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Different associations of parental control, attachment, and child depressive symptoms between paternal and maternal Grandparenting families

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Abstract

Almost 70% grandparents play important roles in the parenting of grandchildren in China. Although several studies have investigated the influence of grandparenting on children, few studies have taken the mutual impacts between parental and grandparental caregivers on children into account. The present study investigated the different associations of mother's and grandmother's parental control (psychological and behavioral control), mother-child attachment, grandmother-child attachment, and child depressive symptoms between paternal and maternal groups from 201 grandparenting families. Results of mediating effect indicated the different associations between groups. In paternal group, significant crossover effect was shown in the association between paternal grandmother's psychological control and mother-child attachment; mother's psychological control and behavioral control were indirectly associated with child depressive symptoms through mother-child attachment. In maternal group, we did not find the same crossover effect as in paternal group, but maternal grandmother's psychological control was indirectly associated with child depressive symptoms through maternal grandmother-child attachment. These findings expanded the crossover theory to grandmother-mother subsystem to reveal the mutual impacts on children between paternal and maternal group in grandparenting families.

Keywords Grandparenting · Mutual impacts · Parental control · Attachment · Child depressive symptoms

Introduction

Grandparenting refers to the form of upbringing carried out mainly by grandparents rather than parents (Chen et al., 2011), which gradually becomes one of the main parenting forms among Chinese families (Ye, 2012). A survey conducted by the China Research Center on Aging showed that 66.5% of grandparents participated in grandchildren parenting in China (Li et al., 2016), which indicated the important role of grandparents in parenting. Owing to the dual pressure of work and life, young parents may not have enough time and energy to take care of their children. Meanwhile, in virtue of retirement,

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many grandparents voluntarily take care of their grandchildren in the large amount of spare time (Li et al., 2020). However, previous studies showed that children from grandparenting families exhibited more emotional problems than children from nuclear families (Liu & Zhao, 2013; Zhang, 2015) due to indulgence and excessive protection (Hayslip & Kaminski, 2005; Ye, 2012). These features of grandparenting families hindered the development of children's emotional regulation and adjustment. Furthermore, children in grandparenting families were more prone to suffer negative emotion such as depression (Hayslip & Kaminski, 2005). Recently, depression disorder was found to be one of the most prevalent mental disorders in the world (Steel et al., 2014), which was most common among children and adolescent (Birmaher et al., 1996). A meta-analysis involved 26 international studies showed a 2.8% prevalence of depression in children under 13 years of age and 5.6% in adolescents during 13–18 years of age (Costello et al., 2006). Although the detection rate of depressive disorder in children is relatively low (Costello et al., 2006; Pulkkinen et al., 1999), the risk of reaching the standards of diagnosis for depressive disorder in early adolescence increases with the aggravated depressive symptoms in children (Keenan et al., 2009). To alleviate the symptoms of depression in children, reduce the detection rate of depression in adolescents, and promote their development of physical and mental health, it is necessary to focus on depressive symptoms of children in age 7–12 from grandparenting families.

However, the existing studies mainly paid attention to the influence of grandparental caregivers on child depression symptoms from an individual perspective, while the interactions between parental caregivers and grandparental caregivers were less concerned. In the typical parenting families, the crossover theory was used to explain the interaction within husband-wife subsystem and parent-child subsystem (Nelson et al., 2009), as well as interaction between parent subsystem and parent-child subsystem (Holland & Mcelwain, 2013). The crossover theory refers to the phenomenon that an individual's investment in a social environment will affect the investment of someone else who is close to him/her in the same social environment (Westman, 2001), involving the transfer of feeling, emotion or behavior (Pedro et al., 2012; Ponnet et al., 2013). With expanding the theory to grandparenting families, the interactions between parental caregivers and grandparental caregivers may help to better understand the influence of grandparenting on child depressive symptoms.

Parental Control and Child Depressive Symptoms

A sizeable number of studies have explored the influencing factors of child depressive symptoms, such as parental control (e.g., Cai & Tu, 2020; He et al., 2018; Jessen, 2013; Lin et al., 2014; Ma & Bellmore, 2011; Xia & Liang, 2016). Parental control includes psychological control and behavioral control (Li et al., 2012; Wang et al., 2007; Xia & Liang, 2016). Psychological control refers to the invasion of child's minds and feelings with over-manipulation, such as guilt and revoking of love (Barber, 1996), while behavioral control refers to the guidance and monitoring of children's behavior (Grolnick & Pomerantz, 2009). Numerous studies found that higher level of psychological control was associated with higher level of depression (Cai & Tu, 2020; He et al., 2018; Lin et al., 2014; Ma & Bellmore, 2011). However, previous literature on relationship between behavioral control and depression has found inconsistent results. Some studies found that the higher level of behavioral control was related with high level of depression (e.g., Kerr & Stattin, 2000; Li et al., 2015; Xia & Liang, 2016), while others found that the higher level of behavioral control was associated with less depression (e.g., Ahemaitijiang et al., 2015; Doyle & Markiewicz, 2005) or no relations between parental behavioral control and depression (e.g., Jessen, 2013). Thus, it is requisite for researchers to investigate how the psychological control and behavioral control of parental and grandparental caregivers impact child depressive symptoms in grandparenting families.

Parent-Child Attachment and Child Depressive Symptoms

In spite of the effects of psychological control and behavioral control on children, previous research has found the negative relation between parent-child attachment and child depressive symptoms (e.g., Branje et al., 2010; Brumariu & Kerns, 2010; Carter et al., 2014; Hughes et al., 2020). Attachment refers to a strong and long-standing emotional connection between caregivers and children (Bowlby, 1973), so unsurprisingly poor quality of attachment is often accompanied by depression in children (e.g., Cai et al., 2013; He et al., 2018). Attachment theory points out that insecure attachment between children and early caregivers may form a negative internal working pattern in children (Bowlby, 1973), which causes a series of internal and external problems (Brumariu & Kerns, 2010), especially depressive symptoms (Branje et al., 2010). Nevertheless, this is not definitive in grandmother-child attachment since grandmother-child attachment is unable to compensate for mother-child attachment (Xing et al., 2016). Hence, it is essential to further study the effect of mother-child attachment and grandmother-child attachment on child depressive symptoms in grandparenting families.

The Mediating Role of Parent-Child Attachment

Studies have found that parental control not only directly affects child depressive symptoms (Ahemaitijiang et al., 2015; Cai & Tu, 2020; Li et al., 2015; Lin et al., 2014; Ma &

Bellmore, 2011), but also could indirectly influence child depressive symptoms through parent-child attachment (He et al., 2018). Specifically, Cai et al. (2013) found that psychological control negatively predicts parent-child attachment. Combined with the aforementioned association between attachment and depression, parent-child attachment serves as a mediator in the effect of psychological control on child depressive symptoms. Furthermore, according to the hopelessness theory of depression, parental control signifies that parents exert pressure on children's feelings, thoughts and behaviors, which deprives the autonomy of children and results in the lack of security, more sense of hopelessness, and further depression (Bean & Northrup, 2009), establishing a conceptual ground for the mediating role of attachment. Still, the mediation effect is yet to be investigated in grandparenting families.

The Differences between Maternal and Paternal Grandmothers

From a cultural perspective, grandparenting in Chinese is different in several ways from Western countries. In general, Chinese grandparents are more involved in parenting of grandchildren than grandparents from the Western countries, such as the United States. Chinese grandparents would participate voluntarily and regularly in the parenting process, mainly for taking the burden off the parents and enjoyment from parenting itself (Li et al., 2020), whereas grandparents from the United States usually participate in parenting in necessary circumstances, including the parents' marital instability, poverty, imprisonment, mental health problems and other family challenges or crises (Swartz, 2009).

Moreover, Chinese grandparent's role and the relationship with their grandchildren might vary depending on lineage. The differences between paternal and maternal grandparents were highlighted in past research from a psychological and sociological point of view, although the literature was low on volume (Tang, 2019; Xiao, 2014). Traditionally, paternal grandparents often and represent the family's intention and concentrate on the social aspect of the grandchildren's development, while maternal grandparents aim to help lighten the burden of their daughter and tend to the grandchildren's biophysical and emotional needs. Thus, it was reasonable to assume that maternal grandmother would have better synergy with the mother than paternal grandmother. Considering the differences in grandmother-mother subsystem between paternal and maternal groups, the relationships in grandparenting families could develop a substantial dichotomy, which deserves further investigation.

The Present Study

The present study aimed to examine the different associations of grandmother's and mother's psychological control as well as behavioral control, mother-child attachment, grandmother-child attachment and child depressive symptoms between paternal and maternal grandparenting families. Three questions would be explored: (a) whether the crossover effects can be expanded to the partnership between mother and grandmother; (b) whether mother-child attachment and grandmother-child attachment mediate the relationship between grandmother's and mother's psychological control as well as behavioral control and child depressive symptoms; (c) how the potential crossover effect and mediating effects vary between paternal and maternal grandparenting families. The proposed model was presented in Fig. 1.

Accordingly, our hypotheses are as following: (a) mother's and grandmother's psychological control would be negatively associated to their own and their partner's attachment with child, and behavioral control would be positively related to their own and their partner's attachment with child; (b) mother-child attachment and grandmother-child attachment would mediate the relations between mother's and grandmother's psychological control as well as behavioral control and child depressive symptoms; (c) the crossover effect and mediating effects of mother-child attachment would be present in the paternal alliance, but not in the maternal alliance.

Method

Participants

During 2016 and 2017, we recruited families from four elementary schools in Beijing, China. Children mainly tended by grandparents were included in this study. Families were invited to meet at least one of the following conditions to participate: (1) one of the grandmothers looked after the child almost all the time, while the parents relatively less; (2) children are mainly taken care of by grandparents during the day and by their parents at night; (3) children are mainly cared for by grandparents on weekdays and by parents on weekends. The families whose parents were not involved at all or not at home as well as the incomplete families were excluded (e.g., single parent families). A total of 234 eligible families were screened out, and the final valid sample consists of 201 mother–grandmother dyads. Children aged from 7 to 12 (M = 9.18, SD = 1.17), of which 50.4% were boys and 49.6% were girls, mother aged from 30 to 48 (M = 37.04, SD = 3.34), and grandmother aged from 42 to 81 (M = 16.11, SD = 5.73). Regarding the lineage of grandmothers, 48.76% of grandmothers were paternal grandmothers, while 50.44% of grandmothers

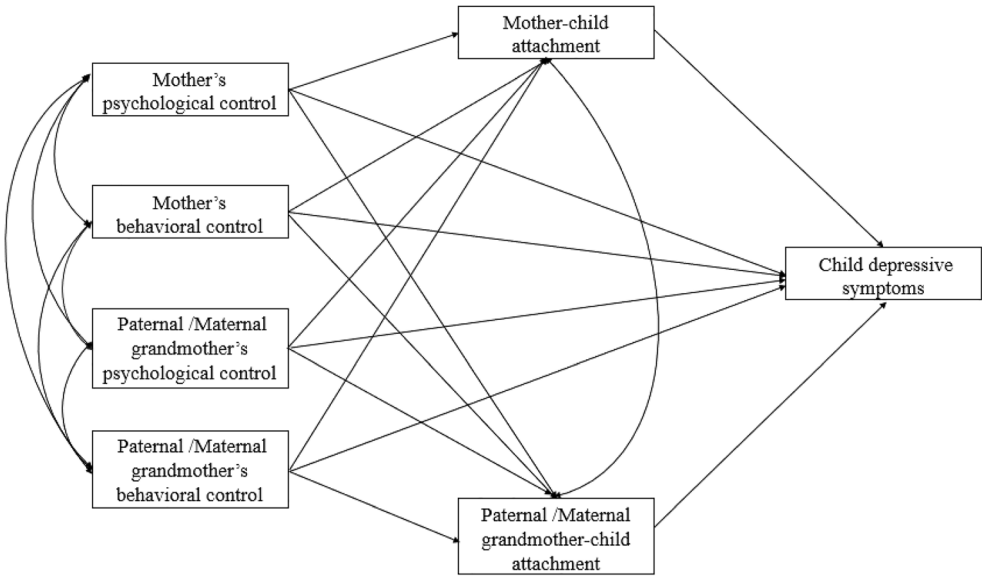

Fig. 1 Postulated relationships among mother's and grandmother's psychological control as well as behavioral control, mother-child attachment, grandmother-child attachment and child depressive symptoms in paternal and maternal group

were maternal grandmothers, and 0.8% of grandmothers were not identified. In terms of average monthly income, the individual average monthly income in Beijing is 8467 Chinese yuan. In the current sample,14.96% of families earned more than 30,000 Chinese yuan per month, 45.73% earned 10,001–30,000 Chinese yuan, 22.22% earned 5001–10,000 Chinese yuan, 5.13% earned 2001–5000 Chinese yuan, 0.43% had less than 2000 Chinese yuan, and 11.54% did not answer this question.

Survey Procedure

First, we contacted four primary schools in Beijing. Then, we sent out and retrieved registration forms accompanied with family information screening. For families who were willing to participate, we asked children to bring home the demographic information sheets required to be filled in by their grandmothers and mothers, and collected the sheets within one week. The questionnaires in Mandarin for children were distributed and collected through trained students majored in psychology. Both individual tests (children under third grade) and group tests (children above third grade) were adopted in a separate empty classroom. The experimenter read to the participants who had difficulties to finish the questionnaire independently. Gifts were given to the families after all the questionnaires had been completed. The research protocol was approved by the Institutional Review Board of XXXs.

Measures

Psychological Control

Grandmother's and mother's psychological control were measured through an 18-item scale (e.g., "My mother/grandmother told me that if I really cared about her, I wouldn't do what worried her.") reported by children (Wang, Pomerantz, & Chen, 2007). Children was asked to judge how much the description of each item matched their mothers (or grandmothers) by the 5-point Likert scale ranged from1 (not at all) to 5 (totally true). Higher scores indicated greater psychological control. In the current study, Cronbach's alpha of the scale was .88 for mothers and .87 for grandmothers.

Behavioral Control

Grandmother's and mother's behavioral control were measured through a 16-item scale (e.g., "My mother/grandmother asked me to tell her how I spent my pocket money.") reported by children. Children were asked to show how often their mothers (or grandmothers) behaved as each item on a 5-point Likert scale ranged from 1 (never) to 5 (always). Higher scores indicated greater behavioral control. In the current study, Cronbach's alpha of the scale was .90 for mothers and .92 for grandmothers.

Mother-Child Attachment and Grandmother-Child Attachment

Mother-child attachment and grandmother-child attachment were measured by child reports of the modified Chinese Version Inventory of Parent and Peer Attachment (IPPA, Li et al., 2017) with 15 items. Overall attachment was constructed by three sub-dimensions: trust (e.g., "My mother/grandmother respects my feelings"), communication (e.g., "My mother/grandmother encourages me to talk about my difficulties.") and alienation (e.g., "I feel angry with my mother/grandmother."). Children were asked to evaluate the perception of the relationship between themselves and the mother/grandmother on a 5-point Likert scale ranged from 1

(never) to 5 (always). The total score was equal to the sum of scores in three sub-dimensions. Higher scores indicated stronger mother–child attachment. In the current study, the Cronbach's α was .81 for mothers and .77 for grandmothers.

Depressive Symptoms

Children reported their depressive symptoms by the Chinese version of Center for Epidemiological Studies-Depression (CES-D) scale (Radloff, 1977). CES-D consists of 20 items (e.g., "I did not feel like eating; my appetite was poor."), including 4 items reversely scored (e.g., "I feel that I was just as good as other people."). The depressive symptoms of children were measured on a 4-point Likert scale ranged from 0 (never or rarely) to 3 (always). Higher scores indicated severer depressive symptoms. Cronbach's alpha of the CES-D scale was .86.

Data Analyses

SPSS 22.0 and Mplus7.4 were adopted to analysis data. Prior to the analysis, the method of Harman's single factor (Podsakoff et al., 2003) was used to test the common method biases for the mother's and grandmother's psychological control, behavioral control as well as mother-child and grandmother-child attachment, and children' depression. The result showed that the first factor of the precipitation for all items explained the variation at 11.65%, which was less than the critical criteria of 40%. Thus, it could be assumed that the common method biases were not significant. The Little's MCAR tests were not significant, $\chi^2_{(137)} = 146.060$, $p = .282$ for all the data. It suggested that the variables were missing completely at random, which meant these data could be predicted by variables in the model. The full-information maximum likelihood (FIML) method was employed to account for missing data in Mplus 7.4 (Muthén & Muthen, 1998–2012).

The descriptive analysis and variation analysis of children's demographic variables, independent variables and dependent variables were carried out first. Then, Pearson correlation analysis was used to analyze the correlations among all variables. Finally, the mediation effects were tested. In order to evaluate the model fit, we used several parameters including the chi-square statistic, the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root-mean-square error of approximation (RMSEA) and the standardized root mean square residual (SRMR). The mother's and grandmother's psychological control, behavioral control were predictors, mother-child attachment and grandmother-child attachment were mediators, child depressive symptoms were outcome variable respectively in the hypothesized model, and child's gender, age and family income were included as covariates.

Results

Descriptions and Correlations of Variables

Means and standard deviations of each variable and bivariate correlations among variables are listed in Table 1. In the correlations among independent variables and dependent variables, only grandmother's psychological control was positively associated with child depressive symptoms. Both mother-child attachment and grandmother-child attachment were negatively related to child depressive symptoms. Both grandmother's and mother's psychological control were negatively associated to their own attachment with child and behavioral control were positively related to their own attachment with child, while mother's behavioral control was positively related to its grandmother-child attachment.

The Differences between Paternal Grandmothers and Mothers

According to paired-sample t-tests, both paternal grandmother's psychological control and behavioral control were significantly less than that of mothers ($t = -3.14$, $df = 79$, $p < .01$; $t = -2.70$, $df = 84$, $p < .01$, for psychological control and behavioral control, respectively) in the paternal group (see, Table 2). However, there was no significant differences between paternal grandmother-child attachment and mother-child attachment ($t = .97$, $df = 80$, $p = .337$).

The Differences of Maternal Grandmothers and Mothers

According to paired-sample t-tests, only the maternal grandmother's behavioral control was significantly less than that of mothers ($t = -3.65$, $df = 85$, $p < .001$), while maternal grandmother's psychological control was not significantly different with that of mothers ($t = -1.45$, $df = 82$, $p = .15$) in the maternal group (see, Table 3). Additionally, there was no significant difference between maternal grandmother-child attachment and mother-child attachment ($t = -.26$, $df = 78$, $p = .80$).

The Differences of Paternal Grandmothers and Maternal Grandmothers

According to ANOVA, there was no significant differences of psychological control, behavioral control and attachment between paternal grandmothers and maternal grandmothers (see, Table 4).

Table 1 Descriptive Data and Correlations between Observed Variables and Demographic Variables

	1	2	3	4	5	6	7	8	9	10	11
1Mpsychological control	1										
2Gpsychological control	.31**	1									
3Mbehavioral control	.40**	.21**	1								
4Gbehavioral control	.14	.25**	.45**	1							
5Mattachment	−.23**	−.13	.36**	.11	1						
6Gattachment	−.05	−.23**	.16*	.31**	.32**	1					
7Cdepressive symptoms	.11	.29**	−.13	−.08	−.39**	−.45**	1				
8Gidentity	−.01	−.04	.05	−.11	.02	−.11	−.02	1			
9Cgender	−.03	−.11	.01	−.03	.11	−.01	.01	.00	1		
10Cage	.10	.06	.16*	.14	.12	.17*	−.10	.03	−.07	1	
11income	.00	−.09	.08	−.17*	.11	.02	−.15	.03	−.06	−.11	1
M	45.32	41.27	53.33	47.87	26.63	27.13	9.90	1.49	1.50	9.15	3.79
SD	14.65	13.32	14.93	15.95	11.28	11.75	9.09	0.51	.50	1.28	.81

Note. C = child's; M = mother's; G = grandmother's;
***p < .05, **p < .01, ***p < .001**

The Associations among Variables and Mediating Effects in Paternal Group

The model indices a good fit for the data (see Fig. 2): $\chi^2_{(8)}$ = 10.15, RMSEA = .052, CFI = .980, TLI = .947, RSMR = .050. Both in mothers and paternal grandmothers, psychological control and behavioral control were not directly related to child depressive symptoms. Only mother-child attachment was significantly related to child depressive symptoms (β = −.30, p < .05). Both mother's and paternal grandmother's psychological control were significantly related to mother-child attachment (β = −.41, p < .001; β = −.19, p < .05, for mothers and paternal grandmothers, respectively), while only mother's behavioral control was significantly related to mother-child attachment (β = .73, p < .001). Additionally, both paternal grandmother's psychological control and behavioral control were significantly related to paternal grandmother-child attachment (β = −.37, p < .01; β = .52, p < .001, for psychological control and behavioral control, respectively).

Mediation analyses (see Table 5) demonstrated that the relationships between mother's psychological control as well as behavioral control and child depressive symptoms were completely mediated by mother-child attachment (β = .12, p < .05; β = −.22, p < .05, for psychological control and behavioral control, respectively). Paternal grandmother's psychological control was significantly correlated with both paternal grandmother-child and mother-child attachment, indicating spillover effect between two caregivers. Despite this correlation, the relationship between paternal grandmother's psychological control and child depressive symptoms was mot mediated by mother-child attachment.

The Associations among Variables and Mediating Effect in Maternal Group

The model indices an acceptable fit for the data (see Fig. 3): $\chi^2_{(8)}$ = 11.51, RMSEA = .065, CFI = .943, TLI = .850, RSMR = .053. Both in mothers and maternal grandmothers, psychological control as well as behavioral control were not directly related to child depressive symptoms. Only maternal grandmother-child attachment was significantly related to child depressive symptoms (β = −.45, p < .05). Both mother's psychological control and behavioral control were significantly related to mother-child attachment (β = −.35, p < .01; β = .33, p < .01, for psychological control and

Table 2 The Differences between Paternal Grandmothers and Mothers

	Psychological Control	Behavioral Control	Attachment
Paternal Grandmothers *M*±*SD*	40.50±12.35	48.15±15.59	27.10±11.25
Mothers *M*±*SD*	46.04±14.19	52.81±14.02	25.67±10.97
t	−3.14**	−2.70**	.97

*p < .05, **p < .01, ***p < .001

Table 3 The Differences between Maternal Grandmothers and Mothers

	Psychological Control	Behavioral Control	Attachment
Maternal Grandmothers *M*±*SD*	42.43±19.91	46.95±16.22	27.32±12.05
Mothers *M*±*SD*	45.08±14.38	53.38±14.40	27.73±12.71
t	−1.45	−3.65***	−.26

*$p < .05$, **$p < .01$, ***$p < .001$

behavioral control, respectively). Additionally, both maternal grandmother's psychological control and behavioral control were significantly related to maternal grandmother-child attachment ($\beta = -.47, p < .01$; $\beta = .32, p < .01$, for psychological control and behavioral control, respectively).

Mediation analyses (see Table 6) demonstrated that only the relationship between maternal grandmother's psychological control, and child depressive symptoms was mediated by maternal grandmother-child attachment ($\beta = .21, p < .05$). There was no crossover effect in the maternal group.

Discussion

As an important form of contemporary family in China, grandparenting families have occupied a considerable portion of Chinese families in which grandmothers play a vital role. This study found evidence that the crossover effect (usually in parenting alliance) could be extended to the paternal and maternal grandmother-mother subsystem in grandparenting families with strong cultural specificity, which was very helpful for explaining the interaction between parental caregivers and grandparental caregivers as well as its impact on children. Different effects from paternal and maternal grandmothers have been found previously in the discrepancy of intergenerational transmission effect and grandparental investment (Tang, 2019), which suggested that parental and grandparental caregivers should form coalitions to play a better part in intergenerational subsystem. Consequently, we provided a clearer understanding for the internal work mode of mother-grandmother alliance and a scientific basis for creating a good environment for child growth in grandparenting families.

The results supported our hypothesis that the crossover theory was also suitable for grandmother-mother subsystem according to the spillover effect in this study. However, spillover effect from grandmother's psychological control to mother-child attachment was exclusively for paternal grandmothers. Some patriarchal elements in the Chinese society might provide explanation to this result. Chinese parents traditionally favor boys over girls, and grandparents prefer to take care of the offspring of the son rather than of the daughter (Tang, 2019). Thus, paternal grandmothers are more inclined to seek and secure attachment from grandchild through psychological control. Furthermore, paternal grandmothers think highly of family reputation so that they experience more responsibility for parenting than maternal grandmothers, resulting in more grandparental investments (Smorti et al., 2012; Tang, 2019). Regarding maternal grandmothers, their psychological control did not show a spillover effect in mother-child attachment, implying a high degree of consistency of parenting between mothers and maternal grandmothers, which might also be subject to intergenerational transmission of parenting. The consistency was also proved by our finding that maternal grandmother-child attachment was positively related to mother-child attachment in maternal group but not in paternal group.

We also revealed the diverse internal mechanism of the influencing factors on child depressive symptoms in paternal and maternal group. Although previous studies found both mother's and father's psychological control directly predicted child depressive symptoms in parental group (Frazer & Fite, 2015; He et al., 2018; Ma & Bellmore, 2011), neither mother's psychological control and behavioral control nor that of grandmothers were found to predict child depressive symptoms directly in this study. Yet, after including mother-child

Table 4 The Different Characteristics between Paternal Grandmother and Maternal Grandmother

	Psychological Control	Behavioral Control	Attachment
Paternal Grandmother *M*±*SD*	40.75±12.42	48.21±15.59	26.44±11.54
Maternal Grandmother *M*±*SD*	42.01±14.16	47.66±16.63	27.38±12.29
F	.35	.05	.24
η^2	.002	.00	.002

*$p < .05$, **$p < .01$, ***$p < .001$

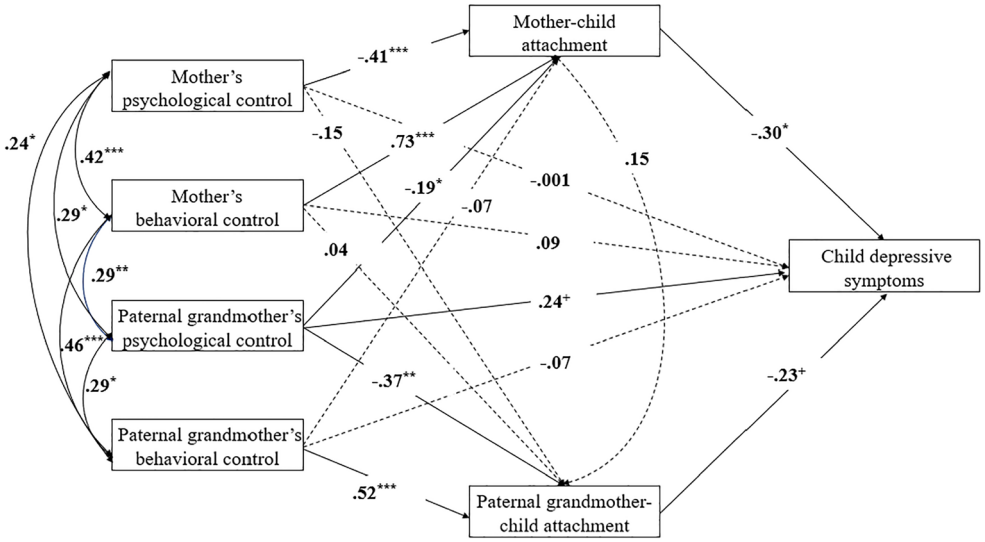

Fig. 2 Attachment as mediators of the relations between psychological control as well as behavioral control and child depressive symptoms in paternal group. $^{+}p < .1$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

attachment and grandmother-child attachment in the analyses, the relationships between mother's psychological control as well as behavioral control and child depressive symptoms were mediated by mother-child attachment, while maternal grandmother's psychological control was related to child depressive symptoms through maternal grandmother-child attachment. The results identified the important role of attachment in grandparenting and verified the increased complexity of grandparenting families compared to mother-father parenting. However, regarding different mediation effects between groups, our results provide further implications for how Chinese grandparenting family dynamics are separated by lineage.

In paternal group, only mother-child attachment played a mediating role for relationship between mother's parental control and child depressive symptoms, but not the paternal grandmother-child attachment. Although paternal grandmothers spend more time with children than mothers do, the role of paternal grandmother was not an alternative to that of mother, confirming findings from past research (Xing et al., 2016). In addition, we found that mother's psychological and behavioral control were significantly higher than that of

Table 5 Mediation Effects in Paternal Group

Effect	β	*SE*
Mpsychological control → child depressive symptoms		
Sum of indirect	.16*	.07
Mpsychological control → Mattachment → child depressive symptoms	.12*	.06
Mpsychological control → Gattachment → child depressive symptoms	.04	.04
Mbehavioral control → child depressive symptoms		
Sum of indirect	−.23*	.10
Mbehavioral control → Mattachment → child depressive symptoms	−.22*	.10
Mbehavioral control → Gattachment → child depressive symptoms	−.01	.04
Gpsychological control → child depressive symptoms		
Sum of indirect	.15 *	.06
Gpsychological control → Mattachment → child depressive symptoms	.06	.04
Gpsychological control →Gattachment → child depressive symptoms	.09	.06
Gbehavioral control → child depressive symptoms		
Sum of indirect	−.10	.08
Gbehavioral control → Mattachment → child depressive symptoms	.02	.03
Gbehavioral control → Gattachment → child depressive symptoms	−.12+	.07

Note. M = mother's; G = paternal grandmother's

$^{+}p < .1$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

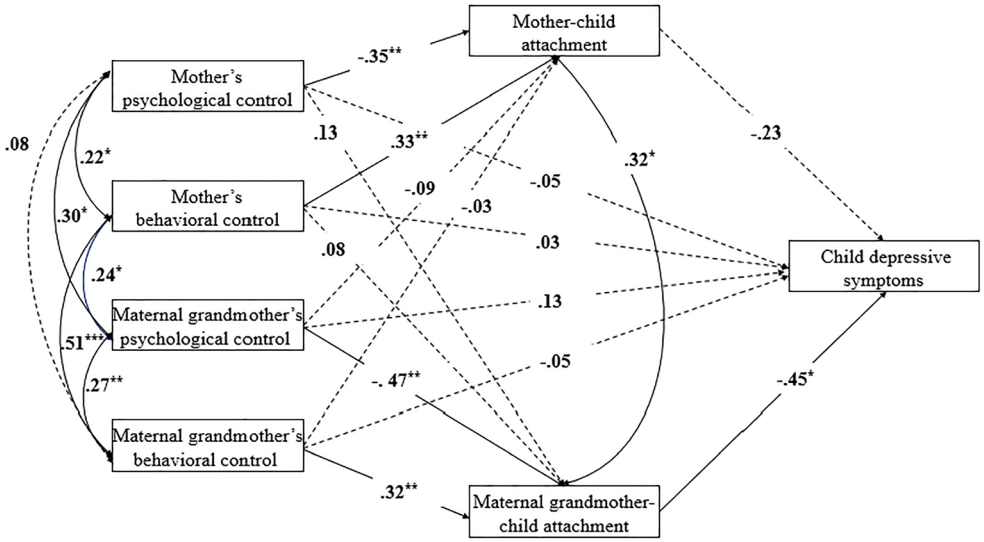

Fig. 3 Attachment as mediators of the relations between psychological control as well as behavioral control and child depressive symptoms in maternal group. **+p < .1, *p < .05, ** p < .01, ***p < .001**

paternal grandmother. It was demonstrated that mother's psychological control enhanced the sense of alienation between mother and child (Shek, 2008) to damage the quality of mother-child attachment (Cai et al., 2013), which was shown to further indirectly aggravated depression in this study. Additionally, mother's behavioral control met the basic psychological needs of children to enhance the quality of mother-child attachment (Deci & Ryan, 2004; Xia & Liang, 2016), which further indirectly mitigated child depressive symptoms. Therefore, the internal mechanism in paternal grandmother-mother subsystem heightens the mediating role of mother-child attachment, implying that mothers in paternal grandmother-mother subsystem should cooperate and keep in step with paternal grandmothers.

However, in maternal group, only maternal grandmother-child attachment played a mediating role between maternal grandmothers' psychological control and child depressive symptoms. The results suggested that children display more response emotionally toward attachment with maternal grandmother. Exploring deeper into the two relationship dynamics might help explain why mother-child attachment was not as significant in child depressive symptoms. One purpose of attending grandchildren for maternal grandmother is to help her daughter lighten the burden of parenting, so maternal

Table 6 Mediation Effects in Maternal Group

Effect	β	*SE*
Mpsychological control → child depressive symptoms		
Sum of indirect	.02	.10
Mpsychological control → Mattachment → child depressive symptoms	.08	.07
Mpsychological control → Gattachment → child depressive symptoms	−.06	.06
Mbehavioral control → child depressive symptoms		
Sum of indirect	−.11	.09
Mbehavioral control → Mattachment → child depressive symptoms	−.08	.07
Mbehavioral control → Gattachment → child depressive symptoms	−.04	.06
Gpsychological control → child depressive symptoms		
Sum of indirect	.23*	.11
Gpsychological control → Mattachment → child depressive symptoms	.02	.04
Gpsychological control → Gattachment → child depressive symptoms	.21*	.10
Gbehavioral control → child depressive symptoms		
Sum of indirect	−.15	.09
Gbehavioral control → Mattachment → child depressive symptoms	−.01	.04
Gbehavioral control → Gattachment → child depressive symptoms	−.14+	.08

Note. M = mother's; G = maternal grandmother's;
+$p < .1$, *$p < .05$, **$p < .01$, ***$p < .001$

grandmother try her best to be in line with her daughter. Furthermore, intergenerational transmission effect indicated that the style of interaction with children might be similar for mothers and maternal grandmothers. The combination of a stable cooperation and indistinguishable parenting styles could signal an interchangeable role and spending more time child-rearing further ensures maternal grandmothers' importance in children's eyes. Therefore, the internal mechanism in maternal grandmother-mother subsystem unfolds the consistency for the intergenerational transmission effect and prompted mothers to spend more time with their children.

Limitations and Implications

For a more nuanced understanding of grandparenting, it is imperative that researchers should take the limitations of this study into account. First, this study only involved female caregivers in despite of the important roles of male caregivers. Future research could add variables into the model regarding fathers and grandfathers. Second, this study only adopted the children's report, implying that the results might be subjective from the children's perspective. Although the common method biases were not significant, potential defects from this design could be larger than random noise. Future research could integrate reports from different family members, such as parents and grandparents. Third, this study only focused on children's emotional problems but not behavioral problems, whereas behavioral problems might be indicative of the parenting dynamics as well. Last but not least, this cross-sectional study could not provide causal relations by its nature. Hence, it is necessary to adopt a longitudinal design for future studies to test the temporal ordering and direction of effects for psychological control, behavioral control, attachments on the emotional problems and behavioral problems of children in parent-grandparent intergenerational alliance.

Despite the limitations, this study provided important implications by exploring the dyadic interactions between intergenerational caregivers and the differences between paternal and maternal intergenerational groups, filling the gap of prior studies. Overall, psychological control from any caregiver was shown to be negatively related to attachment level, which increased the chance of child depressive symptoms. Behavioral control from all caregivers was shown to be positively related to attachment level, which reduced child depressive symptoms. Thus, psychological control is strongly inadvisable in children's emotional development, whereas behavioral control is more perceived as care for children and not deprivation of their autonomy. Instead, healthy communication and behavioral control are better ways to form attachment with children. Additionally, the different impacts on child between paternal and maternal group revealed that mothers should adjust based on the family construct to serve a better emotional ecological system for children. Especially, for families with paternal grandmother caregivers, mothers are advised to cooperate more with paternal grandmothers through communication and develop a shared view of parenting. Yet, for families with maternal grandmother caregivers, mothers are advised to spend more time with their children and pay more attention to children's emotional needs.

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Availability of Data and Material The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author's Contributions All authors have participated in the study and have read and approved the submitted version of the manuscript. Xiuyun Lin conceived the idea and acquire the fund, Wan Ding, and Yongqiang Jiang performed the experiment, Yuxin Tan analyzed the data and wrote the manuscript, Xiuyun Lin, Xiujie Yang, Shaozheng Qin and Stephen P. Hinshaw reviewed and edited the manuscript.

Declarations

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval Prior to conducting the study, the Institutional Review Board of Beijing Normal University in China approved the research protocol, including the consent procedure. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent In the current study, all participants signed informed consent forms before the study.

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