severe offenses, and a higher frequency of assaults against children. Thus, included JSO may represent a subsample of high-risk JSOs, which impedes the generalizability of the present findings. The sample further consisted of JSOs with a wide age range. We cannot exclude the possibility that different subtypes may be found among JSOs more similar in age. However, subsequent analyses included age as a covariate to counteract potential biases.

Second, we could not test differences between JSOs and adolescents without sexual offenses because no comparison groups were available. Moreover, there are numerous other correlates of sexually coercive behavior besides ACEs, e.g., cognitive and developmental factors (Ryan, Leversee, & Lane, 2011), whose consideration was beyond the scope of the present study. Thus, the etiological role of ACEs in sexual offending is not clear-cut. However, the focus of the present study was to untangle the heterogeneity of the JSO-sample itself, aiming at comparing ACE-based JSO-subtypes among each other rather than contrasting them to non-JSO samples. Etiological explanations for the derived subtypes must be understood as preliminary theoretical assumptions that need to be tested by future research that includes both JSO-subtypes and non-JSO samples, and additional influencing factors.

Third, potential influences of psychopathology were not included in the present study because it was not possible to assess psychiatric diagnoses by standardized instruments. Furthermore, Cohen's kappas for two ACE-types were slightly below the threshold for substantial values, yet displaying a highly moderate, better than chance inter-rater agreement (Fleiss, 1981; Landis & Koch, 1977). Lastly, even though ACEs preceded the onset of considered sexual assaults, data were assessed retrospectively impeding causal interpretations and possibly overestimating occurring associations compared to prospective designs (Leach et al., 2016).

Taken together, the present study may inspire future research on the precursors of sexual offending in juveniles. The heterogeneity of JSOs calls for the consideration of their different ACE-patterns when contrasting them to general and/or non-delinquent peers, instead of treating them as a homogeneous sample (Fanniff & Kolko, 2012; Van Wijk et al., 2006). This allows testing the specific role of ACEs in the etiology of different types of juvenile sexual offending. In this, researchers need to respect both the number and types of ACEs when examining their effects on certain outcomes. Especially peer-related ACEs deserve more attention in this regard. For a more comprehensive view on the associations of ACEs with sexual delinquency, future research may as well benefit from taking into account the timing and durations of experienced adversities, most preferably using longitudinal designs that also include re-offense data. Eventually, the examination of female JSO samples is needed as those may differ on certain aspects from male offenders (Oliver & Holmes, 2015).

The present study also gives rise to implications for the work with JSOs in clinical and judicial settings. As most JSOs appear highly burdened with ACEs, an extensive inquiry of various ACEs should be routinely included in anamnestic assessments. This may enable professionals to gain a better understanding of an adolescent's path to delinquency, and to implement appropriate actions. The high prevalence of ACEs and the associations of various ACE-types with sexual delinquency indicate that along with other influencing factors, ACEs need to be considered in education and prevention programs. Still, few prevention approaches for sexual violence have included ACEs, although the promotion of supporting family- and peer-relations appears beneficial in this regard (DeGue et al., 2014; Tharp et al., 2013). Primary prevention programs may focus on reducing ACEs in the first place, both in family- and peer-contexts, e.g., broaching the issues of child maltreatment (e.g., Basile, 2003) and bullying (e.g., Bradshaw, 2015). Secondary and tertiary prevention (intervention) programs that focus on selective samples of adolescents at risk for sexual violence (e.g., former violent

non-sexual offenders; Basile, 2003) and JSOs, respectively, may also benefit from considering ACEs. Multisystemic Therapy (MST), for example, has been proven an effective treatment approach for JSOs (Schmucker & Loesel, 2015). By targeting the social circle of adolescents, current family-, peer-, and school-related adversities may be reduced (Borduin, Schaeffer, & Heiblum, 2009). However, because most JSOs suffer from ACEs that have occurred in their pasts, trauma-oriented approaches might be fruitful as well. Depending on a JSO's offense and victim characteristics, different ACEs may be given specific attention. Some efforts have been made to implement similar interventions in samples of violent adult and juvenile offenders, e.g., narrative exposure therapy for forensic offender rehabilitation (FORNET; Elbert, Hermenau, Hecker, Weierstall, & Schauer, 2012) or Trauma Adaptive Recovery Group Education and Therapy (TARGET; Ford, 2015). Their effectiveness in JSO samples is, however, yet to be proven. Still, the application of these interventions in JSO samples appears promising because they deal with risk factors for recidivism of JSOs (e.g., cognitive and affective distortions; Kenny, Keogh, & Seidler, 2001; Worling & Langton, 2015) which may be (partly) traced back to experienced adversities (Elbert et al., 2012; Ford, 2015).

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Table 1

*Descriptions, inter-rater reliabilities, and prevalence rates of adverse childhood experiences in male juveniles who sexually offended (n = 322)*

	ACE	Content (exemplary)	$\kappa$	Prevalence	
				<i>n</i>	%
PVA	parental verbal abuse <sup>a</sup>	JSO was shouted at, verbally humiliated, or threatened several times a year.	.66	85	26.4
PNVEA	parental non-verbal emotional abuse <sup>a</sup>	JSO was confined or forced to take adult responsibilities several times a year.	.57	112	34.8
PPA	parental physical abuse <sup>a</sup>	JSO was physically punished several times a year.	1.00	100	31.1
PEERE	peer emotional abuse <sup>a</sup>	JSO was actively excluded or verbally humiliated several times a year.	.78	129	40.1
PEERP	peer physical bullying <sup>a</sup>	JSO was punched, kicked, or forced to do something against his will several times a year.	.59	58	18.0
EN	emotional neglect <sup>a</sup>	JSO experienced lack of family cohesion or (un)witting absence of a caregiver several times a year.	.77	194	60.2
PN	physical neglect <sup>a</sup>	JSO experienced lack of basic physical needs or insufficient surveillance several times a year.	.67	124	38.5
WITP	witnessing violence between parents <sup>a</sup>	JSO witnessed physical violence from male caregiver towards female caregiver and vice versa several times a year.	.65	57	17.7
WITS	witnessing violence towards siblings <sup>a</sup>	JSO witnessed threats or physical/sexual assaults against a sibling by a caregiver several times a year.	1.00	27	8.4
SEX	sexual victimization <sup>a, b</sup>	JSO was forced to sexual activities by a caregiver or peer, or was harassed without contact including through electronic means several times a year.	.86	51	15.8

*Note.* ACE = adverse childhood experience, JSO = juvenile who sexually offended.

<sup>a</sup> Maltreatment and Abuse Chronology of Exposure scale (Isele et al., 2014; Teicher & Parigger, 2015). <sup>b</sup> Childhood Sexual Abuse Questionnaire (Mohler-Kuo et al., 2014).



Table 2

*Model parameters of latent class analyses based on ten ACEs for male juveniles with sexual offenses*

Model	Log Likelihood	AIC	BIC	aBIC	<i>p</i> (LMR LRT)	<i>p</i> (BLRT)	Entropy
1-Class	-1776.81	3573.63	3611.37	3579.65	-	-	-
2 Class	-1541.12	3124.24	3203.51	3136.90	.000	.000	.88
3-Class	-1513.32	3090.64	3211.43	3109.93	.060	.000	.83
4-Class	-1486.21	3058.41	3220.72	3084.33	.035	.000	.80
5-Class	-1467.89	3043.78	3247.60	3076.32	.038	.000	.81
6-Class	-1455.31	3040.62	3285.97	3079.80	.244	.167	.80
7-Class	-1446.79	3045.58	3332.45	3091.39	.147	.267	.82
8-Class	-1439.58	3053.15	3381.54	3105.58	.097	.600	.85
9-Class	-1432.40	3060.80	3430.70	3119.86	.195	.667	.86

*Note.* AIC= Akaike Information Criterion, BIC = Bayesian Information Criterion, aBIC = adjusted Bayesian Information Criterion, LMR LRT =

Lo-Mendell-Rubin Likelihood Ratio Test, BLRT = Bootstrapped Likelihood Ratio Test.

Table 3

*Differences in proportions of penetration and choice of a child victim related to latent class membership*

Outcome	Latent Class ( <i>N</i> )															Group Comparison		
	Low-ACE (108)			Peer-ACE (70)			Neglect-only (60)			Family-ACE (55)			Multiple-ACE (29)					
	<i>n</i>	%	AR	<i>n</i>	%	AR	<i>n</i>	%	AR	<i>n</i>	%	AR	<i>n</i>	%	AR	$\chi^2$	df	<i>p</i>
Penetration	23	21.3	-3.2	27	38.6	1.1	20	33.3	0.0	26	47.3	2.4	11	37.9	0.6	13.010	4	.011
Child victim	41	38.0	-2.8	42	60.0	2.1	36	60.0	1.9	23	41.8	-1.2	16	55.2	0.7	13.135	4	.011

*Note.* AR = adjusted residual. Significant deviations from the expected cell counts are indicated by AR values of  $\geq 2.0$  (more than expected) and  $\leq -2.0$  (less than expected).

*p* = Monte Carlo Sig. (2-sided) based on 10,000 sampled tables.

Table 4

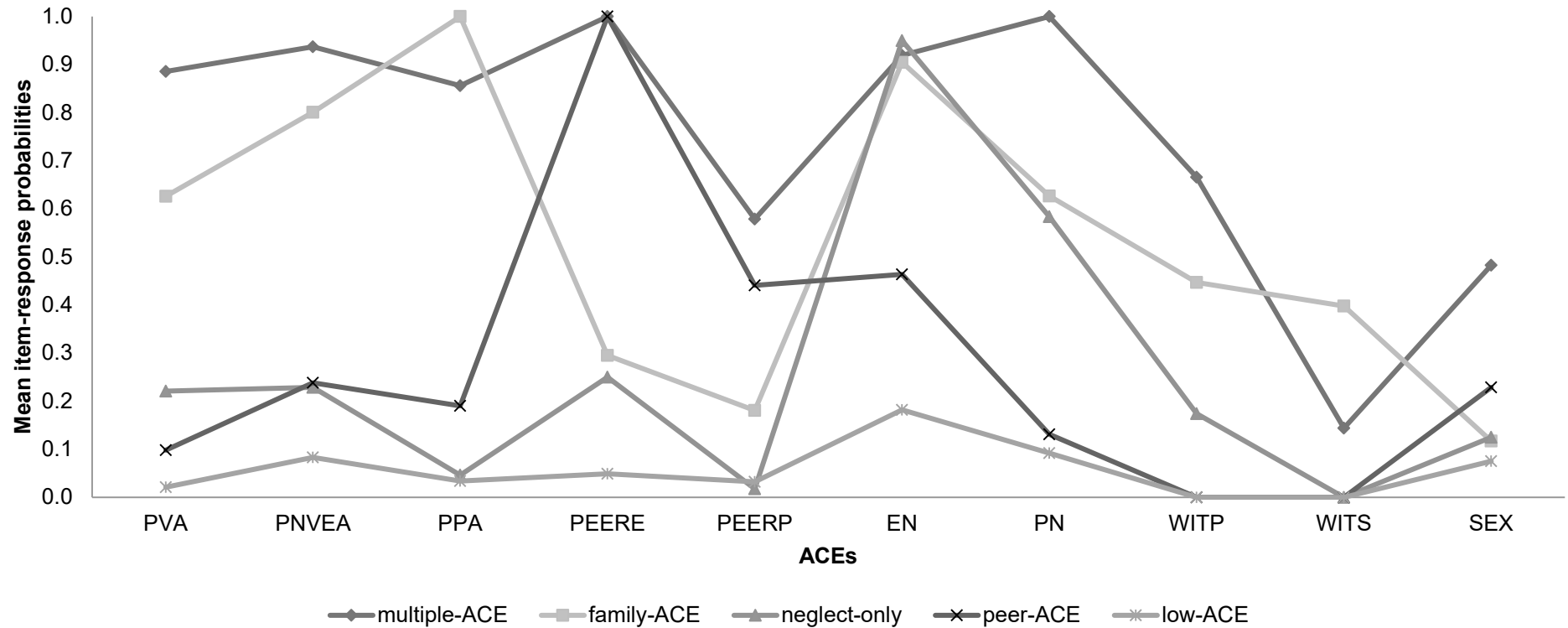
*Binary logistic regressions for penetration and choice of a child victim*

Indicators	Penetration			Child Victim		
	OR	95% CI		OR	95% CI	
		LL	UL		LL	UL
ACE subtype						
Peer-ACE	2.32*	1.13	4.76	2.84**	1.41	5.70
Neglect-only	1.57	0.70	3.54	3.79**	1.71	8.40
Family-ACE	3.66**	1.66	8.06	1.88	0.86	4.13
Multiple-ACE	2.02	0.77	5.30	3.06*	1.17	7.99
Age at index offense	0.77***	0.67	0.87	0.71***	0.62	0.83
Low SES	1.43	0.72	2.82	0.59	0.29	1.22
Foreign nationality	0.86	0.48	1.57	0.40**	0.22	0.74
Prior violent delinquency	1.30	0.58	2.92	0.22**	0.08	0.57
Cumulated ACE score	1.17**	1.05	1.31	1.14*	1.02	1.28
Age at index offense	0.77***	0.67	0.89	0.72***	0.62	0.82
Low SES	1.36	0.68	2.69	0.55	0.26	1.13
Foreign nationality	0.85	0.47	1.53	0.40**	0.22	0.72
Prior violent delinquency	1.24	0.55	2.79	0.23**	0.09	0.60

*Note.* The low-ACE subtypes served as reference group. *OR* = odds ratio, *CI* =

confidence interval, *LL* = lower limit, *UL* = upper limit.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .



*Figure 1.* Five class solution of the latent class analysis based on mean item-response probabilities. ACEs = adverse childhood experiences, PVA = parental verbal abuse, PNVEA = parental non-verbal emotional abuse, PPA = parental physical abuse, PEERE = peer emotional abuse, PEERP = peer physical bullying, EN = emotion neglect, PN = physical neglect, WITP = witnessing violence between parents, WITS = witnessing violence towards siblings, SEX = sexual victimization.