



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

How does parent–child communication affects posttraumatic stress disorder and growth in adolescents during the COVID-19 pandemic? The mediating roles of self-compassion and disclosure

Baohua Zhen^a, Benxian Yao^{a,b,*}, Xiao Zhou^{c,**}^a College of Educational Science, Anhui Normal University, Wuhu 241000, China^b Department of Psychology, Hefei Normal University, Hefei 238076, China^c Department of Psychology and Behavioral Sciences, Zhejiang University, Hangzhou 310028, China

ARTICLE INFO

Keywords:

Parent–child communication
 Self-compassion
 Self-disclosure
 PTSD
 PTG

ABSTRACT

Background: Research suggests that family factors play an important role in adolescent posttraumatic stress disorder (PTSD) and posttraumatic growth (PTG). Parent–child communication has attracted particular attention. However, it remains unclear whether parent–child communication affects PTSD and PTG via unique or shared underlying mechanisms. The study aim was to examine the effect of parent–child communication on PTSD and PTG via self-compassion and self-disclosure.

Methods: Self-report questionnaires were administered to 683 adolescents during the COVID-19 pandemic.

Results: Open parent–child communication was positively associated with PTG and negatively associated with PTSD via two 1-step indirect paths of self-compassion and self-disclosure, and by one 2-step indirect path of self-compassion to self-disclosure. Problematic parent–child communication was negatively associated with PTG and positively associated with PTSD via two 1-step indirect paths of self-compassion and self-disclosure.

Limitations: First, pandemics differ from other disasters, generalizing these findings to other traumatized populations must be cautious. Then, this was a cross-sectional study, so longitudinal effects could not be examined and causal relationships cannot be confirmed.

Conclusions: Different types of parent–child communication have different influencing mechanisms on PTSD and PTG. Therefore, distinct intervention strategies are needed targeted to these two psychological reactions.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a fast-spreading and challenging public health emergency, which has resulted in considerable economic loss, loss of life, and substantially affected physical and mental health. Some individuals have developed various psychological problems related to the pandemic (Fegert et al., 2020); posttraumatic stress disorder (PTSD) is one of the most common reactions (Guessoum et al., 2020). For instance, 20% to 40% of adolescents have developed mental health problems of varying severity during the COVID-19 pandemic, and the incidence rate of PTSD symptoms is 14.4% (Liang et al., 2020; Xie et al., 2020). However, some adolescents may experience a beneficial effect from experiencing traumatic events and show positive changes in the self, relationships with others, and philosophy of life. Tedeschi and

Calhoun (1996) have termed these positive psychological changes “posttraumatic growth” (PTG). Many recent studies have investigated PTG during the COVID-19 pandemic. One study found that the incidence of PTG in adolescents was 45.6% (Zhou et al., 2020). Therefore, adolescents may develop either PTSD or PTG during the pandemic; however, it remains unclear whether these conditions have unique or shared underlying mechanisms. Because PTSD and PTG are two posttraumatic outcomes with distinct valence, differences in their underlying mechanisms would indicate the need for targeted psychological services aimed at relieving PTSD or improving PTG. The aim of this study was to examine and compare the underlying mechanisms of PTSD and PTG in adolescents during the COVID-19 pandemic.

During the outbreak of the pandemic, home quarantine required people to stay at home to protect them from infecting coronavirus,

* Correspondence to: B. Yao, Department of Psychology, Hefei Normal University, Hefei 238076, China.

** Correspondence to: X. Zhou, Department of Psychology and Behavioral Sciences, Zhejiang University, Hangzhou 310028, China.

E-mail addresses: ybx7756@126.com (B. Yao), psyzx@zju.edu.cn (X. Zhou).

<https://doi.org/10.1016/j.jad.2022.03.029>

Received 19 July 2021; Received in revised form 14 January 2022; Accepted 10 March 2022

Available online 14 March 2022

0165-0327/© 2022 Published by Elsevier B.V.

which limited their face-to-face socialization outside (Clark et al., 2020). In such situation, parents were usually the ones who interacted the most with adolescents (Tang et al., 2021). Even at the end of home quarantine, parents were still adolescents' important support resources. Family systems theory (Bowen, 1978) proposed that a family includes multiple subsystems, wherein the members within and outside each subsystem interact with and influence each other, forming a dynamic family functioning network (Bowen, 1978). Such network was closely related with the physical and mental health of system members (Beavers and Hampson, 2000; Bluth et al., 2020). As one of the most important subsystems, parent–child subsystem entailing interaction between parents and children played crucial role in children's mental health (Bian et al., 2016).

There are two distinct types of parent–child communication: open and problematic parent–child communication (Munz, 2015). These communication types have different effects on psychological reactions. For example, open parent–child communication may help parents to share information and needs with their children, increase their trust in their children, and thus provide help and support (Keim et al., 2017). It also helps adolescents to recognize their own status in the family, to become more sensitive to the thoughts and emotions of other family members (Jackson et al., 1998), and to engage in active exploration outside the family (Xu et al., 2016). This enables adolescents to more easily disclose their traumatic and emotional experiences, helps them to regulate negative emotions caused by traumatic events, reduces the occurrence of PTSD, prompts individuals to carry out constructive cognitive reprocessing of trauma, and enhances adolescent PTG (Tabak et al., 2012). In contrast, problematic parent–child communication leads to behavioral and conceptual conflicts (Boniel-Nissim and Sasson, 2018), and may hinder information exchange between children and parents. This prevents adolescents from adapting to change, and increases isolation and immersion in the negative emotional experiences caused by trauma, resulting in more PTSD symptoms. At the same time, problematic parent–child communication may also prevent them from using effective strategies to regulate their negative emotions and hinder the development of PTG (Kilmer et al., 2014; Morris et al., 2020). Therefore, on the basis of previous theories and research, we hypothesized that open parent–child communication would show a positive association with PTG and a negative association with PTSD, and problematic parent–child communication would show a positive association with PTSD and a negative association with PTG.

Furthermore, family systems theory emphasized the role of system members' cognitive and behavioral activities in the relation between members' interaction and their mental health (Bowen, 1978). Self-compassion and self-disclosure are respectively typical cognitive and behavioral activities following trauma, which may play mediating roles in the association between parent–child communication and adolescents' PTSD and PTG. Self-compassion helps individuals to have an open and tolerant attitude, evaluate themselves objectively, recognize their deficiencies, and acknowledge their negative emotions, without necessarily avoiding painful experiences (Neff, 2003b). However, self-compassion is rooted in good family relationships, so a positive family environment can increase self-compassion and promote adolescent health (Moreira et al., 2018). Open parent–child communication enables parents and children to share information and enhances emotional interactions. Adolescents in open parent–child relationships have greater perceived parental support and experience a warm family environment, which helps them to evaluate and accept themselves objectively (Hu and Chong, 2019) and promotes the development of self-compassion (Berryhill and Smith, 2020; Kelly and Dupasquier, 2016; Neff and McGehee, 2010). After a traumatic event, individuals with high self-compassion are more likely to treat themselves kindly (Zhang et al., 2010) and reprocess trauma more accurately. Such individuals can cognitively reconstruct experienced trauma and regulate negative emotions using a positive, self-focused approach. These coping styles prevent the individual from becoming immersed in their traumatic experiences, which

relieves PTSD symptoms and promotes PTG development (Germer and Neff, 2015; Tedeschi and Calhoun, 2004; Wong and Yeung, 2017). Problematic parent–child communication is characterized by evasion or negative attitudes toward communication. Parents and adolescents in problematic parent–child relationships do not understand each other's perspectives and needs. This produces a cold or tense family environment, which leads to low self-compassion (Gilbert et al., 2006; Pepping et al., 2015). Adolescents with low self-compassion may experience more emotional distress, become immersed in negative trauma-related rumination and emotion (Dong et al., 2011; Germer and Neff, 2015), and avoid treatment for trauma. They are unable to adopt positive attitudes to trauma and the self, and their cognitive assessment of life is inaccurate. This generates more PTSD symptoms (Thompson and Waltz, 2008; Winders et al., 2020; Braehler and Neff, 2020) and hinders PTG development. Therefore, parent–child communication may have indirect effects on PTSD and PTG via self-compassion during the pandemic.

Self-disclosure may be another factor that mediates the association between parent–child communication and PTSD and PTG. Parental understanding of adolescents' experiences and activities mostly depends on adolescents' willingness to disclose such information to parents (Dotterer and Day, 2019; Kerr et al., 2010). According to Papini et al. (1990), self-disclosure is highly correlated with adolescents' perceptions of open parent–child communication. Open parent–child communication helps to form a warm, positive family atmosphere. Parents have accurate perceptions of their children's thoughts and feelings, which minimizes conflicts and differences and maintains good parent–child interaction. Adolescents perceive that they have their parents' support and understanding, and are willing to express their emotions through greater self-disclosure (Duncan et al., 2009; Kearney and Bussey, 2015; Kil and Grusec, 2020). Individuals who disclose their traumatic experiences report more PTG than those who do not (Calhoun and Tedeschi, 2006; Dong et al., 2015; Taku et al., 2009). This may be because self-disclosure helps individuals to obtain emotional support from others, and then reprocess their trauma from a new perspective. This helps individuals to rebuild their worldview, increases positive thinking about trauma, promotes PTG development (Wong and Yeung, 2017; Zhao et al., 2020), releases psychological pressure, and reduces negative cognitions and emotions (Stiles, 1987), thus alleviating PTSD symptoms (Levi-Belz, 2019). In contrast, parents and children in problematic communicative relationships feel uncooperative and have negative attitudes to others; adolescents in these relationships tend to avoid and alienate their parents, which reduce adolescent self-disclosure to parents (Marciano et al., 2020; Wang et al., 2017). Long-term suppression of trauma disclosure may lead to the accumulation of pressure, resulting in more psychological problems (Pennebaker and Beall, 1986). In addition, reduced self-disclosure leads to parental lack of understanding of adolescent difficulties; this increases adolescents' isolation and immersion in their traumatic experiences and they become unable to relieve stress and regulate negative emotions, which maintains PTSD symptoms and inhibits PTG development (Pietruch and Jobson, 2012; Tedeschi and McNally, 2011). Therefore, parent–child communication may have an indirect effect on PTSD and PTG via self-disclosure during the pandemic.

Self-compassion and self-disclosure may mediate the association between parent–child communication and PTSD and PTG, but there is also an association between self-compassion and self-disclosure. Individuals with high self-compassion pay little attention to their suffering and have an objective and open attitude to trauma. Instead of avoiding trauma (Thompson and Waltz, 2008), they recognize the need for self-care and practice self-compassion (Winders et al., 2020), and increase self-disclosure (Neff et al., 2007). Empirical studies have shown that individuals with high self-compassion may be more likely to disclose their traumatic experiences to others (Kahn and Garrison, 2009); self-compassion thus affects self-disclosure (Dupasquier et al., 2020; Dupasquier, 2016).

Open and problematic parent–child communication positively and

negatively affects adolescent mental health. However, the mechanisms by which different types of parent–child communication affect PTG and PTSD, and whether these mechanisms are unique or shared, remain unclear. Furthermore, although cognitive factors seem to play important roles in PTSD and PTG, their mediation of the association between parent–child communication and PTSD and PTG has rarely been examined in adolescents. Owing to immature cognitive and emotional regulation abilities, adolescents are more susceptible to stressful or traumatic events (Chassin et al., 2014; Clark et al., 2020). Therefore, compared with adults, adolescents may experience more severe PTSD and lower PTG during the pandemic. Research is therefore needed on adolescent PTSD and PTG during the pandemic. To address these issues, we examined mechanisms underlying the effects of parent–child communication on PTSD and PTG in adolescents during the COVID-19 pandemic. We hypothesized that open parent–child communication and problematic parent–child communication affect PTSD and PTG through the mediating effects of self-compassion and self-disclosure.

2. Methods

2.1. Procedures and participants

Six months after the outbreak of COVID-19 (July 2020) in China, we recruited adolescents from Hubei province, China, which was severely affected by COVID-19. First, we contacted a psychology teacher from a high school in Huanggang city, Hubei province. With the teacher's help, we selected 12 grade one classes with no course teaching activities on the assessment date. There were approximately 60 students in each class. Finally, 683 students were enrolled in this study.

Among the 683 participants, 341 (49.9%) were boys, 301 (44.1%) were girls, and 41 (6.0%) did not report their sex. The mean age was 16.06 years ($SD = 0.56$ years), and the age range was 15–18 years. The majority (85.2%) of the participants were non-only-child while 81 (11.9%) participants were only-child, and 20 (2.9%) participants did not report it. Five hundred and forty-four (79.6%) participants were registered as rural resident, 105 (15.4%) participants were urban resident, and 34 (5.0%) participants did not report their registered permanent residence. Parents of 230 (33.7%) participants worked in their hometown, father or mother of 220 (32.2%) participants worked in other places away from their hometown, and both parents of 172 (25.2%) participants worked in other places away from their hometown, and 61 (8.9%) did not report such information. The average monthly household income of 182 (26.6%) participants were less than 5,000 Yuan, 281 (41.1%) were between 5,000 and 10,000 Yuan, 154 (22.5%) were more than 10,000 Yuan, and 66 (9.7%) participants did not report their household income.

This study was approved by the research ethics committee of the Department of Psychology and Behavioral Sciences, Zhejiang University. All students in the selected classes attended school on the assessment date, and all agreed to participate in the investigation and complete self-report questionnaires. Participants were informed of the study purpose and the voluntary nature of participation before the survey, and written informed consent was obtained from all students and their guardians. Assessments were conducted under the supervision of trained psychology postgraduate students.

2.2. Measures

2.2.1. Pandemic exposure

We used the Epidemic Exposure Scale developed by Zhen and Zhou (2020) to assess pandemic exposure among adolescents. This scale contains 10 items (e.g., “I became infected during the COVID-19 outbreak” and “People I knew were quarantined during the COVID-19 outbreak”). Each item has “yes” and “no” response options (no = 0 and yes = 1). Higher scores indicate higher levels of pandemic exposure.

2.2.2. Parent–child communication

Parent–child communication was evaluated using the Chinese version of the Parent–Child Communication Scale. This scale was developed by An (2004) and is based on the Barnes and Olson (1985) Parent–Adolescent Communication Scale. The scale contains two 10-item subscales that measure open and problematic parent–child communication since the outbreak of COVID-19 pandemic (e.g., Since the outbreak of COVID-19 pandemic, my parents listen to me attentively.). Each item is rated on a 5-point Likert-type scale from 0 to 4 (0 = strongly disagree and 4 = strongly agree). In this study, both open parent–child communication (Cronbach's $\alpha = 0.90$) and problematic parent–child communication (Cronbach's $\alpha = 0.79$) subscales demonstrated good reliability.

2.2.3. Self-compassion

According to Neff (2003a), self-compassion comprises three components: self-kindness, a sense of common humanity, and mindfulness. Therefore, we used the three subscales of the Chinese version of the Self-Compassion Scale developed by Neff (2003a, 2003b) and revised by Chen et al. (2011) to measure self-compassion levels among adolescents. This scale contains 10 items rated on a 5-point Likert-type scale from 0 to 4 (0 = completely inconsistent and 4 = completely consistent). The scale demonstrated good reliability in this study (Cronbach's $\alpha = 0.86$).

2.2.4. Self-disclosure

We used the Chinese version of the Distress Disclosure Index to assess adolescents' self-disclosure. The original scale was developed by Kahn and Hessling (2001) and revised by Zhen et al. (2018) for Chinese samples. The scale comprises 12 items rated on a 5-point Likert-type scale from 0 to 4 (0 = completely inconsistent and 4 = completely consistent). In this study, the scale demonstrated good internal reliability (Cronbach's $\alpha = 0.90$).

2.2.5. Posttraumatic growth inventory (PTGI)

The Posttraumatic Growth Inventory (PTGI) was used to assess adolescents' PTG. This scale was translated and modified by Zhou et al. (2014) and is based on the Posttraumatic Growth Inventory developed by Tedeschi and Calhoun (1996). The scale comprises three subscales: positive changes in self-perception, positive changes in interpersonal relationships, and positive changes in life philosophy. The total scale contains 22 items rated on a 6-point Likert scale ranging from 0 (no change) to 5 (changed a lot). The scale demonstrated good reliability in this study (Cronbach's $\alpha = 0.92$).

2.2.6. PTSD checklist for DSM-5 (PCL-5)

The PTSD Checklist from the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5 PCL-5), was used to measure PTSD symptoms (Weathers et al., 2013). This scale assesses adolescents' PTSD symptoms during the previous 2 weeks. The total scale contains 20 items on four subscales: intrusive symptoms, avoidance symptoms, negative alterations in cognition and mood symptoms, and hyperarousal symptoms. Each item is rated on a 5-point Likert-type scale from 0 to 4 (0 = completely inconsistent and 4 = completely consistent). In this study, the scale demonstrated good internal consistency reliability (Cronbach's $\alpha = 0.89$).

2.3. Data analysis

We used SPSS 21.0 and Mplus 7.0 to perform descriptive statistical analysis and model analysis. First, we performed descriptive statistical analysis and examined the correlations between variables. Then, we generated a direct effects model of open and problematic parent–child communication on PTSD and PTG, after controlling for pandemic exposure. Next, we inserted self-compassion and self-disclosure as mediators, and added a direct path from self-compassion to self-disclosure to generate a mediation effect model. Finally, the non-significant paths

in the model were constrained to 0 to establish a parsimonious path model. Bootstrap testing was used to assess the significance of the indirect effects. We used the chi-square value, the comparative fit index (CFI), the Tucker–Lewis index (TLI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA) to evaluate the model fit. The critical values of the model test were CFI > 0.90, TLI > 0.90, SRMR < 0.08, and RMSEA < 0.08.

3. Results

3.1. Prevalence of PTSD and PTG

The mean scores for PTSD and PTG were 25.57 (SD = 13.43, range: 0–70) and 49.35 (SD = 21.16, range: 0–110), respectively. Based on the diagnostic algorithm of at least one intrusion symptom, one avoidance symptom, two negative alterations in cognition and mood symptoms, and two arousal symptoms endorsed as 2 or greater, a total of 183 (26.8%) adolescents were identified as probable PTSD cases. As the average mean scores above 3 on PTGI indicate a moderate level of PTG (Tang, 2006; Xu and Liao, 2011) and 66 scores were used as the cutoff point for the assessment of PTG (Wu et al., 2018), the prevalence of PTG in this study was 22.4% (n = 153).

3.2. Descriptive statistics and correlations between main measures

Table 1 shows the correlations between pandemic exposure, open parent–child communication, problematic parent–child communication, self-compassion, self-disclosure, PTSD, and PTG. Pandemic exposure was significantly associated with problematic parent–child communication and PTSD, but not significantly associated with the other variables. Open parent–child communication was negatively associated with PTSD and positively associated with self-compassion, self-disclosure, and PTG. Problematic parent–child communication was positively associated with PTSD and negatively associated with self-compassion, self-disclosure, and PTG. Self-compassion was negatively associated with PTSD and positively associated with self-disclosure and PTG. There was a significant positive association between self-disclosure and PTG and a significant negative association between self-disclosure and PTSD, but the association between PTSD and PTG was not significant.

3.3. Testing the mediating roles of self-compassion and self-disclosure

To examine the mediating roles of self-compassion and self-disclosure in the association between parent–child communication and PTSD and PTG, we used pandemic exposure as a control variable, then established a direct effects model with paths from open and problematic parent–child communication to PTSD and PTG. Because of the high correlation between open and problematic parent–child communication, we established a correlation path between the two types of communication to avoid type I error. The direct effects model fit the data completely: $\chi^2 = 0.000$, CFI = 1.000, TLI = 1.000, SRMR = 0.000, RMSEA (90% confidence interval [CI]) = 0.000 (0.000–0.000). The path analysis showed that open parent–child communication was directly

and positively associated with PTG, but the association between open parent–child communication and PTSD was not significant. Problematic parent–child communication was directly and positively associated with PTSD, but the association between problematic parent–child communication and PTG was not significant.

On the basis of the direct effects model, we inserted self-compassion and self-disclosure as mediators between open and problematic parent–child communication and PTSD and PTG. Then, we added a direct path from self-compassion to self-disclosure to develop a final mediation effects model. The final mediation model fit the data completely: $\chi^2 = 0.000$, CFI = 1.000, TLI = 1.000, SRMR = 0.000, RMSEA (90% CI) = 0.000 (0.000–0.000). Path analysis identified 10 significant paths: from open parent–child communication to PTG, self-compassion, and self-disclosure; from self-compassion to self-disclosure, PTG, and PTSD; from self-disclosure to PTG and PTSD; and from problematic parent–child communication to self-disclosure and PTSD. The other paths were not significant.

We then constrained the non-significant paths to zero and established a parsimonious paths model, which fit the data well (Fig. 1). The path analysis showed that open parent–child communication was positively associated with self-compassion, self-disclosure, and PTG; self-compassion was positively associated with self-disclosure and PTG; and self-disclosure was positively associated with PTG. These results indicated that open parent–child communication was positively associated with PTG directly, by two 1-step indirect paths of self-compassion and self-disclosure, and by one 2-step indirect path of self-compassion to self-disclosure. Additionally, open parent–child communication was negatively associated with PTSD by two 1-step indirect paths of self-compassion and self-disclosure, and by one 2-step indirect path of self-compassion to self-disclosure. Problematic parent–child communication was positively associated with PTSD directly and via a 1-step indirect path of self-disclosure. Although the direct association between problematic parent–child communication and PTG was non-significant, these variables were negatively associated via a 1-step indirect path of self-disclosure.

Finally, bias-corrected bootstrap testing was used to examine the significance of the mediation effects. If the 95% CI does not include zero,

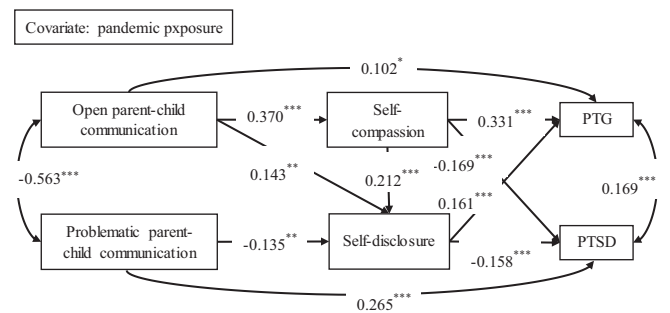


Fig. 1. The parsimonious paths model. Note. ***p < 0.001, **p < 0.01, *p < 0.05. PTSD = posttraumatic stress disorder; PTG = posttraumatic growth.

Table 1 Descriptive statistics and correlations among main variables.

Variables	M(SD)	1	2	3	4	5	6	7
1. Pandemic exposure	2.52(1.35)	1						
2. Open parent-child communication	18.35(8.63)	-0.07	1					
3. Problematic parent-child communication	20.11(7.21)	0.21**	-0.56**	1				
4. Self-compassion	29.19(8.56)	-0.05	0.37**	-0.25**	1			
5. Self-disclosure	25.15(9.55)	-0.03	0.30**	-0.27**	0.30**	1		
6. PTSD	25.57(13.43)	0.13**	-0.25**	0.36**	-0.28**	-0.28**	1	
7. PTG	49.35(21.16)	0.01	0.27**	-0.13**	0.42**	0.29**	-0.01	1

Note. **p < 0.01. M = mean; SD = standard deviation; PTSD = posttraumatic stress disorder; PTG = posttraumatic growth.

this indicates a significant mediation effect. None of the 95% CI of the mediation paths in Fig. 1 included zero, indicating that all the mediation paths in Fig. 1 were significant (Table 2).

4. Discussion

In this study, we investigated the mechanisms underlying the effects of different types of parent–child communication on PTSD and PTG from a family perspective. We found that open parent–child communication was positively and significantly associated with PTG. Home quarantine policies require adolescents to study at home, which increases the influence of family relationships (Donker et al., 2020). Therefore, open parent–child communication enables adolescents to maintain good information exchange with their parents. This enables parents to promptly respond to adolescents' behaviors and emotions, and adolescents to feel that their parents have positive attitudes and can provide emotional support (Fang and Fang, 2003), which helps to generate positive cognitive appraisals of trauma and promotes the development of PTG in adolescents (Xin et al., 2019). This study supports the theory of PTG and the results of empirical studies (Hafstad et al., 2010; Kilmer et al., 2014) indicating that parents and family are important in the development of PTG in adolescents.

We found that open parent–child communication is positively associated with PTG and negatively associated with PTSD through self-compassion. Open parent–child communication increases adolescents' perceived parental support and warmth and maintains a positive home environment, which helps adolescents to treat themselves with kindness, develop objective self-assessment, and form a positive self-attitude, and promotes the development of self-compassion (Berryhill and Smith, 2020). High self-compassion then enables adolescents to struggling with their traumatic experiences and negative emotions (Neff, 2003a, 2003b) and helps adolescents to take a more comprehensive view of their core beliefs and recognize the shortcomings of their original beliefs. This helps them to reach a new balance in their core beliefs, or even move beyond their original cognitive appraisals to establish new core beliefs. This ultimately promotes PTG development and relieves PTSD.

Open parent–child communication was also positively associated with PTG and negatively associated with PTSD through self-disclosure. Open parent–child communication is the most important way of ensuring the exchange of information and emotions between parents and children. Self-disclosure involves sharing thoughts and feelings with others. Both of these communicative processes involve mutual trust and mutual information exchange between communicators. Open

parent–child communication is conducive to the creation of a warm family atmosphere and conflict reduction, which enables adolescents to feel safe without having to activate their defense mechanisms, helps adolescents to feel supported by their parents after trauma, and then to express their emotions through greater self-disclosure (Duncan et al., 2009). In the process of self-disclosure, adolescents use positive ways to share their traumatic experiences and emotions with parents, classmates, and other friends. This enables adolescents to release psychological pressure through various channels and to receive more emotional support, which helps them to manage their negative emotions in more positive and comprehensive ways. Additionally, greater self-disclosure helps adolescents to actively retrieve their memories and think about trauma, generate new cognitions (Levi-Belz, 2015), and make positive changes in their core self-beliefs, thus promoting PTG development and reducing PTSD.

The present findings also showed that open parent–child communication was positively associated with PTG and negatively associated with PTSD via the 2-step path of self-compassion to self-disclosure. Open parent–child communication helps adolescents to maintain positive self-cognitions and achieve greater self-compassion (Berryhill et al., 2018), which enables them to develop an objective attitude to trauma and related negative emotions, and discover deficiencies in their self-attitudes and core beliefs through re-recognition of trauma (Neff, 2003a, 2003b). However, self-cognitions and worldviews are still developing in adolescence, so adolescents may be unable to cope with trauma and negative emotions alone, which may prompt adolescents to seek assistance from the others by increasing self-disclosure. Increasing self-disclosure helps adolescents to express their emotions better, obtain physical and emotional support from parents and others, and regulate negative emotions. This reduces the negative effects of trauma and alleviates PTSD symptoms. During this process of change, instead of being immersed in the traumatic experience, adolescents develop more positive cognitive appraisals of their core beliefs, experience positive emotions from others through self-disclosure, and generate new understandings of trauma. This process of coping with trauma is beneficial and promotes the development of PTG (Wong and Yeung, 2017).

We found that problematic parent–child communication was positively associated with PTSD directly, positively associated with PTSD through the mediating role of self-disclosure, and negatively associated with PTG through the mediating role of self-disclosure. Problematic parent–child communication hinders emotional communication between adolescents and their parents; both parties may adopt negative attitudes toward communication, which may lead to parent–child conflicts (Boniel-Nissim and Sasson, 2018), and hinder adolescents regulating the negative emotions caused by trauma, thus make they to be immersed in negative emotions, experiencing PTSD symptoms (Pugach et al., 2020). While adolescents returned to school and their face-to-face communication with classmates and teachers gradually recovered, parents were important components of their social network as they needed to go back to families in the background of regular pandemic prevention and control measures, thus the problematic parent-child communication still may increase adolescents' negatively perceptions of inequality in communicative relationships and negative parental attitudes. This lead adolescent to avoid their parents and reduces self-disclosure to others (Wang et al., 2017), then adolescents must confront trauma alone. However, adolescents have immature cognitive and emotional regulation abilities, they are unable to generate a comprehensive and objective cognitive appraisal of trauma and regulate negative emotions. So adolescents immersed in traumatic experiences and triggers more PTSD symptoms and inhibit PTG development (Dempsey et al., 2000; Schnider et al., 2007).

Problematic parent–child communication was not significantly associated with PTG and PTSD through self-compassion or via the 2-step indirect path of self-compassion to self-disclosure. A possible explanation is related to the nature of adolescent development. Adolescents have high self-awareness and strong self-concepts, in which they may

Table 2
Bias-corrected bootstrap test of mediation effects.

Path	Estimate	95% Confidence interval	
		Lower	Upper
Open parent-child communication -self disclosure -PTSD	-0.023	-0.042	-0.003
Open parent-child communication -self compassion -PTSD	-0.062	-0.094	-0.031
Open parent-child communication-self compassion - self disclosure-PTSD	-0.012	-0.021	-0.003
Problematic parent-child communication - self disclosure -PTSD	0.021	0.003	0.040
Problematic parent-child communication - PTSD	0.265	0.193	0.338
Open parent-child communication - self disclosure - PTG	0.023	0.004	0.042
Open parent-child communication - self compassion - PTG	0.122	0.077	0.168
Open parent-child communication - self compassion - self disclosure-PTG	0.013	0.004	0.021
Open parent-child communication - PTG	0.102	0.019	0.185
Problematic parent-child communication - self disclosure -PTG	-0.022	-0.040	-0.003

Note. PTSD = posttraumatic stress disorder; PTG = posttraumatic growth.

not attribute problematic parent–child communication to themselves, but place the blame for problematic communication wholly on their parents. Therefore, problematic parent–child communication may not strongly affect self-compassion, which explains why problematic parent–child communication was not associated with PTG and PTSD through the indirect role of self-compassion.

Several study limitations should be noted. First, pandemics differ from other natural disasters, such as earthquakes and tsunamis, because pandemics are long lasting and affect a large proportion of the population. There may be differences between the mechanisms underlying the effects of pandemic exposure and other types of trauma on adolescent PTSD and PTG. Therefore, we must be cautious about generalizing these findings to other traumatized populations. In addition, this was a cross-sectional study, so longitudinal effects could not be examined and causal relationships cannot be confirmed. Longitudinal studies are needed to explore the mechanisms underlying these effects. It is noteworthy that this study was conducted six months after the outbreak of COVID-19 pandemic, and different time phrases may exert impact on individuals' psychological reactions. Hence, it is important to take the timing of this study into consideration when generalizing the findings.

Despite its limitations, this study has important theoretical and practical significance. We found that open parent–child communication, self-compassion, and self-disclosure were important factors for reducing PTSD symptoms and promoting the development of PTG. In contrast, problematic parent–child communication inhibited PTG development and increased PTSD symptoms in adolescents, which supports family systems theory and the PTG model. Parent–child communication is key to maintaining family function and also important for the mental health of family members. When parents and adolescents communicate openly, adolescents have greater perceived parental emotional support, which benefits the development of self-compassion and self-disclosure, helps them to grow following a traumatic event, reduces PTSD symptoms, and promotes the development of PTG. In contrast, problematic parent–child communication may prevent adolescents obtaining sufficient help from parents and family. Such adolescents must confront trauma alone. If their disclosure to the outside world is reduced, PTSD symptoms increase and PTG development is inhibited. From a clinical perspective, open parent–child communication can greatly help adolescents to cope with trauma. However, interventions to help posttraumatic adolescents to alleviate PTSD symptoms should also focus on building a secure communication environment, and help adolescents to address trauma from a broader perspective. Developing adolescents' self-compassion and self-disclosure increases the perceived support from parents and others, helps them to engage with trauma in more positive ways, regulates negative emotions, relieves PTSD symptoms, and promotes the development of PTG. In addition, this study was conducted when the pandemic was initial controlled, and the findings of present study have enlightening significance for our psychological intervention of adolescents while adhering to regular pandemic prevention and control measures.

CRedit authorship contribution statement

BZ contributed to conceptualization, investigation, formal analysis, methodology and writing original draft. BY contributed to conceptualization, investigation, writing review and editing. XZ contributed to conceptualization, investigation, methodology, writing review and editing.

Funding

This study was supported by the National Youth Project for National Social Sciences of China (Education) [Grant No. CHA200259].

Declaration of competing interest

The authors have no conflicts of interest to declare.

Acknowledgement

We would like to thank teachers and students for helping us to carry out the survey and interviews. We would also like to thank all of students for participating in this study.

References

- An, B., 2004. Parenting style. In: *Parent-Adolescent Communication and Their Effects on Adolescents' Social Adjustment*. Shaanxi Normal University, CNKI.
- Barnes, H.L., Olson, D.H., 1985. Parent-adolescent communication and the circumplex model. *Child Dev.* 438–447 <https://doi.org/10.2307/1129732>.
- Beavers, R., Hampson, R.B., 2000. The beavers systems model of family functioning. *J. Fam. Ther.* 22 (2), 128–143. <https://doi.org/10.1111/1467-6427.00143>.
- Berryhill, M.B., Smith, J., 2020. College student chaotically-disengaged family functioning, depression, and anxiety: the indirect effects of positive family communication and self-compassion. *Marriage Fam. Rev.* 1–23 <https://doi.org/10.1080/01494929.2020.1740373>.
- Berryhill, M.B., Harless, C., Kean, P., 2018. College student cohesive-flexible family functioning and mental health: examining gender differences and the mediation effects of positive family communication and self-compassion. *Fam. J.* 26 (4), 422–432. <https://doi.org/10.1177/1066480718807411>.
- Bian, Y., Liang, L., Zhang, Y., 2016. Effects of family on children's mental development. *J. Beijing Normal Univ. (Soc. Sci.)* 05, 46–54.
- Bluth, K., Park, J., Lathren, C., 2020. Is parents' education level associated with adolescent self-compassion? *Explore* 16 (4), 225–230. <https://doi.org/10.1016/j.explore.2020.02.003>.
- Boniell-Nissim, M., Sasson, H., 2018. Bullying victimization and poor relationships with parents as risk factors of problematic internet use in adolescence. *Comput. Hum. Behav.* 88, 176–183. <https://doi.org/10.1016/j.chb.2018.05.041>.
- Bowen, M., 1978. *Family Therapy in Clinical Practice*. Jason Aronson.
- Braehler, C., Neff, K., 2020. Self-compassion in PTSD. In: *Emotion in Posttraumatic Stress Disorder*. Academic Press, pp. 567–596. <https://doi.org/10.1016/B978-0-12-816022-0.00020-X>.
- Calhoun, L., Tedeschi, R., 2006. The foundations of posttraumatic growth: an expanded framework. In: Calhoun, L., Tedeschi, R. (Eds.), *Handbook of Posttraumatic Growth: Research & Practice*. Mahwah, NJ, pp. 3–23.
- Chassin, L., Bountress, K., Haller, M., Wang, F., 2014. Adolescent substance use disorders. In: Mash, E.J., Barkley, R.A. (Eds.), *Child Psychopathology*. The Guilford Press, pp. 180–221.
- Chen, J., Yan, L., Zhou, L., 2011. Reliability and validity of chinese version of self-compassion scale. *Chin. J. Clin. Psych.* 19 (06), 734–736. <https://doi.org/10.16128/j.cnki.1005-3611.2011.06.006>.
- Clark, H., Coll-Seck, A.M., Banerjee, A., Peterson, S., Dalglis, S.L., Ameratunga, S., Balabanova, D., Bhan, M.K., Bhutta, Z.A., Borrazo, J., 2020. A future for the world's children? A WHO-UNICEF-Lancet commission. *Lancet* 395 (10224), 605–658. [https://doi.org/10.1016/S0140-6736\(19\)32540-1](https://doi.org/10.1016/S0140-6736(19)32540-1).
- Dempsey, M., Stacy, O., Moely, B., 2000. "Approach" and "avoidance" coping and PTSD symptoms in innercity youth. *Curr. Psychol.* 19 (1), 28–45. <https://doi.org/10.1007/s12144-000-1002-z>.
- Dong, Y., Zhou, H., Yu, G., 2011. Coping negative academic evaluation: the role of self-compassion. *Chin. J. Clin. Psych.* 19 (06), 810–813. <https://doi.org/10.16128/j.cnki.1005-3611.2011.06.019>.
- Dong, C., Gong, S., Jiang, L., Deng, G., Liu, X., 2015. Posttraumatic growth within the first three months after accidental injury in China: the role of self-disclosure, cognitive processing, and psychosocial resources. *Psychol. Health Med.* 20 (2), 154–164. <https://doi.org/10.1080/13548506.2014.913795>.
- Donker, M.H., Mastrotheodoros, S., Branje, S., 2020. Development of Parent-adolescent Relationships During the COVID-19 Pandemic: The Role of Stress and Coping. <https://doi.org/10.1037/dev0001212>.
- Dotterer, A.M., Day, E., 2019. Parental knowledge discrepancies: examining the roles of warmth and self-disclosure. *J. Youth Adolesc.* 48 (3), 459–468. <https://doi.org/10.1007/s10964-018-0926-2>.
- Duncan, L.G., Coatsworth, J.D., Greenberg, M.T., 2009. A model of mindful parenting: implications for parent–child relationships and prevention research. *Clin. Child. Fam. Psychol. Rev.* 12 (3), 255–270. <https://doi.org/10.1007/s10567-009-0046-3>.
- Dupasquier, J., 2016. Impact and Moderators of a Self-Compassion Manipulation on Perceived Risk of Disclosure. Master's thesis. University of Waterloo. <http://hdl.handle.net/10012/10749>.
- Dupasquier, J.R., Kelly, A.C., Moscovitch, D.A., Vidovic, V., 2020. Cultivating self-compassion promotes disclosure of experiences that threaten self-esteem. *Cogn. Ther. Res.* 44 (1), 108–119. <https://doi.org/10.1007/s10608-019-10050-x>.
- Fang, C., Fang, X., 2003. Review: parent-adolescent communication research. *Adv. Psychol. Sci.* 01, 65–72.
- Fegert, J.M., Vitiello, B., Plener, P.L., Clemens, V., 2020. Challenges and burden of the coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: a narrative review to highlight clinical and research needs in the acute phase and the

- long return to normality. *Child Adolesc. Psychiatry Ment. Health* 14, 1–11. <https://doi.org/10.1186/s13034-020-00329-3>.
- Germer, C.K., Neff, K.D., 2015. Cultivating self-compassion in trauma survivors. In: *Mindfulness-oriented Interventions for Trauma: Integrating Contemplative Practices*, pp. 43–58.
- Gilbert, P., Baldwin, M.W., Irons, C., Baccus, J.R., Palmer, M., 2006. Self-criticism and self-warmth: an imagery study exploring their relation to depression. *J. Cogn. Psychother.* 20 (2), 183–200. <https://doi.org/10.1891/jcop.20.2.183>.
- Guessoum, S.B., Lachal, J., Radjack, R., Carretier, E., Minassian, S., Benoit, L., Moro, M. R., 2020. Adolescent psychiatric disorders during the COVID-19 pandemic and lockdown. *Psychiatry Res.* 113264 <https://doi.org/10.1016/j.psychres.2020.113264>.
- Hafstad, G.S., Gil-Rivas, V., Kilmer, R.P., Raeder, S., 2010. Parental adjustment, family functioning, and posttraumatic growth among norwegian children and adolescents following a natural disaster. *Am. J. Orthopsychiatry* 80 (2), 248. <https://doi.org/10.1111/j.1939-0025.2010.01028.x>.
- Hu, J., Chong, D., 2019. Parental cohesion and prosocial tendency in adolescents: self-compassion and emotion regulation strategies as mediators. *Chin. J. Spec. Educ.* 12, 89–96.
- Jackson, S., Bijstra, J., Oostra, L., Bosma, H., 1998. Adolescents' perceptions of communication with parents relative to specific aspects of relationships with parents and personal development. *J. Adolesc.* 21 (3), 305–322. <https://doi.org/10.1006/jado.1998.0155>.
- Kahn, J.H., Garrison, A.M., 2009. Emotional self-disclosure and emotional avoidance: relations with symptoms of depression and anxiety. *J. Couns. Psychol.* 56 (4), 573. <https://doi.org/10.1037/a0016574>.
- Kahn, J.H., Hessler, R.M., 2001. Measuring the tendency to conceal versus disclose psychological distress. *J. Soc. Clin. Psychol.* 20 (1), 41–65. <https://doi.org/10.1521/jscp.20.1.41.22254>.
- Kearney, J., Bussey, K., 2015. The longitudinal influence of self-efficacy, communication, and parenting on spontaneous adolescent disclosure. *J. Res. Adolesc.* 25 (3), 506–523. <https://doi.org/10.1111/jora.12148>.
- Keim, M.C., Lehmann, V., Shultz, E.L., Winning, A.M., Rausch, J.R., Barrera, M., Jo Gilmer, M., Murphy, L.K., Vannatta, K.A., Compas, B.E., 2017. Parent-child communication and adjustment among children with advanced and non-advanced cancer in the first year following diagnosis or relapse. *J. Pediatr. Psychol.* 42 (8), 871–881. <https://doi.org/10.1093/jpepsy/jsx058>.
- Kelly, A.C., Dupasquier, J., 2016. Social safeness mediates the relationship between recalled parental warmth and the capacity for self-compassion and receiving compassion. *Personal. Individ. Differ.* 89, 157–161. <https://doi.org/10.1016/j.paid.2015.10.017>.
- Kerr, M., Stattin, H., Burk, W.J., 2010. A reinterpretation of parental monitoring in longitudinal perspective. *J. Res. Adolesc.* 20 (1), 39–64. <https://doi.org/10.1111/j.1532-7795.2009.00623.x>.
- Kil, H., Grusec, J.E., 2020. Links among mothers' dispositional mindfulness, stress, perspective-taking, and mother-child interactions. *Mindfulness* 11 (7), 1710–1722. <https://doi.org/10.1007/s12671-020-01387-6>.
- Kilmer, R.P., Gil-Rivas, V., Griese, B., Hardy, S.J., Hafstad, G.S., Alisic, E., 2014. Posttraumatic growth in children and youth: clinical implications of an emerging research literature. *Am. J. Orthopsychiatry* 84 (5), 506. <https://doi.org/10.1037/ort0000016>.
- Levi-Belz, Y., 2015. Stress-related growth among suicide survivors: the role of interpersonal and cognitive factors. *Arch. Suicide Res.* 19 (3), 305–320. <https://doi.org/10.1080/13811118.2014.957452>.
- Levi-Belz, Y., 2019. With a little help from my friends: a follow-up study on the contribution of interpersonal characteristics to posttraumatic growth among suicide-loss survivors. *Psychol. Trauma Theory Res. Pract. Policy* 11 (8), 895. <https://doi.org/10.1037/tra0000456>.
- Liang, L., Ren, H., Cao, R., Hu, Y., Qin, Z., Li, C., Mei, S., 2020. The effect of COVID-19 on youth mental health. *Psychiatry Q.* 91 (3), 841–852. <https://doi.org/10.1007/s11126-020-09744-3>.
- Marciano, L., Petrocchi, S., Camerini, A., 2020. Parental knowledge of children's screen time: the role of parent-child relationship and communication. *Commun. Res.* 1540937053 <https://doi.org/10.1177/0093650220952227>.
- Moreira, H., Gouveia, M.J., Canavarro, M.C., 2018. Is mindful parenting associated with adolescents' well-being in early and middle/late adolescence? The mediating role of adolescents' attachment representations, self-compassion and mindfulness. *J. Youth Adolesc.* 47 (8), 1771–1788. <https://doi.org/10.1007/s10964-018-0808-7>.
- Morris, J.N., Turnbull, D., Martini, A., Preen, D., Zajac, I., 2020. Coping and its relationship to post-traumatic growth, emotion, and resilience among adolescents and young adults impacted by parental cancer. *J. Psychosoc. Oncol.* 38 (1), 73–88. <https://doi.org/10.1080/07347332.2019.1637384>.
- Munz, E.A., 2015. Parent-child communication. *The International Encyclopedia of Interpersonal Communication* 1–5. <https://doi.org/10.1002/9781118540190.wbeic0067>.
- Neff, K.D., 2003. The development and validation of a scale to measure self-compassion. *Self Identity* 2 (3), 223–250. <https://doi.org/10.1080/15298860309027>.
- Neff, K., 2003. Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self Identity* 2 (2), 85–101. <https://doi.org/10.1080/15298860390129863>.
- Neff, K.D., McGehee, P., 2010. Self-compassion and psychological resilience among adolescents and young adults. *Self Identity* 9 (3), 225–240. <https://doi.org/10.1080/15298860902979307>.
- Neff, K.D., Kirkpatrick, K.L., Rude, S.S., 2007. Self-compassion and adaptive psychological functioning. *J. Res. Pers.* 41 (1), 139–154. <https://doi.org/10.1016/j.jrp.2006.03.004>.
- Papini, D.R., Farmer, F.F., Clark, S.M., Micka, J.C., Barnett, J.K., 1990. Early adolescent age and gender differences in patterns of emotional self-disclosure to parents and friends. *Adolescence* 25 (100), 959.
- Pennebaker, J.W., Beall, S.K., 1986. Confronting a traumatic event: toward an understanding of inhibition and disease. *J. Abnorm. Psychol.* 95 (3), 274. <https://doi.org/10.1037/0021-843X.95.3.274>.
- Pepping, C.A., Davis, P.J., O'Donovan, A., Pal, J., 2015. Individual differences in self-compassion: the role of attachment and experiences of parenting in childhood. *Self Identity* 14 (1), 104–117. <https://doi.org/10.1080/15298868.2014.955050>.
- Pietruch, M., Jobson, L., 2012. Posttraumatic growth and recovery in people with first episode psychosis: an investigation into the role of self-disclosure. *Psychosis-Psychol. Social Integr. Approach.* 4 (3), 213–223. <https://doi.org/10.1080/17522439.2011.608434>.
- Pugach, C.P., Campbell, A.A., Wisco, B.E., 2020. Emotion regulation in posttraumatic stress disorder (PTSD): rumination accounts for the association between emotion regulation difficulties and PTSD severity. *J. Clin. Psychol.* 76 (3), 508–525. <https://doi.org/10.1002/jclp.22879>.
- Schneider, K.R., Elhai, J.D., Gray, M.J., 2007. Coping style use predicts posttraumatic stress and complicated grief symptom severity among college students reporting a traumatic loss. *J. Couns. Psychol.* 54 (3), 344. <https://doi.org/10.1037/0022-0167.54.3.344>.
- Stiles, W.B., 1987. I Have to Talk to Somebody. In: Derlega, V.J., Berg, J.H. (Eds.), *Self-Disclosure: Theory, Research, and Therapy*. Springer US, pp. 257–282. https://doi.org/10.1007/978-1-4899-3523-6_12.
- Tabak, I., Mazur, J., Granado Alcón, M.D.C., Örkényi, Á., Zaborskis, A., Aasvee, K., Moreno, C., 2012. Examining trends in parent-child communication in Europe over 12 years. *J. Early Adolesc.* 32 (1), 26–54. <https://doi.org/10.1177/0272431611419509>.
- Taku, K., Tedeschi, R.G., Cann, A., Calhoun, L.G., 2009. The culture of disclosure: effects of perceived reactions to disclosure on posttraumatic growth and distress in Japan. *J. Soc. Clin. Psychol.* 28 (10), 1226–1243. <https://doi.org/10.1521/jscp.2009.28.10.1226>.
- Tang, C.S.-K., 2006. Positive and negative postdisaster psychological adjustment among adult survivors of the southeast Asian earthquake-tsunami. *J. Psychosom. Res.* 61 (5), 699–705. <https://doi.org/10.1016/j.jpsychores.2006.07.014>.
- Tang, S., Xiang, M., Cheung, T., Xiang, Y., 2021. Mental health and its correlates among children and adolescents during COVID-19 school closure: the importance of parent-child discussion. *J. Affect. Disord.* 279, 353–360. <https://doi.org/10.1016/j.jad.2020.10.016>.
- Tedeschi, R.G., Calhoun, L.G., 1996. The posttraumatic growth inventory: measuring the positive legacy of trauma. *J. Trauma. Stress.* 9 (3), 455–471. <https://doi.org/10.1007/BF02103658>.
- Tedeschi, R.G., Calhoun, L.G., 2004. Posttraumatic growth: conceptual foundations and empirical evidence. *Psychol. Inq.* 15 (1), 1–18. https://doi.org/10.1207/s15327965pii1501_01.
- Tedeschi, R.G., McNally, R.J., 2011. Can we facilitate posttraumatic growth in combat veterans? *Am. Psychol.* 66 (1), 19. <https://doi.org/10.1037/a0021896>.
- Thompson, B.L., Waltz, J., 2008. Self-compassion and PTSD symptom severity. *J. Trauma. Stress.* 21 (6), 556–558. <https://doi.org/10.1002/jts.20374>.
- Wang, M., Xu, W., Wang, X., 2017. Parental harsh discipline and adolescents' academic achievement: mediating of self-disclosure. *Chin. J. Clin. Psych.* 25 (04), 684–690. <https://doi.org/10.16128/j.cnki.1005-3611.2017.04.021>.
- Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., Schnurr, P.P., 2013. Scale available from the. In: *The PTSD Checklist for DSM-5 (PCL-5)*. National Center for PTSD, p. 10. www.ptsd.va.gov.
- Winders, S.J., Murphy, O., Looney, K., O'Reilly, G., 2020. Self-compassion, trauma, and posttraumatic stress disorder: a systematic review. *Clin. Psychol. Psychother.* 27 (3), 300–329. <https://doi.org/10.1002/cpp.2429>.
- Wong, C.C.Y., Yeung, N.C., 2017. Self-compassion and posttraumatic growth: cognitive processes as mediators. *Mindfulness* 8 (4), 1078–1087. <https://doi.org/10.1007/s12671-017-0683-4>.
- Wu, X., Wang, W., Zhou, X., Chen, Q., Lin, C., 2018. Investigation on mental health state of adolescents after 8.5 years of wenchuan earthquake. *Psychol. Dev. Educ.* 34 (01), 80–89. <https://doi.org/10.16187/j.cnki.issn1001-4918.2018.01.10>.
- Xie, X., Xue, Q., Zhou, Y., Zhu, K., Liu, Q., Zhang, J., Song, R., 2020. Mental health status among children in home confinement during the coronavirus disease 2019 outbreak in Hubei Province China. *JAMA Pediatrics* 174 (9), 898–900. <https://doi.org/10.1001/jamapediatrics.2020.1619>.
- Xin, Y., Bai, K., Chen, X., Zhu, D., Liu, C., 2019. The effect of social support on posttraumatic growth of adolescents: the mediating role of resilience. *Studies of Psychology and Behavior* 17 (06), 817–823.
- Xu, J., Liao, Q., 2011. Prevalence and predictors of posttraumatic growth among adult survivors one year following 2008 Sichuan earthquake. *J. Affect. Disord.* 133 (1), 274–280. <https://doi.org/10.1016/j.jad.2011.03.034>.
- Xu, J., Zhang, Y., Zhan, W., Wang, J., Dai, Y., Zhang, L., 2016. Mediating role of social support in the adolescent parent-child communication and social adaptation. *Chin. J. Health Psychol.* 24 (01), 65–68. <https://doi.org/10.13342/j.cnki.cjhp.2016.01.015>.
- Zhang, Y., Liu, C., Dong, Y., 2010. The new form of self-views: a review of self-compassion research. *Adv. Psychol. Sci.* 18 (12), 1872–1881. <https://doi.org/10.1016/j.jadohealth.2020.08.026>.
- Zhao, H., Dong, C., Tang, Y., Lu, Z., 2020. Relationship between self-disclosure and post-traumatic growth among patients at the early stage of accidental trauma. *J. Nurs. Sci.* 35 (01), 57–60. <https://doi.org/10.3870/j.issn.1001-4152.2020.01.057>.
- Zhen, R., Zhou, X., 2020. Predictive factors of public anxiety under the outbreak of COVID-19. *Chin. J. Appl. Psychol.* 26 (02), 99–107.

- Zhen, R., Quan, L., Zhou, X., 2018. How does social support relieve depression among flood victims? The contribution of feelings of safety, self-disclosure, and negative cognition. *J. Affect. Disord.* 229, 186–192. <https://doi.org/10.1016/j.jad.2017.12.087>.
- Zhou, X., Wu, X., An, Y., Chen, J., 2014. The roles of rumination and social support in the associations between core belief challenge and post-traumatic growth among adolescent survivors after the wenchuan earthquake. *Acta Psychol. Sin.* 46 (10), 1509–1520. <https://doi.org/10.3724/SP.J.1041.2014.01509>.
- Zhou, J., Wang, Y., Bu, T., Zhang, S., Qiu, X., Chu, H., Wang, W., Wu, Y., Wang, W., Zhang, Y., 2020. The positive and negative psychological impact on adolescents during COVID-19 epidemic: A large sample study in China. <https://doi.org/10.2139/ssrn.3619777>.