Children and Youth Services Review 166 (2024) 107900

Contents lists available at ScienceDirect

Children and Youth Services Review

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

Childhood trauma, emotion regulation, peer attachment, and family functioning: A longitudinal network analysis

Lin Zhang[a,b,c,d,1], Yixiao Xu[a,b,c,d,1], Carter J. Funkhouser[e], Alessio Maria Monteleone[f], Xianglian Yu[g,*]

[a] School of Psychology, Central China Normal University, Wuhan 430070, China
[b] Key Laboratory of Adolescent Cyberpsychology and Behavior, Ministry of Education, Wuhan 430056, China
[c] Key Laboratory of Human Development and Mental Health of Hubei Province, Wuhan 430056, China
[d] Shanghai Key Laboratory of Mental Health and Psychological Crisis Intervention, School of Psychology and Cognitive Science, East China Normal University, Shanghai 200062, China
[e] Department of Psychiatry, Columbia University, New York, NY 10027, USA
[f] Department of Psychiatry, University of Campania L. Vanvitelli, Largo Madonna delle Grazie, Naples 80138, Italy
[g] Department of Education, Jianghan University, Wuhan 430056, China

ARTICLE INFO

Keywords:
Childhood trauma
Emotion regulation
Peer attachment
Family functioning
Longitudinal network analysis

ABSTRACT

Childhood trauma is a significant contributor to the heightened susceptibility to psychiatric disorders. This study aims to clarify the impact of childhood maltreatment on adolescents by investigating the longitudinal associations between childhood trauma, emotion regulation, peer interactions, and family functioning. The study involved a sample of 1280 students (M_{age} = 14.78, SD=1.58) enrolled in two high schools in Fujian Province, including 749 females and 531 males. Participants completed two rounds of questionnaires with a six-month interval between administrations. A directed network was constructed to explore the longitudinal connections. The findings revealed that emotional abuse exhibited the strongest predictive influence, and family functioning emerged as the most influential bridge node within the network. This means that the activation of emotional abuse may subsequently trigger the activation of other risk factors in the network, and family functioning is the most susceptible in the present network. In future research, much more work is needed to test the network replicability and investigate the specific differences between male and female networks.

1. Introduction

Childhood traumatic experiences significantly influence the psychological development of adolescents or adults and represent important risk factors for psychiatric disorders (Stanton, Denietolis, Goodwin, & Dvir, 2020). Childhood trauma is defined as direct exposure to or witnessing actual death, death threats, serious injury, or sexual violence during childhood. It also encompasses emotional abuse, as well as physical and emotional neglect (American Psychiatric Association, 2013). According to a transdiagnostic model, childhood trauma is associated with psychopathology through its influence on emotion processing and social information processing (McLaughlin, Colich, Rodman, & Weissman, 2020).

First, within this transdiagnostic mechanism, childhood trauma directly influences emotion processing. Researchers have proposed that childhood trauma leads to the early maturation of neural circuits underlying emotion regulation, and affects the development of regions associated with processing and cognitive control (Jenness et al., 2021; Keding et al., 2021). Individuals with a history of childhood trauma encounter challenges in recognizing and regulating emotions, especially during distressing moments (Burns, Jackson, & Harding, 2010; van der Kolk et al., 1996; Weissman et al., 2020; Wooten, Laubaucher, George, Heyn, & Herringa, 2022). Moreover, they exhibit a greater tendency to employ avoidant emotion regulation strategies (Milojevich, Norwalk, & Sheridan, 2019).

Second, childhood trauma directly impacts social information

* Corresponding author.
E-mail addresses: yixiaoxu@mails.ccnu.edu.cn (Y. Xu), carter.funkhouser@nyspi.columbia.edu (C.J. Funkhouser), alessiomaria.monteleone@unicampania.it (A.M. Monteleone), psyyu@jhun.edu.cn (X. Yu).
[1] Lin Zhang and Yixiao Xu made equal contributions to this manuscript and should be considered co-first authors.

https://doi.org/10.1016/j.childyouth.2024.107900
Received 14 November 2023; Received in revised form 20 August 2024; Accepted 4 September 2024
Available online 6 September 2024

processing. Individuals who have undergone childhood trauma tend to prioritize threat-related information, subsequently influencing their attitudes, expectations, and perceptions of their surroundings, ultimately altering their interactions within their environment (Dodge et al., 1990, 1995; McLaughlin et al., 2020; Pollak & Kistler, 2002). For instance, a previous study discovered that women who endured trauma during childhood perceived their family environment as more dysfunctional and threatening, resulting in their avoidance of family interactions (Barnhart, Garcia, & Karcher, 2022; Meyerson, Long, Miranda, & Marx, 2002; Sunday et al., 2008). Additionally, college students who experienced childhood trauma struggled to express emotions and communicate with family members, hindering their ability to access value from their family. This can have adverse effects on various aspects of family functioning, such as family structure, family relationships, and coping skills (Kiser & Black, 2005; Tanju & Demirbaş, 2012a; van Harmelen et al., 2016; Zhang, Ma, Yu, Ye, Li, Lu, & Wang, 2021).

Moreover, childhood traumatic experiences may impact individuals' perceptions of relationships, thereby impacting their emotions and behavior (Drapeau & Perry, 2004; Hepp, Schmitz, Urbild, Zauner, & Niedtfeld, 2021; Pepin & Banyard, 2006). For example, childhood trauma can affect individuals' attitudes and expectations regarding peer relationships (Keil & Price, 2009; Price & Glad, 2003; Rogosch, Cicchetti, & Aber, 1995). Previous studies highlighted that children who have experienced trauma tend to develop more negative self-concepts and lower self-esteem, often perceiving themselves as unworthy of love and viewing others as untrustworthy (Alto, Handley, Rogosch, Cicchetti, & Toth, 2018). Another study revealed that peer relationships play a moderating role in the association between childhood trauma and psychopathology. Attachment within peer relationships can, to some extent, mitigate the negative emotions resulting from childhood sexual abuse and act as a protective factor (Aspelmeier, Elliott, & Smith, 2007).

According to attachment theory, the way parents and other caregivers treat children, such as whether they are sensitive to children's needs and whether they may ignore them, affects children's perceptions of self and others, and influences children's patterns of behavior and interpersonal relationships (Bowlby, 1980; Camras et al., 1996; Egeland, Sroufe, & Erickson, 1983; Shipman, Edwards, Brown, Swisher, & Jennings, 2005a). According to the organizational-transactional model of development, children who have undergone trauma are more likely to develop insecure attachments, leading to difficulties in emotion regulation, which in turn can affect individuals' patterns of peer relationships (Cicchetti, Ganiban, & Barnett, 1991; Kim & Cicchetti, 2010; Rogosch et al., 1995; Shields & Cicchetti, 2001).

In summary, childhood trauma emerges as a potent transdiagnostic risk factor associated with elevated susceptibility to various forms of psychopathology. To better understand how childhood trauma increases risk and effectively mitigates its adverse consequences, it is critical to disentangle the relationships between childhood trauma and other risk factors. This study used the network analysis method, one of the most popular analytical methods in recent psychometrics (McNally, 2021). This approach focuses on the interconnections between risk factors, with nodes representing risk factors and edges denoting relationships (Borsboom & Cramer, 2013). Nodes with high centrality indices will be given more importance, indicating their activation or prediction of other nodes, which in turn affects the whole network (Liang, Yang, Xi, & Liu, 2022).

Several studies have conducted network analyses to investigate relationships between childhood trauma and psychopathology (Guo et al., 2023; Lei, Yang, Zhu, Zhang, & Dang, 2024; Schneider et al., 2020; Tang et al., 2024). It has been found that childhood traumatic experiences, family environment, and peer environment interact with adolescent depressive symptoms, with emotional abuse experience from childhood being the most central and having a greater impact on depression than other factors (Wang et al., 2023). These studies also revealed the complex relationships between different variables. For example, childhood trauma influenced relationships between different cognitive emotion regulation strategies and different depressive symptoms (Zhang, Liu, Wu, & Tian, 2022). A complex interplay between emotion regulation and interpersonal problems was also observed in individuals with obesity (Monteleone et al., 2023). Network analyses employing the "shortest pathways" function showed that emotional abuse was included in the pathways conveying all types of childhood maltreatment to eating disorder psychopathology (Monteleone et al., 2019, 2022).

However, the existing studies on adolescents' childhood traumatic experiences have primarily used cross-sectional data, which can identify partial correlations between variables, but fail to determine relationship directions. For example, when a cross-sectional network is built and the node with the highest centrality has been identified, it is not possible to disentangle whether this node is more likely to be predicted by other nodes in the network or more likely to predict other nodes because the edges in the network have no direction. Determining the directionality of relationships is critical for identifying targets for preventative intervention and is an important step toward establishing causality (Hill, 1965; Kendler & Campbell, 2009). Thus, it is necessary to conduct network analysis using longitudinal data to identify relationship directionality.

This study investigated the longitudinal associations between different types of childhood traumatic experiences, emotion regulation, peer relationships, and family functioning. Exploring the specific connections between these variables may allow for clarification of the effects of childhood maltreatment in adolescents. Cross-lagged panel network (CLPN) modeling was employed to examine unique longitudinal relationships between these variables. CLPN is an approach that uses longitudinal panel data to infer the predictive direction of variables in a network (Rhemtulla, Bork, & Cramer, 2018). By identifying the temporal effects between risk factors, a directed network is constructed to estimate the effect of a risk factor in the previous time point on all risk factors in the next time point (McNally, 2016)). In addition, the centrality indices of each node in the network are calculated to determine which risk factors are the strongest predictors of other risk factors and which risk factors are most likely to be predicted by other risk factors. Based on several previous studies mentioned above, we hypothesized that in the network including the above four variables, childhood traumatic experiences (especially emotional abuse or emotional neglect) would be the most central in predicting other risk factors, with perhaps the greatest impact on emotion regulation. Lastly, we explored potential gender differences in these longitudinal associations.

2. Methods

2.1. Participants

Participants from two high schools in Fujian Province, China, were enrolled in this study. Surveys were conducted in the class as a unit. The questionnaire links were distributed online to students in each class, and participants voluntarily completed them using their mobile phones. The survey was conducted with informed consent from the school, participants' parents, and the students. Participants were explicitly informed of their right to choose whether to participate and their ability to withdraw at any time. All data were collected for research purposes only.

The first round of questionnaires was released in April 2021 (T1), and 2399 questionnaires were collected. In September 2021 (T2), the second round of questionnaires was distributed to the same classes as T1. The set of questionnaires at T1 and T2 were identical. Participants completed the questionnaires voluntarily. Some participants who didn't complete the questionnaires at T1 completed them at T2, resulting in 2545 questionnaires collected at T2. Data analysis included responses from participants who completed questionnaires at both rounds. The main reasons for sample loss were graduation, and transferring to another school.

In total, 1280 participants completed questionnaires at both time points. Demographic details reveal 531 (41.5 %) males and 749 (58.5 %)

females, with a mean age of 14.78 ($SD_1 = 1.58$) at T1 and 15.06 ($SD_2 = 1.54$) at T2. Demographic information for the excluded participants is available in Table S1, and it showed no significant differences compared to the participants included in the analysis.

2.2. Measurements

2.2.1. Childhood trauma

Childhood trauma was assessed with the Chinese version of the Childhood Trauma Questionnaire (CTQ-SF) (Fu et al., 2005). It comprises 25 items across 5 subscales: physical neglect, emotional abuse, physical abuse, emotional neglect, and sexual abuse. Each item was scored from "1″ (never) to "5" (very often). The Chinese version of the Childhood Trauma Questionnaire has undergone extensive validation (Tong et al., 2022; Wang, He, Chen, & Lin, 2020; Fu et al., 2005). In the present study, the Cronbach's alpha coefficient is 0.79. Participants reported lifetime trauma experiences at T1 and trauma experiences since T1 at T2.

2.2.2. Emotion regulation

The Emotion Regulation Questionnaire (ERQ) was used to measure individuals' habitual use of cognitive reappraisal and expressive suppression strategies, which are two commonly used emotion regulation strategies. The ERQ consists of 10 items, each rated on a 7-point scale (Wang, Liu, & Li, 2007). A higher total score on the ERQ signifies more frequent use of emotion regulation strategies. The Chinese version of the Emotion Regulation Questionnaire has been validated with good reliability and validity (Hutchison, Yeung, Gerstein, & Wettersten, 2021; Liu, Chen, & Tu, 2017; Wang et al., 2007). In the present study, the Cronbach's alpha coefficient was 0.83.

2.2.3. Peer attachment

The peer attachment subscale of the Inventory of Parent and Peer Attachment was employed to assess participants' perceptions regarding the affective and cognitive aspects of their relationships with close friends. The scale comprises 25 items across three dimensions: peer communication, alienation, and trust. Each item was rated on a scale from "1″ (not true) to "5" (very true). Higher cumulative scores indicate stronger peer relationships (Armsden & Greenberg, 1987). The internal consistency for the scale was good in the present study (Cronbach's $\alpha = 0.87$).

2.2.4. Family functioning

The overall health or pathology of the participant's family was assessed using the General Functioning (GF) Scale of the Chinese version of the Family Assessment Device (FAD), comprising 12 items rated on a scale from "1″ (strongly agree) to "4" (strongly disagree). The questionnaire assessed the participants' perception of their families over the preceding two months. Elevated cumulative scores indicate diminished family functioning (Epstein, Baldwin, & Bishop, 1983). This scale has been validated, demonstrating good reliability and validity within Chinese populations (Shek, 2001, 2002). In the present study, Cronbach's alpha coefficient for the GF Scale in the Chinese version of FAD was reported as 0.83.

2.3. Data analysis

2.3.1. Network estimation

R software was used to calculate cross-lagged effects. The cross-lagged analysis involves controlling for other risk factors at T1 and covariates, with coefficients of risk factors at T1 predicting other risk factors at T2. The cross-lagged panel network was plotted using the R package *qgraph*, employing an algorithm to determine node placement based on connection strength (Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012; Rhemtulla et al., 2018). This directed network was employed to assess the impact of one node at T1 on all other nodes at T2. Gender and age at T1 were incorporated as a covariate in the analysis.

Cross-validation was employed in this study because of its superior trade-off between specificity and sensitivity compared to other regularization parameter selection criteria during model selection (Wysocki & Rhemtulla, 2021). R package *glmnet* was used to perform regularized regressions using the least absolute shrinkage and selection operator (LASSO), converting the coefficient of logistic regressions from log odds to odds ratios (ORs) (Friedman, Hastie, & Tibshirani, 2008). ORs below 1 indicate negative relationships, ORs greater than 1 indicate positive relationships and ORs equal to 1 signify no relationship.

2.3.2. Centrality estimation

Expected influence centrality indices were computed to summarize each node's associations with other nodes in the network (Robinaugh, Millner, & McNally, 2016). To account for the direction of edges, in-expected influence (in-EI) and out-expected influence (out-EI) were calculated separately. In-EI measures the degree to which a node is predicted by other nodes in the network and was calculated by summing edge values from other risk factors to the specific node. Out-EI quantifies the degree to which a node predicts other nodes in the network by summing the edge values from the given node to other risk factors in the network (Jones, Ma, & McNally, 2021).

Additionally, bridge-expected influence (bridge-EI) was calculated to identify bridge nodes serving as bridges between domains (Mullen & Jones, 2020). For preventing psychiatric disorders, these risk factors can be targeted for intervention. The R-package *networktools* was employed to calculate one-step bridge-EI, the metric for assessing node influence (Jones, Heeren, & McNally, 2017). One-step bridge-EI (bridge EI1) is the sum of all edge weights from a given node to other nodes in different domains (Mullen & Jones, 2020).

2.3.3. Network accuracy and stability

The R-package *bootnet* was utilized to test centrality indices stability and the accuracy of edge weights in a three-step process (Epskamp, Borsboom, & Fried, 2018). In the first step, the accuracy of edge weights was estimated by creating bootstrapped confidence intervals (bootstrapped CIs) around the edge weights. Non-parametric bootstrapping methods were employed to calculate CIs (1000 bootstrap samples) (Efron, 2000). Narrower CIs signify greater accuracy.

The second step involved assessing the stability of centrality indices using the centrality stability coefficient (CS coefficient). The CS-coefficient indicated the maximum drop proportions to retain a correlation of 0.7 between the original dataset centrality indices and subsets of data centrality indices in at least 95 % of the samples. If the rank-order of centrality indices in the network, constructed after removing a certain sample proportion, showed a significant correlation with the rank-order of the original network, the centrality can be considered stable. Previous studies suggest that if the CS coefficient is greater than 0.25, the stability is acceptable, and if the CS coefficient is greater than 0.5, the stability is good (Epskamp et al., 2018).

In the third step, a bootstrapped difference test was conducted on edge weights and centrality indices. These tests evaluated the significance of the difference between two edge weights or two nodes' centralities. Each grid in the result represented the relationship between two edge weights or two nodes. If the grid was black, it indicated a significant difference (Epskamp et al., 2018).

2.3.4. Network comparison

Two networks were plotted using the R package *qgraph*. To assess the distinction between the male and female networks, we performed the following analyses: (a) calculating the correlation between edge lists, which showed the similarity between two networks, (b) determining the number and percentage of edges in one network common with another network, and (c) assessing the spearman correlation of centrality indices between male and female networks.

3. Results

3.1. Network accuracy and stability

Fig. S1 shows that bootstrapped CIs ranged from small to moderate. Therefore, the accuracy of edge weights in the network was moderate to high. Bridge-EI exhibited strong stability with a CS coefficient of 0.75, while out-EI demonstrated acceptable stability with a CS coefficient of 0.36. However, in-EI did not display adequate stability, as indicated by a CS coefficient of 0.013 (refer to Fig. S2). Therefore, only bridge-EI and out-EI were interpreted. Bootstrapped edge weight and centrality difference tests are presented in Fig. S3 and Fig. S4. The black boxes denote significant differences in edge weights or centrality among nodes.

3.2. Network inference

The unique longitudinal associations between risk factors are visualized as a directed network (see Fig. 1), where nodes represent the risk factors, and arrows represent the relationships between risk factors. The thickness of each edge corresponds to its weight. The green edges signify positive predictions, while the red edges indicate negative predictions. Table S2 provides information about edge weights. Notably, autoregressive edges (mean OR = 1.26) were stronger than cross-lagged edges (mean OR = 1.01). Therefore, autoregressive edges were excluded from the network plot to prevent them from inhibiting the cross-lagged edges visually. There were a total of 60 cross-lagged edges (49[81.7 %] with OR >1).

Regarding centrality (see Fig. 2), emotional abuse (A2) exhibited the highest out-EI, and it had significantly greater out-EI than 8 of the 10 other nodes in the network. This result signifies their stronger predictive influence on other nodes. Peer alienation (E2) had the lowest out-EI, significantly lower than 9 of 10 other nodes in the network, indicating it minimally predicted other nodes. The three strongest cross-lagged edges were emotional abuse (A2) → family functioning (G; OR=1.233), emotional abuse (A2) → emotional neglect (A4; OR=1.231) and peer alienation (E2) → peer trust (E3; OR=0.81). Peer alienation and expressive suppression were also predicted by emotional abuse.

The 1-step bridge expected influence estimates for each risk factor are presented in Fig. 3. The expected influence values were standardized for ease of interpretation. One-step bridge-EI estimates revealed that family functioning (G) was the most influential bridge node, which indicated that it had the largest influence on nodes from other domains through the network. It had the highest one-step bridge-EI (bridge EI1 = 1.74). Within the emotion regulation domain, expressive suppression (B2) achieved the highest bridge-EI scores (bridge EI1 = 1.05). Additionally, physical neglect (A1) had the highest negative bridge-EI values (bridge EI1 = −1.14).

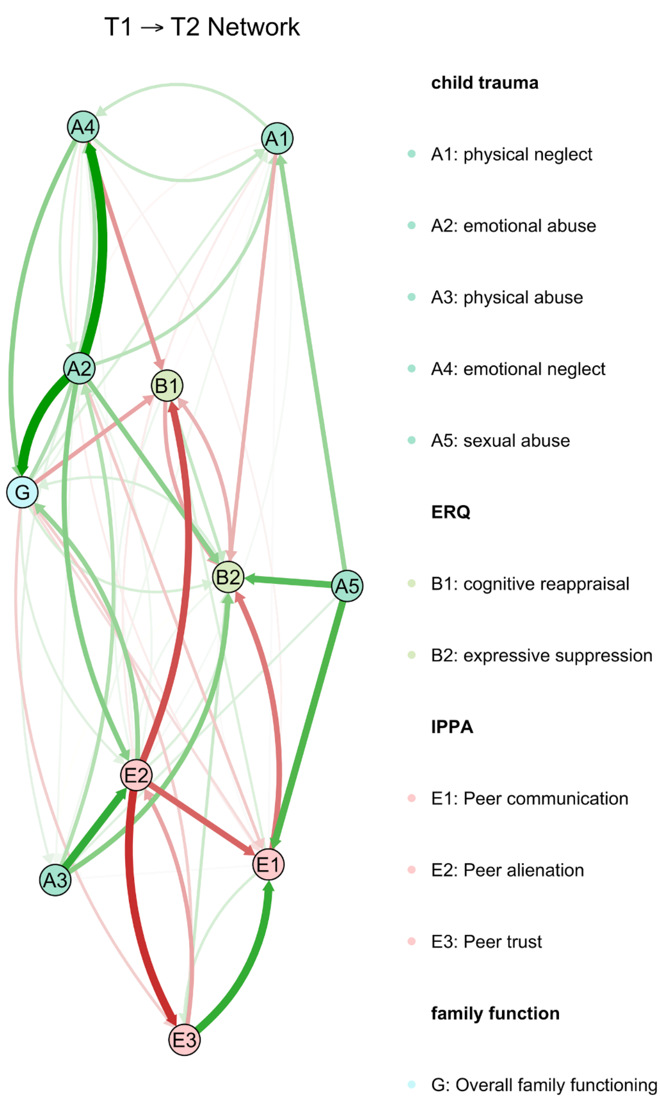

Fig. 1. The cross-lagged panel networks for T1 → T2.

3.3. Network comparison between the male and female

Fig. 4 presents the estimated directed networks for males (n = 531) and females (n = 749). The number of cross-lagged edges in the female network (55 edges) was similar to that of the male network (56 edges). A modest correlation (r = 0.28) was observed between edge lists in the two networks. A total of forty-one edges (comprising 62.1 % of all edges) were common to both networks, including edges with ORs > 1 and ORs < 1.

The centrality indices underscored the importance of risk factors in the two networks. The CS-coefficient of bridge-EI was 0.75 for both genders, signifying the stability necessary for interpretation. However, the CS-coefficients for in-EI and out-EI were below 0.25. Thus, only bridge-EI was considered. Bridge-EI exhibited a high correlation between the male and female networks, as evidenced by the strong rank correlations in one-step bridge-EI ($\rho_{\text{bridge-EI1}} = 0.93$). Family functioning (G) had the highest bridge-EI in both networks Fig. S5. In short, there were some similarities and differences between male and female networks.

4. Discussion

This study employed cross-lagged network analysis to investigate the associations between childhood trauma, utilization of emotion regulation strategies, peer attachment, and family functioning. Employing CLPN allowed for the estimation of longitudinal associations between risk factors over six months. We have derived certain conclusions to enhance comprehension of mental health development following childhood trauma.

Our findings indicated that emotional abuse was the most predictive of other risk factors with the highest out-EI scores. This means that the activation of emotional abuse may subsequently trigger the activation of other risk factors in the network. The strongest positive edges in the network originated from emotional abuse, leading to family functioning. Family functioning refers to the role that family members play in accomplishing various aspects of family tasks (Epstein, Bishop, & Levin, 1978). That is to say, in the present network, emotional abuse is activated with family functioning being the most susceptible. According to previous research, among the networks encompassing childhood trauma, family risk environment, peer rejection, and depressive symptoms, emotional abuse was a central risk factor (K. Wang et al., 2023).

According to attachment theory and research, parents and other

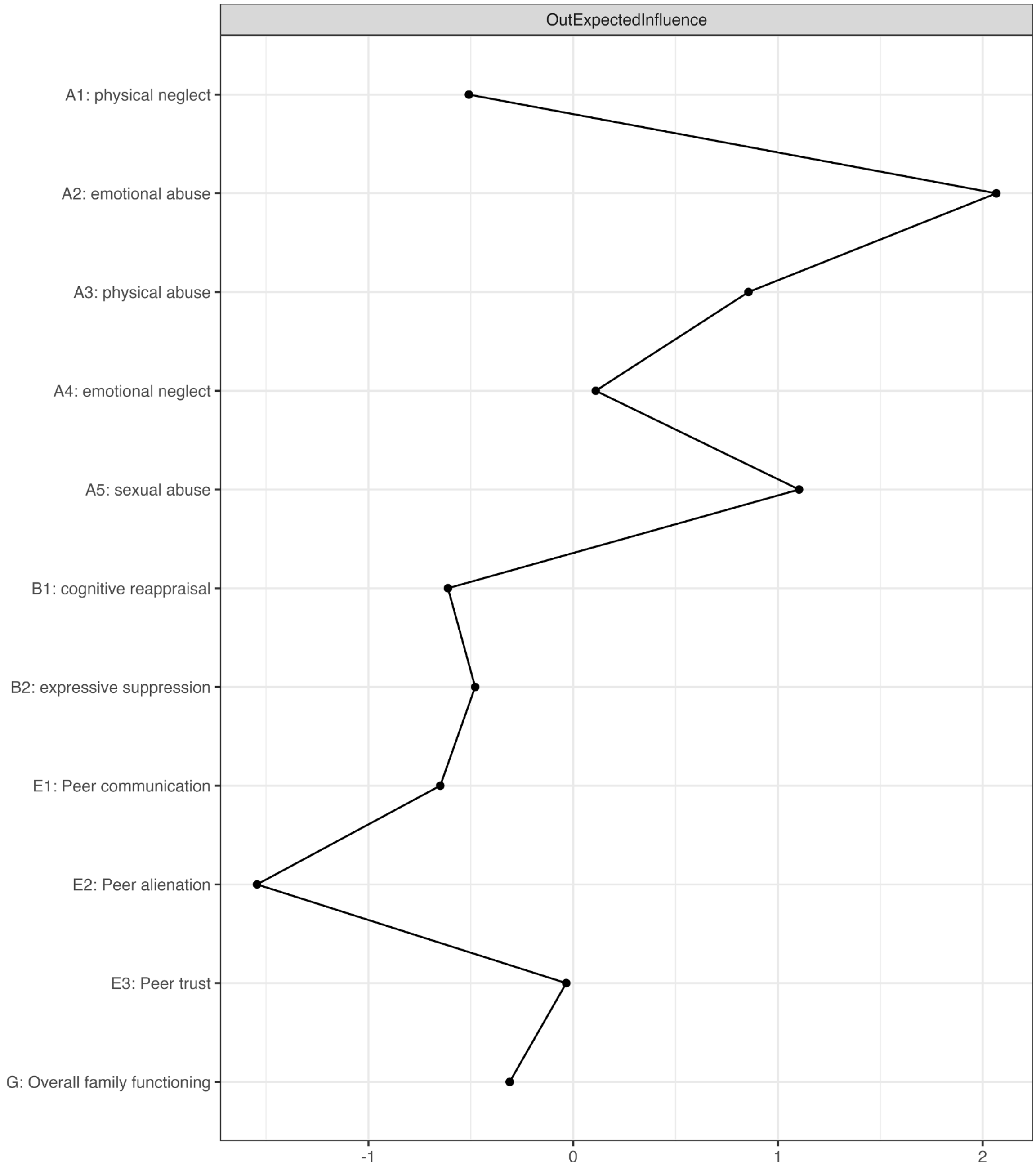

Fig. 2. Out-expected influence centrality estimates in the T1 → T2 network. Larger values indicate greater centrality.

caregivers play an important role in constructing and regulating children's emotions (Bowlby, 1980; Kim & Cicchetti, 2010; Thompson, 1994). Abusive parents often lack impulse control and show low empathic capacity (Milner, 2000; Shahar, 2001). When children are upset, these parents are less likely to soothe and help children regulate their emotions (Shipman et al., 2005b; van der Kolk & Fisler, 1994). Prolonged exposure to such distressing and conflict-ridden environments may affect children's biological stress response, which in turn produces deficits in the development of an individual's relational understanding and emotional regulation (Clemmons, Walsh, DiLillo, & Messman-Moore, 2007; Gunnar & Quevedo, 2007; Kaplow & Widom, 2007). From the perspective of the suboptimal environment hazards model, family risk factors were closely related to childhood trauma. Individuals who have experienced childhood trauma are more likely to perceive caregivers as a source of terror and have difficulty trusting their family members, which in turn impairs family functioning (Hughes, 2004). Specifically, emotional abuse can affect family functioning by influencing the emotional expression of family members (Tanju & Demirbaş, 2012b).

Meanwhile, family functioning was found to exhibit the strongest bridging effect in the network in this study. It displayed substantial edge weights alongside emotional neglect, within the domain of childhood trauma. Consequently, emotional neglect plays a pivotal role in the pathway of family functioning affecting the negative effects of childhood trauma. For psychiatric disorders prevention, parents should refrain from subjecting their children to emotional neglect. Simultaneously, the proximal environment mitigation model suggests that the family environment, as a proximal resource for adolescents, is closely related to adolescent mental health (Hallab & Covic, 2010; Leeman et al., 2016). Thus, assessing whether overall family functioning is healthy or pathological serves as a crucial indicator in preventing the subsequent effects of childhood trauma.

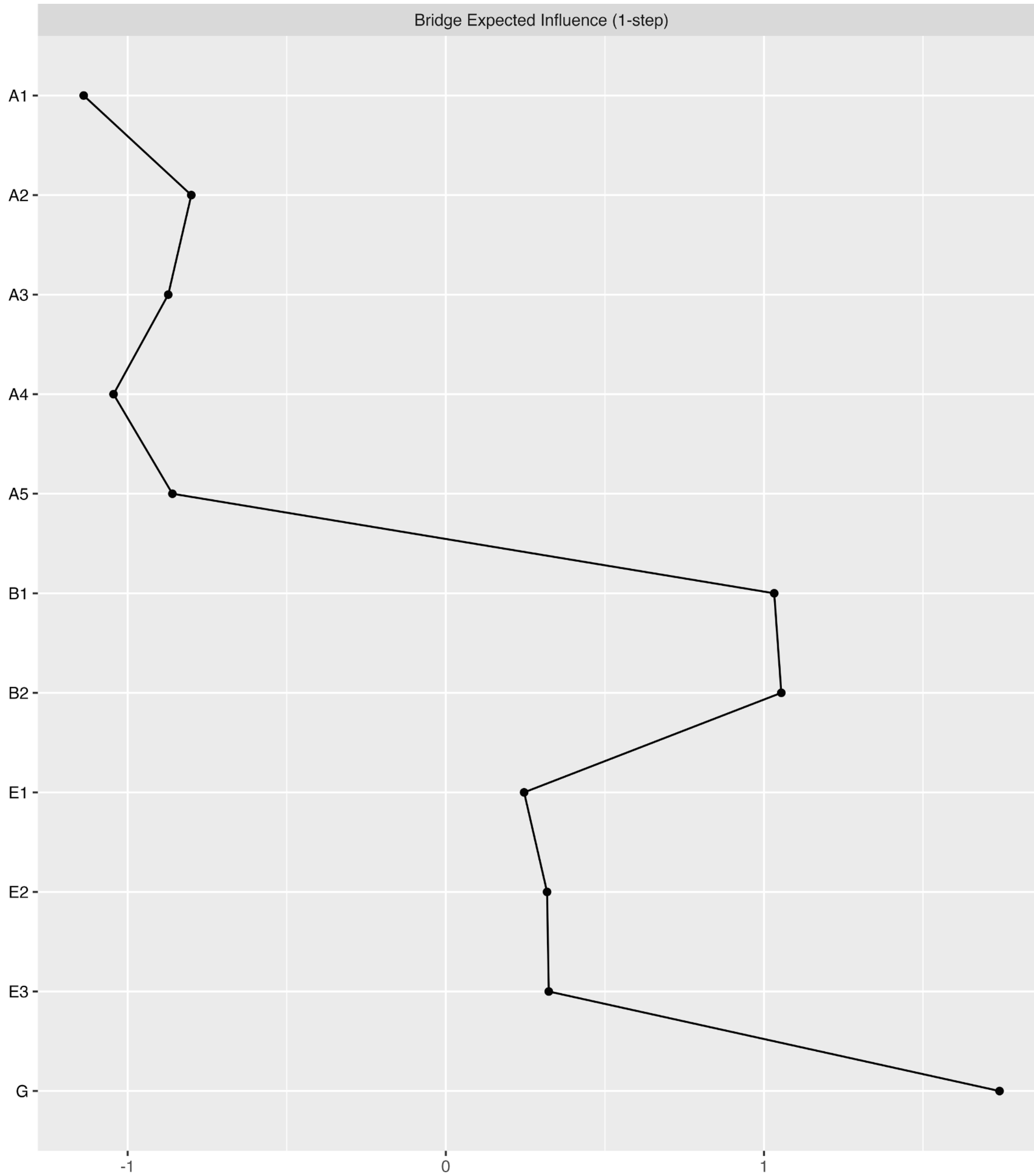

Fig. 3. Bridge centrality indices of the nodes in the network.

The results also revealed that peer alienation had the strongest negative predictive effect on other risk factors. The strongest negative edges in the network existed between peer alienation and both peer communication and peer trust, all within the same domain. Additionally, another negative link was observed between peer alienation and cognitive reappraisal which is situated within the emotion regulation domain. Peer alienation reflects individuals' subjective feelings of being alienated by peers. Previous studies have substantiated the notion that peer alienation can have an impact on self-evaluation, and that lower self-evaluation can affect the development of peer relationships (Chen, Jing, & Pang, 2022; Wu et al., 2022). Subsequent network analysis might consider incorporating self-concept or self-evaluation as a variable to investigate the impact of peer attachment on various facets of children's development through influencing self-evaluation.

Moreover, physical abuse had the highest negative bridge expected influence value, indicating its suppressive impact on emotion regulation through expressive suppression. Research has shown that individuals who have experienced childhood trauma often have difficulties in regulating their emotions (Muehlenkamp, Kerr, Bradley, & Adams Larsen, 2010). This study delved deeper into the underlying mechanisms and identified that physical abuse may affect emotion regulation, particularly through the mechanism of expressive suppression.

In terms of network comparisons, the male and female networks exhibited a strong correlation in bridge-EI, and the risk factors with the highest bridge-EI were consistent across both networks. However, the correlation between these two networks was relatively weak. The specific differences between male and female networks require further investigation through subsequent studies.

In conclusion, emotional abuse had the most predictions for other risk factors, and family functioning was the most influential node in the network. It displayed a robust connection with expressive suppression in the domain of emotion regulation. Physical abuse exhibited the highest negative bridge expected influence. Centrality coefficients within the male and female networks are strongly correlated, indicating the presence of similar bridging network risk factors. However, the degree of similarity between these two networks was not substantial.

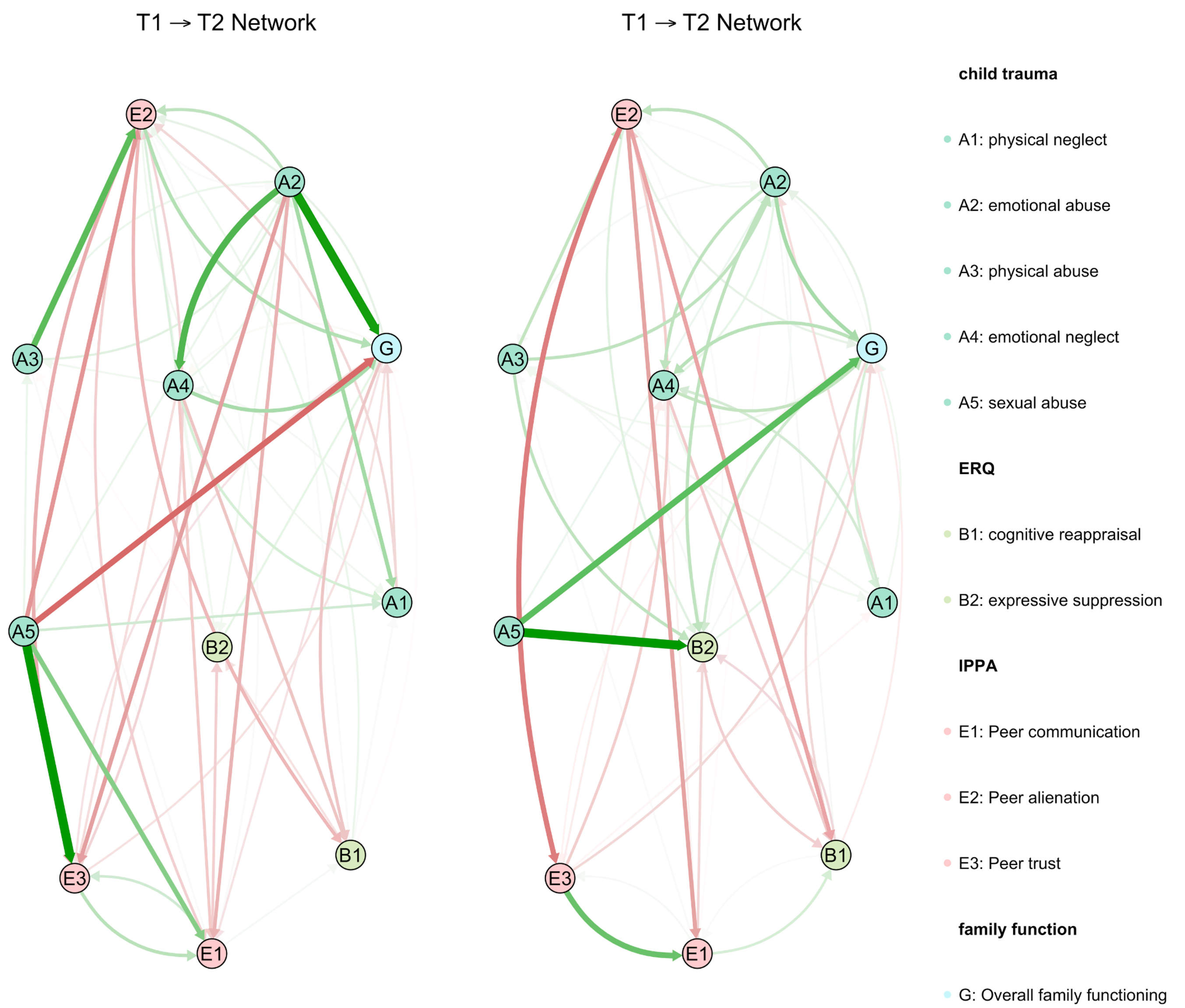

Fig. 4. The cross-lagged panel networks for males (left) and females (right).

4.1. Strengths and limitations

The study possessed several strengths. First, the study used CLPN to model temporal effects and relationships. The directed network allowed for the identification of longitudinal relationships between risk factors and the estimation of temporal effects. This approach differs from cross-sectional network analyses and enhances comprehension of adolescent development, elucidating potential intervention opportunities and challenges. Second, this study investigated a broader array of trans-diagnostic risk factors. In this study, emotion regulation reflected adolescents' emotion processing, and peer attachment and family functioning reflected the social information processing of teenagers. Third, the study compared the network of males and females, elucidating potentially gender-specific associations.

Nonetheless, the study had several limitations. First, data were self-reported, potentially affected by participant willingness and accuracy. Moreover, there are subscales of the Childhood Trauma Questionnaire that do not have very good reliability in the current study, which was similar to the results of the previous study (Badenes-Ribera, Georgieva, Tomás, & Navarro-Pérez, 2024; Briere, 1992; Hardt, Sidor, Bracko, & Egle, 2006; Jiang et al., 2018). However, this scale is a more widely used scale for measuring childhood trauma, so it was still chosen for this study (Bernstein et al., 2003; Fu et al., 2005; Scher, Stein, Asmundson, McCreary, & Forde, 2001; Zhao, Zhang, Li, & Zhou, 2005). Future research can develop a scale with higher reliability for assessing childhood trauma within Chinese populations. In addition, it could be measured using structured interviews or multiple informants in subsequent research (Kullik & Petermann, 2013). Second, this study included only gender and age in the demographic information. More demographic variables could be encompassed in future research, enabling a more comprehensive sample comparison. Third, the study selected six months as the time interval between two rounds of the questionnaires, but its optimality remains unverified. Varied measurement intervals may cause parameter estimate discrepancies, potentially diverging this study's results from other longitudinal network analyses (Wooten et al., 2022). Current predictions and causality between risk factors were provided with a six-month lag, potentially differing with altered time intervals. Additionally, the CLPN failed to disaggregate within-person and between-person effects. Lastly, this study had no symptom data and primarily concentrated on discussing longitudinal relationships between risk factors for psychopathology, potentially limiting its ability to draw conclusions about symptoms of psychiatric disorders.

5. Conclusion

In conclusion, this study modeled a cross-lagged panel network, identifying unique longitudinal relationships between risk factors. Our findings suggested that emotional abuse and peer alienation predicted other risk factors the most. Family functioning was the most influential node in the network. For network comparison, the bridge risk factors of male and female networks were similar. The most influential nodes in the two networks were family functioning and expressive suppression. Much more work is needed in future research not only to test the network replicability but also to investigate the specific differences between male and female networks.

Ethics approval.

The present study was approved by the Human Research Ethics Committee of Central China Normal University (ccnu-irb-202105–001).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Acknowledgements

We sincerely thank our study participants and express our gratitude to the students, teachers, and school principals who have participated in this study.

Funding

This work was financially supported by The 2023 National Social Foundation of China (NSSFC) Annual Program (23CSH091).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.childyouth.2024.107900.

References

Alto, M., Handley, E., Rogosch, F., Cicchetti, D., & Toth, S. (2018). Maternal relationship quality and peer social acceptance as mediators between child maltreatment and adolescent depressive symptoms: Gender differences. *Journal of Adolescence, 63*(1), 19–28. https://doi.org/10.1016/j.adolescence.2017.12.004

Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427–454. https://doi.org/10.1007/bf02202939

Aspelmeier, J. E., Elliott, A. N., & Smith, C. H. (2007). Childhood sexual abuse, attachment, and trauma symptoms in college females: The moderating role of attachment. *Child Abuse & Neglect, 31*(5), 549–566. https://doi.org/10.1016/j.chiabu.2006.12.002

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5[TM], 5th ed.* (pp. xliv, 947). American Psychiatric Publishing, Inc. https://doi.org/10.1176/appi.books.9780890425596.

Badenes-Ribera, L., Georgieva, S., Tomás, J. M., & Navarro-Pérez, J. J. (2024). Internal consistency and test-retest reliability: A reliability generalization meta-analysis of the Childhood Trauma Questionnaire – Short Form (CTQ-SF). *Child Abuse & Neglect, 154*, Article 106941. https://doi.org/10.1016/j.chiabu.2024.106941

Barnhart, S., Garcia, A. R., & Karcher, N. R. (2022). Adolescent Mental Health and Family Economic Hardships: The Roles of Adverse Childhood Experiences and Family Conflict. *Journal of Youth and Adolescence, 51*(12), 2294–2311. https://doi.org/10.1007/s10964-022-01671-9

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., … Zule, W. (2003). Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect, 27*(2), 169–190. https://doi.org/10.1016/S0145-2134(02)00541-0

Borsboom, D., & Cramer, A. O. J. (2013). Network Analysis: An Integrative Approach to the Structure of Psychopathology. *Annual Review of Clinical Psychology, 9*(1), 91–121. https://doi.org/10.1146/annurev-clinpsy-050212-185608

Bowlby, J. (1980). *Attachment and loss.* (p. np, np). Basic Books.

Briere, J. N. (1992). *Child abuse trauma: Theory and treatment of the lasting effects.* (pp. xx, 203). Sage Publications, Inc.

Burns, E. E., Jackson, J. L., & Harding, H. G. (2010). Child Maltreatment, Emotion Regulation, and Posttraumatic Stress: The Impact of Emotional Abuse. *Journal of Aggression, Maltreatment & Trauma. Aggress. Maltreat. Trauma, 19*(8), 801–819. https://doi.org/10.1080/10926771.2010.522947

L. A. Camras, E. Sachs-Alter, S. C. Ribordy. Emotion understanding in maltreated children: Recognition of facial expressions and integration with other emotion cues. In *Emotional development in atypical children.* Lawrence Erlbaum Associates, Inc. (1996), (pp. 203–225).

Chen, N., Jing, Y., & Pang, Y. (2022). Relation between parent and child or peer alienation and life satisfaction: The mediation roles of mental resilience and self-concept clarity. *Frontiers in Psychology, 13*. https://doi.org/10.3389/fpsyg.2022.1023133

Cicchetti, D., Ganiban, J., & Barnett, D. (1991). Contributions from the study of high-risk populations to understanding the development of emotion regulation. In *The development of emotion regulation and dysregulation* (pp. 15–48). Cambridge University Press. https://doi.org/10.1017/CBO9780511663963.003.

Clemmons, J. C., Walsh, K., DiLillo, D., & Messman-Moore, T. L. (2007). Unique and Combined Contributions of Multiple Child Abuse Types and Abuse Severity to Adult Trauma Symptomatology. *Child Maltreatment, 12*(2), 172–181. https://doi.org/10.1177/1077559506298248

Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the Cycle of Violence. *Science, 250*(4988), 1678–1683. https://doi.org/10.1126/science.2270481

Dodge, K. A., Pettit, G. S., Bates, J. E., & Valente, E. (1995). Social information-processing patterns partially mediate the effect of early physical abuse on later conduct problems. *Journal of Abnormal Psychology, 104*(4), 632–643. https://doi.org/10.1037/0021-843X.104.4.632

Drapeau, M., & Perry, J. C. (2004). Childhood trauma and adult interpersonal functioning: A study using the Core Conflictual Relationship Theme Method (CCRT). *Child Abuse & Neglect, 28*(10), 1049–1066. https://doi.org/10.1016/j.chiabu.2004.05.004

Efron, B. (2000). The Bootstrap and Modern Statistics. *Journal of the American Statistical Association, 95*, 1293–1296.

Egeland, B., Sroufe, L. A., & Erickson, M. (1983). The developmental consequence of different patterns of maltreatment. *Child Abuse & Neglect, 7*(4), 459–469. https://doi.org/10.1016/0145-2134(83)90053-4

Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods, 50*(1), 195–212. https://doi.org/10.3758/s13428-017-0862-1

Epskamp, S., Cramer, A. O. J., Waldorp, L. J., Schmittmann, V. D., & Borsboom, D. (2012). qgraph: Network Visualizations of Relationships in Psychometric Data. *Journal of Statistical Software, 48*(4), 1–18. https://doi.org/10.18637/jss.v048.i04.

Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy, 9*(2), 171–180. https://doi.org/10.1111/j.1752-0606.1983.tb01497.x

Epstein, N. B., Bishop, D. S., & Levin, S. (1978). The McMaster Model of Family Functioning. *Journal of Marital and Family Therapy, 4*(4), 19–31. https://doi.org/10.1111/j.1752-0606.1978.tb00537.x

Friedman, J., Hastie, T., & Tibshirani, R. (2008). Sparse inverse covariance estimation with the graphical lasso. *Biostatistics, 9*(3), 432–441. https://doi.org/10.1093/biostatistics/kxm045

Fu, W., Yao, S., Yu, H., Zhao, X., Li, R., Li, Y., & Zhang, Y. (2005). Initial Reliability and Validity of Childhood Truama Questinnaire(CTQ-SF) Apllied in Chinese College Students. *Chinese Journal of Clinical Psychology, 13*(1), 40–42.

Gunnar, M., & Quevedo, K. (2007). The Neurobiology of Stress and Development. *In Annual Review of Psychology. Annual Reviews., 58*, 145–173. https://doi.org/10.1146/annurev.psych.58.110405.085605

Guo, W., Zhao, Y., Chen, H., Liu, J., Chen, X., Tang, H., … Wang, X. (2023). The bridge symptoms of childhood trauma, sleep disorder and depressive symptoms: A network analysis. *Child and Adolescent Psychiatry and Mental Health, 17*(1), 88. https://doi.org/10.1186/s13034-023-00635-6

Hallab, L., & Covic, T. (2010). Deliberate self-harm: The interplay between attachment and stress. *Behaviour Change, 27*(2), 93–103. https://doi.org/10.1375/bech.27.2.93

Hardt, J., Sidor, A., Bracko, M., & Egle, U. T. (2006). Reliability of Retrospective Assessments of Childhood Experiences in Germany. *The Journal of Nervous and Mental Disease, 194*(9). https://journals.lww.com/jonmd/fulltext/2006/09000/reliability_of_retrospective_assessments_of.7.aspx.

Hepp, J., Schmitz, S. E., Urbild, J., Zauner, K., & Niedtfeld, I. (2021). Childhood maltreatment is associated with distrust and negatively biased emotion processing. *Borderline Personality Disorder and Emotion Dysregulation, 8*(1), 5. https://doi.org/10.1186/s40479-020-00143-5

Hill, A. B. (1965). The Environment and Disease: Association or Causation? *Proceedings of the Royal Society of Medicine, 58*(5), 295–300. https://doi.org/10.1177/003591576505800503

Hughes, D. (2004). An attachment-based treatment of maltreated children and young people. *Attachment & Human Development, 6*(3), 263–278. https://doi.org/10.1080/14616730412331281539

Hutchison, A. N., Yeung, D. Y., Gerstein, L. H., & Wettersten, K. B. (2021). Psychometric comparison of Chinese and English versions of the Emotion Regulation Questionnaire with bilingual Hong Kong Chinese students. *International Journal of Psychology, 56*(2), 296–303. https://doi.org/10.1002/ijop.12699

Jenness, J. L., Peverill, M., Miller, A. B., Heleniak, C., Robertson, M. M., Sambrook, K. A., … McLaughlin, K. A. (2021). Alterations in neural circuits underlying emotion regulation following child maltreatment: A mechanism underlying trauma-related psychopathology. *Psychological Medicine, 51*(11), 1880–1889. https://doi.org/10.1017/S0033291720000641

Jiang, W., Zhong, B., Liu, L., Zhou, Y., Hu, X.-H., & Li, Y. (2018). Reliability and validity of the Chinese version of the Childhood Trauma Questionnaire-Short Form for inpatients with schizophrenia. *PLoS One, 13*(12), e0208779.

Jones, P. J., Heeren, A., & McNally, R. J. (2017). Commentary: A network theory of mental disorders. *Frontiers in Psychiatry, 8*, 1305. https://doi.org/10.3389/fpsyg.2017.01305

Jones, P. J., Ma, R., & McNally, R. J. (2021). Bridge Centrality: A Network Approach to Understanding Comorbidity. *Multivariate Behavioral Research, 56*(2), 353–367. https://doi.org/10.1080/00273171.2019.1614898

Kaplow, J. B., & Widom, C. S. (2007). Age of onset of child maltreatment predicts long-term mental health outcomes. *Journal of Abnormal Psychology, 116*(1), 176–187. https://doi.org/10.1037/0021-843X.116.1.176

Keding, T. J., Heyn, S. A., Russell, J. D., Zhu, X., Cisler, J., McLaughlin, K. A., & Herringa, R. J. (2021). Differential patterns of delayed emotion circuit maturation in abused girls with and without internalizing psychopathology. *American Journal of Psychiatry, 178*(11), 1026–1036. https://doi.org/10.1176/appi.ajp.2021.20081192

Keil, V., & Price, J. M. (2009). Social information-processing patterns of maltreated children in two social domains. *Journal of Applied Developmental Psychology, 30*(1), 43–52. https://doi.org/10.1016/j.appdev.2008.10.003

Kendler, K. S., & Campbell, J. (2009). Interventionist causal models in psychiatry: Repositioning the mind–body problem. *Psychological Medicine, 39*(6), 881–887. https://doi.org/10.1017/S0033291708004467

Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. *Journal of Child Psychology and Psychiatry, 51*(6), 706–716. https://doi.org/10.1111/j.1469-7610.2009.02202.x

Kiser, L. J., & Black, M. M. (2005). Family processes in the midst of urban poverty: What does the trauma literature tell us? *Aggression and Violent Behavior, 10*(6), 715–750. https://doi.org/10.1016/j.avb.2005.02.003

Kullik, A., & Petermann, F. (2013). Attachment to Parents and Peers as a Risk Factor for Adolescent Depressive Disorders: The Mediating Role of Emotion Regulation. *Child Psychiatry & Human Development, 44*(4), 537–548. https://doi.org/10.1007/s10578-012-0347-5

Leeman, J., Crandell, J. L., Lee, A., Bai, J., Sandelowski, M., & Knafl, K. (2016). Family Functioning and the Well-Being of Children With Chronic Conditions: A Meta-Analysis. *Research in Nursing & Health, 39*(4), 229–243. https://doi.org/10.1002/nur.21725

Lei, H., Yang, Y., Zhu, T., Zhang, X., & Dang, J. (2024). Network analysis of the relationship between non-suicidal self-injury, depression, and childhood trauma in adolescents. *BMC Psychology, 12*(1), 234. https://doi.org/10.1186/s40359-024-01729-2

Liang, Y., Yang, L., Xi, J., & Liu, Z. (2022). The unique role of sleep problems among symptoms of posttraumatic stress disorder: A cross-lagged panel network analysis. *Acta Psychologica Sinica, 54*, 1206. https://doi.org/10.3724/SP.J.1041.2022.01206

Liu, W., Chen, L., & Tu, X. (2017). Chinese adaptation of Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CCA): A psychometric evaluation in Chinese children. *International Journal of Psychology, 52*(5), 398–405. https://doi.org/10.1002/ijop.12233

McLaughlin, K. A., Colich, N. L., Rodman, A. M., & Weissman, D. G. (2020). Mechanisms linking childhood trauma exposure and psychopathology: A transdiagnostic model of risk and resilience. *BMC Medicine, 18*(1), 96. https://doi.org/10.1186/s12916-020-01561-6

McNally, R. J. (2016). Can network analysis transform psychopathology? *Behaviour Research and Therapy, 86*, 95–104. https://doi.org/10.1016/j.brat.2016.06.006

McNally, R. J. (2021). Network Analysis of Psychopathology: Controversies and Challenges. *Annual Review of Clinical Psychology, 17*, 31–53. https://doi.org/10.1146/annurev-clinpsy-081219-092850

Meyerson, L. A., Long, P. J., Miranda, R., Jr., & Marx, B. P. (2002). The influence of childhood sexual abuse, physical abuse, family environment, and gender on the psychological adjustment of adolescents. *Child Abuse & Neglect, 26*(4), 387–405. https://doi.org/10.1016/s0145-2134(02)00315-0

J. S. Milner, Social information processing and child physical abuse: Theory and research. In *Nebraska Symposium on Motivation Vol. 46, 1998: Motivation and child maltreatment.* University of Nebraska Press. 2000. 39–84.

Milojevich, H. M., Norwalk, K. E., & Sheridan, M. A. (2019). Deprivation and threat, emotion dysregulation, and psychopathology: Concurrent and longitudinal associations. *Development and Psychopathology, 31*(3), 847–857. https://doi.org/10.1017/S0954579419000294

Monteleone, A. M., Cascino, G., Pellegrino, F., Ruzzi, V., Patriciello, G., Marone, L., … Maj, M. (2019). The association between childhood maltreatment and eating disorder psychopathology: A mixed-model investigation. *European Psychiatry, 61*, 111–118. https://doi.org/10.1016/j.eurpsy.2019.08.002

Monteleone, A. M., Cascino, G., Salerno, L., Albano, G., Barone, E., Cardi, V., & Lo Coco, G. (2023). The interplay between emotion regulation, interpersonal problems and eating symptoms in individuals with obesity: A network analysis study. *Journal of Affective Disorders, 324*, 61–67. https://doi.org/10.1016/j.jad.2022.12.056

Monteleone, A. M., Tzischinsky, O., Cascino, G., Alon, S., Pellegrino, F., Ruzzi, V., & Latzer, Y. (2022). The connection between childhood maltreatment and eating disorder psychopathology: A network analysis study in people with bulimia nervosa and with binge eating disorder. *Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity, 27*(1), 253–261. https://doi.org/10.1007/s40519-021-01169-6

Muehlenkamp, J. J., Kerr, P. L., Bradley, A. R., & Adams Larsen, M. (2010). Abuse Subtypes and Nonsuicidal Self-Injury: Preliminary Evidence of Complex Emotion Regulation Patterns. *The Journal of Nervous and Mental Disease, 198*(4). https://journals.lww.com/jonmd/fulltext/2010/04000/abuse_subtypes_and_nonsuicidal_self_injury_.3.aspx.

Mullen, R., & Jones, E. S. (2020). Network Analysis of Competitive State Anxiety. *Frontiers in Psychology, 11*, Article 586976. https://doi.org/10.3389/fpsyg.2020.586976

Pepin, E. N., & Banyard, V. L. (2006). Social Support: A Mediator between Child Maltreatment and Developmental Outcomes. *Journal of Youth and Adolescence. 35*(4), 612–625. https://doi.org/10.1007/s10964-006-9063-4

Pollak, S. D., & Kistler, D. J. (2002). Early experience is associated with the development of categorical representations for facial expressions of emotion. *Proceedings of the National Academy of Sciences, 99*(13), 9072–9076. https://doi.org/10.1073/pnas.142165999

Price, J. M., & Glad, K. (2003). Hostile Attributional Tendencies in Maltreated Children. *Journal of Abnormal Child Psychology, 31*(3), 329–343. https://doi.org/10.1023/A:1023237731683

Rhemtulla, M., Bork, R. V., & Cramer, A. O. J. (2018). Cross-Lagged Network Models. *Multivariate Behavioral Research*.

Robinaugh, D. J., Millner, A. J., & McNally, R. J. (2016). Identifying highly influential nodes in the complicated grief network. *Journal of Abnormal Psychology, 125*(6), 747–757. https://doi.org/10.1037/abn0000181

Rogosch, F. A., Cicchetti, D., & Aber, J. L. (1995). The role of child maltreatment in early deviations in cognitive and affective processing abilities and later peer relationship problems. *Development and Psychopathology, 7*(4), 591–609. https://doi.org/10.1017/S0954579400006738

Scher, C. D., Stein, M. B., Asmundson, G. J. G., McCreary, D. R., & Forde, D. R. (2001). The Childhood Trauma Questionnaire in a Community Sample: Psychometric Properties and Normative Data. *Journal of Traumatic Stress, 14*(4), 843–857. https://doi.org/10.1023/A:1013058625719

Schneider, F. D., Loveland Cook, C. A., Salas, J., Scherrer, J., Cleveland, I. N., & Burge, S. K. (2020). Childhood Trauma, Social Networks, and the Mental Health of Adult Survivors. *Journal of Interpersonal Violence, 35*(5–6), 1492–1514. https://doi.org/10.1177/0886260517696855

Shahar, G. (2001). Maternal Personality and Distress as Predictors of Child Neglect. *Journal of Research in Personality, 35*(4), 537–545. https://doi.org/10.1006/jrpe.2001.2330

Shek, D. T. L. (2001). The General Functioning Scale of the Family Assessment Device: Does it work with Chinese adolescents? *Journal of Clinical Psychology, 57*(12), 1503–1516. https://doi.org/10.1002/jclp.1113

D. T. L. Shek, Assessment of family functioning in chinese adolescents: The chinese family assessment instrument. In N. N. Singh, T. H. Ollendick, & A. N. Singh (Eds.), *International Perspectives on Child and Adolescent Mental Health* (Vol. 2, pp. 297–316). (2002). Elsevier. https://doi.org/10.1016/S1874-5911(02)80013-6.

Shields, A., & Cicchetti, D. (2001). Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. *Journal of Clinical Child & Adolescent Psychology, 30*(3), 349–363. https://doi.org/10.1207/s15374424jccp3003_7

Shipman, K., Edwards, A., Brown, A., Swisher, L., & Jennings, E. (2005). Managing emotion in a maltreating context: A pilot study examining child neglect. *Child Abuse & Neglect, 29*(9), 1015–1029. https://doi.org/10.1016/j.chiabu.2005.01.006

Stanton, K. J., Denietolis, B., Goodwin, B. J., & Dvir, Y. (2020). Childhood Trauma and Psychosis: An Updated Review. *Child and Adolescent Psychiatric Clinics of North America, 29*(1), 115–129. https://doi.org/10.1016/j.chc.2019.08.004

Sunday, S., Labruna, V., Kaplan, S., Pelcovitz, D., Newman, J., & Salzinger, S. (2008). Physical abuse during adolescence: Gender differences in the adolescents' perceptions of family functioning and parenting. *Child Abuse & Neglect, 32*(1), 5–18. https://doi.org/10.1016/j.chiabu.2007.03.025

Tang, Q., Zou, X., Gui, J., Wang, S., Liu, X., Liu, G., & Tao, Y. (2024). Effects of childhood trauma on the symptom-level relation between depression, anxiety, stress, and problematic smartphone use: A network analysis. *Journal of Affective Disorders, 358*, 1–11. https://doi.org/10.1016/j.jad.2024.05.018

E. H. Tanju, H. Demirbaş, Investigation of Childhood Trauma Experiences and Family Functions Among University Students. *Cyprus International Conference on Educational Research (CY-ICER-2012)North Cyprus, US08-10 February, 2012, 47*, 1950–1956. (2012b). https://doi.org/10.1016/j.sbspro.2012.06.929.

Tanju, E. H., & Demirbaş, H. (2012a). Investigation of Childhood Trauma Experiences and Family Functions Among University Students. *Soc. Behav. Sci., 47*, 1950–1956. https://doi.org/10.1016/j.sbspro.2012.06.929

R. A. Thompson, Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*, (1994), *59*(2–3), 25–52, 250–283. https://doi.org/10.2307/1166137.

Tong, J., Zhang, T., Chen, F., Wang, Q., Zhao, X., & Hu, M. (2022). Prevalence and Contributing Factors of Childhood Trauma, Anxiety, and Depression Among Adolescents From Two-Child Families in China. *Frontiers in Psychiatry, 13*. https://doi.org/10.3389/fpsyt.2022.782087

van der Kolk, B. A., & Fisler, R. E. (1994). Childhood abuse and neglect and loss of self-regulation. *Bulletin of the Menninger Clinic, 58*(2), 145–168.

van der Kolk, B. A., Pelcovitz, D., Roth, S., Mandel, F. S., McFarlane, A., & Herman, J. L. (1996). Dissociation, somatization, and affect dysregulation: The complexity of adaptation of trauma. *American Journal of Psychiatry, 153*(7 Suppl), 83–93. https://doi.org/10.1176/ajp.153.7.83

van Harmelen, A.-L., Gibson, J. L., St Clair, M. C., Owens, M., Brodbeck, J., Dunn, V., Lewis, G., Croudace, T., Jones, P. B., Kievit, R. A., & Goodyer, I. M. (2016).

Friendships and Family Support Reduce Subsequent Depressive Symptoms in At-Risk Adolescents. *PLoS One, 11*(5), e0153715.
Wang, J., He, X., Chen, Y., & Lin, C. (2020). Association between childhood trauma and depression: A moderated mediation analysis among normative Chinese college students. *Journal of Affective Disorders, 276*, 519–524. https://doi.org/10.1016/j.jad.2020.07.051
Wang, K., Hu, Y., He, Q., Xu, F., Wu, Y. J., Yang, Y., & Zhang, W. (2023). Network analysis links adolescent depression with childhood, peer, and family risk environment factors. *Journal of Affective Disorders, 330*, 165–172. https://doi.org/10.1016/j.jad.2023.02.103
Wang, L., Liu, H., & Li, Z. (2007). Reliability and validity of emotion regulation questionnaire Chinese revised version. *China Journal of Health Psychology, 15*, 503–505.
Weissman, D. G., Nook, E. C., Dews, A. A., Miller, A. B., Lambert, H. K., Sasse, S. F., … McLaughlin, K. A. (2020). Low Emotional Awareness as a Transdiagnostic Mechanism Underlying Psychopathology in Adolescence. *Clinical Psychological Science, 8*(6), 971–988. https://doi.org/10.1177/2167702620923649
Wooten, W., Laubaucher, C., George, G. C., Heyn, S., & Herringa, R. J. (2022). The impact of childhood maltreatment on adaptive emotion regulation strategies. *Child Abuse & Neglect, 125*. https://doi.org/10.1016/j.chiabu.2022.105494
Wu, X., Zhang, L., Yang, R., Zhu, T., Xiang, M., & Wu, G. (2022). Parents can't see me, can peers see me? Parental phubbing and adolescents' peer alienation via the mediating role of parental rejection. *Child Abuse & Neglect, 132*, Article 105806. https://doi.org/10.1016/j.chiabu.2022.105806
Wysocki, A. C., & Rhemtulla, M. (2021). On Penalty Parameter Selection for Estimating Network Models. *Multivariate Behavioral Research, 56*(2), 288–302. https://doi.org/10.1080/00273171.2019.1672516
L. Zhang, X. Ma, X. Yu, M. Ye, N. Li, S. Lu, J. Wang, (2021). Childhood Trauma and Psychological Distress: A Serial Mediation Model among Chinese Adolescents. *International Journal of Environmental Research and Public Health*, *18*(13). https://doi.org/10.3390/ijerph18136808.
Zhang, D., Liu, S., Wu, X., & Tian, Y. (2022). Network analysis of cognitive emotion regulation strategies and depressive symptoms in young adults after recent stressful events: The moderation of childhood maltreatment. *Journal of Affective Disorders, 301*, 107–116. https://doi.org/10.1016/j.jad.2022.01.044
Zhao, X., Zhang, Y., Li, L., & Zhou, Y. (2005). Evaluation on reliability and validity of Chinese version of childhood trauma questionnaire. *Chinese Journal of Clinical Rehabilitation, 9*, 209–211.