

Adverse childhood experiences and developmental outcomes in adolescents in residential care: A comparison of cumulative and person-based approaches

Lorena Maneiro

lorena.boa@iscte-iul.pt

Iscte – Instituto Universitário de Lisboa

Laura López-Romero

Universidade de Santiago de Compostela

Nerea Llerena

Universidade de Santiago de Compostela

Research Article

Keywords: ACE, Adolescents, Developmental outcomes, Cumulative risk, Latent profile analysis

Posted Date: October 9th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-11143108/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Exposure to adverse childhood experiences (ACEs) has detrimental effects on developmental outcomes, particularly among adolescents in residential care. However, previous evidence suggests that the analytic approach used to study ACEs may influence findings and shape our understanding of their impact. This study addressed this limitation by examining both cumulative and person-centred approaches and their impact on developmental outcomes across two time points in a sample of 161 adolescents (46.6% boys, 49.7% girls, 3.7% non-binary; aged 12–18, $M = 15.22$, $SD = 1.59$) placed in 24 residential facilities, of whom 47.8% were followed up eight months later. Group care workers reported on seven ACEs (family substance use, family mental health problems, family criminality, exposure to domestic violence, physical/psychological abuse, physical neglect, psychological neglect) and trauma-related symptoms, while adolescents self-reported internalizing and externalizing problems. Overall, a higher number of ACEs was associated with more negative outcomes, yet a closer examination revealed a more nuanced pattern. Latent profile analysis identified three profiles, namely Low ACEs, Moderate ACEs–High Neglect, and High ACEs–Low Neglect, with the latter two linked to more adverse outcomes than the Low ACEs group. Comparing approaches highlighted the importance of considering not only the accumulation but also the type and severity of ACEs. Findings underscore the value of combining cumulative and person-centred approaches to advance understanding of how early adversities shape adolescent development.

Introduction

Adolescents in out-of-home care (OOHC) are a highly vulnerable population, at risk of impairments and mental health problems, largely due to their exposure to early adversities (Garcia et al., 2017). Early life adversities – commonly known as adverse childhood experiences (ACEs) – can be defined *as experiences that are likely to require significant adaptation by an average child and that represent a deviation from the expectable environment* (McLaughlin, 2016, p. 364). Early life adversities are among the most intense sources of stress that children can experience, affecting not only their physical and mental health but also generating substantial financial burdens for societies worldwide (Bellis et al., 2019).

The original CDC-Kaiser study by Felitti et al. (1998) identified seven main ACEs that increased the risk of health problems. These included various forms of child abuse (psychological, physical, and sexual) and household dysfunction (e.g., living with a household member who had substance abuse problems, a mental illness, or had been incarcerated, as well as exposure to domestic violence). The list of ACEs was later expanded to include other experiences such as parental separation or divorce, emotional and physical neglect, as well as bullying, poverty, war, or the death of a parent, among others (Dong et al., 2004; WHO, 2018). These adversities rarely occur in isolation; instead, they tend to co-occur and interact in complex ways, increasing the heterogeneity of both developmental trajectories and outcomes in children and youth (Grasso et al., 2016). This complexity is even greater among adolescents in OOHC, where polyvictimization is compounded by the additional stress of being placed in care (Emmerich et al.,

2025), especially for those in residential care, who are more likely to be exposed to multiple adverse experiences across various contexts, not only within the family, but also in the community and among peers (Indias et al., 2019).

An umbrella review encompassing 99 meta-analytic studies found a significant overall effect of ACEs on a wide range of developmental outcomes, including biological system dysregulation, neuropsychological impairments, physical and mental health issues, social and behavioural challenges, and involvement with the criminal justice system, although differences were observed depending on the ACEs approach used in the studies (Kim & Royle, 2025). Studies employing a lumping approach (i.e., treating all adversities as equally impactful regardless of type) combined with a cumulative perspective, produced larger effect sizes compared to specificity (examining the individual effects of adversities), dimensional (grouping adversities into categories such as threat or deprivation), and child maltreatment–centric approaches, particularly in relation to mental health outcomes and involvement with the criminal justice system. It should be noted, however, that this umbrella review did not consider other person-centred approaches, such as cluster analysis or latent class analysis (LCA). These empirically driven methods enable the identification of distinct profiles of individuals based on the combination of their scores across multiple ACEs (Lacey & Minnis, 2020). Given the relevance of the cumulative perspective in relation to mental health as well as the importance of the person-centred perspective for adapting interventions, the present study aims to examine the relationship between both perspectives in the study of ACEs and their association with mental health in adolescents in residential care.

Cumulative Risk Approach

The cumulative risk approach is based on the premise that the greater the number of ACEs experienced, the more severe the impact on developmental outcomes (Lacey & Minnis, 2020). To investigate their cumulative effect, ACEs are typically aggregated into a single summary score. This can be done by using standardized scores or by creating a dichotomous measure of risk exposure (presence/absence) and summing the values (Evans et al., 2013). Extensive research has shown that the accumulation of ACEs is moderately to strongly associated with mental health outcomes, social and behavioural problems, and involvement in the criminal justice system (see Kim & Royle, 2025). Studies focusing specifically on adolescents in OOHC have found that they are not only exposed to a great number of adversities, but also that cumulative risk scores predicted high levels of mental health symptoms and differentiate between those who scored in the clinical range for anxiety, depression, and trauma-related symptoms (Raviv et al., 2010; Zhou et al., 2024).

Despite the utility of cumulative ACEs scores in identifying individuals at high risk for negative outcomes, this approach has several limitations. For example, it assumes that all adversities have an equal impact on development and, consequently, that all individuals will benefit from the same type of intervention, which is unlikely. Moreover, it overlooks distinct patterns of ACEs and fails to account for the possibility that specific adversities may have more detrimental effects depending on the characteristics of the individual (Evans et al., 2013; Lacey & Minnis, 2020). In fact, a recent study found that the impact of

ACEs on developmental outcomes is not necessarily linear, but curvilinear associations emerged for several outcomes in young people, including internalizing problems and recidivism, indicating that negative effects may diminish at higher levels of ACEs (Wolff et al., 2025). This finding highlights the importance of considering alternative perspectives in the study of ACEs and their impact on mental health.

Person-Centred Approaches

Notwithstanding most research on the impact of ACEs being conducted under the assumption of a dose-response relationship, some studies suggest that the type and severity of ACEs may better explain their effects on developmental outcomes rather than the mere accumulation of experiences (Wolff et al., 2025). Furthermore, studies have typically employed a variable-centred approach, which assumes that associations among variables are consistent across individuals, which is unlikely (Sisitsky et al., 2023). Consequently, empirically driven approaches have been proposed to examine how different combinations of early adversities cluster together, under the premise that each ACE may not exert an equal impact on the individual (Lacey & Minnis, 2020; Sisitsky et al., 2023). Among the most widely used person-centred methods are LCA for categorical variables and latent profile analysis (LPA) for continuous variables. Both methods estimate an underlying categorical latent variable that allows the identification of individuals who share similar patterns of exposure to various adverse events (Nylund-Gibson & Choi, 2018). Studies using LCA and LPA are relevant to the field of early life adversities because they can reveal patterns of co-occurrence among a set of ACEs and their relationships with developmental outcomes (Debowska et al., 2017).

A systematic review of studies using LCA or LPA to identify subgroups based on measures of child abuse and neglect reported that, out of 16 included studies, all but one identified three or four classes (Debowska et al., 2017). Despite differences in sample characteristics, cultural contexts, and types of child maltreatment, most studies identified at least a low-risk class and a polyvictimization class, with the latter showing higher levels of internalizing and externalizing problems. Furthermore, while some studies identified profiles that differed primarily in terms of severity (i.e., low, moderate, severe child maltreatment), others found subgroups that differed according to the type of maltreatment experienced. Three profiles were also identified in samples of children and adolescents in the child welfare system based on maltreatment typologies, namely *relative low maltreatment*, *neglected* and *severely abused and neglected* (Fernández et al., 2024). Noteworthy, no significant differences were found in health-related or school-related outcomes among profiles in the study of Fernández et al. (2024).

When considering a broad set of ACEs using exclusively samples of children and adolescents in OOHC, findings support the existence of three profiles, although results differ by study. Rebbe et al. (2017) identified a low-risk group among youth aging out of foster care as well as a complex adversity profile, characterized by high levels of all ACEs except those in the environmental categories, which formed a distinct subgroup. Differences in adult outcomes were observed among profiles, with the complex adversity group showing higher rates of mental health treatment, and the environmental group being

more likely to have been arrested. Yampolskaya et al. (2014) identified: (1) a group characterized by household dysfunction, including caregiver substance abuse and exposure to domestic violence; (2) a group defined by caregiver loss and child abuse; and (3) a group of children with complex needs, marked by exposure to multiple adversities. The complex-needs group showed the highest likelihood of emotional and behavioural problems and greater need for special care.

The use of empirically driven methods such as LCA or LPA has the advantage of identifying distinct combinations of ACEs, but these approaches are not without limitations (Lacey & Minnis, 2020). For instance, although one of their main strengths lies in the potential to inform targeted interventions, many authors argue that the resulting profiles are often difficult to transfer to and interpret in applied settings, thereby limiting their practical usefulness (Debowska et al., 2017). In addition, these methods pose methodological challenges, as they typically require large samples, and their results are often difficult to replicate or compare due to variations in the measures used and the types of ACEs included in the analyses (Lacey & Minnis, 2020).

Comparison of Cumulative and Person-Centred Approaches

A few studies have compared cumulative risk and person-centred approaches, yielding mixed findings. Overall, studies indicate that a greater number of ACEs is associated with more negative outcomes irrespective of the approach used; however, specific combinations of ACEs may also contribute to explain variance in developmental outcomes (Hales et al., 2023; Lanier et al., 2018). For example, using a community adult sample, Barboza (2018) found that the cumulative score effectively discriminated individuals at the extremes (i.e., those with very high or very low numbers of ACEs), but failed to capture the heterogeneity of individuals in the middle of the distribution. In contrast, LCA identified more specific patterns of risk. The study by Lanier et al. (2018), conducted with a community sample of children and adolescents, also support the added value of person-centred approaches, showing that certain combinations of experiences, such as caregiver mental illness and poverty, may have an impact on health comparable to that of three or more ACEs. However, some studies evidenced that the usefulness of each approach may depend on the outcome assessed, with the cumulative risk perspective explaining more variance in emotional symptoms, conduct problems, and hyperactivity, whereas the person-centred approach explained more variance in peer problems (Hales et al., 2023). Similar effects of both approaches were found in other studies (e.g., Merians et al., 2019).

The current study

Most studies to date have been conducted with samples from the general population or the broader group of children and adolescents involved in the child welfare system, with comparatively little attention paid to those in OOHC and, in particular, to adolescents in residential care. Given the high vulnerability of this population, who are exposed to a large number of ACEs and display profiles that differ from adolescents in other OOHC settings (Leloux-Opmeer et al., 2016), it is important to investigate the impact of ACEs in this context. Moreover, there is a lack of studies employing diverse methodological

approaches, which hinders a broader understanding of the impact of ACEs on development and mental health (Tzouvara et al., 2023). To address these gaps, the present study investigates the impact of both cumulative and person-centred approaches on a set of developmental outcomes (i.e., internalizing problems, externalizing problems, and trauma-related symptoms) across two time points in a sample of adolescents in residential care. Based on previous research, we hypothesize that: (1) adolescents exposed to a greater number of ACEs will show higher scores on all developmental outcomes; (2) distinct subgroups of adolescents will emerge according to their exposure to ACEs, differing in both the type and severity of adversities experienced; and (3) adolescent developmental outcomes will be better understood when considering both cumulative risk and person-centred approaches. The findings will shed light into the utility of these two distinct approaches, clarifying whether they are equally effective or offer complementary insights in explaining developmental outcomes. This is particularly relevant in the context of residential care, as such results could help guide how best to respond to the needs of adolescents placed in OOHC.

Method

Participants

The sample of study was drawn from the VRINEP project (Risk and Needs in the Child Protection System), a longitudinal study aimed at disentangling profiles and developmental trajectories of children and adolescents in residential care. The initial sample included 161 adolescents (46.6% boys, 49.7% girls, 3.7% non-binary gender), aged 12 to 18 years old ($M = 15.22$, $SD = 1.59$), who were placed in 24 residential facilities in Galicia (NW Spain). In this study, residential care referred exclusively to living arrangements managed or supported by the Child Protection System for children and adolescents who could not remain with their families due to various reasons, including abandonment or neglect (22.4%), severe behavioural problems (15.5%), parental incapacity to fulfil responsibilities (12.4%), or situations that placed the child's life at risk (8.1%). Among the participating facilities, 13 were group homes (maximum capacity of 8 children), 4 were small residential facilities (maximum capacity of 15 children), 4 were residential care centres with integrated independent living units (organized into units of up to 10 places each), and 3 were therapeutic residential care facilities (specialized in supporting young people with mental health difficulties or severe behavioural problems). At T1, 48 adolescents had been living in the residential facility for more than 24 months, 30 for 12–24 months, 36 for 6–12 months, 22 for 1–6 months, and 2 for less than 1 month. Data on length of stay were not available for the remaining participants. The mean age of participants at their first contact with the Child Protection System was 10.77 years ($SD = 4.51$).

A total of 77 adolescents were followed up after 8 months (53.2% boys, 45.5% girls, and 1.3% non-binary youth), aged 12 to 18 ($M = 15.19$, $SD = 1.49$). Of these, 71.4% were living in the same residential facility as at T1 ($n = 55$), 6.5% had been placed in a different residential care facility ($n = 5$), and 5.2% had been reunified with their birth families ($n = 4$). One adolescent was in foster care, another in a residential facility for care leavers, and the remaining participants did not report their placement. Attrition was partly

due to changes in placement, as at least 54% of participants with missing data at T2 were no longer in the same facility as at T1. There were no significant differences between adolescents who participated in the follow-up and those who did not with respect to family substance abuse ($\chi^2 = .00, p = .991$), family mental health issues ($\chi^2 = .28, p = .594$), family criminality ($\chi^2 = .27, p = .603$), exposure to domestic violence ($F = 1.13, p = .289$), physical and psychological abuse ($F = 1.11, p = .744$), physical neglect ($F = 0.08, p = .781$), psychological neglect ($F = 0.04, p = .850$), externalizing problems at T1 ($F = 0.22, p = .644$), and internalizing problems at T1 ($F = 0.00, p = .985$). However, significant differences were found in trauma-related symptoms at T1 ($F = 4.49, p < .05$), with adolescents who did not participate at T2 reporting higher trauma-related symptoms.

Variables and Measures

Child maltreatment at T1. Child maltreatment was assessed by group care workers using the Spanish translation of the Child Maltreatment Severity Questionnaire (MSQ; Calheiros et al., 2021), a validated instrument specifically designed to be completed by professionals working in the Child Protection System. This questionnaire is composed of 18 items that encompass three types of child maltreatment, including physical and psychological abuse (4 items; e.g., “aggressive verbal interaction”, $\alpha = .83$), physical neglect (8 items; e.g., “physical hygiene and well-being”, $\alpha = .86$), and psychological neglect (6 items; e.g., “relationship with attachment figures”, $\alpha = .79$). These items assess the severity of maltreatment using five levels of descriptors from 1 (*unknown/none of the severity descriptions has occurred*) to 5 (*extremely severe*).

Household dysfunction at T1. Among the seven ACEs considered in the study, four referred to experiences related to household dysfunction, which were assessed using the Adverse Childhood Experiences International Questionnaire (ACE-IQ, WHO, 2018). Group care workers indicated the presence or absence of family substance use, family mental health problems, and family criminality using three items (1 item each) that were rated using a yes/no response option. In the case of exposure to domestic violence, this was assessed by means of 3 items (e.g., “did he/she see or hear a parent or household member in his/her home being yelled at, screamed at, sworn at, insulted or humiliated?”, $\alpha = .92$), responded using a four-point scale from 0 (*never*) to 3 (*often*).

Trauma-related symptoms at T1 and T2. Trauma-related symptoms encompass a range of mental health difficulties commonly observed in children and young people in OOHC who were exposed to child maltreatment and other severe interpersonal adversities (Tarren-Sweeney, 2013). This symptomatology was assessed by group care workers using the Spanish version of the Assessment Checklist for Adolescents-Short Form (ACA-SF, Maneiro et al., 2025). This scale is composed of 37 items grouped into seven factors to assess: 1) Non-reciprocal Behaviour (6 items; e.g., “Does not show affection”), Social Instability (4 items; e.g., “craves affection”), Emotional Dysregulation/Distorted Social Cognition (5 items; e.g., “uncontrollable rage”), Dissociation/Trauma Symptoms (9 items; e.g., “appears dazed, ‘spaced out’”), Food Maintenance (5 items; e.g., “eats secretly”), Sexual Behaviour (5 items; e.g., “seems overly

preoccupied with sex”), and Pseudomature Behaviour (3 items; e.g., “Precocious [talks or behaves like an adult]”). Items were rated on a three-point scale, ranging from 0 (*not true/did not occur*) to 2 (*mostly true/occurred more than once*). For the purposes of the current study, the total score was used, with internal consistency of $\alpha = .85$ both at T1 and at T2.

Internalizing and externalizing problems at T1 and T2. Adolescents self-reported on their internalizing and externalizing problems using the Spanish version of the Social Skills Improvement System Rating Scales (SSIS-RS, Gresham & Elliott, 2008). The two subscales of internalizing (10 items; e.g., “I am afraid of many things”) and externalizing symptoms (12 items; e.g., “I get into fights with others”) were rated using a four-point scale that ranged from 0 (*never*) to 3 (*almost always*). The internal consistency was good for internalizing problems (α T1 = .86, α T2 = .88) and externalizing problems (α T1 = .87, α T2 = .89).

Procedure

This study was approved by the Ethics Board of [blinded for peer review] and the Directorate of the Child Protection System of [blinded for peer review]. After approval, 31 of the 49 residential care facilities in Galicia that met the study eligibility criteria at the time of recruitment were contacted by phone. Information letters were sent by mail, followed by online meetings with the heads of the facilities and group care workers. Of these, 24 centres (49% of all facilities of this type in Galicia) agreed to participate. Group care workers were asked to explain the project to adolescents and invite those meeting the inclusion criteria to participate. Inclusion criteria were: (a) being younger than 18 years old, (b) speaking Spanish, and (c) not having an intellectual disability that could hinder comprehension of the research. Legal guardians were required to provide active consent. For adolescents under the guardianship of Child Protection Delegations, consent was provided by the Delegates, which also assisted in obtaining consent from the legal guardians of children under their custody. At T1, 161 adolescents from 22 centres agreed to participate, out of 340 residents in those facilities. Among the 340 children and adolescents residing in these facilities, 71 did not meet the study’s inclusion criteria, 95 met the criteria but declined to participate, and 7 did not provide information. Consequently, of the 269 eligible participants, 161 adolescents agreed to participate. This represents 59.9% of those approached and 20.7% of the total population of children and adolescents in RC in Galicia in 2022 ($n = 778$) (Consellería de Política Social y Juventud, Dirección General de Familia, Infancia y Dinamización Demográfica, 2023).

Data collection involved two online questionnaires: one completed by group care workers and another by adolescents. Questionnaires were securely linked using a strong password connected to the adolescent’s case file number. Before completing the questionnaires, participants read the project information and assented to participate. Confidentiality was ensured, and only the research team had access to the data.

As an incentive, two giveaways of five smartwatches each were held among adolescents who completed questionnaires at T1 and T2.

Data analysis

The cumulative ACE score was computed by summing the presence or absence of seven adversities: family substance use, family mental health problems, family criminality, exposure to domestic violence, physical/psychological abuse, physical neglect, and psychological neglect. For exposure to domestic violence, scores of 0 or 1 were recoded as absence, and scores of 2 or 3 as presence. For the Child Maltreatment Questionnaire, scores of 1 or 2 were recoded as absence, whereas scores above 2 were recoded as presence. Based on these scores, five categorical variables were created in SPSS v.29 to represent the number of ACEs experienced: 0, 1, 2, 3, and ≥ 4 ACEs. Although seven ACEs were considered, the small number of adolescents who experienced all seven led us to combine cases of four or more adversities into a single category. To examine differences in developmental outcomes at T1 and T2 (internalizing problems, externalizing problems, and trauma-related symptoms) across cumulative ACE categories, a one-way ANOVA was conducted, using Bonferroni coefficient for post-hoc comparisons.

A series of LPAs were conducted using the seven standardized ACE scores as indicators. Four models, ranging from one to four profiles, were estimated in Mplus 8 (Muthén & Muthén, 1998–2017). The optimal solution was selected based on both empirical and theoretical criteria. Fit indices included the Akaike Information Criterion (AIC), the Sample-Size Adjusted Bayesian Information Criterion (ABIC), and entropy, with lower AIC and ABIC values and entropy values closer to 1 indicating better fit. In addition, the Bootstrap Likelihood Ratio Test (BLRT) was applied to assess whether each k-class model significantly improved the fit relative to the model with one fewer class. Group differences in the LPA indicators were examined in SPSS using one-way ANOVA with Bonferroni post-hoc comparisons. Differences in developmental outcomes at T1 and T2 were analysed in Mplus using the BCH method, a three-step procedure appropriate for continuous covariates as distal outcomes.

Results

Impact of the Cumulative Risk Approach on Developmental Outcomes

A total of 138 participants had complete data on variables reported by group care workers at T1, including ACEs and trauma-related symptoms. Of these, 9.2% did not experience (or were not reported to have experienced) any early adversity ($n = 13$); 7.2% experienced one ACE ($n = 10$); 12.3% experienced two ACEs ($n = 17$); 17.4% experienced three ACEs ($n = 24$); and 53.6% experienced four or more ACEs ($n = 74$). The sample distribution was similar at T2, with 63 adolescents having complete data on care worker-reported variables. Among them, 11.1% had not experienced any ACEs ($n = 7$), 9.5% had experienced one ACE ($n = 6$), 12.7% had experienced two ACEs ($n = 8$), 11.1% had experienced three

ACEs ($n = 7$), and 55.6% had experienced four or more ACEs ($n = 35$). Regarding self-reported data, 107 participants with complete information on ACEs also completed their questionnaires on internalizing and externalizing problems at T1. Among them, 6.5% did not experience (or did not report) any early adversity ($n = 7$); 5.6% experienced one ACE ($n = 6$); 11.2% experienced two ACEs ($n = 12$); 17.8% experienced three ACEs ($n = 19$); and 58.9% experienced four or more ACEs ($n = 63$). A total of 57 participants had complete self-reported data at T2, of whom 10.5% were categorized as having zero ACEs ($n = 6$), 7.0% as having one ACE ($n = 4$), 14.1% as having two ACEs ($n = 8$), 12.3% as having three ACEs ($n = 7$), and 56.1% as having four or more ACEs ($n = 32$).

The results of the ANOVAs comparing cumulative ACE scores on developmental outcomes are presented in Table 1.

Table 1
Differences in Developmental Outcomes by Cumulative ACE Score

Developmental outcome	Range	Cumulative ACE score					<i>F</i>	η_p^2
		<i>M (SD)</i>						
		0 ACEs	1 ACE	2 ACEs	3 ACEs	4 + ACEs		
T1								
Externalizing Problems	.08-2.92	0.90 _a (0.77)	0.82 _a (0.64)	1.05 _a (0.51)	1.02 _a (0.52)	1.35 _a (0.60)	2.69*	.10
Internalizing Problems	.10 – 3.00	1.00 _a (0.57)	0.80 _a (0.49)	1.29 _a (0.80)	1.17 _a (0.56)	1.43 _a (0.71)	1.91	.07
Trauma-related symptoms	00-1.22	0.28 _a (0.19)	0.30 _a (0.22)	0.44 _{ab} (0.25)	0.39 _a (0.17)	.57 _b (0.27)	7.03***	.18
T2								
Externalizing Problems	.00-2.55	0.63 _a (0.33)	0.73 _a (0.42)	1.22 _a (0.88)	0.89 _a (0.51)	1.24 _a (0.53)	2.29	.15
Internalizing Problems	.10 – 3.00	0.90 _a (.42)	0.63 _a (0.63)	1.59 _a (0.93)	0.94 _a (0.62)	1.52 _a (0.62)	3.41*	.21
Trauma-related Symptoms	.03-1.05	0.36 _a (0.16)	0.19 _a (0.11)	0.34 _a (.16)	0.43 _a (0.34)	0.45 _a (0.21)	2.16	.13
Note. Means with different subscripts (a, b) are significantly different at <i>p</i> < .05.								
* <i>p</i> < .05; *** <i>p</i> < .001								

Differences in Developmental Outcomes by Cumulative ACE Score

At a descriptive level, participants exposed to four or more ACEs scored higher on all developmental outcomes, except for internalizing problems at T2. However, the mean cumulative ACE score did not increase linearly, as adolescents exposed to more adversities did not necessarily show worse outcomes compared to those exposed to fewer. Significant differences across cumulative risk scores were found for externalizing problems and trauma-related symptoms at T1, and for internalizing problems at T2. Post-hoc comparisons, however, revealed significant subgroup differences only in trauma-related symptoms at T1. Specifically, adolescents exposed to four or more ACEs reported higher levels of trauma-related symptoms compared to participants in all categories, except those who experienced two ACEs.

Identification of Subgroups Based on ACEs

Model fit indices for the 1- to 4-class models are presented in Table 2. Although the 4-class solution yielded the best statistical fit, it was discarded because the best loglikelihood value was not replicated despite increasing the number of random starts. The 3-class solution was therefore selected as the most appropriate, as it showed lower AIC, BIC, and ABIC values and improved the fit relative to the 2-class model. In addition, the 3-class model achieved high entropy (close to 1), and was theoretically interpretable. Figure 1 presents the response patterns for the three classes across the ACE indicators.

Table 2
Fit Indices for Latent Profile Models

Number of classes	AIC	BIC	ABIC	BLRT	Entropy
1	2889.79	2730.77	2686.48	-	-
2	2528.64	2593.04	2523.44	-1330.89***	.87
3	2409.82	2497.64	2402.73	-1242.32***	.92
4	2288.95	2400.19	2279.97	-1161.19***	.97
*** $p < .001$					

Z-Mean Scores for the Three-class Solution

Class 1 (57.2%), labelled *Low ACEs*, showed consistently low scores across all indicators. Class 2 (16%) was labelled as *Moderate ACEs–High Neglect*, displayed scores around the mean for household dysfunctions (i.e., family substance abuse, mental health problems, and criminality), slightly above the mean for exposure to domestic violence and physical/psychological neglect, and the highest scores specifically on neglect. Class 3 (26.8%), labelled *High ACEs–Low Neglect*, was the largest subgroup and was characterized by the highest scores across most ACEs, except for neglect, which scored around the mean. Of the 77 participants who participated in the follow-up assessment (T2), 36 were classified in the Low ACEs group at T1 (54.5%), 13 in the Moderate ACEs–High Neglect group (19.7%), and 17 in the High ACEs–Low Neglect group (25.8%). The results indicated that there were no significant differences in the

distribution of profile membership between adolescents who were retained at T2 and those with missing data at T2 ($\chi^2 = 1.332$; $p = .514$).

The differences among subgroups in LPA indicators are presented in Table 3.

Table 3
Differences Among Subgroups in the LPA Indicators

Family substance use	Range	Low ACEs ($n = 79$)	Moderate ACEs-High Neglect ($n = 22$)	High ACEs-Low Neglect ($n = 37$)	F	η_p^2
	0–1	0.49 _a (0.50)	0.45 _a (0.50)	0.84 _b (0.37)	7.74***	.11
Family mental health problems	0–1	0.45 _a (0.50)	0.54 _{ab} (0.51)	0.81 _b (0.40)	7.27***	.10
Family criminality	0–1	0.13 _a (0.34)	0.23 _{ab} (0.43)	0.47 _b (0.51)	8.64***	.12
Exposure to domestic violence	0–3	0.42 _a (0.63)	2.02 _b (0.94)	2.48 _c (0.48)	136.70***	.68
Physical/psychological abuse	1–4	1.08 _a (0.16)	1.80 _b (0.74)	2.29 _c (0.87)	65.16***	.50
Physical neglect	1–4	1.18 _a (0.25)	2.84 _b (0.59)	1.34 _a (0.34)	203.94***	.75
Psychological neglect	1–3.83	1.44 _a (0.50)	2.93 _c (0.61)	1.88 _b (0.68)	60.17***	.50
Note. Means with different subscripts (a, b, c) are significantly different at $p < .05$.						
*** $p < .001$						

Significant differences were observed across all seven ACEs included as indicators. The three profiles differed significantly in exposure to domestic violence, physical/psychological abuse, and psychological neglect. In all cases, the Low ACEs subgroup showed the lowest scores. The High ACEs–Low Neglect subgroup scored significantly higher than the others in domestic violence and physical/psychological abuse, whereas the Moderate ACEs–High Neglect subgroup obtained the highest scores in psychological neglect. For household dysfunction (i.e., family substance abuse, mental health problems, and criminality), significant differences were found between the Low ACEs and the High ACEs–Low Neglect subgroups. Additionally, the Moderate ACEs–High Neglect subgroup significantly differed from the High ACEs–Low Neglect subgroup in family substance abuse, with the latter showing the highest

scores. Finally, for physical neglect, the Moderate ACEs–High Neglect subgroup obtained the highest scores, significantly differing from the other two subgroups.

Impact of the Person-Based Approach on Developmental Outcomes

Table 4 presents mean scores for each profile across developmental outcomes at T1 and T2. Significant subgroup differences emerged for trauma-related symptoms at both T1 and T2, and for internalizing problems at T2. At T1, the Moderate ACEs–High Neglect and High ACEs–Low Neglect subgroups reported higher trauma-related symptoms than the Low ACEs profile, although they did not differ significantly from each other. At T2, only the Moderate ACEs–High Neglect subgroup scored higher than the Low ACEs group in trauma-related symptoms. For internalizing problems at T2, only the High ACEs–Low Neglect subgroup scored significantly higher than the Low ACEs profile. No significant differences were found in externalizing problems among profiles of ACEs.

Table 4
Comparisons Among Subgroups in Developmental Outcomes

T1	Low ACEs	Moderate ACEs-High Neglect	High ACEs-Low Neglect	χ^2
Externalizing Problems	1.15 _a (.09)	1.24 _a (.12)	1.26 _a (.11)	.63
Internalizing Problems	1.20 _a (.09)	1.21 _{ab} (.16)	1.56 _b (.14)	4.34
Trauma-related symptoms	0.40 _a (.03)	0.53 _b (.04)	0.61 _b (.06)	14.37***
T2				
Externalizing Problems	0.95 _a (.13)	1.36 _b (.12)	1.16 _{ab} (.13)	5.37
Internalizing Problems	1.10 _a (.13)	1.44 _{ab} (.17)	1.69 _b (.18)	7.07*
Trauma-related symptoms	0.33 _a (.04)	0.50 _b (.06)	0.45 _{ab} (.06)	6.76*
Note. Means with different subscripts (a, b, c) are significantly different at $p < .05$.				
* $p < .05$; *** $p < .001$				

Sensitivity Analyses

To assess the robustness of the results given the high attrition rate, the LPA was re-estimated using data only from adolescents who were retained at T2, and the model was compared with the original three-profile solution. Specifically, the LPA was estimated with a sample of 66 adolescents with available data on all seven ACE indicators. The results showed that the three-profile solution was consistent with the solution obtained in the full sample, with a similar distribution of participants across the profiles: 1) Low ACEs (62%), 2) Moderate ACEs–High Neglect (18%), and 3) High ACEs–Low Neglect (20%). The model fit indices were AIC = 1188.10, BIC = 1253.79, ABIC = 1159.35, BLRT = 64.50***, and Entropy = .97. We then examined whether the identified profiles differed in the outcome variables. Although significant differences were found in trauma-related symptoms at T1 and externalizing problems at T2, the pattern of differences across profiles was consistent with that identified in the original analyses. Specifically, the Low ACEs profile showed the lowest scores across all outcomes, whereas the High ACEs–Low Neglect profile showed the highest scores on internalizing problems and trauma-related symptoms at T1, as well as on internalizing problems at T2. On the other hand, the Moderate ACEs–High Neglect subgroup showed higher scores on externalizing problems and trauma-related symptoms at T2. For externalizing problems at T1, the Moderate ACEs–High Neglect and High ACEs–Low Neglect subgroups obtained the same mean score.

Comparison Between Cumulative Risk and Person-Based Approaches

A crosstab was used to compare participants classified according to the cumulative and person-centred approaches. The distribution of the sample is presented in Table 5.

Table 5
Sample Distribution According to Cumulative Risk and Person-Based Approaches

Low ACEs	0 ACE	1 ACE	2 ACEs	3 ACEs	≥ 4 ACEs	Total
	13 (16.5%)	10 (12.7%)	15 (19%)	22 (27.8)	19 (24.1%)	79 (100%)
Moderate ACEs-High Neglect	0	0	1 (4.5%)	1 (4.5%)	20 (90.9%)	22 (100%)
High ACEs-Low Neglect	0	0	1 (2.7%)	1 (2.7%)	35 (94.6%)	37 (100%)

More than 90% of adolescents in the Moderate ACEs–High Neglect and High ACEs–Low Neglect profiles were exposed to four or more ACEs, and none were categorized as having zero or one ACE. In contrast, the distribution within the Low ACEs profile was more heterogeneous, with cumulative risk scores more evenly distributed across categories. The largest category within Low ACEs comprised adolescents exposed to three ACEs while the smallest comprised those exposed to one ACE.

Discussion

This study sought to contribute to the growing body of research on ACEs and their impact on development and mental health by examining how two commonly used approaches (i.e., the cumulative risk and the person-centred approaches) help explain developmental outcomes in an understudied group of adolescents in residential care. Overall, our findings indicate that adolescents exposed to four or more ACEs reported higher levels of externalizing problems, internalizing problems, and trauma-related symptoms, both concurrently and longitudinally (with the exception of internalizing problems at T2). However, significant pairwise differences emerged only for trauma-related symptoms, suggesting a more nuanced picture of the effects of cumulative ACEs. Using a person-centred approach, the LPA identified three distinct profiles based on exposure to seven ACEs, encompassing both household dysfunction and child maltreatment. These profiles were labelled Low ACEs, Moderate ACEs–High Neglect, and High ACEs–Low Neglect, with the latter two groups exhibiting the most adverse developmental outcomes.

Cumulative Risk and Impact on Developmental Outcomes

In this sample, more than half of the adolescents had experienced four or more ACEs, consistent with previous studies reporting high rates of polyvictimization among young people in residential care (Fernández-Artamendi et al., 2020; Indias et al., 2019). This finding is expected given the commonly observed co-occurrence of early adversities, particularly in vulnerable populations (Grasso et al., 2016). Overall, adolescents exposed to a greater number of ACEs showed higher levels of negative outcomes, partially supporting the first hypothesis. With the exception of internalizing problems at T2, all developmental outcomes were higher among adolescents exposed to four or more ACEs. This result aligns with Barboza (2018), who found that the cumulative perspective was particularly useful in distinguishing individuals with extreme levels of adversity. However, post hoc comparisons revealed significant differences only for trauma-related symptoms at T1. The lack of significant differences in the other outcomes may reflect the small size of some subgroups, which in certain cases included fewer than ten participants. Alternatively, it may support previous findings suggesting that the predictive value of the cumulative approach varies depending on the outcome assessed (Hales et al., 2023). Following this line, the cumulative approach may be more effective in explaining trauma-related symptoms than externalizing or internalizing problems. It should be noted that adolescents exposed to four or more ACEs did not differ significantly from those exposed to two ACEs, and the increase in mean score in most negative outcomes, especially internalizing problems, was not linear. This finding is consistent with Wolff et al. (2025), who found that the negative effects of ACEs may diminish at higher levels of exposure, particularly for internalizing problems.

Person-based Profiles and Impact on Developmental Outcomes

The results support the second hypothesis, which predicted that distinct subgroups could be identified using LPA. In line with previous research (Debowska et al., 2017), three profiles were identified: Low

ACEs, Moderate ACEs–High Neglect, and High ACEs–Low Neglect. These profiles were characterized by experiences of household dysfunction (e.g., family substance abuse, mental health problems, criminality, and exposure to domestic violence) and child maltreatment (e.g., physical/psychological abuse, physical neglect, and psychological neglect). Unlike some studies that identified distinct subgroups that mainly differed quantitatively, including a group with the highest scores across all ACEs (Debowska et al., 2017), our results did not reveal such a profile. Instead, the three groups were qualitatively distinct from each other, with the largest differences observed in exposure to domestic violence and child maltreatment, particularly physical/psychological abuse, physical and psychological neglect. This is not surprising as these variables were measured using Likert-type scales rather than dichotomous scores.

Despite comparisons with previous studies are not straightforward due to differences in sample characteristics, measures, and the specific ACEs assessed, the subgroups found in the current study resemble, to some extent, those identified by Fernández et al. (2024) among children and adolescents in the Child Protection System, who found a low-ACE group and two groups differing primarily in neglect, although they did not report differences in health- or school-related outcomes. In contrast, we found significant differences in trauma-related symptoms and internalizing problems, possibly because these outcomes are more strongly linked to these profiles in this particular population. With respect to trauma-related symptoms, both the Moderate ACEs–High Neglect and the High ACEs–Low Neglect groups scored higher than the Low ACEs group, although they did not differ significantly from one another. It should also be noted that the Low ACEs and High ACEs–Low Neglect profiles did not differ in measures of physical neglect. This suggests that trauma-related symptoms may stem primarily from interpersonal adversities such as physical and psychological abuse, regardless of the presence of neglect, as found in prior research (e.g., Maneiro et al., 2025). Thus, severe physical and psychological abuse, alone or in combination with other adversities may drive increases in trauma-related symptoms, as also indicated in the cumulative results. The only exception was observed in the High ACEs–Low Neglect group at T2, which did not significantly differ from the Low ACEs group in trauma-related symptoms. This result may reflect a reduction in mean trauma-related symptoms over time in this subgroup, potentially due to attrition effects or to interventions received, since this group showed the highest risk across most ACEs and may therefore have been more likely to access treatment. Finally, regarding internalizing problems at T2, the High ACEs–Low Neglect group scored significantly higher than the Low ACEs group, further highlighting the vulnerability of this profile.

Comparison of the Cumulative and Person-based Approaches

The third hypothesis, which proposed that developmental outcomes would be better understood when considering both cumulative risk and person-centred approaches, was supported. The present results align with prior studies which show that while the accumulation of ACEs is associated with worse outcomes, a person-centred approach helps disentangle the heterogeneity of developmental trajectories (Hales et al., 2023; Lanier et al., 2018). Our findings indicate that adolescents with more ACEs generally

displayed poorer outcomes; however, when both approaches are compared, the person-centred perspective provides additional insight into how early adversities shape development. For example, the Low ACEs subgroup identified through LPA included adolescents spanning several cumulative risk categories. Indeed, more than half of the adolescents in this subgroup had experienced at least three ACEs, yet it was this group that displayed the most favourable psychosocial functioning. Therefore, these findings suggest that the simple accumulation of ACEs does not necessarily predict poorer outcomes.

Another important contribution of integrating both approaches is that it shows how measurement decisions influence associations of early adversities with developmental outcomes. In our study, ACEs were dichotomized for the cumulative analysis, but standardized scores were used for the person-centred approach. The latter appeared particularly useful for count variables such as exposure to domestic violence and child maltreatment. It should be noted that the child maltreatment measures included descriptors of severity, with higher scores reflecting more severe experiences of physical and psychological abuse, and physical and psychological neglect. The LPA results showed that all three subgroups included adolescents exposed to multiple ACEs, however, it seems that the severity and type of these experiences, particularly neglect, better differentiated profiles, as also suggested by Wolff et al. (2025). Therefore, rather than the mere accumulation of adversities, the type and severity of ACEs may be more informative in explaining their impact on developmental outcomes.

Limitations

The current findings should be interpreted in light of several limitations. First, the sample size was relatively small. This may have influenced both the distribution of participants across cumulative ACE categories and the identification of latent profiles, some of which included only a very small number of adolescents. Recruitment of this population is often subject to institutional procedures, ethical requirements, and the availability of eligible adolescents within residential care settings, which can substantially constrain sample sizes. Despite these challenges, research involving adolescents in residential care remains essential, as they are frequently underrepresented in developmental and mental health research despite their heightened exposure to adverse experiences and their specific needs. Although our sample size was relatively small, there are no universally agreed-upon guidelines regarding the minimum sample size required to conduct LPA. Methodological research has emphasized that the ability to identify and recover latent profiles depends not only on the overall sample size, but also on factors such as the number and relative size of the profiles and, importantly, the degree of separation between them. For example, Nylund and Choi (2018) suggested that simple models with well-separated classes may yield reliable results with samples as small as 30. Similarly, Tein et al. (2013) found that the effect of sample size on the power to detect latent classes was relatively small compared with other factors, particularly the degree of separation between latent classes. In our study, several indicators of the three-profile solution suggested good profile differentiation and classification quality, supporting the interpretability and potential usefulness of the identified profiles. In addition, the high attrition rate may have affected the associations between ACEs and developmental outcomes. Specifically, adolescents

who dropped out of the study scored higher on trauma-related symptoms, which may have contributed to the absence of significant differences between the High ACEs–Low Neglect and Low ACEs subgroups on this variable. Nevertheless, the sensitivity analysis reproduced the three-profile structure and provided some support for the stability of the profiles.

Second, although the proportion of adolescents in residential care included in this study was high relative to the region, the sample cannot be considered representative of the broader population of adolescents in residential care. Moreover, the focus on adolescents in residential care restricts comparability with prior research, which has more often examined broader samples of children and young people in out-of-home care or the child welfare system. Finally, all ACEs were reported by group care workers, which may underestimate the actual number and severity of adversities experienced by adolescents. Given these limitations, future longitudinal studies with larger samples are needed. Such research should not only include different types of out-of-home placements but also examine the impact of ACEs on developmental outcomes using both cumulative and person-centered approaches.

Conclusions

This study contributes to the understanding of how adverse childhood experiences impact adolescents in residential care by examining both cumulative risk and person-centred approaches. Overall, the findings highlight that while greater exposure to ACEs is generally associated with poorer developmental outcomes, particularly trauma-related symptoms, the accumulation of adversities does not fully explain the variability in outcomes. The identification of distinct profiles from a person-based approach underscores the relevance of considering both the type and severity of ACEs, with neglect emerging as a key factor in differentiating subgroups. These results suggest that the integration of cumulative and person-centred perspectives provides a more nuanced understanding of how early adversities shape psychosocial functioning.

Declarations

Clinical trial number: not applicable

Consent to participate. Informed consent was obtained from all individual participants included in the study and from adolescents' legal guardians.

Consent for publication. The participants provided informed consent for the publication of the results obtained from the data collected as part of this research project.

Competing Interests. Authors have no conflicts of interest to disclose.

Author Contributions. Author 1: conceptualization, methodology, investigation, formal analysis, writing – original draft, writing – review and editing; Author 2: investigation, writing – original draft, writing – review and editing; Author 3: methodology, formal analysis, writing – original draft.

Availability of Data and Materials. Due to the characteristics of the sample and the sensitive nature of the data, the dataset cannot be made openly accessible e but metadata will be available upon request.

References

1. Barboza, G. E. (2018). Latent classes and cumulative impacts of adverse childhood experiences. *Child Maltreatment*, 23(2), 111–125. <https://doi.org/10.1177/1077559517736628>
2. Bellis, M. A., Hughes, K., Ford, K., Rodriguez, G. R., Sethi, D., & Passmore, J. (2019). Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *The Lancet Public Health*, 4(10), e517–e528.
3. Calheiros, M. M., Silva, C. S., & Magalhães, E. (2021). Child Maltreatment Severity Questionnaire (MSQ) for professionals: Development, validity, and reliability evidence. *Assessment*, 28(5), 1397–1417. <https://doi.org/10.1177/1073191119890030>
4. Debowska, A., Willmott, D., Boduszek, D., & Jones, A. D. (2017). What do we know about child abuse and neglect patterns of co-occurrence? A systematic review of profiling studies and recommendations for future research. *Child Abuse & Neglect*, 70, 100–111. <https://doi.org/10.1016/j.chiabu.2017.06.014>.
5. Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., Loo, C. M., & Giles, W. H. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse & Neglect*, 28(7), 771–784. <https://doi.org/10.1016/j.chiabu.2004.01.008>
6. Emmerich, O. L. M., Heinrichs, N., Wagner, B., & van Noort, B. M. (2025). Poly-victimization and post-traumatic stress symptoms in care experienced youth: the mediating role of mentalizing. *European Journal of Psychotraumatology*, 16(1), 2526301. <https://doi.org/10.1080/20008066.2025.2526301>
7. Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological bulletin*, 139(6), 1342–1396. <https://doi.org/10.1037/a0031808>
8. Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACES) Study. *American Journal of Preventive Medicine*, 14(4), 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
9. Fernández, I., Malonda-Vidal, E., Navarro-Pérez, J. J., & Llorca, A. (2024). Child Maltreatment Profiles among Children and Adolescents in the Spanish Child Welfare System. *Child Indicators Research*, 17(4), 1829–1849. <https://doi.org/10.1007/s12187-024-10138-1>
10. Fernández-Artamendi, S., Águila-Otero, A., Valle, D., J. F., & Bravo, A. (2020). Victimization and substance use among adolescents in residential child care. *Child Abuse & Neglect*, 104, 104484. <https://doi.org/10.1016/j.chiabu.2020.104484>
11. Garcia, A. R., Gupta, M., Greeson, J. K., Thompson, A., & DeNard, C. (2017). Adverse childhood experiences among youth reported to child welfare: Results from the national survey of child & adolescent wellbeing. *Child Abuse & Neglect*, 70, 292–302. <https://doi.org/10.1016/j.chiabu.2017.06.019>

12. Grasso, D. J., Dierkhising, C. B., Branson, C. E., Ford, J. D., & Lee, R. (2016). Developmental patterns of adverse childhood experiences and current symptoms and impairment in youth referred for trauma-specific services. *Journal of abnormal child psychology*, 44(5), 871–886. <https://doi.org/10.1007/s10802-015-0086-8>
13. Gresham, A. F., & Elliott, S. N. (2008). *Social skills improvement system (SSIS) rating scales*. Pearson Assessments.
14. Hales, G., Debowska, A., Rowe, R., Boduszek, D., & Levita, L. (2023). Comparison of person-centered and cumulative risk approaches in explaining the relationship between adverse childhood experiences and behavioral and emotional problems. *Journal of Interpersonal Violence*, 38(13–14), 8065–8087. <https://doi.org/10.1177/08862605231153877>
15. Indias, S., Arruabarrena, I., & De Paúl, J. (2019). Child maltreatment, sexual and peer victimization experiences among adolescents in residential care. *Children and Youth Services Review*, 100, 267–273. <https://doi.org/10.1016/j.childyouth.2019.03.014>
16. Kim, B., & Royle, M. (2025). Annual Research Review: Mapping the multifACEsted approaches and impacts of adverse childhood experiences—an umbrella review of meta-analyses. *Journal of Child Psychology and Psychiatry*, 66(4), 399–416. <https://doi.org/10.1111/jcpp.14022>
17. Lacey, R. E., & Minnis, H. (2020). Practitioner review: twenty years of research with adverse childhood experience scores—advantages, disadvantages and applications to practice. *Journal of Child Psychology and Psychiatry*, 61(2), 116–130. <https://doi.org/10.1111/jcpp.13135>
18. Lanier, P., Maguire-Jack, K., Lombardi, B., Frey, J., & Rose, R. A. (2018). Adverse childhood experiences and child health outcomes: Comparing cumulative risk and latent class approaches. *Maternal and Child Health Journal*, 22(3), 288–297. <https://doi.org/10.1007/s10995-017-2365-1>
19. Leloux-Opmeer, H., Kuiper, C., Swaab, H., & Scholte, E. (2016). Characteristics of children in foster care, family-style group care, and residential care: A scoping review. *Journal of Child and Family Studies*, 25, 2357–2371. <https://doi.org/10.1007/s10826-016-0418-5>
20. Maneiro, L., Tarren-Sweeney, M., van Geel, M., & Vedder, P. (2025). Navigating mental health complexity in residential care: Validation of the assessment checklist for adolescents – short form. *Developmental Child Welfare*, 7(1), 22–44. <https://doi.org/10.1177/25161032251324852>
21. McLaughlin, K. A. (2016). Future directions in childhood adversity and youth psychopathology. *Journal of Clinical Child and Adolescent Psychology*, 45, 361–382. <https://doi.org/10.1080/15374416.2015.1110823>
22. Merians, A. N., Baker, M. R., Frazier, P., & Lust, K. (2019). Outcomes related to adverse childhood experiences in college students: Comparing latent class analysis and cumulative risk. *Child Abuse & Neglect*, 87, 51–64. <https://doi.org/10.1016/j.chiabu.2018.07.020>
23. Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus User's Guide* (Eighth ed.). Muthén & Muthén.
24. Nylund-Gibson, K., & Choi, A. Y. (2018). Ten frequently asked questions about latent class analysis. *Translational Issues in Psychological Science*, 4(4), 440–461. <https://doi.org/10.1037/tps0000176>

25. Raviv, T., Taussig, H. N., Culhane, S. E., & Garrido, E. F. (2010). Cumulative risk exposure and mental health symptoms among maltreated youth pLACEsd in out-of-home care. *Child abuse & neglect*, 34(10), 742–751. <https://doi.org/10.1016/j.chiabu.2010.02.011>
26. Rebbe, R., Nurius, P. S., Ahrens, K. R., & Courtney, M. E. (2017). Adverse childhood experiences among youth aging out of foster care: A latent class analysis. *Children and youth services review*, 74, 108–116. <https://doi.org/10.1016/j.childyouth.2017.02.004>
27. Sisitsky, M., Hare, M., DiMarzio, K., Gallat, A., Magariño, L., & Parent, J. (2023). Associations between early life adversity and youth psychobiological outcomes: Dimensional and person-centered approaches. *Research on Child and Adolescent Psychopathology*, 51(12), 1789–1800. <https://doi.org/10.1007/s10802-023-01064-x>
28. Tarren-Sweeney, M. (2013). The assessment checklist for adolescents - ACA: A scale for measuring the mental health of young people in foster, kinship, residential and adoptive care. *Children and Youth Services Review*, 35(3), 384–393. <https://doi.org/10.1016/j.childyouth.2012.12.005>
29. Tein, J. Y., Coxe, S., & Cham, H. (2013). Statistical power to detect the correct number of classes in latent profile analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, 20(4), 640–657. <https://doi.org/10.1080/10705511.2013.824781>
30. Tzouvara, V., Kupdere, P., Wilson, K., Matthews, L., Simpson, A., & Foye, U. (2023). Adverse childhood experiences, mental health, and social functioning: A scoping review of the literature. *Child Abuse & Neglect*, 139, 106092. <https://doi.org/10.1016/j.chiabu.2023.106092>
31. WHO (2018). Adverse Childhood Experiences International Questionnaire (ACES-IQ). [https://www.who.int/publications/m/item/adverse-childhood-experiences-international-questionnaire-\(ACEs-iq\)](https://www.who.int/publications/m/item/adverse-childhood-experiences-international-questionnaire-(ACEs-iq)).
32. Wolff, K. T., Craig, J. M., Baglivio, M. T., & Papalia, N. (2025). Are More ACEs Always Worse? Exploring Nonlinear Associations with Youth Behavior. *Journal of Youth and Adolescence*, 1–21. <https://doi.org/10.1007/s10964-025-02225-5>
33. Consellería de Política Social y Juventud, Dirección General de Familia, Infancia y Dinamización Demográfica (2023). *Estadística de protección de menores 2022. Operación estadística 2506-02-OE06*. Xunta de Galicia. <https://politicassocial.xunta.gal/es/recursos/publicaciones/estadistica-de-proteccion-de-menores>
34. Yampolskaya, S., Sharrock, P., Armstrong, M. I., Strozier, A., & Swanke, J. (2014). Profile of children placed in out-of-home care: Association with permanency outcomes. *Children and Youth Services Review*, 36, 195–200. <https://doi.org/10.1016/j.childyouth.2013.11.018>
35. Zhou, Q., Chew, P., Oei, A., Chu, C. M., Ong, M., & Hoo, E. (2024). Longitudinal effects of cumulative adverse childhood experiences on internalizing and externalizing problems in adolescents in out-of-home care: Emotion dysregulation as a mediator. *Adversity and Resilience Science*, 1–17. <https://doi.org/10.1007/s42844-024-00>

Figures

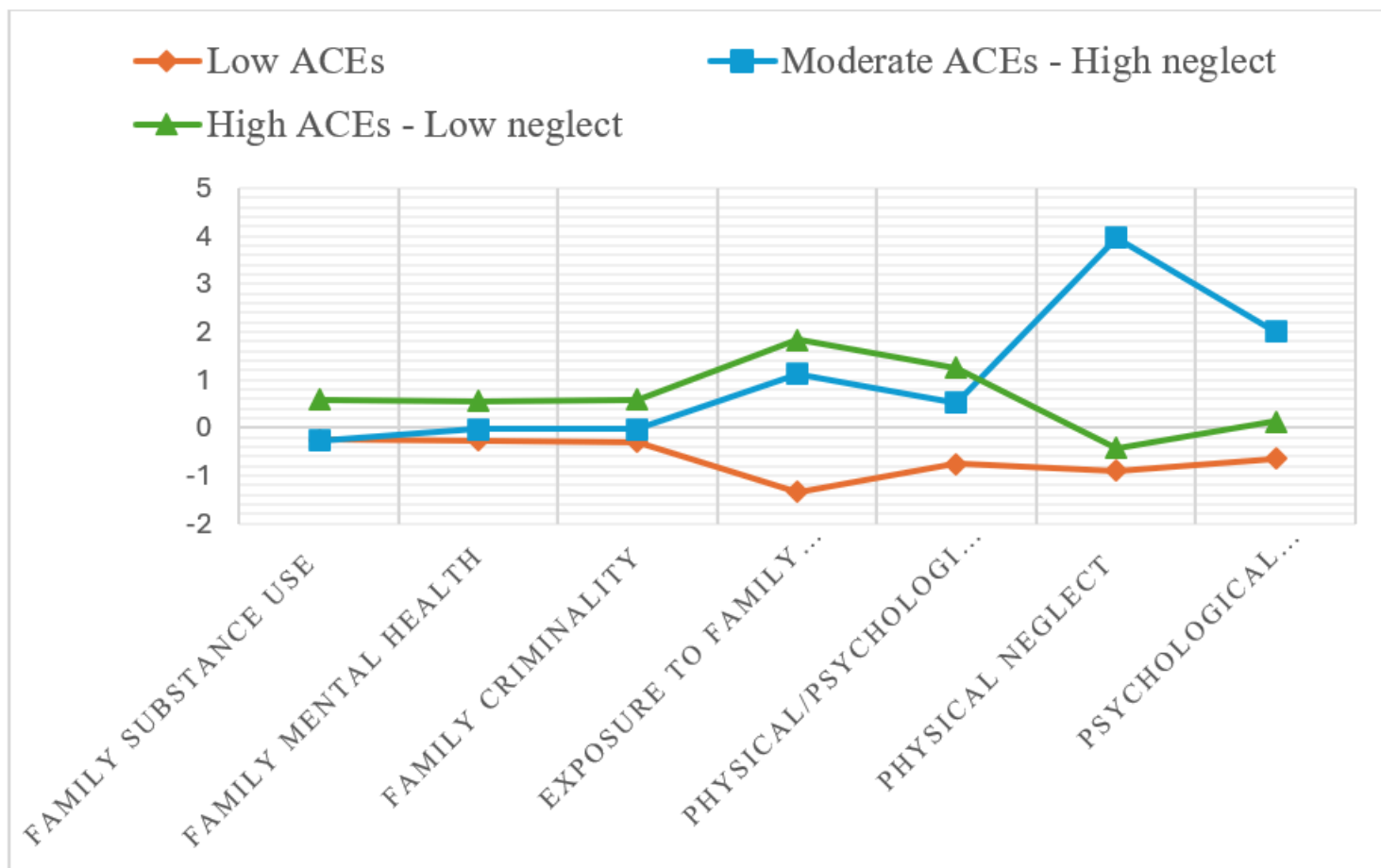


Figure 1

Z-Mean Scores for the Three-class Solution