ORIGINAL RESEARCH

Mindfulness Moderates the Association Between Perceived Discrimination and Cyber Aggression Among Emerging Adults with Early Left-Behind Experience: A Longitudinal Study

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Purpose: Although the risk effect of perceived discrimination on left-behind youth's mental health (mainly emotional problems) has been demonstrated in prior studies, there is a lack of longitudinal studies examining the effect of perceived discrimination on behavioral problems, particularly in emerging adults with early left-behind experience. In addition, little is known about individual differences in terms of this association. In the present study, we draw on the social information processing model of aggression to examine the effect of perceived discrimination and mindfulness on cyber aggression.
Methods: We used two-wave longitudinal panel data involving 535 emerging adults with early left-behind experience in rural China (M $_{age}$ = 19.89 years; SD = 1.20; 57.2% female). To test the moderating role of mindfulness, hierarchical multiple regression and simple slope test analyses were performed.
Results: The results of linear regression analysis demonstrated that higher levels of perceived discrimination at T1 were significantly associated with higher cyber aggression at T2; the strength of this association was buffered by mindfulness over time.
Conclusion: These findings suggest that the facilitation of mindfulness training may be an effective strategy for reducing the risk of perceived discrimination leading to cyber aggression in emerging adults with early left-behind experience.
Keywords: perceived discrimination, cyber aggression, mindfulness, emerging adults with early left-behind experience

Introduction

With the rapid development of modernization and urbanization, a significant increase in family migration has occurred in China. The National Bureau of Statistics of China has indicated that approximately 288.4 million rural migrants were working or looking for work in cities in 2018.[1] However, the majority of these migrant workers had to leave their children in their hometowns because they were unable to afford to raise their children in urban settings.[2] A sample survey based on data from 1.0% of the national population in 2015 shows that 68.77 million children were left behind; These children are denoted as left-behind children/adolescents.[3] Left-behind children are reported to have poorer nutritional status, greater developmental impairment, and worse mental health outcomes (eg, loneliness, depression, anxiety, and suicide) than are non-left-behind children.[4–6] Therefore, the mental status of left-behind children is of vital importance.

Some of these left-behind children study hard and have the chance to go to college, becoming emerging adults (emerging adulthood is the developmental stage between adolescence and young adulthood that takes place during when individuals are 18–25 years old) with early left-behind experience. Prior studies have found that early left-behind experience has an adverse impact on individuals' psychological resources and mental health in emerging adults.[2,7,8] Compared to emerging adults without left-behind experience, adults with such experience were also rated significantly

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lower in terms of self-efficacy, optimism, hope, and overall psychological capital.[9] However, most of the previous studies have focused on left-behind children's personality traits and mental health, considering emotional problems rather than behavioral problems.[5] A recent study has shown that emerging adults with early left-behind experience report significantly higher scores for aggressive behavior than do other adults.[8] The parenting environment plays a critical role in shaping mental health outcomes in children,[10] and it is also considered a crucial factor for aggression,[11] while parental absence leads to a form of neglect.[12] Children with early neglect experience manifest a series of serious aggressive behaviors (ie, anger, disruptive behavior, conduct problems, oppositional behavior, and low ego control)[11,13] and are as likely to be arrested for violence in adults.[14] The current study thus aims to explore the risks of aggressive behavior among these emerging adults and the potential buffering factors.

Cyber Aggression in Adolescents

Recently, cyber aggression has emerged as a new form of violence among adolescents with serious implications for their adjustment and health.[15] Cyber aggression is the use of electronic or digital means to harass, threaten, embarrass, or target another person repeatedly.[16] Cyber aggression may achieve a greater audience than traditional interpersonal aggression since it occurs in the virtual space, where free expression is allowed without social control.[17] A meta-analysis measuring cyber aggression based on 80 studies showed a mean prevalence rate of 15% among adolescents.[18] Studies have shown that cyber aggression is linked to decreased academic achievement and increased substance use (ie, alcohol and drug intake), poor relationships with parents, more feelings of emotional loneliness, less optimism and sense of happiness.[15,19,20] Although cyber aggression has gained much research attention in adolescents, there are few studies examining this topic among emerging adults. Emerging adults differ from adolescents, as they use social media more excessively and display more cyber aggression.[21] Thus, it becomes imperative to investigate the mechanisms of cyber aggression in emerging adults.

Perceived Discrimination and Cyber Aggression

The social information processing model focuses on adverse social and relational experiences and subsequent social adjustment through the perception, identification, and interpretation of social cues.[22,23] Aggression is considered to be a maladaptive behavior and is thought to arise from adverse experiences (ie, deficits and biases in processing social information, especially the misinterpretation or neglect of important social cues).[22–24] Perceived discrimination, as a similar experience, refers to an individual's perception of being treated differently or unfairly because of his or her membership within a group (eg, race or place in the household registration status).[25] Previous studies have shown that the level of perceived discrimination experienced by left-behind children is significantly higher than that experienced by non-left-behind children.[26] Additionally, perceived discrimination is often conceptualized as one of these chronic stressors, which is a significant risk factor contributing to adjustment problems, such as depressive symptoms and low levels of social initiative among left-behind children/adolescents.[27] Due to parental absence, left-behind children/adolescents may be unable to access the immediate emotional support and coping skills provided by parents to effectively cope with stressful situations (ie, perceived discrimination), leading to them becoming withdrawn and unconfident, which over time may lead to a series of behavioral and emotional problems.[6,27,28]

Furthermore, in the context of Chinese culture, emerging adults who reside in rural regions are being confronted with dramatic social and economic changes toward urbanization and substantial regional differences as a result of intensifying the perception of discrimination and making the impact of discrimination enduring to adults.[7,29] Previous cross-sectional studies have shown that the perceived discrimination of adolescents is positively correlated with aggressive behavior.[30,31] A recent eight-year longitudinal study found that perceived discrimination is a key stressor involved in increasing the aggression of indigenous youth residing on reservations/reserves.[32] To the best of our knowledge, relatively few studies have investigated the longitudinal association between perceived discrimination and aggressive behavior among emerging adults, especially those with left-behind experience.

Moderating Role of Mindfulness

Although perceived discrimination may lead to aggression, it is possible that not all individuals are equally influenced by it. Thus, it is essential to explore the moderators that can buffer the negative effect of perceived discrimination on cyber

aggression. A large number of studies have documented that mindfulness can buffer the undesirable impact of negative experiences on mental health.[33–36] However, prior studies have mostly used cross-sectional survey designs, which are not sufficient for demonstrating causality, and the effect of mindfulness on cyber behavior is still underexplored. Thus, the present study examines whether the effect of perceived discrimination on cyber aggression is moderated by mindfulness through the use of a two-wave longitudinal design.

Mindfulness refers to the psychological trait of being aware of ongoing physical, cognitive and psychological experience in a nonjudgmental, accepting, and self-empathetic manner.[37,38] Recent studies have sought to identify the underlying psychological mechanisms of how mindfulness and mindfulness training (eg, emotional regulation and acceptance) improve clinical symptoms.[39,40] One theory—the mindfulness stress buffering model—explains the relationship between mindfulness and health outcomes in terms of reducing stress.[40] This model argues that mindfulness can play an important risk-buffering role in the relationship between negative factors and undesirable consequences.[39,41] Research has also illustrated the stress buffering effect of mindfulness. For example, Watson-Singleton et al demonstrated that mindfulness can diminish the effect of past discrimination on emotional problems (eg, depression).[34] Research has also documented that some contemplative practices (eg, religion/spirituality) moderate the relation between neural network and familial risk for depression.[42] Moreover, Fix et al. reviewed 11 articles and confirmed that mindfulness and mindfulness-based treatments can serve as an effective intervention technique for individuals showing aggressive behavior.[43] In the present study, it can thus be inferred that as an important protective factor, mindfulness may also play a risk buffering role in the association between perceived discrimination and cyber-aggressive behavior.

Present Study

The present study contributes in two critical ways to previous findings demonstrating that perceived discrimination can positively predict aggression among left-behind children/adolescents. First, we draw on the social information processing model[22,23] to assess cyber aggression, a specific form of aggression among emerging adults with early left-behind experience. Second, we aim to examine whether the relation between perceived discrimination and cyber aggression in these adults is moderated by mindfulness. Moreover, one criticism of the above research is that most studies have employed cross-sectional designs, which represent a significant limitation because such designs are likely to inflate the correspondence between perceived discrimination and aggression. Thus, the present work uses a longitudinal design to answer these questions, and the following hypotheses are proposed:

Hypothesis 1. Perceived discrimination can positively predict cyber aggression.

Hypothesis 2. Mindfulness plays a moderating role in the relationship between perceived discrimination and cyber aggression.

Methods
Participants

Participants included 535 emerging adults (57.2% female; age: M = 19.89 years, SD = 1.20) recruited from five public universities located in different areas of Mainland China, who took part in the first measurement time point (T1) in October, 2019 and the follow-up assessment (T2) in March, 2020. The inclusion criteria were as follows: (1) According to Arnett's developmental theory of "emerging adults",[44] participants had to be 18–25 years old and have been born and raised in rural areas. (2) One or both of their parents had to have migrated to a city for employment, and the children had been separated from their migrant parent(s). Most of the emerging adults (53.1%, n = 284) reported who were living in their hometown separating from both parents when they were left-behind. With regard to parental education, 78.7% fathers (n = 421) and 83.9% mother (n = 449) reported completing middle school education. 36.4% emerging adults (n = 195) reported that monthly family income was 1000–3000 RMB and 35.0% emerging adults (n = 187) reported that monthly family income was 3000–6000 RMB.

Measures

Demographic Characteristics

Students were provided with basic information: gender (0 = man, 1 = woman), age, left-behind type (0 = one-migrating-parent children, 1 = two-migrating-parent children), left-behind time, fathers' educational attainment (0 = illiterate and primary school, 1 = junior high school, or 2 = senior high school and above), mothers' educational attainment (0 = illiterate and primary school, 1 = junior high school, or 2 = senior high school and above), and household income.

Perceived Discrimination

The Perceived Discrimination Scale was developed by Shen et al to evaluate the degree of perceived discrimination (eg, "In general, I feel that I have been treated unfairly", and "I feel that I am looked down upon by others").[26] The scale consists of 6 items, and each item is rated on a 5-point Likert scale, with scores ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores across all items indicate higher levels of perceived discrimination. The full scale had an acceptable internal Cronbach's α of 0.93.

Mindfulness

The Mindful Attention Awareness Scale was developed by Brown and Ryan and revised by Deng et al to build the Chinese version (eg, "I find myself doing things without paying attention", and "I rush through activities without being truly attentive to them").[45,46] This scale consists of 15 items rated on a 6-point Likert scale, with scores ranging from 1 (*always*) to 6 (*never*). The items were summed up to obtain mindfulness scores, with higher scores indicating higher levels of dispositional mindfulness. Cronbach's α in the current study was 0.95.

Cyber Aggression

The Adolescent Cyber Aggression Scale was used to assess the degree to which individuals engage in online reactive aggression (eg, "I often insult and scold others when playing online games", and "I exclude someone from our network of friends").[47] Participants rated 15 propositions on a 4-point scale, with scores ranging from 1 (*never*) to 4 (*always*), with higher scores indicating greater engagement in cyber aggression. The internal consistency coefficient (Cronbach's α) in the current study was 0.95.

Statistical Analyses

All statistical analyses were carried out using SPSS 23.0.[48] Preliminarily, Pearson bivariate correlation analysis was performed to examine the general relationships among perceived discrimination, cyber aggression, and mindfulness. Then, based on the approach of Wen et al,[49] a hierarchical multiple regression analysis was used to examine the moderating effect of mindfulness on the relationship between perceived discrimination and cyber aggression. All further regression analyses were conducted after controlling for demographic characteristics by inputting them first into the model to exclude the possibility of their effect on the key variables as much as possible. At the same time, following Preacher, Curran and Bauer's recommendation,[50] a simple slope test was used to operationalize the pattern of this interaction to further examine the moderating effect of mindfulness on the relationship between perceived discrimination and cyber aggression.

Results

Correlations Among Key Variables

As shown in Table 1, perceived discrimination at T1 was negatively correlated with mindfulness at T1 ($r = -0.45$, $p < 0.01$) and positively correlated with cyber aggression at T2 ($r = 0.17$, $p < 0.01$). Mindfulness at T1 was negatively correlated with cyber aggression at T2 ($r = -0.09$, $p < 0.05$).

Moderation Analyses

As shown in Table 2, a moderated regression analysis was performed with demographic control variables. In Model 1, only gender was associated with cyber aggression at T2 ($\beta = -0.20$, $p < 0.01$). In Model 2, perceived discrimination was

Table 1 Descriptive Statistics and Correlations Among Variables (*N* = 535)

	M	*SD*	1	2	3
1. Perceived discrimination (T1)	9.11	4.16	1		
2. Mindfulness (T1)	73.25	12.93	−0.45**	1	
3. Cyber aggression (T2)	16.24	3.61	0.17**	−0.09*	1

Notes: *p<0.05, **p<0.01.

Table 2 Hierarchical Multiple Regression Analysis of the Effects of Perceived Discrimination and Mindfulness on Cyber Aggression (*N* = 535)

Variables	Step 1	Step 2	Step 3
Gender	−0.20**	−0.19**	−0.18**
Age	−0.04	−0.03	−0.03
Left-behind type	0.03	0.03	0.05
Left-behind time	−0.03	−0.03	−0.03
Fathers' educational attainment	−0.03	−0.04	−0.04
Mothers' educational attainment	−0.02	−0.01	0.01
Household income	−0.04	−0.02	−0.03
Perceived discrimination (T1)		0.19**	0.09
Mindfulness (T1)		−0.02	−0.01
Perceived discrimination (T1) × Mindfulness (T1)			−0.20**
R^2	0.05	0.09	−0.12

Notes: The results are standardized coefficients. **p <0.01.

a significant predictor of cyber aggression at T2 (β = 0.19, p < 0.01). Furthermore, in Model 3, the interaction between perceived discrimination at T1 and mindfulness at T1 was a significant predictor of cyber aggression at T2 (β = -0.20, p < 0.01). Thus, mindfulness has a significant moderating effect on the relationship between perceived discrimination and cyber aggression over time.

Simple slope analyses revealed that for people with low mindfulness ($M − 1SD$), their perceived discrimination was significantly associated with cyber aggression at the six-month followup (β = 0.18, t = 4.13, p <.01), but this was not the case for people with high mindfulness ($M + 1SD$) (β = -0.05, t = -0.78, p > 0.05). Therefore, mindfulness was found to buffer the effect of perceived discrimination on cyber aggression. As shown in Figure 1, for those individuals who reported higher levels of mindfulness ($M + 1SD$), perceived discrimination showed no association with cyber aggression over time.

Discussion

The present study investigated the longitudinal impact of perceived discrimination on cyber aggression in emerging adults with early left-behind experience in China, with particular interest paid to whether mindfulness moderates this relationship. Our results show that a high level of mindfulness significantly attenuated the impact of perceived discrimination on cyber aggression over time. These results suggest that being exposed to unfair treatment or discrimination does not necessarily lead to poor psychological adjustment in emerging adults over time. Instead, how they respond to perceived discrimination experience is a more important feature.

Consistent with the social information processing model that stresses the effect of early adverse experiences on aggression outcomes and previous studies on the negative effects of perceived discrimination on the psychological adjustments of left-behind children/adolescents,[22,23,27] the present results show that poor mental health (ie, cyber aggression) in adulthood may be associated with perceived discrimination in individuals with certain experience earlier in life, particularly for emerging adults with early left-behind experience. One explanation may lie in the perspective of Richman and Leary that perceived discrimination represents a form of social rejection and may contribute to social
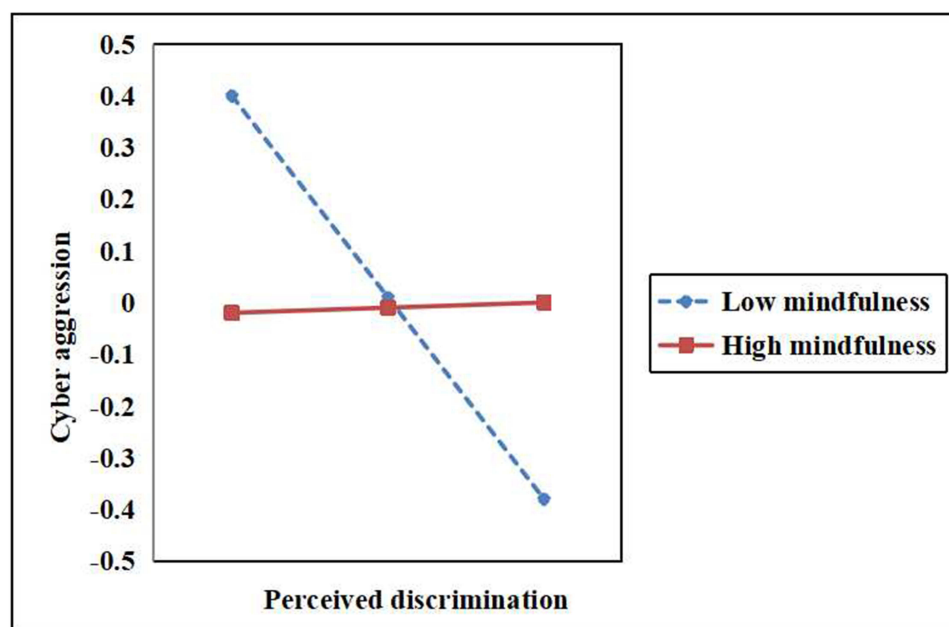
Figure 1 Interaction effect of perceived discrimination and mindfulness on cyber aggression.

avoidance.[51] Moreover, an individual's need for belongingness is satisfied by using the Internet, leading to him or her becoming overdependent, which ultimately results in pathological Internet use.[52] However, the Internet can enhance the awakening of an individual's cognition to external stimuli.[53,54] As a consequence, emerging adults who are addicted to the Internet develop bad behaviors such as cyber aggression.

An alternative explanation may be family instability in individuals' early life.[7] Parental migration greatly reduces family communication, affective expression, and parental involvement, which correspondingly leads to children not being able to reasonably vent their stress (ie, perceived discrimination) and eventually increases their aggressive behavior.[27] Moreover, the accumulation of these weaknesses during early life may contribute to behavioral problems in later life. Most importantly, these drawbacks may be heightened during the transition to adulthood due to the escalation of life challenges.[7]

As expected, the longitudinal relationship between perceived discrimination and cyber aggression is moderated by mindfulness. Specifically, perceived discrimination is positively associated with cyber aggression among emerging adults who reported low levels of mindfulness, whereas this association is not significant among emerging adults who reported high levels of mindfulness. The aforementioned results are consistent with those of a previous study, which indicate that mindfulness serves as a buffer against mental health related to negative experiences.[34,36] Mindfulness is a psychological trait that promotes a nonjudgmental attitude toward the experience of negative emotion and builds the capacity to recognize emotional responses as passing experiences.[55] Thus, rather than becoming hijacked by one's emotional reactions to specific triggers (eg, perceived discrimination) and internalizing these effects, mindfulness may promote the capacity of an individual to separate his or her experience of discrimination from conceptualizations of self-worth,[28] thus mitigating the likelihood of developing behavioral problems (eg, cyber aggression). Based on these findings, interventions designed to encourage adaptive stress management, improve mindfulness levels, and provide the necessary skills to deal with situations of perceived discrimination are likely to reduce or eliminate behavioral problems in emerging adults with early left-behind experience.

This study has some limitations that offer opportunities for future research. First, measures were based on self-reports, and thus, it will be important to include objective measures of all indicators in future studies. Secondly, we did not depict the relevant links over a longer time span (eg, all emerging adult stages) and failed to capture their reciprocal dynamics during educational transitions (eg, from the undergraduate period to the master/Ph.D. period) or school-to-work transitions. For instance, as emerging adults move to different environments, the relation between their perceived

discrimination and their cyber aggression may change. Thus, future studies can span longer time frames and integrate educational and work transitions. Thirdly, exposure to adverse childhood experiences may affect the individual's mental health and extend these effects to the next generation. Future studies can be extended to focus on the intergenerational impacts of adverse childhood experiences.[56] Finally, the present study explored the role of mindfulness as a trait. As a population undergoes mindfulness training, an experimental design can be used to test for the buffering effect of mindfulness interventions in future studies.

Despite these limitations, the present research possessed some significant strengths. First, with an emphasis on the impact of perceived discrimination and cyber aggression, this study addressed a significant gap in the research on individuals' psychological adjustments in terms of perceived discrimination and cyber aggression. Second, a major strength lies in this study's longitudinal design, which allowed for the investigation of this negative effect over time. Finally, the research findings provide convincing evidence of the role of mindfulness in buffering the risks of cyber aggression, thus providing important guidelines to help adolescents and emerging adults with left-behind experience smoothly pass through to emerging adulthood and tackle their behavioral problems.

Ethics Approval and Informed Consent

Prior to data collection, this study was approved by the ethics committee of the Faculty of Psychology, Beijing Normal University, and it was conducted in accordance with the Declaration of Helsinki. Meanwhile, we also got the written informed consent forms from each participant.

Funding

Disclosure

The authors declare that there are no conflicts of interest in this work.

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