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Differences and similarities between children and adolescent exposed to interpersonal traumas with and without Intellectual Disability: An explorative study

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ABSTRACT

Background: Individuals with intellectual disability (ID) are more vulnerable to traumatic and stressful events, increasing their risk of developing post-traumatic stress disorder (PTSD).
Aims: This study aimed to investigate differences in psychopathology, post-traumatic symptoms, and adaptive functioning in a sample of Italian children and adolescents with and without ID. It also sought to determine whether the type of interpersonal trauma was associated with distinct psychopathological outcomes.
Methods and procedures: Sixty-six children and adolescents exposed to interpersonal trauma (physical/sexual abuse, domestic violence, and neglect), were selected and divided into two groups based on the presence or absence of ID. Assessment consisted of structured parent interviews and parent-reported questionnaires. For each scale, comparisons between subtests were performed.
Outcomes and results: Children and adolescents with ID were more likely to exhibit more severe post-traumatic symptoms, anxiety issues, social problems, and poorer adaptive functioning, with the exception of the practical domain, which appeared to be equally impaired in both groups. In terms of interpersonal trauma typology, exposure to physical/sexual abuse and domestic violence led to greater post-traumatic symptoms compared to neglect.
Conclusion and implications: Interpersonal trauma significantly affects children and adolescents, with or without ID, highlighting the need for tailored treatments for both groups.

1. Introduction

Exposure to traumatic events is widely recognized as a significant risk factor for psychopathology, including Post-Traumatic Stress Disorder (PTSD). According to the Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition (DSM-5) (American Psychiatric Association, 2013) the diagnosis of PTSD requires the satisfaction of specific criteria. These criteria encompass direct or indirect exposure to a traumatic event, accompanied by a constellation of symptoms, including intrusive memories or recollections of the event,

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persistent avoidance of trauma-related stimuli, alterations in thought or mood, and a state of hyperarousal (American Psychiatric Association, 2022). Prevalence rates of PTSD vary considerably across studies; according to the DSM-5, the disorder affects approximately 5 % of males and 10 % of females in the United States and can manifest at any age, though children and the elderly are particularly vulnerable (American Psychiatric Association, 2022). While most children and adolescents encounter some form of traumatic event during their early years (Copeland et al., 2007), the estimated prevalence of PTSD symptoms among this population ranges from 8 % to 16 % (Alisic et al., 2014; Copeland et al., 2007; Costello et al., 2002; Kilpatrick et al., 2013; Ogle et al., 2013). Effectively, not all individuals exposed to traumatic experiences develop post-traumatic symptoms. It has been suggested that the likelihood of developing PTSD depends on both genetic and environmental factors (Jovanovic et al., 2012; Ressler et al., 2022). While approximately 30–40 % of this risk is attributed to hereditary factors (Duncan et al., 2018), the individual's personal history and psychological factors play a significant role in modulating the regulation of fear and emotion (Ressler et al., 2022). Specifically, research suggests that the type (Kessler et al., 2017) and the severity of the trauma (R. J. McNally, 2009) are crucial factors, followed by an individual's susceptibility to PTSD (Bowman & Yehuda, 2004; Breslau, 2004; Kessler et al., 2005).

The literature distinguishes between two main types of trauma: (1) interpersonal trauma, which involves events perpetrated by individuals with the intent to harm or threaten, including abuse, maltreatment, and witnessing the killing of a family member or friend, and (2) non-interpersonal trauma, encompassing events such as illnesses and accidents (Ford et al., 2011; Woodward et al., 2015). It has been observed that the risk of developing PTSD is greater when exposed to interpersonal traumas. Furthermore, the severity of PTSD symptoms increases if exposure to interpersonal traumas is repeated over time (Kerig et al., 2009). Additionally, exposure during developmental stages heightens the risk of adverse mental health outcomes (Dube et al., 2006; English et al., 2005). For instance, Dunn et al., (2017) observed that exposure to maltreatment in early developmental stages doubles the risk of developing depressive symptoms and PTSD.

Cognitive level plays an important role in post-traumatic symptomatology: several studies indicate that higher levels of IQ (intelligent quotient) serve as a protective factor for mental health and post-traumatic outcomes (Breslau et al., 2006, 2013; Koenen et al., 2007; Storr et al., 2007). Moreover, numerous studies have shown that lower cognitive levels are associated with more severe symptoms of PTSD (R. J. McNally, 1995; Breslau et al., 2013; Esbensen & Benson, 2006). Effectively, intellectual disability (ID) is associated with a higher prevalence of psychiatric problems, with a frequency that appears to be approximately 2–4 times higher compared to the general population (S.-A. Cooper et al., 2007; Einfeld et al., 2006; Mazza et al., 2020; Totsika et al., 2022). Furthermore, individuals with ID are more susceptible to exposure to traumatic and stressful events, with significant associations particularly in cases of interpersonal violent victimization, including sexual and physical abuse (Focht-New et al., 2007; Fogden et al., 2016; Wigham & Emerson, 2015). A study by Jones et al. (2012) evidenced that children with ID are three times more likely to experience violence in their lives compared to children without ID. Additionally, there is evidence indicating that ID itself raises the probability of abuse by parents or caregivers (Spencer et al., 2005), with early exposure to stressful events increasing the severity of psychopathological manifestations also this population, including PTSD (Esbensen & Benson, 2006; Emerson & Hatton, 2007; Emerson, 2013).

It has been observed that the manifestations of PTSD in ID may differ from those observed in the general population, posing challenges for identification and accurate diagnosis (Bakken et al., 2014; Wigham & Emerson, 2015). For instance, some authors pointed out a higher prevalence of behavioral symptoms, such as aggression and anger outbursts as indicative of PTSD in individuals with ID (S. -A. Cooper et al., 2009; P. McNally et al., 2021). Additional post-traumatic manifestations commonly observed in ID include self-injurious behavior, non-compliance, social isolation, sleeping problems, and restlessness (Tomasulo & Razza, 2007; Mevissen & De Jongh, 2010). However, studies on children with mild and borderline ID report that post-traumatic manifestations are similar to those observed in individuals with normal IQ levels (Mevissen et al., 2014, 2016). These varied symptomatic presentations prompt questions regarding whether the criteria usually applied for the diagnosis of PTSD should be reconsidered for individuals with ID (Wigham et al., 2011; Rittmannsberger et al., 2019). This underscores the necessity for future research to investigate the relationship between the severity of ID and the clinical manifestations of PTSD, as well the presence of potential differences between adult and paediatric populations.

Moreover, the majority of research on individuals with ID who have experienced trauma focuses mainly on the potential development and symptomatic presentation of PTSD, limiting the understanding of the wider range of psychopathological effects that trauma may have on people with ID.

Additionally, while there is increasing evidence suggesting that early exposure to traumatic experiences as well as lower IQ entail greater risks of developing psychopathology and more severe PTSD symptoms, there are still limited data exploring these aspects in paediatric populations. Moreover, the majority of existing studies have predominantly been conducted in English-speaking countries (Balogh et al., 2001; Firth et al., 2001; Esbensen & Benson, 2006; S. -A. Cooper et al., 2009; Breslau et al., 2013), potentially limiting the generalizability of the findings to other countries and cultures, given the significant influence of social and cultural factors alongside genetic and psychological factors in various psychopathological manifestations and outcomes. Considering the above, our study aims to investigate the differences and similarities between Italian children and adolescents with and without ID who have been exposed to interpersonal traumas, exploring a broader spectrum of trauma-related psychopathological symptomatology. To our knowledge, our study represents the first Italian investigation conducted on paediatric population exposed to interpersonal traumatic experiences, both with and without ID. Specifically, our work aims to:

- Observe whether, in our Italian sample, children and adolescents with ID exhibit more significant impairments in adaptive functioning and psychopathological symptoms compared to typically developing individuals exposed to the same interpersonal trauma.

- Determine if there is a distinct pattern of externalizing symptoms following exposure to traumatic events in children and adolescents with ID compared to typically developing individuals.
- Investigate whether different types of trauma result in differences in psychopathological outcomes both in children with ID and in typically developing individuals.

2. Materials and methods

2.1. Participants

In this retrospective study were recruited sixty-six children and adolescents exposed to trauma aged 6–16 years, who attended the Child and Adolescents Neuropsychiatry Unit of the Bambino Gesù Children's Hospital (Rome, Italy). Specifically, the retrospective data were extracted from records extracted from a dedicated database collecting pseudo-anonymized data created for medical practice and refer to a period between 2018 and 2023. Inclusion criteria consisted of (1) being exposed to traumatic events, (2) IQ $\geq$ 40, and (3) no prior evaluation after the experience of trauma. We excluded (1) patients currently undergoing pharmacological or psychological treatment, (2) those diagnosed with Autism Spectrum Disorders, and (3) those with severe ID. The final sample was divided into two main groups aligned by age: a) participants exposed to interpersonal traumatic experiences without ID (ETI group); b) participants exposed to interpersonal traumatic experiences with mild and medium ID (ETI+ID group). Furthermore, interpersonal traumas experienced by both groups were classified into three distinct groups: 1) physical and sexual abuse; 2) domestic violence; and 3) neglect. In the end, six different subgroups distinguished by IQ (ID vs without ID) and type of trauma were obtained. Table 1 summarizes the demographic data, including IQ, general adaptive composite scores, and psychiatric history, which refers to a positive family history of psychiatric disorders (i.e., anxiety, depression, psychosis, etc.)

The assessment was conducted by a team of trained and specialized child and adolescents psychiatrists and psychologists. It comprised the collection of medical history, clinical observations, standardized evaluations, parent interviews and parent-reported questionnaires. All the tests listed and described below were administered during routine clinical activities, typically spanning three working days. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the local Ethics Committee (practice number 3188/2023, protocol number 827, approval date: March 3, 2023).

2.2. Measures

2.2.1. Cognitive assessment

Cognitive development was assessed through Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) (Wechsler et al., 2019), Raven Colored Progressive Matrices (CPM) (Leavitt, 2011), Standard Progressive Matrices (SPM) (De Lemos & Raven, 1989), and Leiter International Performance Scale – Third Edition (Leiter-3) (Roid & Miller, 2013).

WISC-IV is the most widely used intelligence test for assessing the cognitive abilities of children aged 6–16 years and 11 months, with a particular focus on fluid intelligence, working memory, and processing speed. The test evaluates the general IQ, which represents the child's overall cognitive abilities, and includes four indices that assess performance in specific areas: Verbal Comprehension, Perceptual Reasoning, Working Memory and Processing Speed. Cronbach's alpha for WISC –IV ranges from.94 to.97.

CPM and *SPM* assess abstract reasoning and provide a nonverbal estimate of fluid intelligence. CPM comprises 36 nonverbal items and is administered to individuals aged 5–11 years. SPM consists of 60 nonverbal items and is administered to individuals aged 11 years to elderly. The tests demonstrates good internal consistency, with Cronbach's alpha ranging from.80 to.90 for the SPM and from.71 to.90 for the CPM.

Leiter-3 is a nonverbal test designed to measure IQ and cognitive ability across a broad age range, from 3 to 80 years. It emphasizes fluid and nonverbal reasoning, making it particularly suitable for individuals with speech disorders, non-native Italian speakers, or those with brain injuries or degenerative diseases. Cronbach's alpha for the Leiter-3 ranges from.94 to.98.

2.2.2. Adaptive functioning

Adaptive Behavior Assessment System - Second Edition (ABAS II) (Ferri et al., 2014). The ABAS II is a standardized questionnaire

Table 1
Demographic characteristics.

Group	Mean Age	Gender N° M/F	Psychiatric familiarity (%)	N° subjects for type of trauma		Age Range	Average IQ	IQ range	GAC M (SD)
ETI	11.04	15 M	48.5 %	**1**	10	6.94 – 16.47	103	87 – 120	78.8 (21.8)
		18 F		**2**	10	7.28 – 16.49	98	86 – 119	68.2 (18.7)
				3	13	6.07 – 15.24	111	85 – 135	88.0 (21.4)
ETI+ID	11.60	14 M	51.5 %	**1**	10	6.76 – 16.26	61	40 – 69	71.6 (9.8)
		19 F		**2**	10	7.41 – 16.53	57	40 – 70	74.4 (18.2)
				3	13	7.00 – 16.54	58	40 – 70	64.6 (8.7)

ETI: participants exposed to interpersonal traumatic experiences without ID; ETI + ID= participants exposed to interpersonal traumatic experiences with mild and medium ID; 1= physical and sexual abuse; 2 domestic violence abuse; 3= neglect; IQ= intelligent quotient; M=mean; SD= standard deviation; GAC= general adaptive composite.

that evaluates adaptive skills in children from birth to 21 years of age.

The instrument examines ten adaptive areas categorized into three domains: conceptual (communication, preschool/school skills, self-control), social (play/leisure, socialization) and practical (self-care, home/school life, use of the environment, health and safety, work). Additionally, motor skills are assessed, limited to children aged 0–5 years. The instrument yields a global adaptive score (GAC).

Normative data indicate composite scores for overall adaptive functioning (GAC), conceptual (DAC), social (DAS) and practical (DAP) domains, with a mean (M) ± standard deviation (SD) normal range 100 ± 15. Similarly, the nine subscales have a mean ± standard deviation normal range 10 ± 3. The reliability coefficient for the various adaptive domains ranges from.91 to.98.

2.2.3. Behavioural and psychopathological assessment

2.2.3.1. Child behavior checklist (CBCL). The CBCL (Achenbach & Rescorla, 2001) is a parent/ caregiver report form to screen for emotional, behavioral, and social problems. The school-age version (CBCL/6–18) is for children aged 6–18 years. Responses provided by parents enable the calculation of three different macroscales: *Syndrome Scale* (which included Emotionally Reactive, Anxious/-Depressed, Somatic Complaints, Withdrawn, Sleep Problems, Attention Problems, and Aggressive Behavior scales), *Internalizing, Externalizing, Total Problems, Other problems scales* and *DSM-Oriented Scales* (which included Affective Problems, Anxiety Problems, Pervasive Developmental Problems, Attention Deficit/Hyperactivity Problems, Oppositional Defiant Problems scales). According to the ASEBA Assessment Data Manager (ADM), for *Syndrome Scale Scores* and for *DSM-Oriented Scales*, a t-score $\leq$ 64 indicates non-clinical symptoms ("non-clinical"), a t-score between 65 and 69 indicates that the child is at risk for problem behaviours ("borderline"), and a t-score $\geq$ 70 indicates clinical symptoms ("clinically-relevant"). For *Internalizing, Externalizing, Total Problems, Other problems scales*, a t-score $\leq$ 59 indicates non-clinical symptoms ("non-clinical"), a t-score between 60 and 63 indicates that the child is at risk for problem behaviours ("borderline"), and a t-score $\geq$ 64 indicates clinical symptoms ("clinically-relevant"). Cronbach's alpha for the CBCL is.80.

2.2.3.2. Schedule for affective disorders and schizophrenia for school aged children present and lifetime version DSM-5 (K-SADS-PL). The K-SADS-PL (Sogos & Kaufman, 2013) is a semi-structured diagnostic tool designed to identify current and lifetime psychopathological and psychiatric symptoms in children and adolescents based on the DSM-5 criteria. The interview is conducted separately with children and their parents. In specific cases such us ID, the parent is considered the main source of information regarding the child. If general symptoms emerge during the screening interview, questions from the appropriate supplement are used to verify the diagnosis. Each subscale within the interview is scored as follows: '0' for no available information, '1' if the symptom is absent, '2' for sub-threshold symptoms, and '3' for meeting threshold criteria." The interview demonstrated good diagnostic reliability, with inter-rater reliability values exceeding.90.

2.2.4. Post-traumatic symptomatology

2.2.4.1. Trauma symptom checklist for young children (TSCYC). The TSCYC (Briere et al., 2001) is a 90-item caregiver questionnaire designed to assess trauma symptoms in children aged 3–12 years. It calculates two validity scales, such as Response Level (RL) and Atypical Response (ATR), and nine clinical scales: Anxiety (ANX), Depression (DEP), Anger/Aggression (ANG), Posttraumatic Stress-Intrusion (PTS-I), Posttraumatic Stress-Avoidance (PTS-AV), Posttraumatic Stress-Arousal (PTS-AR), Post-traumatic Stress-Total (PTS-TOT), Dissociation (DIS) and Sexual Concerns (SC). Raw scores were converted into t-scores. A T-score $\leq$ 64 indicates the absence of clinical symptoms, T-scores falling between 65 and 69 suggest that the child is at risk, and T-scores $\geq$ 70 are considered indicative of clinical symptoms. The test demonstrates good internal consistency, with an average scale alpha of.87. Chronbach's alpha for each clinical scale is reported below: ANX.86, DEP.84, ANG.91, PTS-I.87, PTS-AV.82, PTS-AR.85, PTS-TOT.93, DIS.91, SC.81.

2.2.4.2. Trauma symptom checklist for children (TSCC). The TSCC (Briere et al., 2011) is a 54-item self-report questionnaire designed to evaluate posttraumatic stress symptoms in children and adolescents aged 8–16 years. It includes two validity scales, Underresponse (UND) and Hyperrresponse (HYP) and six clinical scales: Anxiety (ANX), Anger (ANG), Depression (DEP), Dissociation (DIS), Post-traumatic Stress (PTS), and Sexual Concerns (SC). Additionally, there are two subscales for Sexual Concerns (Sexual Preoccupation SC-P and Sexual Distress SC-D) and Dissociation (Fantasy DIS-F and Overt Dissociation DIS-O). Raw scores were converted into t-scores. For the initial five scales (ANX, ANG, DEP, DIS, PTS), T-scores $\geq$ 65 are deemed clinically significant, whereas T-scores ranging from 60 to 64 are considered clinically relevant. For the SC scale, the threshold is set at T-scores $\geq$ 70, with scores between 65 and 70 considered relevant. The instrument demonstrates good reliability and validity, with norms available based on age and gender, and an overall scale alpha of.84 (Briere, 1996). Chronbach's alpha for each clinical scale is as follows: ANX.82, DEP.86, ANG.89, PTS.87, DIS.83, SC.77.

3. Statistical analyses

All statistical analyses were performed using JAMOVI software version 2.3.26.0. Descriptive analyses were performed to characterize groups of participants (all descriptive statistics are reported in Table 1S). Statistical analyses were performed using two-way analyses of variance - ANOVA (factors "diagnosis" and "type of trauma" and their interaction), followed by Bonferroni's test where appropriate. Before conducting univariate analysis, we provided requested assumptions, including homogeneity of variance,

independence of observations, and normal distribution of the dependent variable (Tabachnick & Fidell, 2019). However, we did not conduct a power analysis beforehand, as our research was exploratory and lacked a directional hypothesis, primarily focusing on the distinctiveness of our sample.The proportion of total variance accounted for by the independent variables was calculated using partial eta squared ($p\eta^2 \leq 0.06$ = small; 0.06–0.14 = medium, 0.14 ≥ large) (Cohen, 2013). $P < 0.05$ was considered statistically significant.

4. Results

4.1. ABAS-II

4.1.1. Descriptive analysis

The ABAS II was completed by caregivers of 65 out of 66 children and adolescents included in the study. Descriptive statistics (M, SD) are reported in Table 1 and Table 2S. Overall, both the ETI+ID group and the ETI group exhibited scores below the norm across GAC (respectively: M = 69.7 SD = 12.8, M = 79.9 SD = 21.7) and its three subdomains: DAC (respectively: M = 71.7 SD = 11.6, M = 83.9 SD = 20.6), DAS (respectively: M = 69.5 SD = 16.5, M = 81.7 SD = 20.0) and DAP (respectively: M = 73.5 SD = 18.0, M = 79.7 SD = 22.9). Specifically, within the ETI+ID group, DAS showed the lowest mean scores, particularly among those exposed to physical/psychological abuse and neglect (M = 64.8 SD = 6.6). Conversely, within the ETI group, lower scores were observed in DAP, particularly among those exposed to domestic violence (M = 66.2 SD = 25.7).

4.1.2. Comparative analysis

The results of ANOVA depicted a significant interaction between diagnosis and type of abuse in GAC domain. Specifically, the subgroup with a history of neglect in the ETI group demonstrated better functioning compared to the neglect subgroup in the ETI+ID group ($F_{(2,1)} = 4.02$ $p < 0.05$; $p\eta^2 = 0.12$; mean difference=23.34 $p < 0.05$; Cohen's d+= 1.35). Additionally, a significant difference in the mean scores of DAC and DAS, associated with the type of diagnosis presented, was identified: the ETI+ID group displayed greater impairment in conceptual and social functioning compared to the ETI group (DAC $F_{(2,1)} = 7.16$ $p < 0.05$; $p\eta^2 = 0.11$; DAS $F_{(2,1)} = 6.48$ $p < 0.05$; $p\eta^2 = 0.09$) (Table 2; also see Table 3S for all statistics).

4.2. CBCL 6–18

4.2.1. Descriptive analysis

The CBCL 6–18 was completed by caregivers of 65 out of 66 participants enrolled in the study. Regarding Internalizing, Externalizing and Total problems scales, we found the following results: the ETI group demonstrated clinical scores in Internalizing Problems scale (M = 64.0 SD = 11.6), and bordering scores in Externalizing and Total Problems scales (respectively: M = 62.3 SD = 12.3, M = 63.9 SD = 12.1). The ETI+ID group exhibited clinically significant scores in Total Problems scale (M = 65.5 SD = 8.8), with bordering scores in the Internalizing and Externalizing problem scales (respectively: M = 63.5 SD = 9.5, M= 62.4 SD = 9.9).

Furthermore, the ETI+ID group scored within the borderline range in Social Problems and Attention Problems scales (respectively: M = 67.5, SD = 9.4; M = 66.7, SD = 9.5). Regarding the DSM-IV-oriented scale, both the ETI group and ETI+ID group exhibit borderline scores in the Depressive Problems scale (respectively: M = 65.5, SD = 10.8; M = 65.0, SD = 8.4). Additionally, the ETI+ID

Table 2
Comparisons of measures among ETI subgroups and ETI + ID subgroups.

Measure	ETI subgroups M (DS)		ETI + ID subgroups M (DS)	Post Hoc Comparisons
ABAS II GAC	**1**	78.8 (21.8)	71.6 (9.8)	ETI 3 > ETI + ID 3*
	2	68.2 (18.7)	74.4 (18.2)	
	3	88.0 (21.4)	64.6 (8.7)	
ABAS II DAC	**1**	84.0 (19.0)	75.0 (10.5)	ETI > ETI + ID*
	2	74.8 (17.3)	73.9 (12.9)	
	3	90.5 (22.9)	67.3 (11.1)	
ABAS II DAS	**1**	84.1 (16.9)	66.3 (23.6)	ETI > ETI + ID*
	2	72.3 (20.2)	78.4 (14.2)	
	3	87.1 (20.8)	64.8 (6.6)	
CBCL 6-18 Social Prob	**1**	62.1 (11.0)	69.2 (1.8)	ETI + ID > ETI*
	2	60.6 (9.2)	65.8 (6.8)	
	3	62.2 (7.9)	67.5 (10.5)	
TSCYC ANX	**1**	50.6 (6.2)	74.0 (24.5)	ETI + ID > ETI**
	2	55.2 (8.3)	68.8 (21.1)	
	3	54.2 (4.9)	60.5 (12.9)	
TSCYC PTS-TOT	1	56.4 (14.0)	80.7 (23.0)	ETI + ID > ETI**
	2	64.2 (10.0)	90.2 (21.8)	2 > 3*
	3	57.7 (8.4)	59.8 (8.3)	

ETI: participants exposed to interpersonal traumatic experiences without ID; ETI + ID= participants exposed to Interpersonal traumatic experiences with mild and medium ID; 1= physical and sexual abuse; 2 domestic violence; 3= neglect; M=mean; GAC= general adaptive composite; DAC= conceptual adaptive domain; DAS= social adaptive domain; Social Prob= social problems; ANX= anxiety; PTS-TOT= post-traumatic stress-total *$p < 0.05$, **$p < 0.01$ **, $p < 0.001$***

group obtained borderline scores in Anxiety Problems (M = 65.1, SD = 7.0). Finally, the 2007 Scales indicate scores falling within the borderline range in the Stress Problems scale for both ETI group and ETI+ID group (respectively: M = 66.2, SD = 10.3; M = 67.8, SD = 9.6). For all sub-groups' statistics consult Table 1S.

4.2.2. Comparative analysis

We found a statistical difference only in the Syndrome Scales. Specifically, a significant difference related to the diagnosis was found in the Social Problems scale, where the ETI+ID group presents greater impairments (Social Problems: $F_{(2,1)} = 6.15$ $p < 0.05$; $p\eta^2 = 0.09$ (Table 2; also see Table 3S for all statistics).

4.3. K-SADS-PL

4.3.1. Descriptive analysis

The K-SADS-PL was administered to 65 out of 66 subjects in our cohort. Our analysis did not reveal any specific symptomatology associated with either of the two groups analyzed. However, traits indicative of and depressive disorder were observed in the ETI group (42 % with separation anxiety disorder and 36 % with depressive disorder) and traits suggestive of post-traumatic stress disorder were identified in both groups (45 % in ETI group and 36 % in ETI+ID group). Upon examining individual subgroups, it was found that the subgroup with a history of domestic violence in the ETI group displayed symptomatology consistent with separation anxiety disorder (70 %). Furthermore, the subgroups with a history of domestic violence (70 %) and physical/sexual abuse (70 %) in the ETI group, as well as the subgroup with physical/sexual abuse (80 %) in the ETI+ID group, exhibited symptomatology indicative of post-traumatic stress disorder (Table 1S).

4.3.2. Comparative analysis

A significant difference was found in the symptomatology related to separation anxiety disorder concerning diagnosis: individuals in the ETI group exhibited symptomatology consistent with separation anxiety disorder, which did not appear to be present in the ETI+ID group ($F_{(2,1)} = 5.41$ $p < 0.05$; $p\eta^2 = 0.08$). Additionally, a main effect of diagnosis on "enuresis" was found, with ETI group exhibiting a greater symptomatology that ETI +ID ($F_{(2,1)} = 7.12$ $p < 0.05$; $p\eta^2 = 0.10$). Finally, a significant difference in PTSD scale emerged based on the type of trauma experienced, independent of diagnosis: individuals with a history of physical/sexual abuse exhibited greater post-traumatic symptoms compared to those with neglect ($F_{(2,1)} = 15.71$ $p < 0.001$; $p\eta^2 = 0.34$); specifically, the post-hoc Bonferroni correction indicated a greater symptomatology in the subgroups with a history of physical/sexual abuse and domestic violence compared to the one with a history of neglect (respectively: mean difference= 0.67, $p<0.001$; Cohen's d+= 1.64; mean difference= 0.42, $p<0.01$; Cohen's d+= 1.03) (Table 2; also see Table 3S for all statistics).

4.4. TSCYC and TSCC

4.4.1. Descriptive analysis

The TSCYC questionnaire was completed by caregivers of 29 out of 43 children aged between 6 and 12 years. Descriptive statistics are reported in Table 1S.

In relation to the TSCYC, the ETI+ID group achieved clinically significant scores in the Post-traumatic Stress-Total scale (M = 77.7, SD = 21.9) and borderline scores in the Anxiety scale (M = 67.3, SD = 18.5). Within the ETI+ID group, the subgroup with a history of physical/sexual abuse demonstrated clinically significant scores in the ANX, PTS TOT, and SC scales. The subgroup exposed to domestic violence showed clinically significant scores in the PTS TOT scale and borderline scores in the ANX scale. However, no clinical scores were reported in the subgroup with a history of neglect. In contrast, the ETI group did not exhibit clinically significant or borderline scores in any scale. Descriptive analyses of different subgroups reveal scores falling within the at-risk range for the subgroup with a history of neglect in the ANG scale (M = 66.8, SD = 25.1) and the subgroup victimized by physical/sexual abuse in the SC Scale (M = 65.0, SD = 19.79). Finally, the subgroup with a history of physical/sexual abuse and neglect in the ETI+ID group obtained at-risk scores in the ANX Scale and PTS TOT Scale (respectively: M = 63.0, SD = 10.5; M = 61.8, SD = 13.3).

4.4.2. Comparative analysis

Regarding the TSCYC, clinically significant differences were found concerning the type of diagnosis in ANX and PTS TOT Scale. Indeed, despite similar adverse traumatic experiences, individuals with ID exhibit statistically significant greater scores in the ANX and PTS TOT scales (respectively, $F_{(2,1)} = 8.08$ $p < 0.01$; $p\eta^2 = 0.26$; $F_{(2,1)} = 9.97$ $p < 0.01$; $p\eta^2 = 0.32$). Finally, a main effect of type of trauma was found in PTS TOT Scale ($F_{(2,\ 1)} = 4.17$ $p < 0.05$; $p\eta^2 = 0.26$); specifically, individuals with a history of domestic violence experience greater post-traumatic consequences compared to those with neglect (mean difference= 18.47, $p<0.05$; Cohen's d+= 1.27) (Table 2; also see Table 3S for all statistics).

5. Discussion

Our study aimed to analyse differences in psychopathological manifestations and adaptive functioning between children with and without ID who have experienced interpersonal traumas. Additionally, the study intended to determine if there was a distinct pattern of externalizing symptoms in the ID group compared to the non-ID group. Finally, the study aimed to investigate whether the type of interpersonal trauma (physical/sexual abuse, domestic violence, and neglect) was associated with distinct psychopathological

outcomes in both cohorts. To our knowledge, this is the first research among Italian paediatric participants with and without ID exploring a wide range of psychological effects of exposure to interpersonal trauma.

Taking into account adaptive functioning, notable deficits are generally observed in both ETI and ETI+ID groups. However, a significant disparity is noted in DAS and DAC, which are both significantly lower in individuals with ID. These results are not surprising considering that for the diagnosis of ID impairment in at least one area of adaptive functioning is required (American Psychiatric Association, 2013, 2022). Consequently, the heightened difficulties experienced in the ID group may be attributed to the substantial limitations inherent in ID-related adaptive behaviour. Concurrently, the lower scores observed in the non-ID group could be associated with the repercussions of exposure to interpersonal traumatic events, which, as evidenced in various studies, results in disruptions to developmental trajectories, including deficits in social and adaptive functioning (Lee & Hoaken, 2007; Schatz & Lounds, 2007; Shonk & Cicchetti, 2001; Teisl & Cicchetti, 2008; Viezel et al., 2014). However, a surprising observation concerns the absence of significant differences between the two groups in the practical domain, encompassing skills such as self-care, household item management, time management, basic travel, and financial management. Moreover, the overall functioning of the two groups does not exhibit notable differences, except for the subgroup with a history of neglect, where the presence of ID is associated with more pronounced impairments in overall adaptive functioning. These findings underscore the significant impact of exposure to interpersonal traumas on individual functioning (Viezel et al., 2014) and suggest that the practical domain may be particularly vulnerable (Mevissen et al., 2016). Consistent with our study findings, the presence or absence of ID does not seem to result in differences in practical skills and activities of daily living. We speculate that in individuals with normal IQ exposed to traumatic experiences, the basic skills necessary for everyday life, which should be acquired through development, instead seem to undergo significant regression. Specifically, we hypothesize that a major setback occurs in self-care and in the ability to manage one's health and safety. Traumatic experiences, especially if repeated over time, may lead, at a conscious or unconscious level, to negative self-perceptions of not being deserving of care and love (Van Der Kolk, 2005; Van Der Kolk & Courtois, 2005), resulting in neglectful behaviors towards one's own health and overall well-being. This can manifest in functioning patterns similar to those observed in individuals with ID. However, the limited sample size restricts the generalizability of these results to the broader population, and the existing literature is limited (Mevissen et al., 2014, 2016). This underscores the need for further studies that include larger samples and consider the possibility of assessing individuals' cognitions and perceptions of themselves.

Regarding psychopathological manifestations, no substantial differences between the two groups were depicted. Both cohorts exhibit clinical and/or borderline scores in the internalizing, externalizing, and total scales of the CBCL without statistically significant variances. Taking into account post-traumatic symptomatology, both the CBCL and K-SADS do not detect significant distinctions between the two groups: caregivers from both cohorts report scores indicative of risk on Stress Problems Scale and identify the presence of PTSD traits through the semi-structured interview. However, significant differences between the ETI group and the ETI+ID group are evident in the TSCYC: individuals with ID display more pronounced post-traumatic symptomatology compared to those without ID. This findings aligns with existing literature, which suggests that the presence of cognitive deficits is associated with more severe symptoms of PTSD and, more broadly, with more severe psychopathological presentations (R. J. McNally, 1995; Breslau et al., 2006; Esbensen & Benson, 2006; Koenen et al., 2007; Storr et al., 2007; Breslau et al., 2013).

Additionally, other psychopathological differences identified between the two groups include a heightened presence of social difficulties in the ID group, as indicated by the CBCL. This finding may be attributed to the inherent presence of ID, which, regardless of the presence or absence of traumatic experiences, is associated with challenges in interpersonal relationships (Bertelli et al., 2016). Moreover, the ID group demonstrates a higher prevalence of anxious manifestations compared to the non-ID group, as indicated by the TSCYC; this manifestations may be elucidated by both the presence of ID itself (Mazza et al., 2020), which is frequently linked to anxious symptomatology, and to the heightened vulnerability of individuals with ID following exposure to stressful events (Mevissen et al., 2016; Mevissen & De Jongh, 2010).

In contrast, the ETI group appears to manifest more pronounced symptoms related to separation anxiety and enuresis (K-SADS scores). Although these symptoms do not meet clinical thresholds, they seem to be more evident in individuals without ID. The presence of separation anxiety following traumatic events is well-documented in the literature, highlighting that PTSD is not the only disorder resulting from such events (Auxéméry, 2018). Anxious symptoms, including separation anxiety, can manifest in both adults (Shear et al., 2006; Silove et al., 2010) and children (Hoven et al., 2005; Scheeringa & Zeanah, 2008). Enuresis can also occur as a consequence of exposure to trauma; various studies conducted on children with enuresis report that they have been more exposed to stressful events, leading to greater psychological and emotional vulnerability (Castillo & Pham, 2024; El Sayed Hassan Ibrahim El-Azzab et al., 2023; Joinson et al., 2016).

Despite the previously described differences, no distinct pattern of externalizing symptoms was found between the two cohorts, since both exhibited similar behavioural manifestations in cases of mild and moderate ID. This finding aligns with previous, albeit limited, studies on children, which indicated that post-traumatic manifestations in mild and borderline ID, as reported by caregivers, were comparable to those observed in children with typical IQ levels (Mevissen et al., 2014, 2016; Fletcher et al., 2016), contrasting with other studies conducted on adults that highlighted increased behavioural manifestations in individuals with ID exposed to trauma (S. -A. Cooper et al., 2009; P. McNally et al., 2021). It is plausible to speculate that the presence of mild and moderate ID, wherein verbal abilities are present albeit exhibiting fragility, may yield similar post-traumatic outcomes compared to severe ID, characterized by pronounced linguistic impairments that can lead to more severe behavioural manifestations. These findings underscore the importance of distinguishing between the severity of ID and the psychopathological manifestations in adulthood and those in childhood and adolescence, paving the way for further studies to analyse how symptomatology evolves over time.

In terms of interpersonal trauma typology, significant differences in post-traumatic manifestations emerge, regardless of the presence of ID: K-SADS and TSCYC results indicate that exposure to physical/sexual abuse, and particularly to domestic violence, leads

to greater post-traumatic symptoms compared to neglect. A central role may be attributed to the higher acceptance of neglect compared to other forms of child maltreatment (Bartoli et al., 2024). Neglect entails the caregiver's failure to provide the stimuli and interactions necessary for healthy child development (World Health Organization, 1999; Pollak, 2008). This parental failure is often associated with other stressful conditions such as unemployment, social deprivation, poverty, or economic crisis, factors that could lead to greater acceptance of neglect, which may not be perceived as direct caregiver rejection (Music, 2016). For instance, the cross-cultural study conducted by Bartoli et al. (2024) observed the moderating role of neglect acceptance in attenuating post-traumatic symptomatology, underscoring the importance of early neglect identification and provision of adequate prevention and intervention measures.

To the best of our knowledge, our study represents the first attempt to analyse the effects of exposure to interpersonal traumas in the Italian paediatric population, examining potential disparities between individual with and without ID. Overall, as previously discussed, significant differences were not observed between the two cohorts in terms of adaptive and psychopathological aspects. This finding highlights the need for further investigation, including larger sample sizes to ascertain the generalizability of our results. In this regard, it is important to emphasize that both children and adults with ID continue to be systematically excluded from clinical research aimed at understanding psychopathology and assessing the effectiveness of behavioral interventions. This exclusion limits their access to widely available psychological treatments (Totsika et al., 2022). Moreover, in clinical practice, a phenomenon known as "diagnostic overshadowing" is prevalent, where emotional and behavioral problems in individuals with ID are often attributed solely to their ID, preventing clinicians from making accurate and timely diagnoses (Fletcher, 2018). Additionally, there are different studies supporting the behavioural equivalents hypothesis for mental health problems in people with ID, which indicates that in some cases challenging behaviours in ID can be considered as atypical presentations of psychopathology (Painter et al., 2018; Bakken, 2021). This is particularly evident in conditions such as PTSD, which often goes unrecognized in individuals with ID (Mevissen & De Jongh, 2010). These observations indicate that assessments should always be carried out by clinicians with expertise in the field of ID.

Our findings, which reveal similarities in psychopathological manifestations between children with and without ID, further demonstrate that the exclusion of children with cognitive deficits from research is both discriminatory and unjustified. Psychiatric disorders affect individuals with and without ID, showing overlapping features alongside some differences. Therefore, behavioral interventions should not exclude those with cognitive deficits but instead be adapted to meet their needs. Indeed, given the similarities in post-traumatic outcomes observed between the two populations, it is essential that evidence-based trauma treatments used for individuals with typical cognitive functioning are adapted for those with ID, taking into account their additional cognitive challenges. Such adaptations may involve modifications to the duration of the therapy, the therapeutic approach, and the tools employed, with potential involvement of family members or caregivers to improve the effectiveness of the treatment. Numerous psychotherapeutic interventions have demonstrated efficacy in treating trauma-related conditions like PTSD in individuals with typical IQ (Gkintoni et al., 2024). Nevertheless, there is growing evidence that treatments such as EMDR (Eye Movement Desensitization and Reprocessing) and CBT (cognitive-behavioral therapy) show promise for people with ID, despite being primarily studied in adults (Mevissen & De Jongh, 2010; Mevissen et al., 2011; P. McNally et al., 2021; Byrne, 2022).

Therefore, it is of critical importance to promote the specialized training of therapists in understanding trauma and its impact on children and adolescents with ID, both in terms of assessment and treatment, to facilitate early identification and improve access to targeted intervention.

6. Study limitations and conclusions

Although this study holds significant implications for the mental health field concerning children and adolescents, several limitations are worth noting. The primary limitation is the small sample size, which could affect the robustness of the findings and the generalizability of the conclusions. These constraints provide avenues for improvement in future research. A second limitation pertains to the absence of data regarding adaptive functioning and psychopathology before the traumatic event; on the other side, children and adolescents typically present to our service only following the trauma. An additional limitation relates to the difficulty in determining the time interval between exposure to the traumatic event and the psychopathological assessment. However, it should be noted that the study sample consists of individuals accessing hospital services for the first time and lacking previous treatment. Moreover, the questionnaires employed (CBCL, TSCYC and TSCC) are not specifically designed to detect emotional and behavioral issues in children and adolescents with ID, potentially limiting the identification of characteristic behavioral aspects in individuals with ID. However, it has been reported that the CBCL can be utilized for assessment in case of mild ID, as compared to moderate, severe or profound ID (Koskentausta et al., 2004).

Despite these limitations, the present study has important clinical implications and underscore the importance of conducting a comprehensive assessment of psychopathological outcomes in children and adolescents who have experienced traumatic events, regardless of their cognitive status, including both those with normal cognitive levels and those with ID. This is essential for proposing suitable and effective interventions. In this direction, longitudinal studies examining the evolution of symptomatology over time in children exposed to trauma, especially to those undergoing psychotherapy interventions, should be pursued.

Ethics statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the local Ethics Committee (practice number 3188/2023, protocol number 827, approval date: March 3, 2023).

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CRediT authorship contribution statement

Stefano Vicari: Writing – review & editing, Supervision, Project administration, Data curation. **Paolo Alfieri:** Writing – review & editing, Supervision, Investigation. **Paola De Rose:** Writing – review & editing, Investigation, Conceptualization. **Federica Alice Maria Montanaro:** Writing – review & editing, Writing – original draft, Formal analysis. **Veronica Sperandini:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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Informed consent statement

Informed consent was obtained from the legal guardians or next of kin of all subjects involved in the study.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ridd.2024.104860.

Data Availability

Data will be made available on request.

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