Childhood maltreatment on young adult depression: A moderated mediation model of negative automatic thoughts and self-compassion

Xiang-Ling Hou1*, Xiao-Hua Bian1*, Zhi-Hong Zuo1, Ju-Zhe Xi1, Wei-Jun Ma1 and Laurence D Owens2

Abstract
This study examines the mediating role of negative automatic thoughts on the link between childhood maltreatment and young adult depression, and the moderating role of self-compassion in this indirect link. College students (N=578) completed self-report questionnaires assessing the mentioned study variables. The results showed that childhood maltreatment was positively associated with young adult depression via negative automatic thoughts. Moreover, self-compassion moderated this indirect link such that participants with low self-compassion demonstrated a stronger indirect link than those with high self-compassion. These findings highlight the important role of self-compassion in countering the adverse outcomes of childhood maltreatment.

Keywords
Cognitive processing, depression, path analysis, trauma, youth

Introduction
Childhood maltreatment, or “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (Leeb et al., 2008: 11), is a worldwide public health problem that increases young adults’ risk for the development of long-term poor mental health outcomes, including a range of internalizing and externalizing problems (Jaffee, 2017). Childhood maltreatment takes many forms including emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect (Bernstein et al., 2003). Research with young adults indicates that child maltreatment can lead to the development of interpersonal difficulties (Wilson and Scarpa, 2015), body concerns (Brooke and Mussap, 2013), insomnia

1East China Normal University, China
2Flinders University, Australia
*These authors are regarded as co-first authors.

Corresponding author:
Ju-Zhe Xi, Affiliated Mental Health Center (ECNU), School of Psychology and Cognitive Science, East China Normal University, 3663 N. Zhongshan Rd., Shanghai 200062, China.
Email: jzxi@psy.ecnu.edu.cn
symptoms (Hamilton et al., 2018), substance use behaviors (Cohen et al., 2017), and problematic alcohol use (Miron et al., 2013). Of all the long-term adverse outcomes, childhood maltreatment is most consistently linked to the development and maintenance of depression symptoms (meta-analyses; see Mandelli et al., 2015; Nelson et al., 2017). Cross-sectional (Coates and Messman-Moore, 2014; Wilson and Scarpa, 2015; Wu et al., 2018) and longitudinal (Cohen et al., 2017) studies have shown that different forms of maltreatment during childhood are positively associated with young adult depression symptoms, suggesting childhood maltreatment is a robust risk factor in predicting young adult depression symptoms.

Given the consistent and robust risk of young adult depression symptoms among those who experienced maltreatment in childhood, it is critical to identify potential psychological mechanisms in the relationship between childhood maltreatment and young adult depression symptoms. Several studies (Coates and Messman-Moore, 2014; Ross et al., 2019; Wu et al., 2018) have explored the potential mechanisms by which childhood maltreatment may confer risk for young adult depression symptoms. However, these studies only examined the possible mediators in this link and focused on specific types of childhood maltreatment. That is, questions such as when the possible mediators mediate the childhood maltreatment–young adult depression relationship (i.e. moderation) and whether the possible mediators have the same roles within general childhood maltreatment remain unclear. From the perspective of Jaffee (2017), identifying systematic mechanisms underlying the link between childhood maltreatment and adverse mental health outcomes such as young adult depression symptoms is warranted and important. To date, no research has yet examined mediation and moderation mechanisms simultaneously in this link. Based on available studies, it has been proposed that negative automatic thoughts might be a valuable mediator in the link between childhood maltreatment and young adult depression symptoms (e.g. Beck, 1967; Buschmann et al., 2017). However, not every person who experienced maltreatment in childhood has the outcome of negative automatic thoughts, indicating certain factors can counteract the adverse impact of childhood maltreatment. Some researchers suggest that self-compassion might be a protective factor and play a significant role in this process (e.g. Barlow et al., 2017; Neff et al., 2007).

Therefore, this study carried out a further investigation into the relationship between general childhood maltreatment and young adult depression symptoms by examining the mediation role of negative automatic thoughts and the moderation role of self-compassion. This research helps us to understand how and when childhood maltreatment contributes to young adult depression symptoms as well as develop effective experience-based interventions.

**The mediation role of automatic thoughts**

Automatic thoughts are images or cognitions caused by cognitive schema or core belief that is activated in one particular moment (Beck, 1967). Initiated by both conscious and unconscious thoughts, automatic thoughts do not require conscious effort or control and have a strong impact on mood (Ingram et al., 1995; Piasecki and Hollon, 1987). Once activated, automatic processes run to completion and are difficult to alter, to ignore, or to suppress (Shiffrin and Schneider, 1977). Negative automatic thoughts are often activated by negative life experiences and characterized by repetition and intrusiveness, and they play a key role in developing psychopathology such as depression symptoms (Tanaka et al., 2006).

The cognitive model of depression (Beck, 1967, 1983; Beck et al., 1985) theorized that early negative experiences such as exposure to childhood maltreatment might foster the formation of negative automatic thoughts (as a form of cognitive vulnerability), which are influenced by negative beliefs or maladaptive schemas, as the consequence of one’s information processing bias. Meanwhile, these thoughts, in turn, contribute to the onset and recurrence of
later depression symptoms. That is to say, those who experience childhood maltreatment likely experience automatic negative thoughts, which lead to depression later. Indeed, childhood abuse/neglect has been associated with negative automatic thoughts (e.g. Kaya and Cecen-Erogul, 2016), cognitive vulnerability (Paredes and Calvete, 2014; Wells et al., 2014), and negative trauma appraisals (Barlow et al., 2017). In turn, negative automatic thoughts have been associated with childhood negative experiences and young adult depression symptoms in cross-sectional (Arimitsu and Hofmann, 2015; Buschmann et al., 2017; Tanaka et al., 2006) and longitudinal studies (Hjemdal et al., 2013). In addition to showing that negative automatic thoughts correlate with childhood negative experiences and young adult depression symptoms, researchers have begun to examine the mediating effect of negative automatic thoughts on individuals’ mental health (depression or behavioral problems) as a result of stress or childhood maltreatment (Buschmann et al., 2017; Kaya and Cecen-Erogul, 2016). Findings suggest that negative automatic thoughts might mediate the association between childhood maltreatment and young adult depression symptoms. Some related research about cognitive vulnerability also lends support for this assertion. For example, studies demonstrated that cognitive vulnerability mediated the relationship between emotional maltreatment and depressive symptoms among adolescents (Paredes and Calvete, 2014) and college students (Wells et al., 2014).

The moderation role of self-compassion

While the negative outcomes of childhood maltreatment have been well studied, not all individuals exposed to early negative experiences develop adverse outcomes such as negative automatic thoughts (Maheux and Price, 2016). It could be that the consequence of negative automatic thoughts caused by childhood maltreatment is mitigated by various protective factors. One of the variables that might hold promise as a protective factor buffering the negative outcome (i.e. negative automatic thoughts) of these early negative experiences is self-compassion. Neff (2003b) defines self-compassion as responding to one’s suffering by treating oneself with loving-kindness, connection, and concern rather than with self-criticism and harshness. In other words, self-compassion involves taking a positive attitude toward oneself when facing pain or failure. Self-compassion consists of three basic components: self-kindness (seeing one’s experiences with understanding and warmth), common humanity (seeing one’s sufferings or experiences as a part of the universal human experience), and mindfulness (seeing one’s sufferings or experiences in a balanced view), which contribute to recognizing and accepting the reality, and enhancing the capacity to respond effectively in any given situation (Neff, 2003a, 2003b). A growing body of research has found that positive or negative thoughts are predicted by self-compassion. For example, young adults who are more self-compassionate experience more positive automatic thoughts (Arimitsu and Hofmann, 2015), less negative automatic thoughts (Akin, 2012; Arimitsu and Hofmann, 2015; Mantzios et al., 2015), less negative cognitive reactions to daily life problems (Muris et al., 2019), as well as less self-criticism, rumination, and thought suppression (Neff et al., 2007). Also, individuals who are higher in self-compassion are more likely to take a balanced approach to one’s negative experiences so that negative thoughts or feelings are neither suppressed nor exaggerated (Neff et al., 2007). In this way, self-compassion appears to attenuate negative automatic thoughts caused by early adverse experiences. The protective role of self-compassion in the relationship between childhood maltreatment and negative automatic thoughts has not been investigated empirically despite the presence of the theories, yet this notion seems promising based on several studies with indirect evidence. For example, Barlow et al. (2017) found that self-compassion was inversely associated with negative trauma appraisals, that is, individuals with a history of...
child abuse and high self-compassion were less likely to have negative trauma appraisals, suggesting self-compassion may serve as a moderator in the link between childhood maltreatment and negative automatic thoughts.

Overview of this study

Given the theoretical and empirical evidence presented above, this study established a moderated mediation model (see Figure 1) to clarify the possible mechanisms (i.e. mediation and moderation) in the relationship between childhood maltreatment and young adult depression symptoms among college students. We hypothesized that (a) negative automatic thoughts would mediate the link between childhood maltreatment and young adult depression symptoms, and (b) the mediating effect of negative automatic thoughts would be moderated by self-compassion. Specifically, the indirect effect of childhood maltreatment on young adult depression symptoms via negative automatic thoughts would be stronger for individuals with low self-compassion than for those with high self-compassion.

Method

Participants and procedure

A total of 578 (47.8% females) Chinese college students aged between 17 and 24 years ($M \pm SD = 20.30 \pm 1.29$) participated in the study. The sample consisted of freshmen (33.2%), sophomores (28.9%), juniors (33.4%), and seniors (4.5%). Most (56.1%) of the participants majored in natural science (e.g. math, physics, and chemistry) and 43.9 percent in social science (e.g. education, philosophy, and politics).

After the Ethics Committee of Psychological Research at the corresponding author’s institution approved this study, we carried out this investigation in classrooms between May and June 2017. Before accessing the survey during regular classes at school, informed consent was obtained from participants and teachers. The survey included the instrument battery and demographic information (i.e. gender, age, grade, and major). The average time of completing the survey was about 20 minutes. Participants received no compensation for their participation.

Measures

Childhood maltreatment. The 28-item Childhood Trauma Questionnaire—Short Form (CTQ-SF) was administered to assess childhood maltreatment (Bernstein et al., 2003). The CTQ-SF contains five subscales: emotional abuse (e.g. “people in my family said hurtful or insulting things to me”), physical abuse (e.g. “I got hit so hard by someone in my family that I had to see a doctor or go to the hospital”), sexual abuse (e.g. “someone tried to touch me in a

![Figure 1. The proposed moderated mediation model.](image-url)
sexual way or tried to make me touch them”), emotional neglect (e.g. “people in my family felt close to each other”), and physical neglect (e.g. “I had to wear dirty clothes”). Each item is rated on a 5-point scale ranging from 1 (never true) to 5 (very often true), with higher scores indicating higher levels of maltreatment in childhood. The Chinese version of CTQ-SF has demonstrated good psychometric properties among Chinese college students ($\alpha = .90$; Wu et al., 2018). In this study, the Cronbach’s $\alpha$ was .91.

**Negative automatic thoughts.** The Automatic Thought Questionnaire (ATQ) was administered to assess negative automatic thoughts (Hollon and Kendall, 1980). The ATQ contains 30 items (e.g. “What’s the matter with me?”), and each item is rated on a 5-point scale ranging from 1 (not at all) to 5 (all the time), with higher scores indicating greater frequencies of negative automatic thoughts. The Chinese version of ATQ has demonstrated good psychometric properties among Chinese college students ($\alpha = .95$; Cao et al., 2001). In this study, the Cronbach’s $\alpha$ was .97.

**Self-compassion.** The 26-item Self-Compassion Scale (SCS) was administered to assess self-compassion (Neff, 2003b). The SCS contains six subscales: self-kindness (e.g. “I’m kind to myself when I’m experiencing suffering”), common humanity (e.g. “I try to see my failings as part of the human condition”), mindfulness (e.g. “when something upsets me I try to keep my emotions in balance”), self-judgment (e.g. “when times are really difficult, I tend to be tough on myself”), isolation (e.g. “when I fail at something that’s important to me I tend to feel alone in my failure”), and over-identification (e.g. “when something upsets me I get carried away with my feelings”). Among them, items in self-judgment, isolation, and over-identification were reversely coded. Each item is rated on a 5-point scale ranging from 1 (almost never) to 5 (almost always), with higher scores indicating higher levels of self-compassion. The Chinese version of SCS has demonstrated good psychometric properties among Chinese college students ($\alpha = .80$; Wu et al., 2018). In this study, the Cronbach’s $\alpha$ was .82.

**Depression symptoms.** The Beck Depression Inventory–First Edition (BDI-I) was administered to assess depression symptoms (Beck et al., 1961). The BDI-I contains 21 items (e.g. “I feel blue or sad”), and each item is rated on a 4-point scale ranging from 0 (no symptom) to 3 (most severe), with higher scores indicating higher levels of depression. The Chinese version of BDI-I has demonstrated good psychometric properties among Chinese college students ($\alpha = .93$; Li et al., 2017). In this study, the Cronbach’s $\alpha$ was .89.

**Statistical analysis**

Statistical analyses were conducted using SPSS version 21.0 and Mplus version 7.0. Descriptive statistics (means and standard deviations) and bivariate correlations of study variables were computed. Unmeasured latent method factor technique (Podsakoff et al., 2012) was used to assess the common method bias. According to the recommendation of Edwards and Lambert (2007), structural equation modeling (SEM) with maximum likelihood estimation was used to test the moderated mediation. The indices of comparative fit index ($\text{CFI} \geq .90$), the Tucker–Lewis index ($\text{TLI} \geq .90$), the root mean square error of approximation (RMSEA $\leq .08$), and the standardized root mean square residual (SRMR $\leq .08$) were used to assess the model fit (Bentler, 1990; Hu and Bentler, 1999). In the moderated mediation analysis, all variables were standardized to minimize multi-collinearity; gender and age were also controlled.

**Results**

**Preliminary analyses**

Means, standard deviations, and bivariate correlations of study variables are presented in
Both negative automatic thoughts and depression symptoms were positively correlated with childhood maltreatment ($r = .46$ and $r = .32$, respectively; $p < .01$) and negatively correlated with self-compassion ($r = -.54$ and $r = -.43$, respectively; $p < .01$). Childhood maltreatment was negatively correlated with self-compassion ($r = -.33$, $p < .01$). Negative automatic thoughts were positively correlated with depression symptoms ($r = .63$, $p < .01$). The raw data of the subscales of self-compassion are shared as Supplemental material.

### Common method bias

According to the recommendations of Podsakoff et al. (2012), we examined the potential threat of common method bias through statistical remedies. First, the full measurement model was established using confirmatory factor analyses (CFA). The results showed that the full measurement model was satisfactory: $\chi^2(146) = 445.73$, $p < .001$, $\chi^2/df = 3.05$, CFI = .97, TLI = .96, RMSEA = .06, and SRMR = .04; the standardized loadings of all factors were greater than .60 at $p < .05$. Then, an unmeasured common latent method factor was added into the full measurement model, and this was uncorrelated with other factors. The results showed that the fit of this model was significantly worse than the full measurement model ($\Delta \chi^2 = 71.34$, $\Delta df = 14$, $p < .001$), suggesting that the threat of common methods bias in this study is not significant.

### The moderated mediation analyses

The moderated mediation model showed an acceptable model fit with $\chi^2(2) = 9.49$, $p < .01$, $\chi^2/df = 4.75$, CFI = .99, TLI = .93, RMSEA = .08, and SRMR = .01. The results of moderated mediation analyses are reported in Table 2 and Figure 2. The mediation analysis indicated that childhood maltreatment positively predicted negative automatic thoughts ($\beta = .29$, $p < .001$), and negative automatic thoughts in turn positively predicted young adult depression symptoms ($\beta = .60$, $p < .001$). That is, negative automatic thoughts mediated the link between childhood maltreatment and young adult depression symptoms. Moreover, the results revealed a significant moderation effect of self-compassion ($\beta = -.09$, $p < .05$) such that this link was weaker in high self-compassion than in low self-compassion (see Figure 3). That is, self-compassion moderated the indirect impact of childhood maltreatment on young adult depression symptoms via negative automatic thoughts. Specifically, this indirect effect was weaker at high
levels of self-compassion ($\beta=.12$, $p<.01$), rather than low levels of self-compassion ($\beta=.22$, $p<.001$).

**Discussion**

This study examined the underlying mechanisms of childhood maltreatment on depression symptoms in young adults by investigating the mediation role of negative automatic thoughts and the moderation role of self-compassion in a sample of college students. Consistent with prior studies (e.g. Wu et al., 2018), childhood maltreatment was positively correlated with young adult depression symptoms, suggesting that early negative experiences such as childhood maltreatment may lead to the development of later depression symptoms (Beck, 1967). Moreover, negative automatic thoughts mediated the link between childhood maltreatment and young adult depression symptoms, which supports the first hypothesis. Specifically, childhood maltreatment positively predicted negative automatic thoughts, and negative automatic thoughts in turn positively predicted young adult depression symptoms. This finding aligns with
the cognitive model of depression (Beck, 1967, 1983; Beck et al., 1985), which proposes that early negative experiences might lead to negative automatic thoughts, which in turn lead to later depression. Under the influence of stress, individuals may narrow their attention to focus on stress-related information and bias their memory search to more easily accessible information sources (Eysenck, 1976; Mandler, 1975). In this case, individuals who experienced maltreatment (abuse or neglect) in childhood might be vulnerable to form stable negative beliefs (about oneself, the world, and the future) or dysfunctional schemata (Beck, 1967; Beck et al., 1985). These negative beliefs or schemata are more likely to be practiced by people who are exposed to maltreatment during childhood, and thus, processing negative thoughts becomes automatic (Hartlage et al., 1993); meanwhile, these automatic negative thoughts triggered or activated by stress, in turn, would lead to later depressive symptoms (Beck, 1983). As Hartlage et al. (1993) pointed out, “depression may be characterized by automatic activation of negative self-referent content and by the use of available cognitive resources primarily to focus on negative information”(p. 271).

In addition, consistent with the second hypothesis, we found that self-compassion moderated the indirect effect of negative automatic thoughts in the link between childhood maltreatment and young adult depression. Specifically, the mediating effect of negative automatic thoughts was weaker for young adults with high levels of self-compassion than for those with low levels of self-compassion. This finding aligns with prior studies demonstrating that self-compassion plays an important role in predicting well-being among youth who experienced childhood maltreatment (e.g. Tanaka et al., 2011). One way that self-compassion might influence well-being is by helping one to feel safe and secure (Neff, 2011) so that individuals would recollect more positive memories rather than negative thoughts and emotions when considering their sufferings or failures (Zessin et al., 2015). This is in line with the view of Gilbert (2013), who holds that self-compassion can protect mental health by activating the self-soothing system that contributes to managing stress, creating secure attachment and feelings of safeness, and reducing a sense of threat. Then, when suffering (e.g. childhood maltreatment) is experienced, a self-compassionate person can respond to this experience with kindness and nonjudgment, and acknowledge this experience is a part of human life (Neff, 2009). Thus, self-compassion would more likely transform unwanted thoughts and negative emotions into self-acceptance (Leary et al., 2007), thereby decreasing negative automatic thoughts and depression symptoms.

**Figure 3.** The moderating role of self-compassion.

![Diagram showing the moderating role of self-compassion](image-url)
Limitations and implications

This study has several limitations. First, a cross-sectional design was used to examine our hypothesis. The long-term effect of a moderated mediation model should be replicated in longitudinal designs, as prior studies (e.g. Cohen et al., 2017) have found that childhood maltreatment positively predicted young adult depression symptoms over time. Second, the whole data were collected by self-report questionnaires from college students, indicating the generalization of these findings requires caution. These limitations need to be overcome through multiple samples (e.g. adults at different stages) and multiple data collection methods (e.g. reports from parents, teachers, and peers).

Nevertheless, our study has meaningful implications. This study adds to the growing body of knowledge in the link between childhood maltreatment and young adult depression by examining whether negative automatic thoughts mediate this link and whether self-compassion moderates this indirect link among a sample of college students. The results showed that negative automatic thoughts are a proximal risk factor in predicting depression for young adults who have childhood maltreatment experiences. While self-compassion shows promise as one intervention avenue for those who experienced childhood maltreatment, researchers might examine other interventions designed to address negative automatic thoughts. Moreover, self-compassion was found to protect young adults against the impact of childhood maltreatment on negative automatic thoughts, thereby decreasing depression symptoms, suggesting that self-compassion is a promising candidate to be cultivated and targeted in prevention and intervention efforts (Biber and Ellis, 2017). Future researchers should examine self-compassion interventions for those who experienced childhood maltreatment. A meta-analysis about self-compassion (Zessin et al., 2015) summarized that either manipulation for state self-compassion (e.g. Leary et al., 2007) or intervention for trait self-compassion (e.g. mindful self-compassion training) significantly increased well-being. Furthermore, an intervention study demonstrated that compassion-focused therapy (CFT), which supports clients to use a positive and compassionate way for responding to trauma-based stimuli, is highly applicable and promising for adult survivors of sexual abuse (McLean et al., 2018). Thus, self-compassion is a worthwhile intervention target against the outcomes (e.g. negative automatic thoughts and depression symptoms) of early negative experiences.

Authors’ note

Xiang-Ling Hou, Ju-Zhe Xi and Wei-Jun Ma are also affiliated with Shanghai Changning Mental Health Center, China.
Xiao-Hua Bian is also affiliated with Zhengzhou Normal University, China.

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ORCID iD

Xiang-Ling Hou https://orcid.org/0000-0002-1580-1092

Supplemental material

Supplemental material (i.e., the raw data of self-compassion) for this article is available online.

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