Childhood trauma and posttraumatic stress symptoms in adolescents and young adults: The mediating role of mentalizing and emotion regulation strategies

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ABSTRACT

Objectives: Childhood trauma (physical, emotional, sexual abuse and/or physical and emotional neglect) represents a specific risk for developmental perturbations and long-term negative outcomes. Adolescents and young adults with childhood trauma have rarely experienced a single type of traumatic event but rather multiple traumatic experiences. However, studies on adolescent PTSD are sparse. This study examines the possible mediating role of mentalizing, cognitive and interpersonal emotion regulation strategies between multiple types of childhood trauma exposure and PTSD in adolescents and young adults.
Methods: The sample consisted of 456 adolescents and young adults aged 15 and 25, recruited from four high schools and one university. Participants completed self-report questionnaires assessing childhood trauma, mentalizing, cognitive and interpersonal strategies of emotion regulation and PTSD.
Results: Structural Equation Modeling revealed that multiple types of childhood trauma exposure have a significant indirect effect on PTSD symptoms through its association with hypomentalizing and maladaptive cognitive strategies of emotion regulation (i.e. self-blame, rumination, catastrophizing). Results also showed a significant indirect effect between multiple types of childhood trauma exposure and PTSD symptoms through its association with hypomentalizing and maladaptive interpersonal strategies of emotion regulation (i.e. emotional reactivity and tendency to avoid emotional connection). Indirect paths were also run in reverse to control for the direction of the effect.
Conclusion: Our findings show that exposure to multiple types of childhood trauma contributes to severe PTSD through several complex pathways including both hypomentalizing and maladaptive emotion regulation strategies in adolescence and young adulthood.

1. Introduction

Childhood trauma (physical, emotional, sexual abuse and/or physical and emotional neglect) is associated with negative outcomes, including disturbances in emotion regulation (ER) and social cognition, and posttraumatic stress disorder (PTSD) (Messman-Moore & Bhuptani, 2017). Exposure to different forms of childhood trauma called "multiple traumatic events" is associated with PTSD and more

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severe PTSD symptoms in adolescence and young adulthood (Cloitre et al., 2019; Ehring & Quack, 2010; Messman-Moore & Bhuptani, 2017). Adolescence and early adulthood are crucial periods for the development of emotional and social cognition skills. These abilities are essential for long-term social functioning (Denham, 2019; Mills et al., 2014). Although it is now recognized that childhood trauma represents a specific risk for developmental perturbations (Cicchetti & Toth, 2016; Harms et al., 2019), data on the relationships between multiple types of childhood trauma exposure, ER, social cognition and adolescent PTSD are sparse (Nooner et al., 2012). The present study aims at identifying the disturbances in ER and social cognition that may affect the link between multiple types of childhood trauma exposure and PTSD in adolescence and young adulthood.

1.1. Childhood trauma and emotion regulation

Recent research suggests that exposure to various type of childhood trauma (i.e. neglect, physical, psychological or sexual abuse) affects developmental processes related to emotion regulation (ER) which persist into adolescence and adulthood (Cloitre, 2009; Pollak, 2008; Vettese et al., 2011). ER corresponds to the modulation of emotional experience and response (Dvir et al., 2014), including the capacity to utilize cognitive ER strategies (Gross, 2014; McRae & Gross, 2020). Cognitive ER strategies refer to the cognitive strategies people use to deal with traumatic or stressful events and modify the intensity and/or type of emotional experience (Aldao et al., 2010; Garnefski & Kraaij, 2006). Individuals with ER difficulties have impairments in monitoring, evaluating and modulating emotional experience. They usually employ maladaptive cognitive ER strategies (e.g. self-blame, other-blame, rumination, catastrophizing) (Aldao et al., 2016; Henschel et al., 2019). The ability to regulate emotions with others and through others under stressful circumstances is also compromised (Doba et al., 2018; Williams et al., 2018). A first type of maladaptive ER in interpersonal relationships is an emotional reactivity strategy in which individuals react disproportionately to negative emotions and have high levels of emotional lability in responses to environmental stimuli (Skowron et al., 2004). Emotional cutoff is also a maladaptive strategy in interpersonal relationships in which individuals amplify their emotional distance from others (Krycak et al., 2012). Numerous studies have demonstrated that PTSD symptom severity is associated with greater difficulty in ER, including lower levels of emotional awareness, clarity and adaptive cognitive ER strategies, higher levels of emotion suppression, and impulsive behaviors during periods of distress in adults (Ehring & Quack, 2010; Messman-Moore & Bhuptani, 2017; Weiss et al., 2019). In both adolescents and young adults, greater ER difficulties were associated with greater severity of PTSD (John et al., 2017; Sundermann & DePrince, 2015). Indeed, adolescents with low levels of emotional clarity have difficulty differentiating emotional states, which exacerbating reactions to traumatic memories and related symptoms (Viana et al., 2018). Although several studies have demonstrated a potential role of ER difficulties in the etiology and maintenance of PTSD in adulthood, no studies have examined the relationships between cognitive and interpersonal ER strategies and PTSD in adolescent and young adult survivors of multiple different types of childhood trauma exposure.

1.2. Childhood trauma and mentalizing

ER develops in early relationships between infants and attachment figure (Morris et al., 2007). In particular, ER evolves essentially through a contingent and marked mirroring of the infant's emotional states by the attachment figure (Fonagy & Allison, 2012). Children learn how to mentally represent their own emotional states and develop abilities to understand, identify and regulate their own emotion (Fonagy et al., 2019). Mentalizing is the ability to understand about and interpret one's own actions and those of others in terms of mental states (Bateman & Fonagy, 2019; Sharp et al., 2012). The development of mentalizing abilities facilitates that of adaptive strategies to regulate own emotional states or distress experiences (Fonagy et al., 2019; Sharp et al., 2012). Mentalizing has been operationalized in terms of reflective functioning (Badoud et al., 2015; Poznyak et al., 2019) including two types of impairment: hyper- or hypomentalizing. Hypermentalizing is the over-attribution of mental states and corresponds to high levels of certainty about one's own mental states or those of others, while hypomentalizing is the under-attribution of mental states and corresponds to high levels of uncertainty about one's own mental states or those of others.

The exposure of childhood trauma affects developmental processes related to reflective functioning and may lead children to inhibit the inferences about their own states or those of others (Luyten & Fonagy, 2019; Sharp et al., 2012). Several studies show that lower mentalizing (i.e., hypomentalization) mediated the link between childhood trauma and PTSD (Huang et al., 2020; Sharp et al., 2012). Childhood trauma may alter the development of mentalizing abilities, which may contribute to ER difficulties (Luyten & Fonagy, 2019). Nevertheless, empirical studies have examined the relationships between childhood trauma and mentalizing in either early childhood (Berthelot et al., 2019; Ensink et al., 2017) or adulthood (Huang et al., 2020; Schwarzer et al., 2021), ignoring adolescence and ER difficulties. Several studies have shown that mentalizing abilities present prolonged development in adolescence, related to ongoing development of cognitive control processes (Apperly et al., 2009; Vetter et al., 2013) and their underlying neural mechanisms (Crone & Dahl, 2012; Luna et al., 2015). As adolescence is a critical period for the maturation of mentalizing abilities (Blakemore, 2008; Poznyak et al., 2019), childhood trauma may disrupt the development of mentalizing processes and impair the ability to understand mental states and effectively use ER strategies in adolescence.

1.3. Objectives of the present study

Despite substantive research on the relationship between childhood trauma and PTSD symptoms, little is known about the mediating role of ER and mentalizing in the relationship between multiple types of childhood trauma exposure and PTSD, particularly in adolescents and young adults. In this study, we investigated whether mentalizing, interpersonal and cognitive ER strategies mediate

the relationship between childhood trauma and PTSD in adolescents and young adults. Based on previous research, we hypothesized that having the presence of multiple types of childhood trauma is associated with hypomentalizing and that each childhood trauma type is associated with hypomentalizing in adolescents and young adult. In particular, we hypothesized that exposure to multiple types of trauma in childhood is associated with hypomentalization, which in turn may lead to an increase in maladaptive interpersonal and cognitive emotional regulation strategies, both of which responsible for high levels of PTSD symptoms.

2. Method

2.1. Participants

The original sample was composed of 500 adolescents and young adults. Eligibility criteria included being speaking French and not suffering from psychotic, bipolar or anorexia nervosa (American Psychiatric Association, 2013). Participants first completed a short set of questions including sociodemographic information and the eligibility criteria. Forty-four participants were excluded owing to missing information on variables included in the study or not meeting the eligibility criteria. Therefore, the final sample consisted of 456 participants (296 females, 160 males) aged between 15 and 22 years (M = 17.61 years, SD = 1.45). In terms of education, 77.6 % were recruited in high school and 22.4 % in university. Families' socioeconomic status ranged from lower (44 %) to upper middle-class (56 %). The parental situation of participants was as follows: 61.5 % married, 32 % divorced or separated and 6.5 % widowed.

2.2. Procedure

This study was approved by a research ethics committee for the protection of persons (CPP.047/2017) and complied with the tenets of the Declaration of Helsinki. It was conducted on a community population of adolescents and young adults from local schools (high school and university) in the North of France. One local university and eight local high schools were selected without any criteria from a list of Rectorate of the school academy of Lille (North of France). Four local high schools out of a total of 8 agreed to participate in this study. With the teachers' permission, the researchers met the participants in their classrooms to explain the study. Each participant received a study information sheet and provided his/her written informed consent. Participants were informed that their responses to the questionnaires would be anonymous and confidential. There was no compensation for participation. When participants were minors (under 18 years of age), parental consent was obtained. They completed a short questionnaire assessing age, education level, family's socioeconomic status, parental situation and eligibility criteria. Following initial eligibility screening (eligibility criteria), self-reports were individually administered to participants.

2.3. Measures

2.3.1. Childhood trauma
Exposure to childhood trauma was assessed using the Childhood Trauma Questionnaire (CTQ), a 28-item self-report inventory (Bernstein et al., 1994; Paquette et al., 2004). The CTQ measures five types of childhood trauma: emotional abuse (Cronbach's α = 0.81), physical abuse (α = 0.83), sexual abuse (α = 0.71), physical neglect (α = 0.69) and emotional neglect (α = 0.84). Responses to each item are rated on a 5-point Likert scale, ranging from 0 (never true) to 5 (always true). Items for each subscale were summed to yield a total score for each type of trauma. Total scores on subscales of emotional abuse, physical abuse, sexual abuse, physical and emotional neglect were used to assess multiple types of childhood trauma exposure. Higher scores for each subscale reflect more severe exposure to childhood trauma type (Walker et al., 1999). The five subscale scores have good internal consistency (coefficient alpha) in this study.

2.3.2. Cognitive emotion regulation strategies
The Cognitive Emotion Regulation Questionnaire (CERQ) was used to evaluate cognitive ER strategies used to respond to stressful situations (Jermann et al., 2006). The CERQ is a 36-item questionnaire, which uses a 5-point Likert scale to assess nine subscales of adaptive and maladaptive strategies of ER. Maladaptive cognitive strategies correspond to (1) self-blame (α = 0.78) (i.e. thoughts of blaming oneself for what one has experienced), (2) rumination (α = 0.78) (i.e. thinking about the feelings and thoughts associated with a negative event all the time), (3) catastrophizing (α = 0.65) (i.e. explicitly emphasizing the terror of an experience) and (4) other-blame (α = 0.85) (i.e. thoughts of putting the blame on others for what one has experienced). Adaptive cognitive strategies correspond to (5) acceptance (α = 0.71) (i.e. thoughts of being resigned to what has happened), (6) positive refocusing (α = 0.86) (i.e. thinking of other, pleasant matters instead of the actual event), (7) refocusing on planning (α = 0.81) (i.e. thinking about what steps to take in order to deal with the event), (8) positive reappraisal (α = 0.80) (i.e. thinking of attaching a positive meaning to the event in terms of personal growth), (9) putting into perspective (α = 0.81) (i.e. thoughts of playing down the seriousness of the event when compared to other events). The higher the subscale score, the more a specific strategy is used. In this study, nine scale scores have good internal consistency (coefficient alpha).

2.3.3. Interpersonal emotion regulation
The Differentiation of Self Inventory (Knauth & Skowron, 2004) was used to measure maladaptive interpersonal strategies of ER (Doba et al., 2018; Henschel et al., 2019). The DSI-R is a 46-item self-report measure assessing interpersonal levels of ER with two scales: emotional reactivity and emotional cutoff (Wei et al., 2005). The emotional reactivity scale (α = 0.83) reflects the degree to

which a person responds to environmental stimuli with emotional flooding, emotion lability or hypersensitivity to the point of being consumed by them. The emotional cutoff scale (α = 0.75) reflects feeling threatened by intimacy and isolating oneself from others and one's emotions when intrapersonal or interpersonal experiences are too intense. Participants were asked to rate how generally true the items were about them on a scale from 1 (=not at all true of me) to 6 (=very true of me). Each subscale ranges from 1 to 6, with higher scores in emotional reactivity and emotional cutoff reflecting a lesser use of these maladaptive strategies. In this study, the DSI-R demonstrated good internal consistencies (coefficient alpha).

2.3.4. Reflective functioning

The Reflective Functioning Questionnaire (RFQ) was used to evaluate participants' capacity to think about themselves and others in terms of mental states (Badoud et al., 2015; Fonagy et al., 2016). The RFQ is a self-report measure of reflective functioning including eight items that are answered on a 7-point Likert scale, ranging from "completely disagree" to "completely agree". The RFQ measures two subscales of reflective functioning assessing Certainty (RFQc) and Uncertainty (RFQu). High scores on the RFQ Uncertainty subscale reflect extreme uncertainty about mental states, assumed to reflect hypomentalizing. High scores on the RFQ Certainty (RFQc) subscale capture extreme levels of certainty that are assumed to be indicative of hypermentalizing. The RFQ demonstrated good internal consistencies for the Uncertainty subscale (α = 0.73) and for the Certainty subscale (α = 0.67).

2.3.5. Posttraumatic stress symptoms

The Posttraumatic Stress Disorder Checklist Scale (PCL) was used to evaluate the 3 main symptoms of PTSD (Adkins et al., 2008; Blanchard et al., 1996; Yao et al., 2003). The PCL is a 17-item questionnaire with a 5-point Likert scale (from 1- not at all - to 5 - extremely). The scale can be divided into three subscores corresponding to the three main syndromes of PTSD: reexperiencing (α = 0.84), avoidance (α = 0.76) and hyperarousal (α = 0.78). Higher scores indicate greater level of PTSD symptoms. Three scale scores have good internal consistency (coefficient alpha) in this study.

2.4. Data analysis

First, the percentage of each type of childhood trauma was calculated using CTQ cut-off scores. Descriptive statistics (means, standard deviations) were performed to investigate the distributions of childhood trauma, mentalizing (i.e. uncertainty and certainty), adaptive and maladaptive cognitive strategies of ER, maladaptive interpersonal strategies of ER and PTSD. The data from CTQ were used to create several variables to account for multiple types of childhood trauma: total scores on subscales of emotional abuse, physical abuse, sexual abuse, physical and emotional neglect were used to assess the severity of each type of trauma. Higher scores for each subscale reflect more severe exposure to childhood trauma type.

Second, direct and indirect effects between multiple types of childhood trauma (i.e. total scores for each subscale), mentalizing, adaptive and maladaptive cognitive strategies of ER, maladaptive interpersonal ER strategies and PTSD symptoms were investigated using partial least squares path modeling (PLS-SEM; Vinzi et al., 2010). PLS-SEM is a nonparametric method for studying complex multivariate relationships among manifest variables (MVs) and latent variables (LVs). Two models were used to describe the PLS-SEM: the outer model connecting the MVs to their LVs (also called the measurement model), and the inner model relating some LVs to others (also called the structural model). PLS-SEM loadings (w) of MVs on each LV are similar to principal components analysis regression loadings, and its path coefficients (β) are similar to the standardized beta coefficients in a classic regression analysis. We used bootstrapping with 5000 resamples to estimate probability values for significance testing. We used PLS-SEM since the PLS-SEM method handles non-normally distributed data (Chin et al., 2003), works efficiently with complex models (many structural model relations) and constructs with single-item and multi-item measures (Cassel et al., 1999). PLS-PM analyses were conducted with the Smart-PLS version 3.2.1 software (Hair et al., 2016).

Table 1
Percentage of childhood trauma types.

Childhood trauma type	$N = 456$	%
No trauma	183	40.2
Physical neglect	113	24.78
Emotional neglect	97	21.27
Physical abuse	73	16
Emotional abuse	114	25
Sexual abuse	68	14.91

Note. Percentage of childhood trauma types derived from cut-off scores of Childhood Trauma Questionnaire: emotional abuse ≥ 10, physical abuse ≥ 8, sexual abuse ≥ 8, physical neglect ≥ 8, and emotional neglect ≥ 15 (Walker et al., 1999). Percentages of trauma types add up to >100 % because most participants reported multiple trauma types. N = Number of participants with no trauma or childhood trauma type.

3. Results

3.1. Descriptive data

CTQ cut-off scores revealed that 40.2 % of participants reported no trauma history, 28.9 % experienced one type of trauma and 30.9 % reported multiple traumatic childhood experiences.

CTQ cut-offs were validated for each subscale (emotional abuse ≥ 10, physical abuse ≥ 8, sexual abuse ≥ 8, physical neglect ≥ 8, and emotional neglect ≥ 15) (Walker et al., 1999). Table 1 displays the percentage of each type of childhood trauma for all participants. Table 2 reports the descriptive statistics for severity of each type of childhood trauma for all participants (i.e. total scores). Scores on the PCL ranged from 17 to 83 (mean score, 43.61 ± 14.10) with 34.87 % of participants above the cut-off score (≥50) for PTSD (Wilkins et al., 2011).

3.2. Structural modeling

3.2.1. Outer model

Table 2 reports MVs and LVs for the theoretical model. The latter includes 21 MVs loaded on 6 LVs. The inner model was represented using the following theoretical entities: (1) multiple types of childhood trauma, (2) mentalizing, (3) adaptive cognitive ER strategies, (4) maladaptive cognitive ER strategies (5) maladaptive interpersonal ER and (6) PTSD symptoms as LVs. The first steps consisted of selecting MVs to obtain acceptable LVs unidimensionality (DG-rho > 0.7) and significant loadings of MVs on each LV (loading > 0.7). Two MVs were removed (non-significant loadings): MV acceptance for LV adaptive cognitive ER strategies and MV other-blame for LV maladaptive cognitive ER strategies. According to unidimensional results and loadings, MV certainty for LV mentalizing was removed. The final model involved 18 MVs on 6 LVs. The final model and significant weights of MVs on each LV are presented in Table 2. Importantly, results show significant weights between each MV (MV emotional abuse, MV physical abuse, MV sexual abuse, MV physical neglect, MV emotional neglect) and LV multiple types of childhood trauma. The quality of this outer model was acceptable regarding unidimensionality (DG-rho > 0.70), internal consistency reliability (Cronbach's alpha > 0.7), convergent validity (AVE > 0.5) and discriminant validity (heterotrait-monotrait ratio < 0.80) for all LVs (Chin, 1998; Henseler et al., 2014; Tenenhaus et al., 2005).

3.2.2. Inner model

Fig. 1 displays the final model of relationships between multiple types of childhood trauma, mentalizing (i.e. uncertainty), adaptive cognitive ER strategies, maladaptive cognitive ER strategies, maladaptive interpersonal ER and PTSD symptoms. The proportion of explained variance (R^2) for LVs of adaptive ER strategies, mentalizing, maladaptive ER strategies, interpersonal ER and PTSD symptoms was 0.02, 0.02, 0.12, 0.17 and 0.53, respectively, indicating small-to-large values (Vinzi et al., 2010). Standardized root mean square residual (SRMR = 0.05) indicated a good fit and goodness-of-fit index (GOF = 0.37) was satisfactory (Henseler et al.,

Table 2
Description of manifest variables and latent variables for final model.

Latent variables	Manifest variables	Questionnaires	Mean (SD)	Weight
Multiple types of childhood trauma	Physical neglect	CTQ	6.73 (2.73)	0.23
	Emotional neglect		10.84 (4.57)	0.32
	Physical abuse		6.33 (3.21)	0.16
	Emotional abuse		8.17 (4.16)	0.37
	Sexual abuse		6.24 (3.51)	0.20
Mentalizing	Uncertainty	RFQ	4.85 (3.40)	1
	Certainty		5.27 (4.3)	–
Adaptive cognitive ER strategies	Acceptance	CERQ	12.39 (4.02)	–
	Positive refocusing		10.36 (4.28)	0.21
	Refocusing on planning		12.41 (3.88)	0.39
	Positive reappraisal		11.65 (3.89)	0.35
	Putting into perspective		12.79 (3.80)	0.36
Maladaptive cognitive ER strategies	Self-blame	CERQ	10.05 (3.38)	0.45
	Rumination		11.16 (4.34)	0.46 0.43
	Catastrophizing		8.27(3.45)	–
	Other-blame		7.92 (2.91)	
Maladaptive interpersonal ER	Emotional reactivity	DSI-R	3.10 (1)	0.84
	Emotional cutoff		4.08 (0.84)	0.46
Posttraumatic stress symptoms	Reexperiencing	PCLS	13.01 (5.22)	0.40
	Avoidance		16.71 (5.90)	0.37
	Hyperarousal		13.89 (5.21)	0.40

Note. ER = emotion regulation. CTQ = Childhood Trauma Questionnaire. RFQ = reflective functioning questionnaire. CERQ = Cognitive Emotion Regulation Questionnaire. PCLS = Posttraumatic Stress Disorder Checklist Scale. Means of emotional abuse, physical abuse, sexual abuse, physical and emotional neglect derived from total score for each subscale of the CTQ. Significant weights are presented for final model including 18 MVs on 6 LVs: MV certainty, MV acceptance and MV other-blame were removed (non-significant loadings).
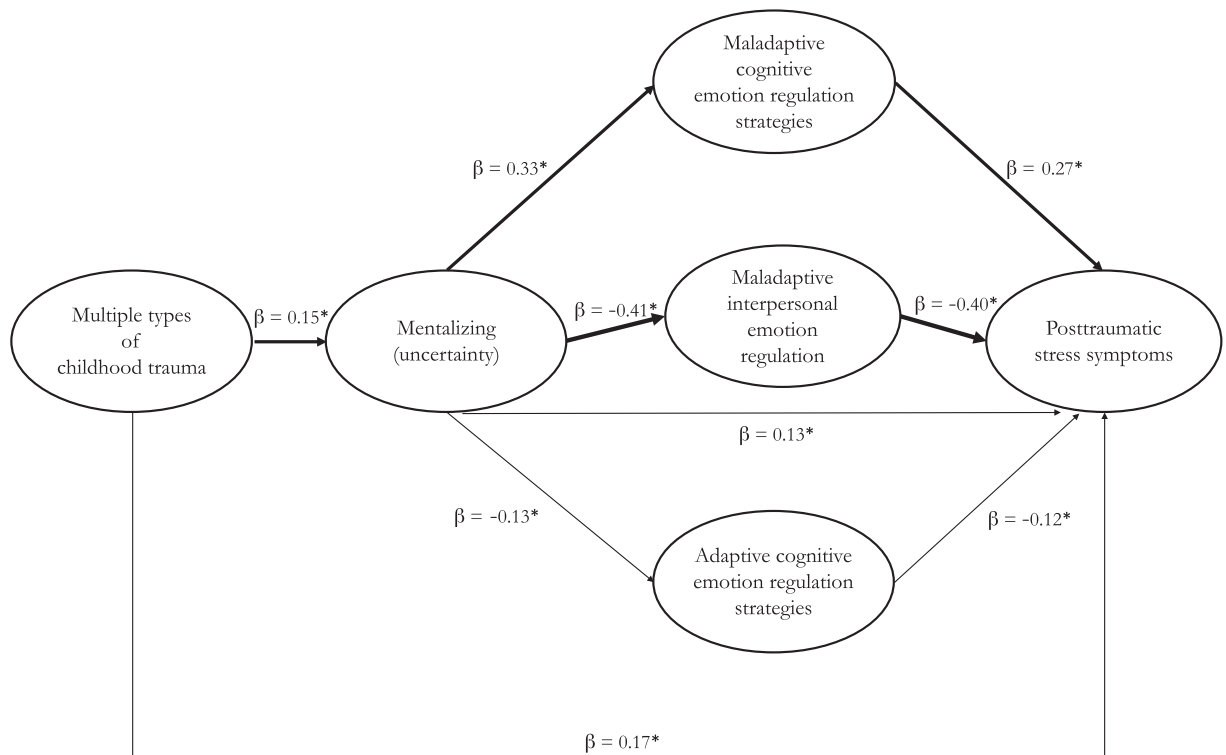
Fig. 1. Multiple mediation model.

2014). Direct bootstrapped path coefficients are displayed in Table 3.

Regarding posttraumatic symptoms, the analysis of the PLS-SEM model explored the relationship between multiple types of childhood trauma and PTSD symptoms in the presence of multiple and sequential mediators. As presented in Table 3, results indicated that multiple types of childhood trauma were associated with PTSD symptoms (β = 0.17). Direct path showed that multiple types of childhood trauma were significantly associated with mentalizing (i.e. uncertainty) (β = 0.15). A significant yet small association was observed between mentalizing and PTSD symptoms (β = 0.13). Another significant yet small indirect association was observed between multiple types of childhood trauma and PTSD through mentalizing (i.e. uncertainty) (β = 0.02, bootstrap CI [0.005, 0.037]).

Direct path results also revealed significant yet weak associations between mentalizing (i.e. uncertainty) and adaptive cognitive ER strategies (β = −0.13), as well as between adaptive cognitive ER strategies and PTSD symptoms (β = −0.12). Results highlighted that indirect effect of multiple types of childhood trauma on PTSD symptoms through both mentalizing (i.e. uncertainty) and adaptive cognitive ER strategies was not significant (β = 0.00, bootstrap CI [0.00, 0.006]).

Direct path results revealed a moderate and significant association between mentalizing (i.e. uncertainty) and maladaptive cognitive ER strategies (β = 0.33), as well as between maladaptive ER cognitive strategies and PTSD symptoms (β = 0.27). Importantly, indirect path results reveal that multiple types of childhood trauma affect PTSD symptoms through the path containing two sequential mediators. Indeed, results show that multiple types of childhood trauma have a significant indirect effect on PTSD symptoms through its association with mentalizing (i.e. uncertainty) and maladaptive cognitive ER strategies (β = 0.02, bootstrap CI [0.003, 0.022]).

Table 3
Direct bootstrapped path coefficients for final model.

Latent variables	B mean (SD)	95 % bootstrap CI
Direct paths		
Multiple types of childhood trauma → PTSD	0.17 (0.04)	[0.08, 0.25]*
Multiple types of childhood trauma → mentalizing (uncertainty)	0.15 (0.05)	[0.03, 0.22]*
Mentalizing (uncertainty) → maladaptive cognitive ER strategies	0.33 (0.03)	[0.23, 0.42]*
Mentalizing (uncertainty) → adaptive cognitive ER strategies	−0.13 (0.05)	[−0.21, −0.02] *
Mentalizing (uncertainty) → interpersonal ER	−0.41 (0.04)	[−0.47, −0.32]*
Mentalizing (uncertainty) → PTSD	0.13 (0.04)	[0.04, 0.21]*
Maladaptive cognitive ER strategies → PTSD	0.27 (0.05)	[0.19, 0.35]*
Adaptive cognitive ER strategies → PTSD	−0.12 (0.04)	[−0.19, −0.04]*
Interpersonal ER → PTSD	−0.40 (0.04)	[−0.46, −0.32]*

Note. CI: confidence interval; *: $p < 0.05$. ER = emotion regulation. PTSD = posttraumatic.

Direct path results also showed significant and strong associations between mentalizing (i.e. uncertainty) and maladaptive interpersonal ER (β = −0.41), as well as between maladaptive interpersonal ER and PTSD symptoms (β = −0.40). Indirect path results showed that multiple types of childhood trauma were associated with PTSD symptoms through the path containing two sequential mediators, with a significant indirect effect on PTSD symptoms through its association with mentalizing (i.e. uncertainty) and maladaptive interpersonal ER (β = 0.03, bootstrap CI [0.006, 0.038]).

3.2.3. Control for direction of effects

Indirect paths were also run in reverse to control for direction of effect. The bootstrap method for testing indirect effects indicated that the indirect effect of multiple types of childhood trauma on PTSD symptoms through adaptive cognitive ER strategies to mentalizing (i.e. uncertainty) was not significant (β = 0, bootstrap CI [−0, 0.001]). Results also showed that the indirect effect of multiple types of childhood trauma on PTSD symptoms through maladaptive cognitive ER strategies to mentalizing (i.e. uncertainty) was not significant (β = 0.002, bootstrap CI [−0.001, 0.005]). Similarly, results revealed that the indirect effect of multiple types of childhood trauma on PTSD symptoms through maladaptive interpersonal ER to mentalizing (i.e. uncertainty) was not significant (β = 0.002, bootstrap CI [0, 0.002]).

3.2.4. Control for age effects

To examine the moderating effect of age on the link between multiple types of childhood trauma and PTSD symptoms, we tested interaction effects between these latent variables with the product indicator approach (Chin et al., 2003). Results showed that moderating effect of the age on the relationship between multiple types of childhood trauma and PTSD symptoms was not significant (β = 0.07, bootstrap CI [−0.015, 0.15]).

3.2.5. Control for gender effects

A nonparametric multi-group analysis was conducted to test for possible differences between female and male participants using the PLS-MGA method (Hair et al., 2016). Indirect path comparisons were not significant between female and male participants: multiple types of childhood trauma to maladaptive cognitive ER strategies (β = 0.008, p = 0.57), multiple types of childhood trauma to adaptive cognitive ER strategies (β = 0.003, p = 0.41), multiple types of childhood trauma to maladaptive interpersonal ER (β = 0.013, p = 0.38), multiple types of childhood trauma to mentalizing (i.e. uncertainty) (β = 0.06, p = 0.13) and multiple types of childhood trauma to PTSD symptoms (β = 0.001, p = 0.51).

4. Discussion

The present study is the first to explore a model that examines the possible mediating role of mentalizing, cognitive and interpersonal ER strategies between multiple types of childhood trauma and PTSD symptoms. The current findings identify several complex pathways and mechanisms through which multiple types of childhood trauma severity impacts PTSD in adolescence and young adulthood.

As previous research and theory on social cognition pointed to both over-attribution and under-attribution of mental states as a consequence of trauma and a possible mechanism involved in the development of PTSD, we examined both hypomentalization (i.e. uncertainty) and hypermentalization (i.e. certainty) as possible mediators of the relation between multiple types of childhood trauma and PTSD. The first main results reveal that lower mentalizing mediates the relationship between childhood trauma and PTSD in adolescents and young adults. This supports the idea that exposure to multiple types of childhood trauma might lead individuals to inhibit mentalizing about their own mental state and that of others. Indeed, results reveal that different types of trauma exposure (emotional abuse, physical abuse, sexual abuse, physical neglect, emotional neglect) are each associated with hypomentalizing. As in Sharp et al.'s (2012) social-cognitive model of PTSD and previous empirical findings (Huang et al., 2020), our findings suggest that multiple types of childhood trauma result in impaired developmental processes related to the growth of mentalizing abilities. However, the size of the direct associations between mentalizing (i.e. uncertainty) and PTSD was relatively small in the present study.

Direct path results reveal a moderate and significant association between mentalizing (i.e. uncertainty) and maladaptive ER strategies, as well as between maladaptive ER cognitive strategies and PTSD symptoms. It may be that mentalizing abilities contribute to PTSD through several complex pathways and mechanisms. Indeed, the second main results of the present study highlight the presence of multiple and sequential mediators: indirect results show that mentalizing (i.e. uncertainty) has significant indirect effects on PTSD symptoms through maladaptive cognitive and interpersonal ER strategies. These suggest that hypomentalization and maladaptive ER strategies constitute key factors in the development of PTSD symptoms. In particular, results support that multiple types of childhood trauma lead to a higher level of hypomentalization, which might in turn contribute to greater maladaptive cognitive ER strategies and cause high levels of PTSD symptoms. Several studies have already underlined that PTSD symptoms are related to greater difficulty in ER, such as reduced levels of emotional awareness and clarity and higher levels of emotion suppression during periods of distress (Ehring & Quack, 2010; Messman-Moore & Bhuptani, 2017; Weiss et al., 2019). Our findings show the crucial role of hypomentalization and maladaptive cognitive ER strategies in the development of PTSD in adolescents and young adults. They suggest that adolescents exposed to multiple types of childhood trauma develop a higher level of hypomentalization, which in turn contributes to greater self-blame, rumination, catastrophizing and leads to PTSD symptoms, such as re-experience of the initial trauma, symptoms of excessive arousal (e.g. hypervigilance, exaggerated startle response, and difficulty concentrating) and avoidance of stimuli associated with the trauma. Adolescents who cannot engage in mentalization are deprived of the cognitive ability to understand the source of their negative emotions, which in turn increases rumination, self-blame and catastrophizing, as well as the risk of developing PTSD

symptoms. Finally, these findings suggest that hypomentalization associated with maladaptive cognitive strategies may constitute a risk factor for severe and prolonged periods of distress in adolescents and young adults.

Another crucial finding of the current study is that multiple types of childhood trauma have a significant indirect effect on PTSD symptoms through its association with hypomentalization and maladaptive interpersonal ER strategies. Therefore, it seems that multiple types of childhood trauma are associated with a higher level of hypomentalization, which contributes to high levels of emotional reactivity and tendency to avoid emotional connection in interpersonal relationships, leading to PTSD symptoms. These findings complement the previous results demonstrating that the pathway from traumatic events to PTSD may be mediated by interpersonal factors, such as poor quality of intimate relationships, lack of social support and negative or detrimental social support (Cook et al., 2004; Maercker & Horn, 2013; Olff et al., 2005). A key contribution of our results is that the association between hypomentalization and high levels of emotional reactivity and tendency to avoid emotional connection in interpersonal relationships play an important role in PTSD among adolescents and young adults.

Importantly, it is not clear from previous studies whether it is mentalizing difficulties that contribute to maladaptive ER strategies and PTSD or whether it is the contrary. The analysis of the direction of indirect effects between multiple types of childhood trauma and PTSD indicates that hypomentalization precedes maladaptive cognitive and interpersonal ER strategies. Our data suggest that hypomentalizing may play an important role in the development of maladaptive ER strategies by making it challenging for an adolescent to understand his/her own mental state as well as the mental states of others.

Our findings should be considered in light of several study limitations. As we intended to recruit a large and diverse sample of adolescents and young adults who would be representative of the general population, self-report measures were used to assess reflective functioning, ER strategies, childhood trauma and PTSD. Replication with other methods of data collection may be useful in future research. Second, childhood trauma data were derived from the CTQ. Although it has shown great reliability and validity in the reporting of childhood trauma, it has several limitations. It does not provide information on the duration of each type of trauma. In addition, the cross-sectional design of this study constitutes a limitation. While no gender effect was found in the current model, it is still possible that the relationship between multiple types of childhood trauma, hypomentalizing, maladaptive ER strategies and PTSD may evolve differently in boys and girls over the course of long periods of assessment.

5. Conclusion

To our knowledge, the current study is the first to empirically demonstrate the role of hypomentalizing and maladaptive ER strategies in the development of PTSD in adolescents and young adults with histories of childhood trauma. The link between mentalizing and PTSD has rarely been investigated in adolescents. These findings provide empirical evidence demonstrating that impairment in mentalizing abilities is associated with ER strategies in community adolescents and young adults. It also shows that exposure to a high level of multiple types of childhood trauma contributes to PTSD symptoms through several complex pathways, including both cognitive and interpersonal ER. Finally, this study suggests that hypomentalizing could be an important target for psychological interventions, as it influences the developmental trajectory of PTSD. In adolescents who have been exposed to childhood trauma, psychological interventions based on the ways in which adolescents perceive and understand their mental state or that of others could be developed, in order to reduce maladaptive cognitive and interpersonal strategies of ER.

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Declaration of competing interest

None.

Data availability

Data will be made available on request.

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