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Childhood Trauma and Anxiety: The Chain Mediating Effects of Intolerance of Uncertainty and Proactive Coping

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Abstract

Objective: To investigate the chain mediating effect of intolerance of uncertainty and proactive coping on the relationship between childhood trauma and anxiety among Chinese college students. **Methods:** 409 college students completed the Childhood Trauma Questionnaire, Self-rating Anxiety Scale, the Intolerance of Uncertainty Scale and Proactive Coping Inventory. **Results:** (1) The score of Proactive Coping Inventory was negatively correlated with those of Childhood Trauma Questionnaire and Self-rating Anxiety Scale, while the score of Intolerance of Uncertainty Scale was positively correlated with scores of Childhood Trauma Questionnaire and Self-rating Anxiety Scale. There is a positive correlation between Intolerance of Uncertainty and Proactive Coping; (2) Intolerability of uncertainty and proactive coping play a chain mediating role in the relationship between childhood trauma and anxiety of college students. **Conclusion:** In the cognitive and coping process of childhood trauma experiencer, intolerance of uncertainty and lack of proactive coping promote the severity of anxiety symptoms, but the chain path of childhood trauma → intolerance of uncertainty → proactive coping → anxiety is a negative mediator, indicating a certain protective mechanism.

Keywords: intolerance of uncertainty, proactive coping, anxiety, childhood trauma, intermediary role

1. Introduction

Childhood trauma refers to "all forms of physical or emotional abuse, sexual abuse, and neglect, commercial or other forms of exploitation, in the context of responsibility, trust or power relationships, which will cause exact or potential harm to children." (World Health Organization (WHO), 1999). Childhood trauma generally refers to the following five categories of experiences: emotional abuse, physical abuse, sexual abuse, physical neglect, and emotional neglect (Butchart et al., 2006). The harmfulness of childhood trauma can persist into adulthood and is one of the most powerful risk factors for anxiety and depression in adulthood (Kuzminskaite, et al., 2021).

Childhood trauma can predict anxiety in adulthood (Kisely et al., 2018). Meta-analytical data (Chen et al., 2010) showed that individuals who experienced early childhood abuse were three times more likely to suffer from anxiety. The correlation between childhood trauma and anxiety has also been demonstrated in Chinese college students (Gong et al., 2018; Zhao et al., 2020). A recent meta-analysis showed that the overall prevalence of anxiety symptoms among Chinese college students was 24.0% (Zhang et al., 2021). Prolonged anxiety is associated with lower levels of mental health among students, which may lead to insomnia (Son et al., 2020), aggression, smartphone addiction, and suicide among college students (Duan et al., 2020). It is not only detrimental to the academic achievement of college students, but also damages their physical and mental health.

With the development of modern society, the emergence of many emerging industries and things has greatly increased the uncertainty of personal experience and social changes. The outbreak and spread of the COVID-2019 epidemic also adds to the uncertainty of the general environment. Uncertainty plays an important role in the pathological development of anxiety. In the context of this era, understanding how childhood trauma experiencers perceive and cope with uncertainty, as well as its contribution to anxiety, has certain clinical significance, and can help clinicians identify effective entry points for intervention work in the current environment.

The model of intolerable of uncertainty of generalized anxiety (Dugas et al., 1997) proposes that anxiety is caused by excessive worrying, which is a pathological response to inability to deal with uncertainty. Intolerance

of uncertainty (IU) refers to negative beliefs about unpredictable and ambiguous situations, as well as excessive fear of future negative outcomes, regardless of the likelihood of the occurring. The intolerance of uncertainty has two dimensions: (1) inhibitory intolerance of uncertainty, which refers to the inability to act or difficulty in acting in the face of uncertainty; (2) forward-looking intolerance of uncertainty, which refers to inability to act on expectations, people will have threatening perceptions about uncertainty, and an exaggerated tendency to view potentially negative events as unacceptable (Carleton et al., 2007).

Empirical research confirms that intolerance of uncertainty is associated with anxiety. Research shows that intolerance to uncertainty is still a strong predictor of worry after controlling for other important cognitive factors that influence worry (Groves et al., 2020). Researchers investigated the specificity of the relationship between intolerance of uncertainty and anxiety and found that intolerance of uncertainty was more associated with anxiety than it was with compulsive and panic feelings (Dugas et al., 2001).

The relationship between childhood trauma and intolerance of uncertainty can be understood through the identity destruction model. The Identity Disruption Model proposes that early adversity disrupts normal identity development, leading to a deficit in a person's sense of personal identity with oneself (Carlson et al., 1999). Individuals who lack a clear and stable sense of self are thought to turn to external sources to help define themselves (Campbell, 1990). Based on people's tendency to seek certainty, it is reasonable to speculate that the tendency to turn to external sources for self-definition may increase the degree of aversion to uncertainty. Existing empirical research has also established a relationship between childhood trauma and the intolerance of uncertainty (Hayward et al., 2020).

Although childhood trauma, intolerance of uncertainty, and anxiety are associated in pairs, the mediating role of intolerance of uncertainty between childhood trauma and anxiety has not been determined. The determination of this mediating effect plays an important role in the treatment of trauma-induced adult anxiety. One reason is that based on the current era background, whether it is an objective environment or personal subjective experience, uncertainty is increasing, and we urgently need research in the context of this era, exploring the characteristics of traditional research themes in the context of the new era, specifically, how people who experience childhood trauma experience uncertainty in this era of increasing uncertainty, and how the cognitive style of traumatic experience affects their anxiety performance. In the current era, understanding this mediation pathway provides practical ideas for clinicians to intervene.

Based on above, this study proposes that H1: intolerance of uncertainty is a mediating factor between childhood trauma and anxiety.

Another possible mediating path is the lack of adaptive coping with uncertainty. Childhood trauma may cause individuals to lose adaptive coping styles (Cicero, 2018), thereby increasing their vulnerability to anxiety. Future-oriented coping refers to the positive and purposeful coping that individuals take in the face of possible future pressures and threats. Gan et al. (2007) identified two dimensions of future-oriented coping: proactive coping and preventive coping, where proactive coping refers to an individual's efforts to accumulate general resources to deal with possible future challenges, which is an adaptive coping style. Proactive coping has been shown to be associated with multiple positive mental health outcomes. For example, in trauma-experienced individuals, higher levels of proactive coping were associated with fewer symptoms of post-traumatic stress (Vernon et al., 2009). Smith (2020) reported the moderating role of proactive coping between trauma and anxiety and depression, suggesting that proactive coping is a protective buffer between trauma and subsequent poor mental health outcomes.

Proactive coping is a complex executive process that requires the involvement of multiple cognitive processes, including the ability to apply attention with purpose, problem solving, and future planning (Diamond, 2013), and empirical research has demonstrated that the severity of childhood trauma in all age groups were significantly associated with deficits in executive function (Sarita Silveira et al., 2020), which may reduce the proactive coping ability of individuals with traumatic experiences. A small number of existing empirical studies have also confirmed the negative relationship between childhood trauma and proactive coping (Smith, 2020).

Proactive coping is a concept that belongs to positive psychology. According to the above literature, it can be seen that proactive coping has a protective effect on post-traumatic stress disorder and anxiety caused by traumatic experiences. The direct relationship between proactive coping and childhood trauma has not yet been directly established. At present, the two can only be linked from the perspective of cognitive deficits, but there is no evidence that the two are directly related. Therefore, the first goal of this mediation pathway is to directly verify the relationship between childhood trauma and proactive coping, to supplement the gaps in existing research, the second purpose is to explore whether proactive coping plays a mediating role between childhood

trauma and anxiety, proactive coping is a positive factor, if The mediation effect is established, and it can also be used as a starting point for intervention. Therefore, H2 is: proactive coping is a mediating factor between childhood trauma and anxiety.

In addition, the perception of uncertainty, that is, intolerance of uncertainty, may also affect the individual's coping with future uncertainty, that is, proactive coping. According to uncertainty reduction theory (Berger and Calabrese, 1975), experiencing high levels of uncertainty prompts individuals to seek information to reduce uncertainty (Deci, 1975). Kellerman and Reynolds (1990) believed that the degree of individual intolerance of uncertainty is a better predictor of information-seeking behavior than the uncertainty experienced. Although Uncertainty Reduction Theory is proposed in the context of organizational communication, it reflects the nature of individuals actively seeking to reduce uncertainty, and seems to be used to explain the relationship between intolerance of uncertainty and proactive coping, that is, because of an intolerance of uncertainty, proactive action is taken to deal with future uncertainty.

Although uncertainty reduction theory can explain the relationship between intolerance of uncertainty and proactive coping to a certain extent, there are few studies indicates some contradictory results, so this study directly exploring the relationship between them can supplement previous research and enrich the characteristics of the subjects. In addition, this path may lead to more different understanding of intolerance of uncertainty. Specifically, overall, intolerance of uncertainty is generally considered a negative trait, but according to uncertainty reduction theory, intolerance of uncertainty motivates individuals to seek information to reduce uncertainty, and uncertainty is normal state of the world, and it is human nature to avoid uncertainty. Whether this aversion to uncertainty has its positive side, such as it will prompt individuals to find various ways to reduce the uncertainty of the environment, at this level, uncertainty aversion can have positive effects if it does not just stay at the cognitive level, but translates into action. This study is innovative in this regard. Therefore, of this study: intolerance of uncertainty and proactive coping play a chain mediating role between childhood trauma and anxiety.

Based on above, this study will explore the mediating factors centered on uncertainty cognition and coping between childhood trauma and anxiety among college students, and verify the mediating effect of intolerance of uncertainty and proactive coping factors, in order to find a suitable entry point for anxiety treatment of Chinese college students in the current environment of uncertainty.

2. Method

2.1 Participants

Chinese college students were recruited through the Questionnaire Star platform network. A total of 423 questionnaires were distributed, and 409 valid questionnaires were included, with an effective rate of 97%. The age range was between 16 and 26 years old (M=21.70, SD=2.39). There were 199 males (49%) and 210 females (51%). The subjects were told that this was a survey about the life experience of college students, and the filling time was 3 to 4 minutes, and that they would receive a random amount of compensation after completing the filling.

2.2 Measurement

2.2.1 Childhood Trauma Questionnaire, CTQ

It was compiled by Bernstein et al. in 1998, and Fu Wenqing et al. and Zhang Xingfu et al. revised the Chinese version of the questionnaire. The questionnaire has 28 items, including five dimensions of physical abuse, sexual abuse, physical neglect, emotional abuse and emotional neglect. Each dimension is measured by 5 questions, and the remaining three items are used for validity testing. The questionnaire is expressed on a 5-point Likert scale, ranging from 1 to 5. The higher the score, the higher the degree of childhood trauma. The questionnaire can be used for adult subjects to measure the abuse before the age of 16. Childhood trauma is considered to have occurred when at least one subscale score is above the cutoff value (ie, physical abuse >9, physical neglect >9, emotional abuse >12, emotional neglect >14, sexual abuse >7) (Bernstein et al., 2003). The Cronbach alpha coefficient of the Childhood Trauma Questionnaire in this study was 0.84.

2.2.2 Proactive Coping Subscale

The proactive coping subscale of the Chinese revised version of the Future-oriented Coping Inventory (FOCI) was used. The Future-oriented Coping Inventory was developed by Greenglass et al. in 1999 and Gan et al. Chinese version revised. The revised scale consists of 16 items, consisting of two subscales, preventive coping and proactive coping. The anticipatory response consisted of 8 items including "I will always try to find a way out of the way, nothing really stops me" on a 4-point scale, from 1 (completely incorrect) to 4 (completely

correct). This scale can be used for adult subjects. The Cronbach alpha coefficient of the proactive coping subscale in this study was 0.94.

2.2.3 The Intolerance of Uncertainty Scale

The Intolerance of Uncertainty Scale (IUS) was used in Chinese revised and simplified version. The Intolerance of Uncertainty Scale (Carleton et al., 2007) consists of 12 self-report items, and Zhang et al. revised the Chinese version in 2013, with 12 items including "unforeseen things make me upset" Composition, expressed on a 5-point Likert scale, on a scale of 1 to 5, with higher scores indicating a greater intolerable degree of uncertainty. This scale can be used for adult subjects. Intolerable Uncertainty Scale Cronbach's alpha coefficient was 0.90 in this study.

2.2.4 Self-Rating Anxiety Scale

The self-rating anxiety scale (SAS) developed by Zung et al in 1971 was used, it includes 15 positive scores such as "I feel more nervous and anxious than usual", "I feel calm and easy to sit quietly". The 4-point scale is used to evaluate the frequency of symptoms defined by the main assessment items, from 1 (no or very little time) to 4 (most or all of the time). This scale can be used for adult subjects. The Cronbach's alpha coefficient of anxiety in this study was 0.78.

2.3 Statistic Analysis

Descriptive statistical analysis and independent samples t-test were performed using SPSS 22.0 to analyze gender differences in intolerance of uncertainty, proactive coping, anxiety, and childhood trauma and dimensions of childhood trauma (see Table 1). And Pearson correlation analysis was performed to test the relationship between variables. According to the research of Wen Zhonglin et al. (2014), the analysis of multiple mediation effects can be carried out from three perspectives: the overall mediation effect, the mediation effect of specific paths, and the comparative mediation effect, and the bootstrap method is better to test multiple mediation effects. Therefore, SPSS 22.0 and the SPSS macro program PROCESS of Hayes (2013) were used to organize and analyze the data under the control of age and gender. The mediation effect was tested by estimating the 95% confidence interval of the mediation effect for a sample of 5000 Bootstrap.

3. Results

3.1 Common Method Bias

Harman's univariate test was used to test for common method bias on the Childhood Trauma Questionnaire, Self-Rating Anxiety Scale, Intolerance of Uncertainty Scale, and Proactive Coping Scale (Zhou & Long, 2004). The results show that there are 11 factors with eigenvalues greater than 1 in the unrotated principal component factor analysis, and the cumulative explanation rate is 67.50%. The first factor extracted explained 23.88% of the total variance, far below the critical value of 40%, indicating that there is no serious common method bias.

3.2 Descriptive Analysis and Correlation Analysis Between Variables

Table 1. Description and correlation

Variables	$M \pm SD$ (N=409)	1	2	3	4	4.1	4.2	4.3	4.4	4.5
1Proactive coping	19.38±4.91	–								
2Intolerance of uncertainty	29.98±9.27	0.23**	–							
3Anxiety	34.28±8.29	–0.47**	0.32**	–						
4Childhood trauma	43.78±13.06	–0.44**	0.20**	0.58**	–					
4.1Physical abuse	6.59±3.41	–0.25**	0.27**	0.46**	0.86**	–				
4.2Sexual abuse	6.80±3.40	–0.22**	0.22**	0.44**	0.82**	0.87**	–			
4.3Physical neglect	9.96±3.46	–0.43**	0.07	0.49**	0.78**	0.52**	0.52**	–		
4.4Emotional Abuse	7.46±3.17	–0.20**	0.38**	0.47**	0.82**	0.84**	0.77**	0.48**	–	
4.5Emotional neglect	12.97±4.20	–0.48**	–0.13**	0.32**	0.48**	0.09**	0.03	0.40**	0.09	–

*$p<0.05$; **$p<0.01$

Descriptive statistics and correlation analysis were performed on proactive coping, intolerable uncertainty, anxiety and childhood trauma and each dimension, as shown in Table 1. According to the critical value of childhood trauma, the incidence rates of physical abuse, physical neglect, emotional abuse, emotional neglect, and sexual abuse in this study sample were 13.2%, 51.3%, 8.1%, 29.3%, and 23.2%, respectively. The incidence rate was 63.1%. The results of intervariate correlation analysis showed that childhood trauma was negatively correlated with proactive coping (r=-0.44, p<0.01), childhood trauma was positively correlated with intolerance of uncertainty (r=0.20, p<0.01), and childhood trauma was positively correlated with anxiety (r=0.58, p<0.01). There was a positive correlation between proactive coping and intolerance of uncertainty (r=0.23, p<0.01), and a negative correlation between proactive coping and anxiety (r=–0.47, p<0.01). There was a positive correlation between intolerance of uncertainty and anxiety (r=0.32, p<0.01). Correlations between each trauma type and other variables are also listed in Table 1.

3.3 The Test of Mediating Effect

The sequential test results of the mediation effect analysis are shown in Table 2. Childhood trauma significantly positively predicted intolerance of uncertainty (β=0.21, p<0.001) and anxiety (β=0.33, p<0.001), and significantly negatively predicted proactive coping (β=–0.50, p<0.001); intolerance to uncertainty significantly positively predicted proactive coping (β=0.32, p<0.001) and anxiety (β=0.37, p<0.001); proactive coping significantly negatively predicted anxiety (β=–0.39, p<0.001).

Table 2. Regression outcome

Regression		Fitness				Sig
Outcome variable	predictor	R	R^2	*F*	*β*	*t*
Anxiety	Childhood Trauma	0.59	0.35	73.00	0.58	14.35***
Intolerance of uncertainty	Childhood Trauma	0.27	0.07	10.53	0.21	4.30***
Proactive coping	Intolerance of uncertainty	0.55	0.30	42.92	0.32	7.45***
Anxiety	Childhood Trauma	0.72	0.51	85.26	–0.50	–11.77***
	Intolerance of uncertainty				0.37	9.61***
	Proactive coping				–0.39	–9.48***
	Childhood Trauma				0.33	7.95***

***p<0.001

Using the PROCESS macro program, the mediating effects of childhood trauma, intolerance of uncertainty, anticipatory coping, and anxiety were analyzed, controlling for age and gender. The results of the analysis and the road map show (see Table 3 and Figure 1) that the Bootstrap 95% confidence intervals for the indirect effects of intolerance uncertainty and proactive coping do not contain zero, indicating that intolerance of uncertainty and proactive coping have a significant impact on childhood trauma. Anxiety played a significant mediating role. The total indirect effect value was 0.16, accounting for 43.2% of the total effect of 0.37. The mediating effect affects anxiety through three paths: childhood trauma → intolerance of uncertainty, which is indirect effect 1 (0.05, accounting for 13.5% of the total indirect effect); childhood trauma → intolerance of uncertainty → proactive coping → anxiety, which is indirect Effect 2 (–0.02, 5.4% of the total indirect effect); childhood trauma→proactive coping→anxiety, or indirect effect 3 (0.13, 35.1% of the total indirect effect).

Table 3. Mediating Effect

	Path	Effect	lowBoot CI	upBoot CI
Total indirect effect		0.16	0.12	0.19
indirect effect 1	Childhood trauma→Intolerance of uncertainty→Anxiety	0.05	0.02	0.07
indirect effect 2	Childhood trauma→ Intolerance of uncertainty →Proactive coping→Anxiety	–0.02	–0.03	–0.01
indirect effect 3	Childhood trauma→Proactive coping→Anxiety	0.13	0.10	0.16
Direct effect	Childhood trauma→Anxiety	0.21	0.16	0.26
Total effect		0.37	0.32	0.42

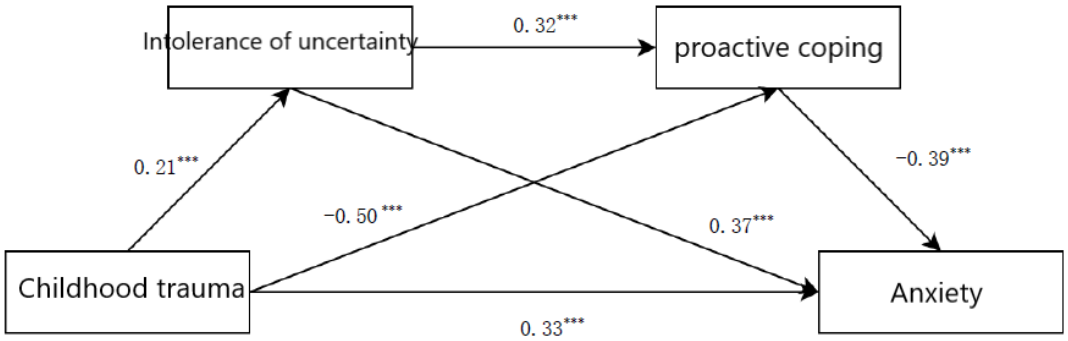

Figure 1. Mediating Model

4. Discussion

This study explores the chain mediating role of intolerance of uncertainty and proactive coping in the relationship between childhood traumatic experiences and anxiety. The results showed that in the sample of this study, the total incidence of childhood trauma is 63.1%, which is similar to the previous meta-analysis on the incidence of childhood trauma in Chinese college students (Fu et al., 2018). Intolerance of uncertainty and proactive coping play a chain mediating role between childhood trauma and anxiety. The findings are consistent with the hypothesis and support the identity destruction model of trauma and the uncertainty reduction theory.

Specifically, this chained mediation model contains three distinct paths. First, childhood trauma increases the severity of anxiety through elevated levels of intolerable of uncertainty. This shows that childhood trauma can cause individuals to have a distorted cognition of uncertainty, increase their aversion to uncertainty, and thus increasing anxiety. This result supports the identity-disruption model, in which traumatic experiences prevent individuals from developing a mature and clear sense of self (Carlson et al., 1999). This may prompt individuals to seek a definition of self-identity from the outside, which increases aversion to uncertainty. Consistent with previous theories and research results (Hayward, 2020), Breslau et al. (1999) found that traumatic events lead to persistent vulnerability to anxiety through an exaggerated cognitive tendency to the probability of occurrence of threats, which can explain that the intolerance of uncertainty mediates the relationship between childhood trauma and anxiety.

Secondly, childhood trauma impairs an individual's ability of proactive coping, thereby increasing the severity of anxiety. The negative relationship between childhood trauma and proactive coping, consistent with previous findings (Smith, 2020), can be understood in terms of impaired executive function. Proactive coping relies on the integrative use of cognitive processes (Aspinwall & Taylor, 1997), and the competencies required for these stages are considered executive functions (Diamond, 2013). Childhood trauma impairs individual executive

function (Silveira et al., 2020), so individuals who experience trauma have lower levels of proactive coping. This study has inconsistent conclusions with previous studies. Smith's (2020) study found that childhood trauma has a negative predictive effect on proactive coping, but there is no significant correlation between proactive coping and anxiety. The possible reason for the difference is that participants age and cultural background are different. The literature suggests that there are age differences in levels of proactive coping (Vaillant, 1986). This is probably the main reason for the difference.

The third significant path is the chain between intolerance of uncertainty and proactive coping. Childhood traumatic experiences increase the individual's intolerable uncertainty level, and the increased intolerable uncertainty level increases the individual's proactive coping level thus reducing subsequent anxiety symptoms. This conclusion supports the uncertainty reduction theory and expands the scope of application of this theory. It may indicate that some childhood trauma experiencers, because of intolerance of uncertainty, promote their proactive coping behaviors, thereby reducing the occurrence of anxiety.

The results of the study have some clinical implications, suggesting that clinicians can improve anxiety symptoms in individuals with childhood traumatic experiences by intervening in intolerance of uncertainty and proactive coping. Targeted cognitive behavioral therapy has been shown to improve individuals' intolerance of uncertainty (Zemestani, 2021). As for proactive coping, some researchers found that with the increase of age and experience, the proactive coping level of an individual will gradually mature (Arnett, 2007). For college students in the early adulthood age of 18-25, this period may be a favorable time to promote the development of proactive coping strategies. Both can be used as entry points for clinical intervention.

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