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Research paper

Anhedonia mediates the relationships between childhood trauma and symptom severity of PTSD and depression, but not of social anxiety

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A B S T R A C T

Background: Childhood trauma is a risk factor for developing multiple forms of psychopathology, including depression, posttraumatic stress disorder (PTSD), and social anxiety. Yet, the mechanisms linking childhood trauma and these psychopathologies remain less clear.
Objective: Here we examined whether anhedonia, a reduced ability to experience pleasure, may mediate the relationship between childhood trauma and symptom severity of depression, PTSD, and social anxiety.
Methods: A total of 230 trauma-exposed participants aged 18–75 were assessed for lifetime trauma exposure, including general and childhood traumatic events, anhedonia, and symptoms of depression, PTSD, and social anxiety.
Results: Controlling for age, gender, and general lifetime trauma exposure, mediation analyses revealed a significant mediation effect of anhedonia for the relationship between childhood trauma and symptom severity of depression and PTSD, but not social anxiety. To better understand these significant mediation effects, we repeated the analyses separately for childhood abuse and neglect, and then for the various subtypes of each type of childhood trauma. Results showed a significant mediation effect of anhedonia on symptoms of both depression and PTSD in individuals who reported high emotional and sexual abuse levels. F Anhedonia was also found to mediate the relationship between both emotional and physical neglect and symptoms of depression and PTSD.
Conclusion: These findings refine our understanding of the ways in which childhood traumatic experiences may be associated with different mental health problems by increasing anhedonia. Anhedonia may be an important treatment target in survivors of childhood abuse and neglect.

Approximately one in four children experiences childhood trauma, with abuse and neglect being two of its most prevalent forms (Brown et al., 2023). Childhood trauma constitutes a significant risk factor for the development of mental health problems later in life, including depression, post-traumatic stress disorder (PTSD), and social anxiety (Haim-Nachum et al., 2022; Fan et al., 2021; McLaughlin et al., 2012; McLaughlin and Lambert, 2017; for review, see Li et al., 2016; McKay et al., 2021; Pfaltz et al., 2022; Yap et al., 2014). However, the mechanisms by which childhood trauma may lead to these psychopathologies are yet to be fully understood. One potential mechanism that seems worth exploring is that of anhedonia — decreased pleasure from, or reduced interest in, activities that were once experienced as enjoyable (American Psychiatric Association, 2013). Past research has shown anhedonia to be associated with both childhood trauma and psychopathology (Fan et al., 2021; Sonmez et al., 2021). Specifically, anhedonia has shown to be associated with symptom chronicity, severity, and poor remission across various forms of psychopathology (Shankman et al., 2014; for reviews, see McLaughlin and Sheridan, 2016; Pizzagalli, 2014). Conversely, reduced risk for mental health problems including depression (Dennison et al., 2016) and PTSD (Risbrough et al., 2018), was found to be linked to the ability to enjoy positive and rewarding experiences, both at the neural and behavioral levels (Corral-Frias et al., 2015; Feldman, 2017; Morgan et al., 2022; Pizzagalli, 2014). Moreover, a recent intervention aimed at increasing reward motivation and positive affect resulted in lower levels of depression, anxiety, and stress (Craske et al., 2019). Taken together, accumulating evidence suggests that anhedonia may account for different mental health outcomes (McLaughlin and Lambert, 2017; McLaughlin et al., 2019).

Anhedonia was also found to be associated with childhood trauma (Fan et al., 2021; Sonmez et al., 2021). For example, early experiences

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with one's primary caregivers have been shown to shape reward anticipation throughout life (Feldman, 2017; Morgan et al., 2022), a central part of anhedonia (Pizzagalli, 2014; Shankman et al., 2014). Additional research shows that emotional numbness, the inability to feel emotions, serves as a mediating factor between childhood trauma and trauma responses (Kerig et al., 2012). Relatedly, individuals with depression or PTSD with a history of childhood trauma report increased anhedonia (e.g., Acheson et al., 2022; American Psychiatric Association, 2013; Armour et al., 2015; Liu et al., 2014; Lumley and Harkness, 2007; Nawijn et al., 2015; Olson et al., 2018; Pizzagalli, 2014; Vujanovic et al., 2017).

Importantly, childhood trauma is not a unified construct, but may take different forms. One main type of childhood trauma is *childhood abuse* — the presence of threatening input. This includes sexual, emotional, or physical abuse. Another main type of childhood trauma is *childhood neglect* — deprivation of key conditions, which could be physical, e.g., poor hygiene/malnutrition, or emotional, e.g., lack of emotional support (Moody et al., 2018). Current developmental models of the effects of traumatic experiences propose that abuse and neglect impact neural development, influencing reward and fear processing, and potentially leading to different symptom presentations (McLaughlin and Sheridan, 2016). To our knowledge, no study to date has explicitly tested whether anhedonia may be the mechanism that mediates the relationship between different childhood abuse and neglect experiences and symptoms of depression, PTSD, and social anxiety.

The current study aimed to examine the potential mediating role of anhedonia in the relationships between childhood trauma and different psychopathologies. We hypothesized that anhedonia would mediate the relationships between childhood trauma and all three types of psychopathology. If confirmed, our findings could refine our understanding regarding the ways in which childhood trauma may be associated with profiles of risk for mental health problems through anhedonia.

1. Methods

1.1. Participants

We recruited 230 Israeli participants with general lifetime trauma exposure via the online platform Ipanel (52.2 % female, M_{age} = 46.30 years, SD_{age} = 15.00; see Table 1 for detailed sample characteristics). Specifically, participants were asked to fill out the Life Events Checklist for DSM-5 (LEC-5; Weathers et al., 2013a) for 16 general traumatic events they had potentially experienced during their lives. We included only those who scored ≥1, reflecting a trauma history across one's lifetime.

Table 1
Demographic and clinical characteristics.

Variables	Means and (*SD*)	Range
Age (years)	46.30 (15.00)	18–75
*Female/Male	120/110	–
Education (years)	15.48 (2.83)	11–28
LEC-5	4.14 (2.58)	1–13
CTQ-SF	46.80 (10.00)	35–99
Emotional abuse	7.46 (3.50)	5–25
Physical abuse	6.15 (2.41)	5–24
Sexual abuse	6.38 (3.09)	5–25
Emotional neglect	10.30 (4.69)	5–25
Physical neglect	6.78 (2.34)	5–16
PHQ-9	5.31 (4.41)	0–20
PCL-5	11.92 (13.38)	0–64
Mini SPIN	3.13 (2.81)	0–12
SHAPS	1.23 (2.30)	0–14

N = 230.
Note. LEC-5 = life events checklist; CTQ-SF = childhood trauma; PHQ-9 = depressive symptoms; PCL-5 = PTSD checklist for DSM-5; Mini-SPIN – social anxiety scores; SHAPS = anhedonia.
* The values for Female/Male represent frequencies.

Out of these, only individuals who met a cutoff value of ≥35 for total Childhood Trauma Questionnaire — Short Form (CTQ-SF; Bernstein et al., 1994) scores (as previously used in other studies, e.g., Vahapoglu et al., 2018), were included in our sample. This score reflects significantly experiencing at least one type of childhood trauma. Based on our previous findings (Haim-Nachum et al., 2022), we were interested in individuals with a childhood trauma history and an additional exposure to general lifetime trauma throughout their lives.

Eligible participants were at least 18 years old with sufficient reading skills and understanding of the local language. Participants were excluded if they failed to notice attention check/s implemented throughout the experiment (see procedure below). A total of 21 participants were excluded based on these criteria and were replaced by new participants to maintain the desired sample size.

1.2. Measures

1.2.1. Lifetime traumatic life events

Lifetime trauma exposure was assessed using the Life Events Checklist (LEC; Weathers et al., 2013a), which screens for 16 traumatic events. For each event, responders indicated whether the event happened to them, whether they had witnessed it happening to someone else, learned that it happened to a person close to them, exposed to it as part of their job, or whether none of these applied to them.

1.2.2. Childhood trauma

The Childhood Trauma Questionnaire — Short Form (CTQ-SF; Bernstein et al., 1994) measures the severity of five childhood trauma subscales: Emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. For each item, participants respond in the context of "when you were growing up", ranging from 1 = "never" to 5 = "very often", producing scores of 5 to 25 for each subscale. Cut-off scores (9, 8, 6, 10, and 8, for emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect, respectively) were computed according to the manual of the CTQ-SF (Bernstein et al., 2003). Internal consistency coefficient in the current sample was α = 0.80.

1.2.3. PTSD symptoms

PTSD symptoms were assessed with the Posttraumatic Stress Disorder Checklist (PCL-5; Weathers et al., 2013b) — a 20-item questionnaire that assesses the DSM-5 symptoms of PTSD over the past month. Responses are scored on a five-point scale ranging from 0 = "not at all" to 4 = "extremely". This is a sound measure that has strong psychometric properties, including convergent and discriminant validity and test-retest reliability (Blevins et al., 2015). Internal consistency in the current study was 0.95. Due to the content overlap between anhedonia and PTSD, we used the PCL-5 without the anhedonia item (item #12, α = 0.95). Nevertheless, for comprehensive analysis, we have also included results with the full version of the PCL-5 in Supplementary 1.

1.2.4. Depression

Depression was assessed using the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001), a brief instrument assessing nine depressive symptoms experienced over the past two weeks. Responses are scored from 0 = "not at all" to 3 = "nearly every day". Symptom severity is indicated by the sum of all item scores. The psychometric properties of this measure proved to be adequate with a robust factor structure and good internal consistency (Richardson and Richards, 2008). Internal consistency in the current study was α = 0.83. Given the content overlap between anhedonia and depression, we utilized the PHQ-9 without including the anhedonia item (item #1, α = 0.82). We have also included results with the full version of the PHQ-9 in Supplementary 1.

1.2.5. Social anxiety

We used the Mini-Social Phobia Inventory (Mini-SPIN; Connor et al., 2001), which contains three items about avoidance of social activities and fear of embarrassment during the past week. Items are rated from 0 "not at all" to 4 "extremely"; higher scores indicate greater levels of social phobia. Internal consistency in the current sample was $\alpha = 0.85$.

1.2.6. Anhedonia

The Snaith-Hamilton Pleasure Scale (SHAPS; Snaith et al., 1995) is the gold standard for measuring anhedonia. It includes 14 items, each has a set of four response categories: Definitely Agree, Agree, Disagree, and Strongly Disagree, with either of the Disagree responses receiving a score of 1 and either of the Agree responses receiving a score of 0. The total scores range from 0 to 14, with higher scores indicating higher levels of present state of anhedonia. Internal consistency in the current sample was $\alpha = 0.92$.

Sociodemographic variables, including age, gender, education, country of birth, language proficiency, family status, employment status, and religious affiliation were assessed using a brief self-report questionnaire.

1.3. Procedure

All study procedures were approved by the Saarland University's Institutional Review Board (#22-01). The study was pre-registered on Open Science Framework (OSF) in July 2022 (available at https://osf.io/sabxz) and contains secondary analyses of a larger study conducted to assess belief updating in trauma-exposed individuals. Data was collected online using the software Qualtrics (Provo, USA). The study was described as a research project on "the relationship between trauma exposure and different mental health outcomes". Following informed consent, participants first completed a demographic questionnaire, followed by the above-described measures. Attention checks were inserted throughout the survey to increase data quality. For example, in a multiple-choice question "We want to test your attention, please click on the answer Agree", those who selected other options (e.g. Disagree, Strongly Agree) were considered inattentive and were excluded from the final sample (Berinsky et al., 2021). We did not collect identifying information. The study lasted 35 min on average, and participants were given approximately 40 credit points that were translated to money (~12 USD)/gift cards using Ipanel service.

1.4. Data analysis

Data analysis was performed using IBM SPSS Statistics 25. Prior to conducting analyses, we examined the distribution of all study variables for potential outliers (data points that exceeded 3.0 interquartile ranges above the upper or below the lower quartile of the distribution). No outliers were detected.

We used G*Power software (Faul et al., 2007) to calculate the required sample size, which revealed a need for at least 204 participants to detect a medium-size effect ($f^2 = 0.15$; based on Li et al., 2020), given an alpha of 5 %, with 80 % power.

To test our hypotheses, we conducted mediation models using Hayes Process Model 4 (Hayes, 2013), with symptoms of depression, PTSD, and social anxiety as dependent variables, anhedonia as the mediator, and childhood trauma as the independent variable. We entered gender, age, and additional trauma exposure in adulthood (LEC-5 total scores) as control variables into the models to account for any variance explained by these variables. Follow-up analyses included the same models but instead of using total CTQ scores, we unified the three types of abuse (emotional, physical, sexual) to one Childhood Abuse score and emotional and physical neglect to one Childhood Neglect score, as the independent variables on each model. Moreover, in an exploratory attempt to comprehend the effects of various childhood trauma experiences on the associations between anhedonia and symptoms of depression and PTSD, we re-run the models, considering emotional, sexual, and physical abuse, as well as emotional and physical neglect, as independent variables.

2. Results

2.1. Sample clinical characteristics

All participants in our sample met the cutoff value of ≥35 for total CTQ scores (as previously used in other studies, e.g., Vahapoglu et al., 2018). This score reflects significantly experiencing at least one type of childhood trauma, including Emotional abuse (26.10 %), Physical abuse (15.70 %), Sexual abuse (27.80 %), Physical neglect (25.70 %), and Emotional neglect (50.00 %). We observed a significant level of co-occurrence among childhood trauma types. Specifically, none of our participants reported experiencing abuse (whether sexual, physical, or emotional) without also experiencing neglect (whether sexual, physical, or emotional). Only 12 (5.22 %) participants reported experiencing neglect (either emotionally or physically) but not abuse. Moreover, 10.00 % of the sample met the cut-off for PTSD (PCL-5 > 31), 33.00 % reported mild depression (PHQ-9 = 5–9), 10.80 % reported moderate depression (PHQ-9 = 10–14), and 5.20 % reported moderately severe depression (PHQ = 15–27). A total of 22.20 % met the cut-off for social anxiety disorder and generalized social anxiety (Mini-SPIN > 6).

2.2. Main analyses: mediation models using total CTQ scores

Correlation coefficients provide preliminary support for our study hypotheses (see Supplementary 2). As evident from Supplementary 2, there is no significant correlation between childhood trauma and social anxiety. Nevertheless, in accordance with contemporary approaches that propose that the direct effect is not always a prerequisite for conducting mediation analysis (see Hayes and Rockwood, 2017), we proceeded to conduct a full mediation analysis for this outcome.

The association between childhood trauma (X) and anhedonia (M, path a, Fig. 1A, B and C) was significant and positive (this association is similar in all three models). Furthermore, the associations between anhedonia (M) and depression (Y_1, path b, Fig. 1A), as well as PTSD (Y_2, path b, Fig. 1B) were also positive and significant. However, the association between anhedonia (M) and social anxiety (Y_3, path b, Fig. 1C) was not. The indirect effect was significant for depression ($\beta = 0.10$, 95 % $CI = 0.04,0.19$), accounting for 39.71 % of the total explained variance (R^2) of 12.95 %, and for PTSD ($\beta = 0.08$, 95 % $CI = 0.02,0.16$) accounting for 32.60 % of the total explained variance of 14.67 %. The indirect effect was not significant for social anxiety ($\beta = 0.05$, 95 % $CI = -0.01,0.12$).

2.3. Mediation analyses for childhood abuse and childhood neglect

Results showed that anhedonia mediated the relationship between both Childhood Abuse ($\beta = 0.09$, 95 % $CI = 0.03,0.17$; $\beta = 0.07$, 95 % $CI = 0.02,0.14$), and Childhood Neglect ($\beta = 0.11$, 95 % $CI = 0.05,0.19$; $\beta = 0.09$, 95 % $CI = 0.02,0.16$), for depression and PTSD symptoms, respectively (see Fig. 2).

2.4. Exploratory mediation analyses for the different sub-types of childhood trauma

Results showed a mediation effects in those who were emotionally ($\beta = 0.06$, 95 % $CI = 0.02,0.13$; $\beta = 0.05$, 95 % $CI = 0.01,0.11$) and sexually ($\beta = 0.08$, 95 % $CI = 0.02,0.16$; ($\beta = 0.06$, 95 % $CI = 0.01,0.13$) abused, for both depression and PTSD, respectively (see Fig. 3). No such effects were noted for individuals who reported physical abuse ($\beta = 0.04$, 95 % $CI = -0.01,0.12$; $\beta = 0.04$, 95 % $CI = -0.01,0.10$), for either depression or PTSD, respectively. Results revealed significant effects in those who were emotionally ($\beta = 0.10$, 95 % $CI = 0.05,0.16$; $\beta = 0.08$, 95 % $CI =$

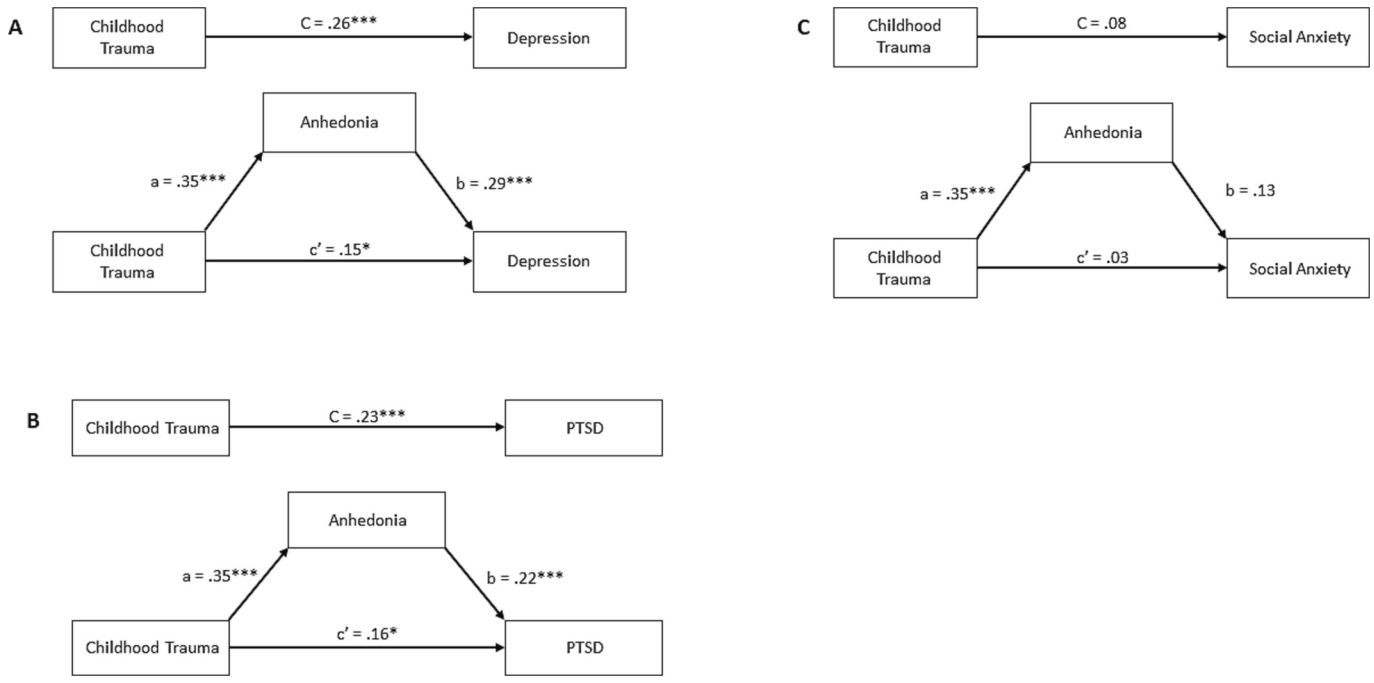

Fig. 1. Mediation analyses of anhedonia in the relationships between total CTQ scores and depression (A), PTSD (B), and social anxiety (C).

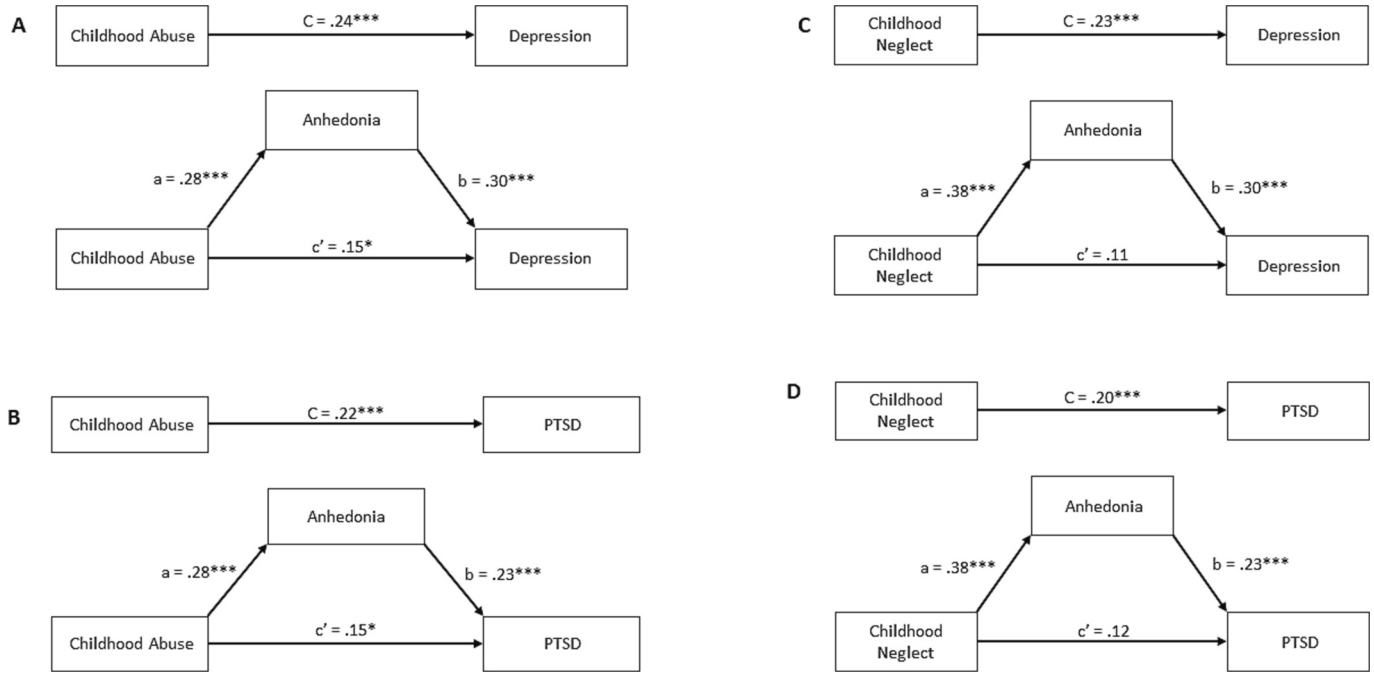

Fig. 2. Mediation analyses of anhedonia in the relationship between childhood abuse vs. childhood neglect and depression and PTSD.

0.02,0.15) and physically ($\beta = 0.11$, 95 % $CI = 0.04,0.19$; $\beta = 0.09$, 95 % $CI = 0.02,0.17$) neglected, for depression and PTSD symptoms, respectively (see Fig. 4).

3. Discussion

The current study tested the mediating role of anhedonia in the relationships between childhood trauma and symptoms of depression, PTSD, and social anxiety. As predicted, we found significant mediation effects of anhedonia for symptoms of depression and PTSD. Conversely, the association between anhedonia and social anxiety symptoms was not significant. The effect for depression and PTSD was present in those who had experienced sexual and emotional abuse, but not physical abuse, as well as among those who had experienced physical and emotional neglect in childhood. To our knowledge, this is the first study to demonstrate the mediating role of anhedonia in the relationship between distinct childhood trauma experiences and depression, PTSD, and social anxiety symptoms.

Our findings that anhedonia plays an important role in both depression and PTSD symptoms are congruent with previous research suggesting that anhedonia is a central characteristic of these disorders (Acheson et al., 2022; Fan et al., 2021; Frewen et al., 2012; Risbrough

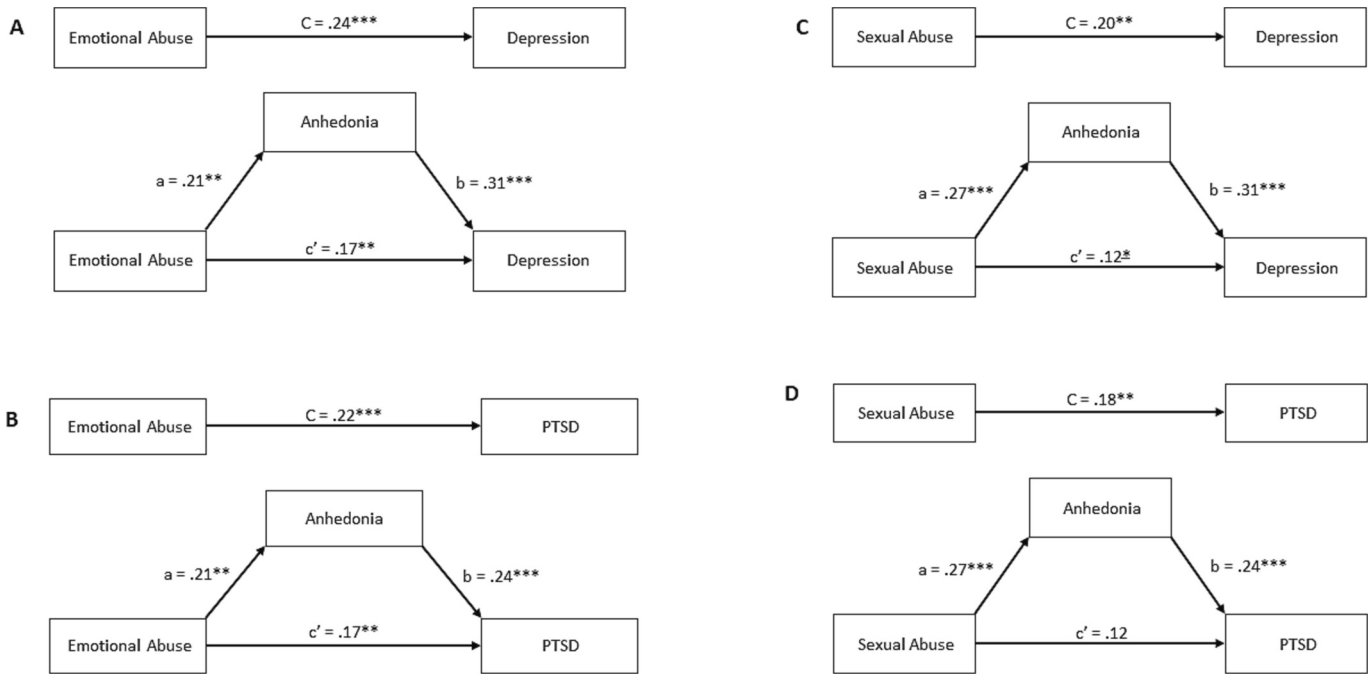

Fig. 3. Mediation analyses of anhedonia in the relationships between sub-types of childhood abuse and depression and PTSD.

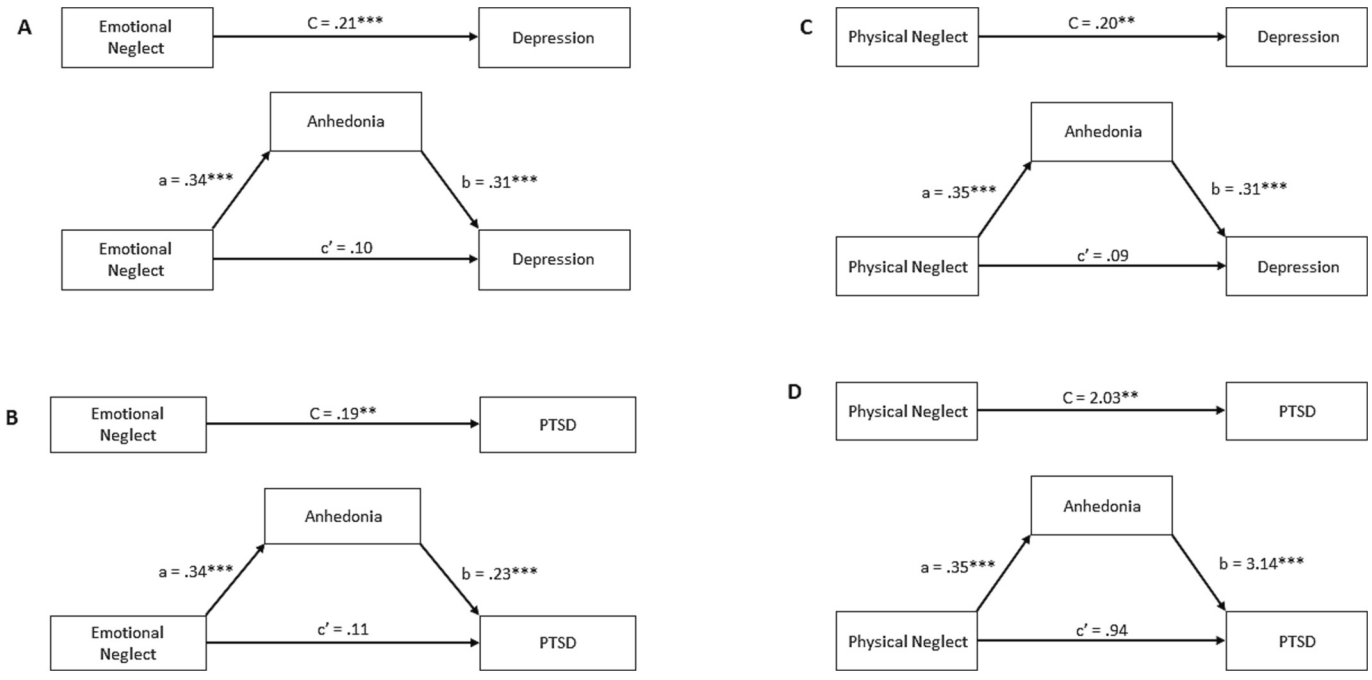

Fig. 4. Mediation analyses of anhedonia in the relationships between sub-types of childhood neglect and depression and PTSD.

et al., 2018; Rizvi et al., 2016). For example, a systematic review on individuals with a history of trauma exposure showed that reduced hedonic responses were consistently observed in individuals with PTSD (Nawijn et al., 2015). Similarly, Cohen et al. (2019) showed that deficits in anticipatory positive affect in adults explained the relation between childhood neglect and depression and PTSD anhedonic symptoms. Taken together, these findings suggest that anhedonia is an important factor in the relationship between childhood trauma and symptoms of depression and PTSD. Studies with longitudinal design should clarify its potential role in predicting these outcomes following childhood trauma.

We did not find a significant relationship between childhood trauma and social anxiety symptoms, which diverges from previous research (Bruijnen et al., 2019, see Liu et al., 2023 for a meta-analysis). A possible explanation may be related to the level or severity of social anxiety. Specifically, Bruijnen et al. (2019) found a positive correlation between the severity of social anxiety symptoms and childhood trauma among 51 individuals with moderate to severe social anxiety disorder. Conversely, in our sample only 22 % met the Mini SPIN cut off for social anxiety disorder. Hence, lack of effects in our sample may be due to lower symptom levels of social anxiety. It is possible that among individuals with higher symptom levels, the link to childhood trauma would have been significant. More research is needed to clarify this suggestion by,

for example, exploring the potential effect of childhood trauma on social anxiety symptoms among groups with different levels of social anxiety. Another possibility may be the variance in measurement tools employed to assess social anxiety in the two studies. The Mini-SPIN, while validated and reliable in prior research (Fogliati et al., 2016; Seeley-Wait et al., 2009), is inherently more limited in scope when compared to the comprehensive Liebowitz Social Anxiety Scale (LSAS) utilized by Bruijnen et al. (2019). The LSAS consists of 24 items, covering a wide spectrum of social situations that have the potential to induce anxiety. This discrepancy in the depth of assessment may contribute to the observed differences in findings between the two studies. Additionally, it is worth considering the nature of the childhood trauma assessed in this study. It is possible that only a more socially oriented childhood trauma (i.e., bullying in school) would have resulted in significant links between the childhood trauma and social anxiety (Chen et al., 2021).

Our findings that both childhood abuse (emotional and sexual) and neglect (emotional and physical) are associated with anhedonia are also supported by previous studies (e.g., Fan et al., 2021; Miu et al., 2017). For example, Wang et al. (2022) found links between anhedonia and abuse and neglect experiences, especially with emotional abuse, emotional neglect, and physical neglect. However, other studies have shown inconsistent findings where only emotional neglect – but not emotional abuse – was associated with anhedonia (Cohen et al., 2019; van Veen et al., 2013). This discrepancy could be due to the sample characteristics and/or the assessment method used to assess anhedonia. Considering sample characteristics, Cohen et al. (2019) focused on adolescents with a history of abuse and neglect, suggesting that the consequences of emotional neglect on anhedonia may be especially prominent in this developmental period, which is often characterized by cognitive, social, and emotional skills that are not fully developed (Blakemore, 2008). Regarding the assessment of anhedonia, whereas we used the SHAPS questionnaire, van Veen et al. (2013) examined a specific dimension of anhedonic depression using a tripartite model of depression and anxiety (general distress, anhedonic depression, and anxious arousal). Hence, the findings of van Veen et al. (2013) may be limited to anhedonia in depression following childhood trauma. To better understand the possible effects of sample characteristics and assessment tools, future studies may contrast different populations (e.g., adolescents vs. adults) as well as anhedonia measures.

Our results also suggest that within childhood abuse, physical abuse was not significantly associated with anhedonia and symptoms of depression and PTSD. This might be explained by the relatively low percentage of individuals experiencing physical abuse in our sample (15.7 %), as compared to those experiencing emotional (26.1 %) and sexual (27.8 %) abuse. Future studies should clarify this finding by including higher rates of individuals with a history of childhood physical abuse. However, due to the high co-occurrence of childhood trauma subtypes both reported in the literature (e.g., Brown et al., 2019; Kim et al., 2017) and observed in our study, it is hard to draw firm conclusions about the relationship between childhood trauma type and these symptoms. Future studies should clarify how childhood trauma types contribute to these mental health outcomes while considering their frequent co-occurrence by including larger sample sizes per childhood trauma type.

Taken together, anhedonia seems an important therapeutic target for developing treatments for depression and PTSD in the aftermath of childhood trauma. Our findings can inform clinical practice by emphasizing the need for tailored interventions addressing anhedonia as part of PTSD and depression treatment, potentially reducing comorbid presentations of these disorders. Recent research also supports the importance of targeting anhedonia, as it is not merely a state-dependent effect of trauma exposure and PTSD symptoms but may be a pre-trauma risk factor for PTSD (Acheson et al., 2022). Additionally, Khazanov et al. (2022) suggested a variety of interventions targeting anhedonia by improving specific reward processing deficits, potentially increasing treatment initiation and continuation. Empirical testing of the efficacy of such interventions in reducing symptoms in individuals with depression and PTSD following childhood trauma is required.

3.1. Limitations

This study has several limitations. First, we used self-report measures which are influenced by memory biases (Baldwin et al., 2019). While these measures are widely used and provide insights into individuals' behavior (Bethell et al., 2017), future studies may wish to include performance-based paradigms and neurobiological measures in order to complement these findings. Second, the data quality of online panels has been criticized recently for representativeness of samples and their susceptibility to response bias (Kees et al., 2017). However, Chmielewski and Kucker (2020) suggest that these effects can be mitigated by using response validity indicators and screening the data, which we implemented via attention checks. Third, while the current demographic allows generalization of the findings to more segments of society (in line with the RDoC framework; Carcone and Ruocco, 2017), future examinations may test the mediating role of anhedonia in the relationships between childhood trauma and these symptoms in clinically diagnosed individuals with elevated symptom levels. Such studies may assess whether and how anhedonia predicts specific symptom clusters. Fourth, the cross-sectional design of this study precludes making causal inferences about the relationships between childhood trauma, anhedonia, and symptoms. Therefore, future investigations should clarify these relationships over time by incorporating longitudinal research. Fifth, we did not assess race/ethnicity in our sample. Certain race/ethnicity groups may be more sensitive or resilient to childhood trauma and should be taken into account in future research (Moody et al., 2018; Pfaltz et al., 2022). Finally, studies may benefit from differentiating between domains (i.e., consummatory vs. anticipatory) and/or types (social, physical) of anhedonia. Differentiating between these factors could help elucidate the mechanisms underlying the relationships between childhood trauma, anhedonia, and symptoms of depression and PTSD (Wang et al., 2022).

In summary, our findings highlight the role of anhedonia in mediating the relationships between childhood abuse and neglect and symptoms of depression and PTSD. The results extend previous findings by suggesting that anhedonia is especially relevant for depression and PTSD. This implies that explicitly targeting anhedonia in treatment can optimize treatment outcomes. Ultimately, this research could help identify and develop early intervention and treatment strategies for depression and PTSD by targeting anhedonia in survivors of childhood trauma.

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CRediT authorship contribution statement

SHN wrote the first draft of this manuscript. SHN and MRS contributed to the design of the study, collected the data, and performed the statistical analyses. SHN, DA, AL, RZ, YN, and MRS interpreted the results, drafted the manuscript and provided critical comments. All authors reviewed and approved the manuscript.

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Declaration of competing interest

The authors declare that there are no conflicts of interest in relation to the subject of this study.

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