



Childhood adversity and empathy in eating disorders: Exploring transdiagnostic profiles and socio-emotional functioning

Paolo Meneguzzo^{a,b,*}, Alberto De Mico^c, Laura Maragno^c, Anna Marzotto^d,
Fabio Conti^e, Luca Maggi^f, Barbara Mezzani^g, Patrizia Todisco^d

^a Department of Neuroscience, University of Padova, Padova, Italy

^b Padova Neuroscience Center, University of Padova, Padova, Italy

^c Department of General Psychology, University of Padova, Padova, Italy

^d Eating Disorder Unit, Casa di Cura "Villa Margherita" – Neomesia, Arcugnano, Vicenza, Italy

^e Eating Disorders Unit, Casa di Cura Villa Armonia - Neomesia, Roma, Italy

^f Eating Disorders Unit, Casa di Cura Ville di Nozzano - Neomesia, Nozzano, Lucca, Italy

^g Eating Disorders Unit, Casa di Cura Villa dei Pini - Neomesia, Firenze, Italy

ARTICLE INFO

Keywords:

Eating disorder
Trauma
Empathy
Childhood trauma
Adverse childhood experiences
Social skill
Cognitive empathy
Emotional reactivity

ABSTRACT

Background: Adverse childhood experiences (ACEs), including abuse and neglect, have been associated with difficulties in developing empathy. People with eating disorders (EDs) often report higher rates of ACE and display empathy-related impairments, which may contribute to maladaptive interpersonal functioning.

Objective: This study explored the associations between childhood adversities and empathy-related outcomes in individuals with ED compared to a general population sample (GP).

Participants and setting: Participants included 210 people with EDs (94 anorexia nervosa restrictive, 34 binge-purge anorexia nervosa, 36 bulimia nervosa, 36 binge-eating disorder, 24 OSFED) from national ED clinics and 151 participants from the GP.

Methods: Participants completed the Childhood Trauma Questionnaire (CTQ) and the Empathy Quotient (EQ). Multivariate analyzes evaluated group differences and associations between specific forms of childhood adversity and subdomains of EQ: cognitive empathy (CE), emotional reactivity (ER) and social skills (SS).

Results: ACEs were more prevalent in the ED group (56 %) than in the GP (33 %, $\chi^2 = 31.81$, $p < 0.001$). Emotional abuse and neglect were associated with a lower ER and SS, and physical neglect was associated with a reduction in CE and ER. No significant effects for physical or sexual abuse. Group membership alone was not associated with empathy outcomes. Cluster analysis identified two profiles: one with high trauma exposure and lower empathy, and another with lower trauma and more preserved socio-emotional functioning.

Conclusion: Findings highlight the specific impact of emotional forms of childhood adversity on empathy in EDs and support trauma-informed, individualized interventions based on socio-emotional profiles.

* Corresponding author at: Department of Neuroscience, University of Padova, Via Giustiniani 2, 35128 Padova, Italy.

E-mail addresses: paolo.meneguzzo@unipd.it (P. Meneguzzo), fabio.conti@neomesia.com (F. Conti), barbara.mezzani@neomesia.com (B. Mezzani).

<https://doi.org/10.1016/j.chiabu.2025.107445>

Received 19 November 2024; Received in revised form 29 March 2025; Accepted 31 March 2025

Available online 6 April 2025

0145-2134/© 2025 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Adverse childhood experiences (ACEs) refer to a range of potentially harmful events that occur before the age of 18, including various forms of abuse (emotional, physical, sexual) and neglect (emotional, physical), as well as household dysfunction. Although not all ACEs qualify as traumatic events per se, they can nonetheless have significant developmental consequences. According to recent classifications (Fares-Otero & Seedat, 2024), trauma typically involves an overwhelming experience that threatens the individual's physical or psychological integrity, whereas ACEs encompass a broader array of early adversities. Childhood adversity has been extensively studied for its enduring effects on psychological development (Brown et al., 2021; Kuzminskaite et al., 2021; McKay et al., 2021; Watters et al., 2023). These adverse experiences can disrupt normative developmental trajectories, leading to a cascade of emotional, cognitive, and behavioral difficulties that persist into adulthood. One critical area affected by childhood trauma is empathy, a multifaceted construct that involves both affective and cognitive components (Berzenski & Yates, 2022; Narvey et al., 2021).

Empathy enables individuals to understand and share the emotional states of others, facilitating social cohesion and prosocial behaviors (Eklund & Meranius, 2021). Empathy deficits have been implicated in a variety of psychological disorders, including eating disorders (EDs) (Corsi et al., 2021; Gaggero et al., 2023; Konstantakopoulos et al., 2020). Eating disorders, which include anorexia nervosa, bulimia nervosa, and binge-eating disorder, are severe psychiatric conditions characterized by dysfunctional eating behaviors, preoccupations with body weight and shape, and a host of physical and psychological complications (American Psychiatric Association, 2013). The etiology of eating disorders is complex and multifactorial, involving genetic, biological, psychological, and socio-environmental factors (Culbert et al., 2015). Among these, childhood trauma has emerged as a significant risk factor, with numerous studies documenting high rates of early adverse experiences in individuals with EDs (Brewerton, 2015; Groth et al., 2020; Meneguzzo et al., 2021; Meneguzzo, Mancini, et al., 2022).

The intersection of ACEs, empathy, and eating disorders is an area of growing research interest (Gagliardini et al., 2024; Sansone & Sansone, 2007). Adverse events experienced during the early years can profoundly affect the development of empathy abilities. Early adverse experiences can hinder the ability to recognize, understand, and respond to the emotions of others, potentially leading to empathy deficits (Meneguzzo et al., 2021). These deficits can manifest in various ways, including difficulties in emotional regulation, impaired social functioning, and increased vulnerability to psychopathology (Gagliardini et al., 2024; Kong & Bernstein, 2009; Meneguzzo, Garolla, et al., 2022). In the context of eating disorders, impaired empathy may contribute to the maintenance and exacerbation of disordered eating behaviors (Kerr-Gaffney et al., 2019; Meneguzzo et al., 2020, 2023).

Individuals with eating disorders often report higher incidences of childhood trauma compared to their healthy counterparts (Backholm et al., 2013). This association suggests that early traumatic experiences may predispose people to developing empathy deficits, which, in turn may exacerbate the symptoms of eating disorders (Trottier et al., 2016; Trottier & MacDonald, 2017). For example, difficulties in emotional regulation and interpersonal relationships, common in those with empathy deficits, can lead to maladaptive coping mechanisms such as disordered eating (Mallorquí-Bagué et al., 2020; Monell et al., 2018). Moreover, the social isolation and interpersonal difficulties resulting from empathy impairments can perpetuate the cycle of disordered eating behaviors, creating a complex interplay between trauma, empathy, and eating disorders (Hanna et al., 2023; Makri et al., 2022; Meneguzzo, Terlizzi, et al., 2024).

Empathy deficits in populations with eating disorders can have far-reaching implications for treatment and recovery (Barone et al., 2023; Meneguzzo, Garolla, et al., 2022; Westwood et al., 2017). Traditional therapeutic approaches for eating disorders often focus on addressing disordered eating behaviors and cognitive distortions related to body image. However, understanding the role of empathy and its impairment due to ACEs can provide a more nuanced perspective, highlighting the need for interventions that also address emotional and social dysfunctions. Therapeutic approaches that improve empathy skills, improve emotional regulation, and foster healthier interpersonal relationships can be particularly beneficial for this population (Meneguzzo, Bonello, et al., 2024; Tchanturia et al., 2015).

This paper explores the complex relationship between ACEs and empathy in people with eating disorders. The primary objective of this study is to investigate the relationship between ACEs and empathy-related outcomes in people with eating disorders, compared to a sample of the general population. By identifying these associations, the study seeks to improve understanding of the psychological mechanisms that contribute to empathy deficits in populations of eating disorders and to provide insights that may inform the development of targeted therapeutic interventions.

2. Methods

The participants were 210 cisgender subjects (186 women and 24 males) recruited from four different national emergency department clinics at the beginning of inpatient treatment. All participants met the diagnostic criteria for anorexia nervosa subtype (ANr, $n = 94$, 41.9%), anorexia nervosa subtype (ANbp, $n = 34$, 15.2%), bulimia nervosa (BN, $n = 36$, 16.1%), binge eating disorder (BED, $n = 36$, 16.1%) or other specified feeding and eating disorders (OSFED, $n = 24$, 10.7%). Diagnoses were made by experienced ED clinicians using a semi-structured clinical interview routinely employed in clinical practice and based on DSM-5 criteria (First et al., 2015). Exclusion criteria included the presence of cognitive impairment and active psychotic symptomatology.

The study also included 151 cisgender participants from the general population (133 women, 18 male), who voluntarily responded to public announcements shared on social media and university platforms. As participation was entirely voluntary and no record of how many individuals viewed the announcements was kept, the response rate could not be calculated. To reduce potential confounding, individuals with a history of psychiatric diagnosis or with a first-degree relative affected by an ED were excluded. All participants signed an informed consent to participate in this study and agreed to the publication of the results. The Vicenza Ethics

Committee approved the protocol.

2.1. Measures

The ED group as part of a routine service evaluation within one week of admission, including demographic data collection. The GP group completed self-reported questionnaires after the assessment of their eligibility for the study, which also included demographic data. All questionnaires were administered in the form of a questionnaire pack, taking approximately 20 min to complete. The questionnaire pack comprised several standardized instruments, including the Childhood Trauma Questionnaire (CTQ) and the Empathy Quotient (EQ).

The CTQ is a 25-item self-report questionnaire using a five-point Likert scale (from “never” to “frequently”) to assess adverse experiences during infancy (Innamorati et al., 2016). The total score ranges from 25 (no trauma) to 125 (extreme trauma), with significant child adverse events considered present when scores were moderate or severe in at least one of the subscales (emotional abuse ≥ 13 , physical abuse ≥ 10 , sexual abuse ≥ 8 , emotional neglect ≥ 15 , and physical neglect ≥ 10 ; (Bernstein et al., 2003)). The internal consistency, evaluated with Cronbach's alpha, was >0.80 for all subscales.

The 15-item Italian version of the EQ (Senese et al., 2018) is a self-report measure designed to assess empathy in adults on a four-step Likert-type scale, from “strongly disagree” to “strongly agree.” Responses were classified into three domains according to the original scoring procedure: cognitive empathy (CE), emotional reactivity (ER), and social skills (SS). The internal consistency, evaluated with Cronbach's alpha, was >0.80 for all subscales.

2.2. Statistical analysis

Descriptive statistics were used to calculate the means and standard deviations for continuous variables and the percentages and frequencies for categorical variables. Independent *t*-tests were conducted to analyze demographic and psychological data between the ED and GP groups. We calculated Hedges' *g* to estimate the effect size for group differences, adjusting for small sample bias, and classified the magnitude of effects as small ($g = 0.2$), medium ($g = 0.5$), or large ($g = 0.8$) according to conventional benchmarks. In addition, a MANOVA was performed to assess the predictive effects of the group (ED and GP) and CTQ scores on the various components of EQ, both individually and combined. Wilks' lambda was used as the multivariate test statistic to assess the overall significance of each predictor. To identify potential transdiagnostic profiles within the ED group based on trauma and empathy

Table 1
Descriptive statistics for the participants.

| | GP <i>n</i> = 151 | ED <i>n</i> = 210 | <i>t</i> | <i>p</i> <i>g</i> |
|--------------------------------|----------------------|----------------------|----------|------------------------|
| Age, years | 25.88 | 26.54 | -0.695 | 0.487 |
| | 6.23 | 11.79 | | |
| BMI, kg/m ² | 21.84 | 22.18 | -0.416 | 0.677 |
| | 2.75 | 11.70 | | |
| Years of education | 13.81 | 13.40 | 1.678 | 0.094 |
| | 2.45 | 2.07 | | |
| Duration of illness, years | - | 6.99 | | |
| | | 8.16 | | |
| EDE-Q | 1.48 | 4.04 | -18.347 | <0.001 |
| Global Score | 1.28 | 1.34 | | 1.946 |
| Childhood Trauma Questionnaire | | | | |
| Emotional abuse | 6.83 | 10.31 | -8.360 | <0.001 |
| | 2.81 | 5.16 | | 0.803 |
| Physical abuse | 5.23 | 6.87 | -6.632 | <0.001 |
| | 0.80 | 3.55 | | 0.595 |
| Sexual abuse | 5.50 | 7.07 | -4.697 | <0.001 |
| | 1.76 | 4.50 | | 0.434 |
| Emotional neglect | 8.74 | 12.50 | -7.856 | <0.001 |
| | 3.84 | 5.40 | | 0.782 |
| Physical neglect | 5.72 | 7.34 | -6.536 | <0.001 |
| | 1.42 | 3.25 | | 0.613 |
| Total score | 32.01 | 44.09 | -8.932 | <0.001 |
| | 8.16 | 17.47 | | 0.843 |
| Empathy quotient | | | | |
| Cognitive empathy | 6.45 | 4.61 | 7.627 | <0.001 |
| | 2.21 | 2.33 | | 0.807 |
| Emotional reactivity | 6.81 | 6.13 | 2.958 | 0.003 |
| | 2.11 | 2.20 | | 0.314 |
| Social skills | 5.80 | 3.06 | 10.111 | <0.001 |
| | 2.60 | 2.54 | | 1.068 |
| Total EQ | 19.06 | 13.80 | 10.594 | <0.001 |
| | 4.89 | 4.56 | | 1.119 |

dimensions, a cluster analysis was conducted. Standardized scores from CTQ subscales and EQ subscales were used as clustering variables. Variables were standardized using z-scores prior to analysis. K-means clustering was performed, and solutions ranging from two to six clusters were evaluated based on silhouette scores to determine the optimal number of clusters. The two-cluster solution yielded the highest silhouette score (0.28), indicating the best fit. Cluster membership was then used to compare trauma and empathy profiles, as well as the distribution of ED diagnoses across clusters. The effect sizes for the differences were calculated using Cohen's *d*, with values of 0.2, 0.5, and 0.8 conventionally interpreted as small, medium and large effects, respectively. Cohen's *d* was used to assess the magnitude of differences in trauma and empathy dimensions between groups. The significance level was set at $p < 0.05$ for all analyses. All analyses were conducted using IBM SPSS Statistics version 25.0 (SPSS, Chicago, IL, United States).

3. Results

No differences emerged between the ED participants and the GP regarding the main demographic variables, such as age, BMI, and years of education (see Table 1 for demographic and psychological details). Regarding participants' sex, no differences were observed: $\chi^2 = 0.779$, $p = 0.377$. In terms of the presence of adverse childhood events (ACEs+), different distributions were found, with the clinical population presenting a higher lifetime prevalence: ACE+ ED: 117 out of 210 (56 %), GP: 36 out of 110 (33 %), $\chi^2 = 31.810$, $p < 0.001$.

A MANOVA was conducted to examine the effects of different types of ACEs on empathy-related outcomes. Emotional abuse showed significant effects on emotional recognition (ER), $F(17,245) = 2.088$, $p = 0.008$, social sensitivity (SS), $F(17,245) = 2.227$, $p = 0.004$, and Total Empathy Quotient (Total EQ), $F(17,245) = 1.869$, $p = 0.021$, but no significant effect on cognitive empathy (CE).

Table 2
Summary of MANOVA results.

| Effect | Dependent variable | F | p |
|---------------------------|--------------------|-------|-------|
| Emotional abuse (CTQ) | CE | 1.293 | 0.197 |
| | ER | 2.088 | 0.008 |
| | SS | 2.227 | 0.004 |
| | Total EQ | 1.869 | 0.021 |
| Physical abuse (CTQ) | CE | 0.771 | 0.690 |
| | ER | 1.377 | 0.171 |
| | SS | 0.615 | 0.841 |
| | Total EQ | 0.493 | 0.927 |
| Sexual abuse (CTQ) | CE | 1.635 | 0.056 |
| | ER | 0.551 | 0.924 |
| | SS | 1.434 | 0.121 |
| | Total EQ | 0.771 | 0.725 |
| Emotional neglect (CTQ) | CE | 1.216 | 0.245 |
| | ER | 1.737 | 0.031 |
| | SS | 1.665 | 0.043 |
| | Total EQ | 2.113 | 0.005 |
| Physical neglect (CTQ) | CE | 1.948 | 0.034 |
| | ER | 2.957 | 0.001 |
| | SS | 1.473 | 0.142 |
| | Total EQ | 2.944 | 0.001 |
| Group | CE | 0.564 | 0.454 |
| | ER | 0.511 | 0.475 |
| | SS | 0.511 | 0.476 |
| | Total EQ | 0.098 | 0.755 |
| Emotional abuse * group | CE | 1.193 | 0.300 |
| | ER | 1.920 | 0.050 |
| | SS | 1.350 | 0.212 |
| | Total EQ | 1.082 | 0.376 |
| Physical abuse * group | CE | 2.356 | 0.072 |
| | ER | 1.329 | 0.266 |
| | SS | 1.843 | 0.140 |
| | Total EQ | 2.330 | 0.075 |
| Sexual abuse * group | CE | 0.655 | 0.658 |
| | ER | 1.134 | 0.343 |
| | SS | 0.720 | 0.609 |
| | Total EQ | 1.040 | 0.395 |
| Emotional neglect * group | CE | 0.972 | 0.482 |
| | ER | 1.274 | 0.224 |
| | SS | 1.894 | 0.028 |
| | Total EQ | 1.659 | 0.065 |
| Physical neglect * group | CE | 1.839 | 0.141 |
| | ER | 2.519 | 0.059 |
| | SS | 2.444 | 0.065 |
| | Total EQ | 2.303 | 0.078 |

For emotional neglect, significant effects were found for ER, $F(19,245) = 1.737, p = 0.031$, SS, $F(19,245) = 1.665, p = 0.043$, and Total EQ, $F(19,245) = 2.113, p = 0.005$, while no significant effect was observed for CE, $F(19,245) = 1.216, p = 0.245$.

Physical neglect had significant effects on CE, $F(11,245) = 1.948, p = 0.034$, ER, $F(11,245) = 2.957, p = 0.001$, and Total EQ, $F(11,245) = 2.944, p = 0.001$, but no effect on SS.

No significant effects of physical or sexual abuse on any empathy-related outcomes.

In terms of interaction effects between ACEs and groups, emotional abuse was significantly related to ER differently across groups, $F(9,245) = 1.920, p = 0.050$. Additionally, emotional neglect had a significant interaction with the group on SS, $F(14,245) = 1.894, p = 0.028$. No significant interactions were found for other ACEs subscales.

Finally, group membership alone did not significantly influence any of the empathy outcomes. For more details, see [Table 2](#).

To further investigate whether the associations between childhood adversity and empathy-related outcomes varied by group, we conducted separate MANOVA analyses for the ED and GP samples. We focused on the three CTQ subscales that showed significant effects in the combined analysis—emotional abuse, emotional neglect, and physical neglect. In the ED group, all three subscales were significantly associated with empathy components, with stronger multivariate effects (Wilks' lambda = 0.938 for emotional abuse, 0.949 for emotional neglect, and 0.951 for physical neglect). In the GP group, these associations were weaker (Wilks' lambda = 0.965, 0.964, and 0.955, respectively). These results suggest that specific forms of childhood adversity may have a more pronounced relationship with the functioning of empathy in individuals with EDs.

3.1. Explorative subgroup analysis

To explore potential differences in trauma and empathy across ED subtypes, a one-way ANOVA was conducted with diagnosis as the independent variable (AN-R, AN-BP, BN, BED, OSFED). No significant group differences emerged for empathy-related outcomes, including cognitive empathy ($F(4,225) = 0.35, p = 0.84$), emotional reactivity ($F(4,225) = 1.01, p = 0.40$), or social skills ($F(4,225) = 0.43, p = 0.79$). However, significant differences were found for emotional abuse ($F(4,225) = 7.98, p < 0.001$) and emotional neglect ($F(4,225) = 12.10, p < 0.001$). Post hoc Tukey HSD tests showed that individuals with anorexia nervosa restrictive subtype (AN-R) reported significantly lower levels of emotional abuse compared to participants with BN ($p < 0.001$), BED ($p = 0.006$), and OSFED ($p = 0.006$). Similarly, AN-R participants reported lower emotional neglect than all other diagnostic groups (all $p < 0.01$). Furthermore, BN participants reported higher emotional neglect than those with AN-BP ($p = 0.023$).

To explore potential clinical profiles based on trauma exposure and empathy functioning in ED diagnoses, a cluster analysis was performed using standardized scores on the five CTQ subscales (emotional abuse, emotional neglect, physical abuse, physical neglect, and sexual abuse) and the three EQ subscales (cognitive empathy, emotional reactivity, and social skills). A two-cluster solution yielded the highest silhouette score (0.34), indicating a strong separation of the participant profiles. Cluster 1 ($n = 73$) was characterized by markedly higher levels of emotional abuse ($M = 16.03$), emotional neglect ($M = 18.55$), physical abuse ($M = 8.82$), physical neglect ($M = 10.21$), and sexual abuse ($M = 8.86$), alongside lower cognitive empathy ($M = 4.16$), emotional reactivity ($M = 5.90$), and social skills ($M = 2.52$). In contrast, Cluster 0 ($n = 147$) exhibited lower scores across all CTQ domains—emotional abuse ($M = 7.48$), emotional neglect ($M = 9.50$), physical abuse ($M = 4.43$), physical neglect ($M = 5.92$), and sexual abuse ($M = 4.09$)—and showed comparatively higher scores in cognitive empathy ($M = 4.83$), emotional reactivity ($M = 6.24$), and social skills ($M = 3.33$). Effect sizes for trauma subscales ranged from $d = 1.70$ to 2.59 , while empathy subscales showed small-to-moderate effects ($d = -0.32$ to -0.42), supporting a clinically meaningful distinction between a high-trauma, low-empathy profile (Cluster 1) and a lower-trauma, more emotionally adaptive profile (Cluster 0).

The distribution of ED diagnoses differed between clusters. AN-R was most frequent in Cluster 0 ($n = 78$ out of 95 total AN-R cases), while BN (21/36), BED (18/43), and OSFED (8/12) were overrepresented in Cluster 1. AN-BP was distributed across both clusters, though more frequent in Cluster 0 ($n = 25$ vs. 9). These results suggest that individuals with binge-eating and purging behaviors are more likely to belong to the high-trauma profile, whereas those with restrictive presentations are more frequently represented in the lower-trauma group. See [Fig. 1](#) for a graphical representation of the clusters.

4. Discussion

This study investigated the effects of ACEs on empathy-related outcomes in individuals diagnosed with EDs compared to a general population sample. The findings reveal a significant disparity in the prevalence of adverse childhood events between the two groups. This supports existing literature suggesting a robust link between childhood adversity and the development of eating disorders, indicating that early adverse experiences may exacerbate the psychological and emotional difficulties commonly observed in this population (Meneguzzo, Mancini, et al., 2022; Monteleone et al., 2021; Rabito-Alcón et al., 2021).

While a higher prevalence of childhood adversity was observed in the clinical group compared to the general population, the different types of adverse experiences were not uniformly associated with empathy, emotional functioning, and interpersonal skills. This highlights the importance of examining the specific associations between distinct forms of adversity and empathy-related outcomes. Considering emotional abuse, the results of MANOVA demonstrated that it significantly influenced emotional recognition, social skills, and total empathy quotient in the ED group. In contrast, cognitive empathy did not show significant differences related to emotional abuse. This finding suggests that while individuals with a history of emotional adverse experiences may struggle with emotional responsiveness, their ability to understand others' perspectives may remain intact. The study also showed significant effects of emotional neglect on ER, SS, and Total EQ, underscoring how emotional experiences can be correlated with interpersonal functioning, as reported in the literature (Haslam & Taylor, 2022).

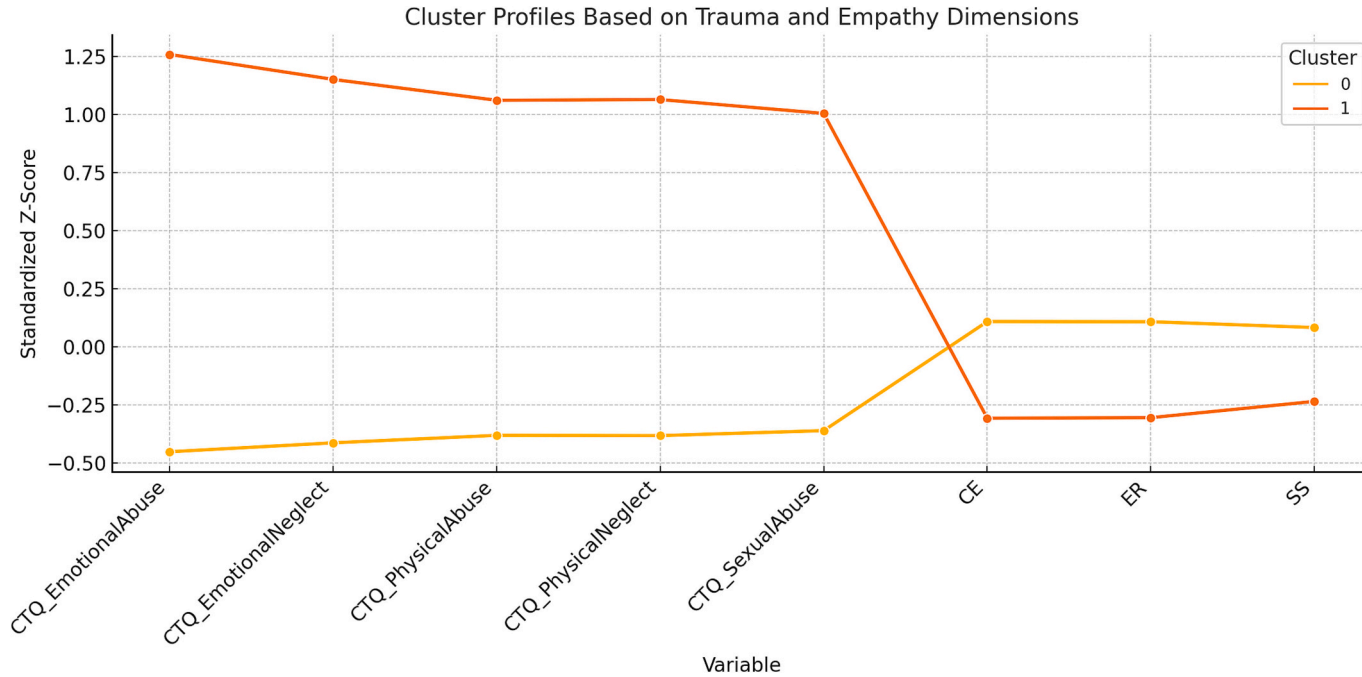


Fig. 1. Standardized trauma and empathy profiles for the two clusters identified through K-means analysis in the ED group ($n = 220$). Cluster 1 ($n = 73$) represents individuals with high levels of childhood adversity across emotional, physical, and sexual domains, paired with lower empathy-related functioning. Cluster 0 ($n = 147$) includes individuals with lower trauma exposure and comparatively higher socio-emotional functioning. Diagnostic distribution differed across clusters: AN-R was primarily represented in Cluster 0 (78 out of 95), while BN (21 out of 36), BED (18 out of 43), and OSFED (8 out of 12) were more prevalent in Cluster 1. Scores are standardized (z-scores) for comparability across variables.

Regarding physical neglect, the study produced important results since it emerged as a significant predictor of CE, ER, and Total EQ, indicating that this form of ACE may be uniquely associated with emotional and cognitive processing. However, there was no evidence of any influence of physical and sexual abuse on empathy. This result turns out to be just as interesting because it underscores the differential association of various types of ACE with the emotional component and its various facets. Therefore, it suggests the need for a nuanced understanding of how different experiences may correlate with different psychological profiles. Neglect has been pointed to be a specific element that increases the presence of hostile and oppositional behaviors (Cohen et al., 2017; Haslam & Taylor, 2022), elements that are negative predictors of outcomes in EDs (Todisco et al., 2023).

Although emotional and physical neglect was significantly associated with empathy-related outcomes, physical and sexual abuse were not. This contrasts with previous literature that often links these experiences to interpersonal and emotional dysfunctions (Brewerton, 2015; Trottier & MacDonald, 2017). One possible explanation lies in the differential psychological effects of various types of adversity. Recent work highlights that the impact of early adverse experiences varies depending on factors such as type, severity, and timing (Fares-Otero & Seedat, 2024). Neglect, in particular, may disrupt empathy development more directly by affecting emotional attunement and relational availability (Berzenski & Yates, 2022). Furthermore, physical and sexual abuse may manifest through mechanisms such as dissociation or externalization behaviors, which may not be fully captured by self-report empathy measures. Underreporting due to stigma or recall difficulties could also contribute to the absence of significant findings. These results highlight the importance of considering the distinct psychological pathways linked to different forms of adversity, rather than treating childhood trauma as a unitary construct (Fares-Otero & Seedat, 2024).

The effects of the interaction between ACEs and group membership for emotional abuse and emotional neglect further emphasize the complexity of these relationships. The significant interaction for emotional abuse in the ER suggests that the association between this form of adversity and emotional functioning may be more pronounced in individuals with eating disorders. Importantly, group membership alone did not significantly influence empathy-related outcomes, suggesting that the effects of ACEs may be more critical to understanding these constructs than the diagnosis itself. This finding implies that customized therapeutic interventions that address both ACE and ED symptoms may be critical in improving emotional processing and social interactions between affected individuals, as already suggested in the literature (Brewerton, 2019).

Subgroup analyses support the idea that the association between childhood adversity and empathy may be particularly relevant in the clinical population. Emotional abuse, emotional neglect, and physical neglect were more strongly associated with difficulty with empathy in the ED group compared to the general population. Although all five CTQ subscales were collected, only the three that showed significant effects in the combined analysis were further examined between groups. This decision was based on both theoretical considerations and initial results, which revealed no significant associations for physical and sexual abuse. These findings emphasize the role of emotional and relational deprivation in shaping empathy-related outcomes, particularly in individuals already vulnerable to emotional dysregulation and interpersonal difficulties (Gagliardini et al., 2024; Haslam & Taylor, 2022). They also reinforce the importance of trauma-informed care that targets these specific interpersonal sequelae of early adversity in ED treatment.

The additional exploratory analyses offered valuable insights into the heterogeneity of trauma-empathy associations across ED subtypes. Although no significant differences in empathy scores across diagnoses, emotional abuse and emotional neglect were significantly higher in people with BN, BED, and OSFED compared to those with AN-R. These findings are consistent with previous research suggesting that patients with binge-purge or broader spectrum ED presentations may have experienced more relational trauma and emotional invalidation during childhood (Berzenski & Yates, 2022; Trottier & MacDonald, 2017). As the literature emphasizes, the psychological impact of early adversity is shaped by its type, chronicity, and relational context, and emotional neglect in particular may exert a “developmentally insidious” effect on socio-emotional capacities such as empathy and interpersonal trust (Fares-Otero & Seedat, 2024; Norman et al., 2012; Podubinski et al., 2015; Teicher & Samson, 2016).

To further investigate the presence of transdiagnostic profiles, we performed a cluster analysis. Two distinct profiles emerged: a high-trauma/low-empathy cluster and a lower-trauma/more emotionally adaptive cluster. The high-trauma group consistently elevated levels in all forms of childhood adversity—including emotional, physical, and sexual abuse and neglect, combined with lower cognitive empathy, emotional reactivity, and social skills. In contrast, the lower-trauma group reported minimal trauma exposure and relatively intact socio-emotional functioning. In particular, BN, BED and OSFED were more frequently represented in the high trauma group, whereas AN-R was predominantly found in the lower trauma group. These findings suggest that trauma exposure, particularly when it is broad and cumulative, can shape distinct interpersonal and emotional response within ED populations, potentially influencing not only severity but also the underlying mechanisms of emotional dysregulation. This supports the need for a dimensional, trauma-informed perspective that considers socio-emotional functioning alongside diagnosis, moving beyond categorical classifications toward profiles that may better guide individualized treatment. As others have proposed, understanding how “emotional neglect compromises emotional attunement and empathic development” (Berzenski & Yates, 2022) is crucial to tailoring treatment, particularly for individuals with complex trauma histories and interpersonal sensitivity.

Despite these significant findings, the study is not without limitations. As a cross-sectional design, it does not allow causal inferences regarding the relationship between ACEs and empathy outcomes. Longitudinal studies are needed to explore how these variables interact over time. Given the self-report nature of the measures, recall biases and under/overreporting of empathy or adversity may affect the findings. The absence of data on anxiety symptoms limits our ability to assess their potential confounding effect on the relationship between ACEs and empathy. In the general population group, participants were self-selected through online recruitment, which may introduce selection bias and limit generalizability. Furthermore, no response rate could be calculated. Finally, the sample consisted primarily of cisgender participants, which limited the generalizability of the findings to more diverse populations. All participants were recruited in Italy, primarily of similar cultural background, limiting the ability to assess sociocultural moderators. Future research should aim to include a wider range of participants, including those of different genders, sexual orientations, and

ethnic backgrounds, to better understand the complex interplay between ACEs and empathy across diverse experiences.

5. Conclusion

In summary, the present study highlights the significant role of ACEs in influencing empathy-related outcomes in people with eating disorders. These findings underscore the need for clinical practitioners to consider the history of ACEs when developing treatment plans. Future research should aim to further elucidate the mechanisms by which different types of ACE and trauma are related to empathy and emotional functioning and how these relationships may differ between various clinical populations.

CRedit authorship contribution statement

Paolo Meneguzzo: Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Formal analysis, Conceptualization. **Alberto De Mico:** Writing – original draft, Visualization, Data curation. **Laura Maragno:** Writing – original draft, Investigation. **Anna Marzotto:** Writing – review & editing, Investigation, Data curation. **Fabio Conti:** Writing – review & editing, Investigation. **Luca Maggi:** Writing – review & editing, Investigation, Conceptualization. **Barbara Mezzani:** Writing – review & editing, Investigation, Conceptualization. **Patrizia Todisco:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Funding acquisition, Conceptualization.

Consent for publication

Written informed consent was obtained from all participants, or from parents or legal guardians if participants were underage, for their involvement in this study and inclusion in any published research paper.

Ethics statement

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. A specific approval of the research protocol was obtained by the Vicenza Ethics Committee (67/21).

Funding statement

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Declaration of competing interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Data availability

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. Washington, DC: American Psychiatric Association. Author.
- Backholm, K., Isomaa, R., & Birgegård, A. (2013). The prevalence and impact of trauma history in eating disorder patients. *European Journal of Psychotraumatology*, 4 (SUPPL). <https://doi.org/10.3402/ejpt.v4i0.22482>
- Barone, E., Carfagno, M., Cascino, G., Landolfi, L., Colangelo, G., Della Rocca, B., & Monteleone, A. M. (2023). Childhood maltreatment, alexithymia and eating disorder psychopathology: A mediation model. *Child Abuse & Neglect*, 146, Article 106496.
- Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., ... Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse and Neglect*, 27(2), 169–190. [https://doi.org/10.1016/S0145-2134\(02\)00541-0](https://doi.org/10.1016/S0145-2134(02)00541-0)
- Berzenski, S. R., & Yates, T. M. (2022). The development of empathy in child maltreatment contexts. *Child Abuse & Neglect*, 133, Article 105827.
- Brewerton, T. D. (2015). Stress, trauma, and adversity as risk factors in the development of eating disorders. *The Wiley Handbook of Eating Disorders*, 445–460.
- Brewerton, T. D. (2019). An overview of trauma-informed care and practice for eating disorders. *Journal of Aggression, Maltreatment and Trauma*, 28(4), 445–462. <https://doi.org/10.1080/10926771.2018.1532940>
- Brown, M., Worrell, C., & Pariante, C. M. (2021). Inflammation and early life stress: An updated review of childhood trauma and inflammatory markers in adulthood. *Pharmacology Biochemistry and Behavior*, 211, Article 173291.
- Cohen, J. R., Menon, S. V., Shorey, R. C., Le, V. D., & Temple, J. R. (2017). The distal consequences of physical and emotional neglect in emerging adults: A person-centered, multi-wave, longitudinal study. *Child Abuse & Neglect*, 63, 151–161.
- Corsi, E., Cardi, V., Sowden, S., Coll, M. P., Cascino, G., Ricca, V., ... Monteleone, A. M. (2021). Socio-cognitive processing in people with eating disorders: Computerized tests of mentalizing, empathy and imitation skills. *International Journal of Eating Disorders*, (April), 1–10. <https://doi.org/10.1002/eat.23556>
- Culbert, K. M., Racine, S. E., & Klump, K. L. (2015). Research review: What we have learned about the causes of eating disorders—a synthesis of sociocultural, psychological, and biological research. *Journal of Child Psychology and Psychiatry*, 56(11), 1141–1164.
- Eklund, J. H., & Meranius, M. S. (2021). Toward a consensus on the nature of empathy: A review of reviews. *Patient Education and Counseling*, 104(2), 300–307.
- Fares-Otero, N. E., & Seedat, S. (2024). Childhood maltreatment: A call for a standardised definition and applied framework. *European Neuropsychopharmacology*, 87, 24–26. Elsevier B.V <https://doi.org/10.1016/j.euroneuro.2024.07.002>.

- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015). *Structured Clinical Interview for DSM-5® Disorders—Clinical Trials Version (SCID-5-CT)* (p. 1). Arlington, VA: American Psychiatric Association.
- Gaggero, G., Luminet, O., Vermeulen, N., De Timary, P., Nandrino, J.-L., Goffinet, S., Dereau, J., Shankland, R., Dassonneville, C., & Grynberg, D. (2023). A multidimensional examination of affective and cognitive empathy in anorexia nervosa. *European Eating Disorders Review*, 31(4), 505–519.
- Gagliardini, G., Pandolfi, G., & Colli, A. (2024). Attachment, mentalization, emotion dysregulation, and empathy in eating disorders: Comparing anorexic and bulimic patients. *The Journal of Nervous and Mental Disease*, 212(7), 370–377.
- Groth, T., Hilsenroth, M., Boccio, D., & Gold, J. (2020). Relationship between trauma history and eating disorders in adolescents. *Journal of Child & Adolescent Trauma*, 13, 443–453.
- Hanna, K., Cross, J., Nicholls, A., & Gallegos, D. (2023). The association between loneliness or social isolation and food and eating behaviours: A scoping review. *Appetite*, 191, Article 107051.
- Haslam, Z., & Taylor, E. P. (2022). The relationship between child neglect and adolescent interpersonal functioning: A systematic review. *Child Abuse & Neglect*, 125, Article 105510.
- Innamorati, M., Erbutto, D., Venturini, P., Fagioli, F., Ricci, F., Lester, D., Amore, M., Girardi, P., & Pompili, M. (2016). Factorial validity of the Childhood Trauma Questionnaire in Italian psychiatric patients. *Psychiatry Research*, 245, 297–302. <https://doi.org/10.1016/j.psychres.2016.08.044>
- Kerr-Gaffney, J., Harrison, A., & Tchanturia, K. (2019). Cognitive and affective empathy in eating disorders: A systematic review and meta-analysis. *Frontiers in Psychiatry*, 10(March). <https://doi.org/10.3389/fpsy.2019.00102>
- Kong, S., & Bernstein, K. (2009). Childhood trauma as a predictor of eating psychopathology and its mediating variables in patients with eating disorders. *Journal of Clinical Nursing*, 18(13), 1897–1907.
- Konstantakopoulos, G., Ioannidi, N., Patrikelis, P., & Gonidakis, F. (2020). Empathy, mentalizing, and cognitive functioning in anorexia nervosa and bulimia nervosa. *Social Neuroscience*, 15(4), 477–488.
- Kuzminkaite, E., Penninx, B. W. J. H., van Harmelen, A.-L., Elzinga, B. M., Hovens, J. G. F. M., & Vinkers, C. H. (2021). Childhood trauma in adult depressive and anxiety disorders: An integrated review on psychological and biological mechanisms in the NESDA cohort. *Journal of Affective Disorders*, 283, 179–191.
- Makri, E., Michopoulos, I., & Gonidakis, F. (2022). Investigation of loneliness and social support in patients with eating disorders: A case-control study. *Psychiatry International*, 3(2), 142–157. <https://doi.org/10.3390/psychiatryint3020012>
- Mallorquí-Bagué, N., Testa, G., Lozano-Madrid, M., Vitró-Alcaraz, C., Sánchez, I., Riesco, N., ... Fernández-Aranda, F. (2020). Emotional and non-emotional facets of impulsivity in eating disorders: From anorexia nervosa to bulimic spectrum disorders. *European Eating Disorders Review*, 28(4), 410–422. <https://doi.org/10.1002/erv.2734>
- McKay, M. T., Cannon, M., Chambers, D., Conroy, R. M., Coughlan, H., Dodd, P., ... Clarke, M. C. (2021). Childhood trauma and adult mental disorder: A systematic review and meta-analysis of longitudinal cohort studies. *Acta Psychiatrica Scandinavica*, 143(3), 189–205.
- Meneguzzo, P., Bonello, E., Tenconi, E., & Todisco, P. (2024). Enhancing emotional abilities in anorexia nervosa treatment: A rolling-group cognitive remediation and emotional skills training protocol. *European Eating Disorders Review*. <https://doi.org/10.1002/erv.3113>
- Meneguzzo, P., Cazzola, C., Castegnaro, R., Buscaglia, F., Bucci, E., Pillan, A., ... Todisco, P. (2021). Associations between trauma, early maladaptive schemas, personality traits, and clinical severity in eating disorder patients: A clinical presentation and mediation analysis. *Frontiers in Psychology*, 12(March). <https://doi.org/10.3389/fpsyg.2021.661924>
- Meneguzzo, P., Collantoni, E., Bonello, E., Busetto, P., Tenconi, E., & Favaro, A. (2020). The predictive value of the early maladaptive schemas in social situations in anorexia nervosa. *European Eating Disorders Review*, 28(3). <https://doi.org/10.1002/erv.2724>
- Meneguzzo, P., Garolla, A., Bonello, E., & Todisco, P. (2022). Alexithymia, dissociation and emotional regulation in eating disorders: Evidence of improvement through specialized inpatient treatment. *Clinical Psychology and Psychotherapy*, 29(2), 718–724. <https://doi.org/10.1002/cpp.2665>
- Meneguzzo, P., Mancini, C., Terlizzi, S., Sales, C., Francesconi, M. F., & Todisco, P. (2022). Urinary free cortisol and childhood maltreatments in eating disorder patients: New evidence for an ecophenotype subgroup. *European Eating Disorders Review*, January. <https://doi.org/10.1002/erv.2896>
- Meneguzzo, P., Meragalli, V., Collantoni, E., Cardi, V., Tenconi, E., & Favaro, A. (2023). Virtual rejection and overinclusion in eating disorders: An experimental investigation of the impact on emotions, stress perception, and food attitudes. *Nutrients*, 15(4). <https://doi.org/10.3390/nu15041021>
- Meneguzzo, P., Terlizzi, S., Maggi, L., & Todisco, P. (2024). The loneliness factor in eating disorders: Implications for psychopathology and biological signatures. *Comprehensive Psychiatry*, 132, Article 152493.
- Monell, E., Clinton, D., & Birgegård, A. (2018). Emotion dysregulation and eating disorders—Associations with diagnostic presentation and key symptoms. *International Journal of Eating Disorders*, 51(8), 921–930.
- Monteleone, A. M., Cascino, G., Ruzzi, V., Pellegrino, F., Patriciello, G., Barone, E., ... Maj, M. (2021). Emotional traumatic experiences significantly contribute to identify a maltreated ecophenotype sub-group in eating disorders: Experimental evidence. *European Eating Disorders Review*, 29(2), 269–280.
- Narvey, C., Yang, J., Wolff, K. T., Baglivio, M., & Piquero, A. R. (2021). The interrelationship between empathy and adverse childhood experiences and their impact on juvenile recidivism. *Youth Violence and Juvenile Justice*, 19(1), 45–67.
- Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine*, 9(11). <https://doi.org/10.1371/journal.pmed.1001349>
- Podubinski, T., Lee, S., Hollander, Y., & Daffern, M. (2015). Evaluating the relationship between childhood abuse and neglect, interpersonal hostile-dominance, and aggression in psychiatric hospitals. *Journal of Aggression, Maltreatment & Trauma*, 24(9), 986–1001.
- Rabito-Alcón, M. F., Baile, J. I., & Vanderlinden, J. (2021). Mediating factors between childhood traumatic experiences and eating disorders development: A systematic review. *Children*, 8(2), 1–12. <https://doi.org/10.3390/children8020114>
- Sansone, R. A., & Sansone, L. A. (2007). Childhood trauma, borderline personality, and eating disorders: A developmental cascade. *Eating Disorders*, 15(4), 333–346.
- Senese, V. P., De Nicola, A., Passaro, A., & Ruggiero, G. (2018). The factorial structure of a 15-item version of the Italian Empathy Quotient Scale. *European Journal of Psychological Assessment*, 34(5), 344.
- Tchanturia, K., Brown, A., & Fleming, C. (2015). Thinking about emotions: CREST group. In *Brief group psychotherapy for eating disorders* (pp. 88–120). Routledge.
- Teicher, M. H., & Samson, J. A. (2016). Enduring neurobiological effects of childhood abuse and neglect. *Journal of Child Psychology and Psychiatry*, 57(3), 241–266. <https://doi.org/10.1111/jcpp.12507>
- Todisco, P., Meneguzzo, P., Garolla, A., Diomidous, E., Antoniadis, A., Vogazianos, P., & Tozzi, F. (2023). Understanding dropout and non-participation in follow-up evaluation for the benefit of patients and research: Evidence from a longitudinal observational study on patients with eating disorders. *Eating Disorders*, 31(4), 337–352. <https://doi.org/10.1080/10640266.2022.2135738>
- Trottier, K., & MacDonald, D. E. (2017). Update on psychological trauma, other severe adverse experiences and eating disorders: State of the research and future research direction. *Current Psychiatry Reports*, 19(8), 1–9. <https://doi.org/10.1007/s11920-017-0806-6>
- Trottier, K., Wonderlich, S. A., Monson, C. M., Crosby, R. D., & Olmsted, M. P. (2016). Investigating posttraumatic stress disorder as a psychological maintaining factor of eating disorders. *International Journal of Eating Disorders*, 49(5), 455–457.
- Watters, E. R., Aloe, A. M., & Wojciak, A. S. (2023). Examining the associations between childhood trauma, resilience, and depression: A multivariate meta-analysis. *Trauma, Violence, & Abuse*, 24(1), 231–244.
- Westwood, H., Kerr-Gaffney, J., Stahl, D., & Tchanturia, K. (2017). Alexithymia in eating disorders: Systematic review and meta-analyses of studies using the Toronto Alexithymia Scale. *Journal of Psychosomatic Research*, 99(June 2017), 66–81. <https://doi.org/10.1016/j.jpsychores.2017.06.007>