



**ARTICLE**

# How Child Maltreatment Enduringly Impacts Aggression: A Perspective Based on Personality Solidification

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## ABSTRACT

It has been shown that early experiences of maltreatment can stably influence an individual's internal and external aggressive behavior in adulthood. And on what mechanisms do this stability arise? From the perspective of personality solidification theory, this study sample of 1951 primary and secondary school students was used to explore the relationship between child maltreatment, Big Five personality and internalized and externalized aggression, as well as the different mechanisms of differentiation of personality components in child maltreatment on two different natures of aggression, using four scales: The Childhood Trauma Questionnaire (CTQ), Revised NEO Personality Inventory (NEO-PI-R), None-suicidal Self-Injury Scale and Aggression Questionnaire. The findings suggest that (1) neuroticism plays the same mediating mechanism in the effect of child maltreatment on the persistence of internalized and externalized aggression; and (2) conscientiousness plays a different mechanism in effect of child maltreatment on both internalized and externalized aggression. Therefore, child maltreatment should be discouraged and the development of a sound personality should be guided, thus reducing future aggressive behavior and promoting child development and social harmony.

## KEYWORDS

Child maltreatment; personality; internalized aggression; externalized aggression

## 1 Introduction

Child maltreatment has been a hot topic of concern for society. Child maltreatment refers to the experience of actual or potential harming to a child's health, development and self-esteem during early development, including emotional abuse, physical abuse, sexual abuse, neglect and abandonment [1,2]. Such trauma not only causes severe physical damage to the individual [3,4], but also leads to the development of negative emotions such as anxiety and depression [5,6] and is a significant source of undesirable behaviors such as substance addiction and abuse [7]. Among the many undesirable behaviors, aggression is not only harmful to one's own health, but also to social order and public safety [8,9], and is a serious risk that has attracted extensive research. Aggression is behavior that is intended to hurt or harm others [10]. It can take two form, external aggression, which is manifested by harming others [11], and



internal aggression, which is manifested by self-injurious behavior [12]. There are many factors that influence internalized and externalized aggression, but the effects of early maltreatment on aggressive behavior are of a persistent nature [13,14]. However, why does child maltreatment, as a past experience, persistently predict aggression in adulthood? This study constructs a theory of personality solidification based on a personality perspective and incorporating empirical data. Confirmation of this theory will not only deepen understanding of the mechanisms by which early abuse affects aggression, but also reveal the general mechanisms by which personality plays a role in solidifying the effects of adverse early environments on individuals' negative emotions and behaviors.

A large body of previous research has shown that early experiences of maltreatment can have a lasting and consistent effect on an individual's internalized or externalized aggressive behavior. In terms of externalized aggression, individuals that have experienced child maltreatment showed higher levels of externalized aggression in adulthood [15] and are accustomed to responding to others with anger and aggression [16]. Besides, Sullivan et al. [17] and others have found that groups of women who have experienced child maltreatment is more likely to resort to violence to resolve intimate conflict. It is clear that there is a direct relationship between child maltreatment and externalized aggression. In terms of internalized aggression, Gratz's [18] study found that child maltreatment positively predicted self-injurious behavior, and Gomez's [19] study also found that individuals that were neglectfully abused in childhood were at a higher risk of self-harm. Even more, Martin et al. [14] showed that early experiences of maltreatment were strongly associated with an individual's propensity for self-harm in adulthood, such as drug or alcohol addiction. Thus, there may be a close relationship between child maltreatment and internal aggressive behavior.

Furthermore, the predictive effect of child maltreatment on both internalized and externalized aggressive behaviors is characterized by stability, in that individuals' experiences of child maltreatment predict internal and externalized aggressive behaviors, or repeated aggressive behaviors, in adulthood [20–22]. However, child maltreatment as an individual's past experience is forgotten over time as early memories are made [23] and can hardly have a direct impact on an individual's present-day behavior. Why, then, does early maltreatment have a lasting effect on an individual's aggressive behavior? This has been explored previously through the lens of cognitive style, information processing biases, and the solidification of physiological structures. For example, Glassman et al. [24] found that child maltreatment can solidify an individual's cognitive style and subsequently influence intra-individual aggression, and Chen et al. [25] found that child maltreatment can cause individuals to develop social information processing biases that lead to aggressive behavior. In addition, it has also been found that child maltreatment can also solidify certain constructs in the brain, which in turn continues to influence individual maladaptive behaviors [26]. Of these crystallised factors, personality is considered to be a combination of cognitive and behavioral characteristics of the individual [27] and is closely linked to physiological structures [28]. Personality has been shown to be stable, and once a personality trait is formed, it is difficult to change [29], so it may closely link our past events to our current behavior.

Personality refers to individual differences in cognitive, affective and behavioral characteristics [30]. A widely accepted and used personality dimension is the Big Five [31,32], which consists of five dimensions: openness (e.g., imagination, exploration), conscientiousness (e.g., self-discipline, achievement, self-restraint and caution), extraversion (e.g., active, optimistic, social), agreeableness (e.g., empathy, humility, caring, trustworthy) and Neuroticism (e.g., anxiety, anger, hostility, depression, and vulnerability) [33–36]. Individual personality traits are not only genetically influenced, but are also related to an individual's later developmental experiences, most typically early experiences in maltreatment [37,38]. This has been confirmed by previous research. For example, Ryan et al. [39] and Allen et al. [40] found that individuals that were abused early in life had higher levels of neuroticism and lower openness compared to their peers. At the same time, personality also plays an important role in predicting aggressive behavior in

individuals. In the terms of externalized aggression, previous research has found that individuals with low agreeableness are more offensive and aggressive towards others [41], and that verbal aggression towards others is more frequent in individuals with high neuroticism [42]. In the terms of internalized aggression, the higher the individual's neuroticism, the greater the likelihood of self-injury [29]. Individuals who engage in self-injurious behaviors such as cutting their wrists scored lower on agreeableness and extraversion [9]. Conversely, individuals that are high in agreeableness are more willing to engage in pro-social behavior and rarely attack others [43]. Thus, it is likely that personality is an important factor of explaining the enduring and stable influence of early abusive experiences of aggression. This suggests that early experiences of maltreatment may have a lasting and stable effect on internal and externalized aggression by solidified personality traits.

Based on these, is there then a common mechanism for personality in explaining child masochistic and internal and external aggressive behavior? Previous research has found that for individuals, the role of aggressive behavior is sometimes contradictory. On the one hand, internalized aggression has been shown to be a seriously damaging behavior for one's health [44], but on the other hand, individuals can vent negative emotions and soothe their mood through externalized aggression [45]. Interestingly, people with certain personality traits also tend to engage in seemingly contradictory behaviors. For example, it has been found that individuals with high levels of conscientiousness often have habits that are conducive to health, such as eating well and exercising regularly [46], but they are also always overworked and willing to work overtime, overworking themselves to the detriment of their health [47]. Thus, individuals with a certain personality may show different levels of internalized and externalized aggression. Plus, because both types of aggression are closely linked to early adverse family environments [48], it can be proposed that child maltreatment can have different effects on both internalized and externalized aggression through certain personality traits.

In summary, the present study intends to examine how child maltreatment actually affects individuals' persistent and stable internal and external aggressive behavior through the perspective of personality solidification. This study proposes two hypotheses: H1) Child maltreatment indirectly predicts persistent aggressive behavior through personality entrenchment, and H2) Child maltreatment has different predictive effects on persistent internalized and externalized aggression through personality entrenchment.

## **2 Methods**

### **2.1 Participants**

The data of this study are from an ongoing project "Early Adverse Environment Influences Cognitive Affective Mechanism", and some of the data in this study have been used in previous papers [49,50]. In December 2019, 2098 adolescents were recruited from two primary schools, two middle schools and one high school in Changsha and Liuyang, China, using cluster sampling method. The questionnaire should be filled out in paper form with black ink pen. Members of the psychological research laboratory cooperated with the author to carry out a series of work, such as sending and receiving questionnaires and explaining. After removing some unfinished or prank questionnaires, 1951 valid samples remained. Among them, 669 are elementary school students, 723 middle school students, and 559 high school students. The age of the participants ranged from 8–19 years with a mean age of  $12.93 \pm 2.54$  years. Before filling in the questionnaires, they all provided handwritten informed consent. After the instruction in detail, the questionnaires were filled out. Ethics approval for this study was also obtained from authors' organization.

### **2.2 Measures**

This study was conducted using questionnaires. The questionnaire consisted of four parts: The Childhood Trauma Questionnaire (CTQ), Revised NEO Personality Inventory (NEO-PI-R), None-suicidal Self-Injury Scale and Aggression Questionnaire.

### 2.2.1 *The Childhood Trauma Questionnaire (CTQ)*

The Childhood Trauma Questionnaire (CTQ), developed by Bernstein et al. [51] and revised by Zhao et al. [52], was used in this study. The CTQ consists of three validated items and 25 clinical items, for a total of 28 items. 25 clinical items examine five areas of emotional abuse, emotional neglect, physical abuse, physical neglect, and sexual abuse. The questionnaire includes items such as “Someone in my family beat me up or bruised me” and “I feel that someone in my family hates me”. Each item was rated on a scale of 1 to 5 to measure the level of abuse, with 1 being “never” and 5 being “always”. The higher the score, the more severe the child maltreatment. In view of the experience of previous studies, the five items associated with the sexual abuse subscale were excluded from the implementation due to the discomfort associated with recalling the experience of sexual abuse, and the remaining items were measured. This scale has been widely used in Chinese samples and has good reliability [52,53]. In this study, the internal consistency coefficient of the scale was  $\alpha = 0.84$ .

### 2.2.2 *None-Suicidal Self-Injury Scale*

Zanarini et al. [54] developed the Non-Suicidal Self-Injury Sale (NSSI) to be used on an individual’s level of internal aggression. The original scale consisted of 12 questions, but in view of the difficulty of understanding certain dimensions in the younger age groups, such as ‘dropping acid on oneself’, 10 items were retained, such as ‘deliberately cutting oneself with a knife’, “inserting objects into nails or skin”, etc. A scale of 1 to 4 is used, where 1 means “0 times”, 2 means “1–2 times”, 3 means “3–5 times” and 4 means “6 times and more”. The higher the score, the more frequent the self-injurious behavior has been in the past year. Previous research has shown that this scale has good reliability in Chinese samples [9]. In the present study, the internal consistency coefficient of the scale was  $\alpha = 0.86$ .

### 2.2.3 *Aggression Questionnaire*

The Aggression Questionnaire (AQ) was developed by Buss et al. and consists of four subscales: physical aggression, verbal aggression, anger and hostility [55]. There are 29 items on a five-point scale, with 1 representing strongly disagree and 5 representing strongly agree. The higher the score, the greater the aggression. A revised Chinese version was used in this study and has been shown to have high reliability in Chinese populations [53]. As this scale was used to measure externalized aggression in this study, only two of the dimensions, physical aggression and verbal aggression, were selected. The internal consistency coefficients “ $\alpha$ ” for the two subscales in this study were: physical aggression: 0.84 and verbal aggression: 0.76.

### 2.2.4 *Revised NEO Personality Inventory*

Costa et al. [56] Revised NEO Personality Inventory (NEO-PI-R) contains five dimensions: neuroticism, openness, extraversion, conscientiousness, and agreeableness. Each dimension has 24 items, making a total of 120 items for the whole scale. The scale is scored on a five-point scale, with 1 representing strong disagreement and 5 representing strong agreement. Some items were reverse scored before further analysis. Previous studies have shown that the scale has high reliability for use with local Chinese samples [3,57,58]. In this study, the consistency coefficients “ $\alpha$ ” for each dimension were: neuroticism: 0.78, extraversion: 0.65, openness: 0.64, agreeableness: 0.64, and conscientiousness: 0.80.

## 2.3 *Data Analysis*

Amos 22.0 and Spss 24.0 were used for data analysis in this study. First, a Harman one-way test was conducted [59]. Measurement models were then developed to test whether the observed variables were valid predictors of the underlying variables. The self-injurious behavior reference item was packaged into three dimensions [60]. In addition, we chose standardized root mean square residuals (SRMR), root mean square error of approximation (RMSEA), and comparative fit index (CFI) as indicators of our model fit [61], and Akaike Information criteria (AIC) as indicators of comparative models [62]. Also, the expected cross-validation index (ECVI) was used to assess the likelihood of replicating the model across samples [62], with lower ECVI values indicating a greater likelihood of replicating the model across samples [44]. Furthermore, if the measurement model fits well, we will proceed to construct the structural model in the

same way as the measurement model. Next, Bootstrapping was used to test the mediating effect of the Big Five personality between child maltreatment and internalized and externalized aggression.

### 3 Results

#### 3.1 Measurement Model

The results showed that: The percentage of variance explained by the first common factor of the Harman one-way test was 12.142%, which was less than 40%, the common method bias was not significant [63], and, the measurement model fitted well. The standardized factor loadings for each latent variable were significant ( $p < 0.001$ ), indicating that all latent variables were well represented by the corresponding observed variables. Furthermore, as shown in Table 1, there were significant correlations between the latent variables, except for openness, which was not correlated with internal aggressive behavior. Child maltreatment positively predicted both internalized and externalized aggressive behaviors.

**Table 1:** Descriptive statistics and zero-order correlations of all variables

	M	SD	1	2	3	4	5	6	7	8
1. CTQ	32.48	9.77	1.00							
2. NSSI	12.95	4.62	0.44**	1.00						
3. AGG	26.35	9.09	0.31**	0.32**	1.00					
4. P_N_T	71.39	12.38	0.31**	0.37**	0.32**	1.00				
5. P_E_T	78.40	8.82	-0.24**	-0.17**	-0.07**	-0.33**	1.00			
6. P_O_T	83.82	7.91	-0.16**	-0.02	-0.08**	-0.14**	0.37**	1.00		
7. P_A_T	85.27	9.36	-0.30**	-0.22**	-0.35**	-0.40**	0.29**	0.33**	1.00	
8. P_C_T	81.54	11.61	-0.25**	-0.18**	-0.29**	-0.51**	0.29**	0.33**	0.47**	1.00

Note: \* $p < 0.05$ , \*\* $p < 0.01$ .

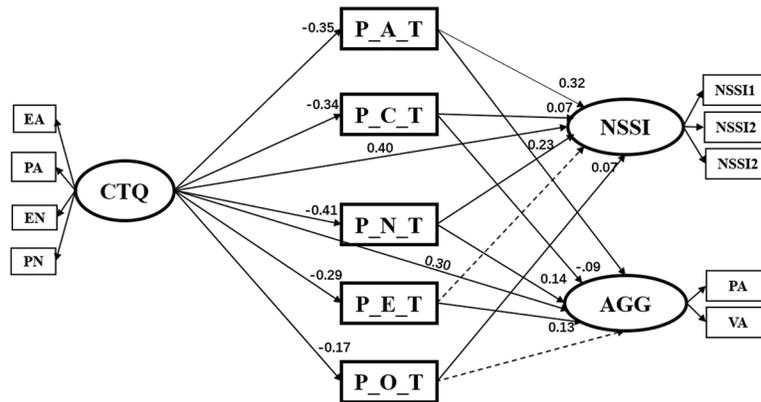
NSSI (non-suicidal self-injury); CTQ (child maltreatment); P\_N\_T (neurotic personality trait), P\_E\_T (extraverted personality traits), P\_O\_T (open personality traits), P\_A\_T (agreeableness personality traits), P\_C\_T (conscientious personality traits) are five parcels of Big Five personality; AGG (aggression).

#### 3.2 Rationality of Structural Model

First, the coefficient of the direct pathway from child maltreatment to external vs. internal aggression was significant (Beta = 0.30/0.40, both  $p < 0.001$ ) in the absence of a mediating variable (Big Five personality) (standardized). Model 1 was then constructed based on the hypothesis that early maltreatment directly predicted internal and external aggression; the Big Five personality partially mediated the relationship between child maltreatment and internalized and externalized aggression. The results indicated that model 1 did not fit well. Moreover, responsibility to internal aggression (Beta = -0.03,  $p = 0.20$ ) and openness to internal and externalized aggression were not significant (Beta = -0.023,  $p = 0.132$ ), so the pathway was restricted to zero. Subsequently, the error terms with larger MI values were concatenated to construct model 2; the results showed that model 2 fitted better than model 1 (see Table 2) [64]. Therefore, model 2 was chosen as the best model (see Fig. 1). In addition, it is worth noting that the correlation coefficient values may differ from the zero correlation values due to the prevalence of structural equation models being influenced by the whole equation model when analyzing two-by-two correlations between variables. The mediation analysis in this study is based on the path coefficient criterion in the structural model.

**Table 2:** Fitting index of model 1 and model 2

	$\chi^2$	df	CFI	RMSEA	SRMR	AIC	ECVI
Model 1	2361.33	69	0.76	0.13	0.12	2433.33	1.25
Model 2	469.75	51	0.96	0.07	0.04	577.75	0.30



**Figure 1:** A standardized mediation model

Note: Factor loadings are standardized. EA (emotional abuse), PA (physical abuse), EN (emotional neglect) and PN (physical neglect) are four parcels of childhood maltreatment (CTQ); NSSI1, NSSI2 and NSSI3 are three parcels of NSSI (non-suicidal self-injury); P\_N\_T (neurotic personality trait), P\_E\_T (extraverted personality traits), P\_O\_T (open personality traits), P\_A\_T (agreeableness personality traits), P\_C\_T (conscientious personality traits) are five parcels of Big Five personality; BA (physical aggression), VA (verbal aggression) are two parcels of aggression (AGG).

**3.3 Mediation Variable Significance Test**

Finally, based on model 2, the mediation effects in the model were estimated using the bootstrapping method. A bootstrapping sample of 2000 was generated from the original data ( $N = 1951$ ) by random sampling. The results indicated that some of the mediating effects of model 2 were significant at the 95% confidence interval. Specifically, child maltreatment significantly and indirectly influenced both internalized and externalized aggression through conscientiousness and neuroticism; agreeableness and extroversion significantly mediated between early maltreatment and externalized aggression, and openness mediated between mediated significantly between child maltreatment and internalized aggression. Openness did not mediate significantly between early maltreatment and external aggression (see [Table 3](#)).

**Table 3:** Indirect effects of normalization of 95% confidence intervals

Path	Indirect effect estimation	Lower limit	Upper limit
CTQ → P_A_T → NSSI	0.009	-1.188	0.024
CTQ → P_A_T → AGG	0.307	0.203	0.496
CTQ → P_C_T → NSSI	-0.019	-0.683	-0.006
CTQ → P_C_T → AGG	0.113	0.042	0.230
CTQ → P_N_T → NSSI	0.076	0.055	0.105
CTQ → P_N_T → AGG	0.205	0.073	0.327
CTQ → P_E_T → NSSI	0.001	-0.629	0.012
CTQ → P_E_T → AGG	-0.135	-2.917	-0.006
CTQ → P_O_T → NSSI	-0.010	-0.562	-0.003
CTQ → P_O_T → AGG	-0.021	-1.393	0.006

#### 4 Discussion

Based on a personality solidification perspective, this study explored the question of how child maltreatment steadily influences individual aggressive behavior and the mechanisms by which personality differentiates between child maltreatment and two different types of aggressive behavior. The study found that child maltreatment was significantly associated with both internalized and externalized aggression. The mediating role of neuroticism and conscientiousness in revealing the relationship between child maltreatment and the two types of aggression was significant. Extraversion and agreeableness were significant mediators between child maltreatment and external aggressive behavior.

Specifically, firstly, the findings suggest that child maltreatment positively predicts internal and external aggressive behavior, which is consistent with the findings of He et al. [49]. Basic psychological needs theory suggests that humans are born with three most basic psychological needs, namely the need for competence, the need for relatedness and the need for act with a sense of volition. The need for competence refers to the individual's perception that he or she is competent and in control of challenges. The need for relatedness needs to refer to the individual's need to feel good relationships between others and the support of others; The need for act with a sense of volition refers to the individual's need to perceive themselves as being in control and having psychological freedom [65–67]. The degree to which the three needs are met determines the individual's level of well-being and has a directing effect on individual behavior [68]. Unfortunately, early experiences of maltreatment can undermine the three basic psychological needs of individuals. Previous research has shown that early abuse can cause individuals to become immersed in the negative emotions that they cannot extricate themselves from [69], accompanied by feelings of isolation and poorer interpersonal relationships [70], thus leaving the needs for act with a sense of volition and relatedness unmet. In addition, individuals that experience childhood abuse often feel worthless and lack the ability to cope with challenges [71], and their needs for competence are not met. When needs are deprived, individuals may develop negative emotions such as anxiety and anger, and self-resolve through abusive or self-destructive behaviors [66,72,73], thus increasing internalized and externalized aggression.

At the same time, mediation analyses showed that neuroticism mediated significantly between child maltreatment and aggressive behavior, and that neuroticism acted on both internalized and externalized aggression by the same mechanism, i.e., child maltreatment led to high levels of neuroticism in the individual, which then enhanced the individual's tendency to be intrinsically and extrinsically aggressive. This is consistent with the findings of Coby [16]. Individuals with high levels of neuroticism are characterized by moodiness, anxiety, depression and weak self-control [61], which happen to be one of the causes of aggressive behavior. On the one hand, individuals with poor self-control tend to externalize bad emotions such as anger and become more impulsive, resulting in aggression towards others. On the other hand, highly neurotic individuals are more inclined to self-injure when relieving their negative emotions, as self-injury is not only within reach, but also effective in relieving bad emotions [74] and can make individuals feel relieved [75]. Thus, the entrenchment of a neurotic personality is an important reason why child maltreatment continues to influence both internal and external aggressive behavior.

Furthermore, in the present study, conscientiousness also played a significant mediating role between child maltreatment and internalized and externalized aggression. However, the path coefficients suggest that conscientiousness has different mechanisms of influence on both internal and external aggressive behavior. Specifically, child maltreatment negatively predicted individual levels of conscientiousness, while conscientiousness was negatively associated with externalized aggression and positively associated with internalized aggression. Individuals with high levels of conscientiousness have a strong sense of compliance with social norms and are able to suppress their impulsive behavior and refrain from losing their temper [76]. As a result, they are not inclined to resort to socially unethical means, such as externalized aggression, when meeting their own needs. People with high conscientiousness are perceived

by others as non-reckless and affectionate [77], and are willing to forgive others rather than engage in conflict [78]. However, on the other hand, their high standards and strict demands on themselves, as well as their perfectionist mindset and strong sense of responsibility [79,80], may make them dissatisfied with their current status quo, such as their studies and work, and blame themselves for it, feeling strong self-blame, which is likely to lead to internal aggressive behavior, such as deliberately scratching. This may lead to internal aggressive behavior, such as deliberately scratching and slashing wrists [81]. However, individuals' levels of responsibility can be inhibited by early experiences of maltreatment, resulting in low self-esteem, lack of self-confidence and problem avoidance [5,61]. In conclusion, child maltreatment can inhibit intra-individual aggression and promote extra-aggressive behavior by reducing the individual's level of conscientiousness.

In addition, child maltreatment can also influence individuals' tendency to be outwardly aggressive by inhibiting both agreeableness and openness as personality traits. This may be due to the fact that child maltreatment inhibits peer support [82], creates a sense of mistrust towards the outside world, and makes individuals more withdrawn [83]. Abused individuals often feel isolated, perceive others as untrustworthy, resist social interaction and are therefore less willing to cooperate with others, and have lower levels of agreeableness and extroversion [39,84,85]. In terms of agreeableness, individuals with low agreeableness tend to satisfy their own needs without regard for the feelings of others [86], and are perceived as extroverted because they are self-directed and aggressive. In terms of extraversion, however, people with low extraversion tend to avoid contact with others, preferring to be alone [86], and may be less outwardly aggressive. In addition, people with low openness are narrow-minded and have difficulty forgiving others [56], and may have higher levels of aggression.

In summary, this study investigates the mechanisms of child maltreatment and internalized and externalized aggression from the perspective of personality solidification, and for the first time explores the internal control and mediating role of the Big Five personality, further answering the question of how individuals' early experiences influence their aggressive behavior in adulthood, further enriching the research on child maltreatment and proposing a theoretical perspective of personality solidification, which has strong theoretical significance. At the same time, this study also has strong practical implications, providing a new personality perspective for the proper treatment of adolescent aggression and offering effective suggestions on how to reduce aggressive behavior in and out of adolescence.

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