11-2018

Depression among Chinese LBC: Understanding Depression in context of a family-oriented culture

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DEPRESSION AMONG CHINESE LBC: UNDERSTANDING DEPRESSION IN THE

CONTEXT OF A FAMILY-ORIENTED CULTURE

by

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A DISSERTATION

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Psychological Studies in Education

Under the Supervision of Professor Eric S. Buhs

Lincoln, Nebraska

November, 2018

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University of Nebraska, 2018

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Background: *Left-Behind Children* (LBC) refers to children who are under 18 and must live separately from at least one of their parents for longer than six months because of parents' labor migration (Zhou & Duan, 2006). The long-term family separation might greatly impair the family environment and increase the risk of developing depression among LBC. This research examined the relationships among family structure (left-behind status), caregiving, and child depression using archival data from the China Family Panel Studies (CFPS) in both cross-sectional and longitudinal analyses.

Methods: In Study 1, multilevel regression analyses investigated how contextual factors (family structure and caregiving) and personal characteristics (age and gender) related to children's depressive symptoms in a CFPS 2012 sample of 2,936 Chinese children aged 10-15. In Study 2, latent growth analyses examined the predictive role of family structure and child age/gender in the developmental trajectory of depressive symptoms in a sample of 1,588 Chinese children aged 10-19 from CFPS 2010 to 2014.

Results: In Study 1, multilevel regression analyses revealed that the family structure did not have a significant effect over and above the influence of caregiving. Children reporting more positive caregiving tended to experience fewer depressive symptoms. The interactive effects of the family structure and caregiving did not influence child depressive symptoms. In Study 2, latent growth analyses indicated that paternal

absence significantly predicted a more increase in depression over time compared to non-LBC. Maternal absence significantly predicted a less increase in depression compared to non-LBC. Importantly, LBC who have been cared for by non-parent guardians (usually grandparents) indicated no significant effects on concurrent depressive symptoms or developmental trajectories in depressive symptoms over time.

Conclusions: The present findings indicated that child depressive symptoms were significantly associated with the family structure, caregiving, and child age. Understanding how familial and individual factors may affect the development of child depressive symptoms is critical for the development of prevention and intervention strategies. Findings supported the premise that training to increase parenting skills and responsiveness of guardians has the potential to reduce the risk of depressive symptoms in LBC.

ACKNOWLEDGEMENTS

Without the help from people who offered me support and encouragement, it would be impossible for me to finish this rewarding journey at University of Nebraska-Lincoln. First, I want to express my sincerest gratitude to my advisor, Dr. Eric Buhs, who is always patient and supportive for my research. I am lucky to have such a great advisor in my graduate journey. His constant patience and kindness offer me the greatest encouragement to finish the long journey of doctoral program. The valuable suggestions and insightful thoughts from Dr. Buhs provide me the most precious resources to finish this project.

I would like to thank all my committee members, Dr. Crockett, Dr. Martin, and Dr. Newman, for their brilliant ideas and valuable comments on this project. I am so lucky to have them in my dissertation project and had great experience discussing with them.

I would also like to take this opportunity to thank my colleagues in the Nebraska Prevention Center for Alcohol and Drug Abuse. Thanks to Dr. Duane Shell, Lok-Wa Yuen, Michelle Mass, Niran Tamrakar for their help in editing this dissertation draft.

Finally, I would like to express unlimited appreciation to my husband Liangwen Pi for his support and encouragement in finishing this project. Thank you for accompanying me all the time. I also would like to thank my parents-in-law and my parents for being supportive all the time.

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CHAPTER 1 Introduction

Left-Behind Children (LBC) is a term used here to refer to children who are under age 18 and must live separately from at least one of their parents for longer than six months because of parents' labor migration (Zhou & Duan, 2006). According to the National Population Census in China (2011), approximately 261 million people migrated from the countryside to cities for better job opportunities in 2010. These migrant workers are regarded as unofficial residents in cities, and hence are often denied access to urban social services such as health, education, insurance, and housing allowance. Therefore, they often leave their children at home in care of a single parent or other family members or even family friends. In 2015, over 68 million Chinese children (25% of child population) were left behind in their hometowns by one or both parents, and a majority of these children, over 55 million, were from rural China (Duan, Lai, & Qin, 2017). One-third of LBC only see their parents during annual holidays like spring festivals, while the remaining larger percentage of children (approximate 70%) is not lucky enough to see their parents every year (Chelala, 2005).

Various studies have suggested that a long-term separation from parents deprives Chinese left-behind children of regular family life, education, and care. Such a prolonged separation combined with other factors like potential social discrimination and poverty leads to adverse impacts on these children's development (Chan, 2009). The majority of studies concerned with the effect of parental labor migration on child outcomes have focused on schooling, nutrition, and risky behaviors, little is known about the potential impact of parental migration on the emotional well-being of LBC. To address this gap, two studies in the present research were conducted to describe and explain the

development of depressive symptoms in Chinese LBC. Study 1 examined the extent of depressive symptoms among Chinese LBC and identified contextual and personal factors contributing to depressive symptoms using a cross-sectional design. Study 2 employed a longitudinal approach to identify and explain changes in depressive symptoms among Chinese LBC. The findings from this research will likely shed light on psychosocial challenges faced by this vulnerable population, and enhance our understanding of child development in a family-oriented culture.

Depression in Chinese Children and Adolescents

Depression, a common psychological disorder, is the fourth leading cause of the global burden of disease (Reddy, 2010). Depression is defined as "a constellation of emotional and behavioral symptoms with corresponding impairments" (Thapar, Collishaw, Pine, & Thapar, 2012). The existing literature has identified three levels of operationalizing depression (Reinemann & Swearer, 2005): *Depressive mood* represents emotions of being sad, unhappy, or blue (Compas, et al., 1993; Petersen et al., 1993). *Depressive syndromes* indicate a cluster of emotional and behavioral symptoms and usually are treated as a continuous variable in data analyses (Compas et al., 1993; Reinemann & Swearer, 2005). *Depressive disorders* are characterized by a diagnosis of significant levels of depressive syndromes, distress, and functional impairments (American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition-Text Revision, DSM-IV-TR, 2000). The present study used depressive symptoms measured by the Center for Epidemiologic Studies Depression Scale (*CES-D*; Radloff, 1977) as an index of depression among Chinese children and adolescents.

Mental illness is a relatively new concept in China. There is a long history of prejudice toward people with mental disorders, which were often considered to possess personal weakness, evil spirits, craziness, and danger. Sufferers are much more likely to hide the shame of mental illness than to seek effective care (Jie, 2005). In the late 1990s, research in the field of mental health started emerging in China. Scholars began to pay attention to the depression of Chinese youth as a public health issue, rather than presume depression to be a normal and transitory state of mood disturbances during adolescent development (Robertson & Simons, 1989; Wei, Chen, & Liu, 2007). Previous studies estimated the rate of depressive symptoms to be 10-15% among Chinese adolescents (Wang, 2007; Wang, 2009; Wang et al., 2013). The prevalence of similar symptoms among LBC has been estimated to be higher ranging from 26.4-30.9% (Ding, Yuen, Buhs, & Newman, in press; Liu, Hu, & Zhou, 2014; Xu, Ci, Jiang, & Sui, 2016). Researchers have also looked into various factors related to depressive symptoms in Chinese populations and found that depressive symptoms usually increase with age, being female, negative parenting behaviors, and poor academic performance (He et al., 2012; Horowitz & Garber, 2006; Wang et al., 2011).

The attitude of people toward mental illness is rapidly changing and people are starting to realize the significance of mental health. These changes in modern China are deemed promising with respect to research and education for mental health. Unfortunately, teen mental illness, including depression, is on the rise (Jie, 2005). Labor migration brings special challenges to Chinese family integrity and might impair children's emotional well-being. This situation demands an increase in research to understand the extent of the problem for policy change and interventions aimed at

effectively addressing the mental health issue among Chinese youth in general, and in vulnerable populations like LBC in particular. The existing literature has also suggested a need for further research in understanding associated risk factors for depression among children in China.

Influence of Family Structure on Child Depression

A solid, intact family structure with two biological parents is generally considered as the optimal environment to promote healthy child outcomes (Amato, 1993, 2010). Such an intact family structure offers several benefits such as role models, gender socialization, attachment figures, and access to economic and community resources (Collins & Russell, 1991; Parsons & Bales, 1955). In contrast, family separation often disrupts the integrity of the family system and erodes family dynamics. When one parent migrates to working places, the remaining parent often has to fulfill multiple responsibilities (i.e., work and family obligations). This role overload often leads to increased risk of developing psychosocial disorders and marital discords which may impair family environment. Also, children who were left in the care of single parents or non-parental caregivers are susceptible to experience relationship instability, irregular care arrangements, and complex living conditions. Children living in separated families are found to be associated with a range of issues related to psycho-emotional problems, poverty, public health concerns, and juvenile delinquency (e.g., Murray et al., 2012).

Since the Chinese society places a high value on family cohesion and belongingness, the impact of family separation on LBC might be especially pronounced (Wu & Chao, 2005). The family breakdown goes against normative family values in

China and might magnify the feelings of being abandoned and rejected among LBC, which may increase LBC vulnerability to emotional disorders.

The empirical evidence on the difference in depressive symptoms between LBC and children from intact families is mixed in China. While some studies have shown higher depressive symptoms in LBC (Chan, 2009; Gao, Wang, Liu, & Wang, 2007; He et al., 2012; Wang et al., 2011), others have reported negligible differences in depressive symptoms between LBC and children from intact families (e.g., Ren & Treiman, 2016; Wen & Lin, 2012). Considering these inconsistent findings drawn from Chinese regional samples, data from nationally representative samples might yield a clearer picture of the emotional status of LBC and differences, if they exist, when compared to the children in intact families.

Influences of Parenting on Child Depression

In spite of the fact that family structure is associated with children's mental health, this relationship has been found to be reduced or absent after controlling for family processes (e.g., acceptance, support, control, and interaction; Feldman, Rubenstein, & Rubin, 1988). This finding suggests that it is not the family composition but the specific parenting practices that matter most for child development and well-being (Adlaf & Ivis, 1997; Farber et al., 1985; Fein & Ooms, 2006; McKeown et al., 1997; Osborne, McLanahan & Brooks-Gunn, 2005).

It is generally acknowledged that parenting behaviors play a critical role in children's emotional development. Attachment theory suggests that children who experience high quality parenting are better able to develop a positive sense of self, others, and their surrounding world. Subsequently, they are less likely to experience

depressive affect (Bowlby, 1973, 1980). Conversely, negative parenting practices (e.g., indifference, low support, and neglect) tend to adversely affect children's emotional well-being (e.g., Barber, 2005; Clark & Ladd, 2000; Greenberger, Chen, Tally, & Dong, 2000). Similarly, labor migration limits parents' opportunities to maintain parental commitment, consequently increasing the risk of maladjustment outcomes among children.

These negative effects are more prone to manifest in the Chinese context, where Confucianism encourages firm discipline of children and restraint of emotional expression in personal and public lives (Chao, 2001; Chao & Tseng, 2002; Wu & Chao, 2005). With this childrearing belief, Chinese parents rarely express affection and approval to their own children openly or directly (Wu & Chao, 2005). Such childrearing practice further reduces the perception of parental warmth and acceptance in LBC.

A Protective Role for Responsive Caregivers in Child Depression

Despite the negative effects of family separation and parental absence, other family supports (typically grandparents) might function in a protective role and counter the stress of being left behind. Extended family involvement could allow LBC to express their feelings and concerns, and to get the help needed to do school work. Thus, responsiveness from surrogate caregivers could provide a cushion of support or even a surrogate for migrant parents, which helps LBC cope with emotional difficulties and social stress (Kornhaber & Woodward, 1981).

This is particularly important in view of the influences of caregiving behaviors on the child outcome in Chinese culture, in which Confucianism emphasizes interdependence and cohesion among family members. Multiple generations living in one house is common in China. All family members usually work in a corporate

group/mutual aid model to adjust to family difficulties and stress (Sun, 2002). This is especially true when facing family separation due to parental labor migration. Extended family members (typically grandparents) often have the responsibility for taking care of LBC when young couples must leave for employment in cities. The aid from extended family members in the form of nurturing and caring may introduce a different impact of family separation on child outcomes in Chinese contexts. Thus, it is meaningful to examine the moderating effects of responsive guardians on the association between family structure and the development of depression in a sample of Chinese LBC. Identifying the protective factors is crucial to support this vulnerable population's well-being.

Research Purpose

In this paper, I (1) examined how contextual factors and personal characteristics of LBC relate to their depressive symptoms, (2) identified the developmental trajectory of depressive symptoms over time and investigated predictors that could account for the changes in depressive symptoms in a nationally representative sample of Chinese LBC.

I used the archival data from China Family Panel Studies (CFPS) to conduct two studies. Study 1 used a cross-sectional design to examine how contextual factors (family structure and caregiving) and personal characteristics (age and gender) relate to depressive symptoms in a sample of Chinese LBC. Study 2 applied a longitudinal design to examine intra- and inter-individual changes in depressive symptoms in a sample of Chinese LBC over time. Study 2 also looked into the predictive effect of family structure and personal characteristics (age and gender) on the developmental trajectory of depressive symptoms over time.

Findings from current studies would help us understand which contextual and individual factors may contribute to the development of depressive symptoms in early and mid-adolescence. Results may also be used to help develop effective family support programs and interventions aimed to prevent more severe depressive experience among LBC. For example, training to increase positive parenting strategies and the responsiveness of guardians may have the potential to reduce the depression risk in LBC. Additionally, exploring the depression from a family-centered cultural perspective could assist in theory development and further our understanding of child development in a Chinese context.

CHAPTER 2 Literature Review

This chapter begins with an overview of depression in childhood and adolescence, followed by a review of studies concerning the impacts of family structure on depression and a review of studies on the influence of parenting on children's depression. A discussion on the influence of gender differences in child depression will also be included in this chapter. All of these reviews and discussion will take into consideration the Chinese context.

Depression in Childhood and Adolescence

Depression affects about 1-2% of children and rises substantially throughout adolescence with a prevalence of 4-8% (Green, McGinnity, Meltzer, Ford, & Goodman, 2005; Kessler, Avenevoli, & Merikangas, 2001). This disorder tends to be more robust in girls than in boys (Costello, Erkanli, Angold, 2006; Maughan, 2013; Thapar, Collishaw, Pine, & Thapar, 2012). By age 18, nearly a fourth of all children will have experienced clinically significant depressive symptoms, making such symptoms one of the most prevalent psychiatric problems in young people (Clarke, Hawkins, Murphy, & Sheeber, 1993; Horowitz, & Garber, 2006; Lewinsohn, Rohde, Seeley, & Fisher, 1993).

Depression is associated with a range of unfortunate outcomes including substance abuse, risky behaviors, delinquency, suicide, physical illness (e.g., obesity), mental health disorder, social withdrawal, learning disabilities, and family dysfunction (e.g., Fröjd, et al., 2008; Wichstrom et al., 2012; Thapar, Collishaw, Pine, & Thapar, 2012). Depression in children and adolescents is more likely to be accompanied by multiple comorbidities (e.g., disruptive behavior disorder, eating disorders, and autistic spectrum disorders). Around two-thirds of adolescents with depression have at least one

comorbid psychiatric disorder and 10-15% of adolescents have two or more

comorbidities (Ford, Goodman, & Meltzer, 2003).

In addition, depression is a chronic situation. Depression in early childhood leads

to an increased risk of subsequent depression later in both adolescence and adulthood.

Even after a treatment and recovery, the risk of recurrence later in life is still high.

Follow-ups three to seven years after such treatments and recoveries indicate that the

recurrence rates of depression ranged from 45-72% (Lewinsohn, Rohde, Klein, & Seeley,

1999; Rao, Hammen, & Daley, 1999). In clinical samples, 50-70% of patients were

reported to have developed subsequent depressive episodes within five years (Dunn &

Goodyer, 2006; Lewinsohn, Rohde, Seeley, Klein, & Gotlib, 2000).

Influences of Family Structure on Child Depression

The Family Stress Model proposes that continuing life stressors (i.e., low income,

financial strain, and financial tragedies) contribute to negative child outcomes via family

processes (Conger et al., 1994; Conger & Conger, 2002). When a family is enduring

severe economic hardship, the stress experienced by parents could adversely affect

parents' emotions, behaviors, and interpersonal relationships. This compromised parental

psychological functioning could further interfere with parenting effectiveness and

ultimately cause negative impacts on child development (Conger & Donnellan, 2007).

According to the Family Stress Model, an adverse family environment could negatively

affect child functioning in three ways:

First, if living in chronic poverty, parents often have difficulty satisfying the

family's basic needs for food, shelter, medical care, and education. A lack of resources

brings about pressure that will trigger emotional distress in parents such as depression,

anxiety, hostility, and irritability (Conger, 1995; Conger et al., 2002). These negative

emotions would disrupt parental caring, nurturing, warmth, and support, which in turn

would negatively affect child development (Patterson, DeBaryshe, & Ramsey, 1989).

Second, chronic hardship in a home will increase the risk for behavioral problems

among parents like substance abuse, social withdrawal, and aggressive behaviors (Conger,

1995; Conger et al., 2002). Parents experiencing high stress are likely to use negative

practices such as corporal punishment and coercive discipline (Hoffman, 2003). These

negative parental actions diminish the effectiveness of parenting as positive role models

and socialization guidance. Moreover, children may incorporate this negative social

schema and emulate parents' antisocial behaviors as children encounter socialization

outside the family. The social learning theory offers similar explanations (e.g., Bandura,

1977). This process is often related to increased externalizing problems among children

and adolescents (Barnett, 2008; Conger et al., 1991).

Third, chronic adversity in a home will impinge on the ongoing inter-parental

relationships and parent-child interactions (Conger & Conger, 2002). When stress is high,

people are likely to project negative emotions upon others, especially upon their intimate

family members. Also, distressed parents might demonstrate reduced affection to their

partner and children. Parents under chronic stress are often preoccupied with their own

issues, becoming less attentive to the needs of their family members and less patient in

communication. This impaired family process leads to an increased risk of marital

discords, dissatisfaction, and parent-child conflicts (Conger & Donnellan, 2007; Cutrona

et al., 2003). Overtime, parental distress will increase the overall level of family stress

and eventually cause negative effects on child development (Conger, Conger, & Martin,

2010; Conger et al., 1994; Masarik & Conger, 2017; Wickrama, Conger, Lorenz, & Jung, 2008).

Within the current conceptual framework, these specific processes suggested for parental caregivers are keys to understanding the effects of the family structural changes brought on by the LBC phenomenon. Within the current framework/model and data structure, however, we have chosen to examine aspects of caregiving independently from the family structure (i.e., LBC status) because of the variability in the degree to which the parent-child relationship stays intact across the different caregiving arrangements within the LBC status constructs. We were thus unable to assume distinct and reliable sets of caregiving differences (at least, this was not feasible given the current data structure) unique to the family structure categories. This prevented us from placing caregiving as a mediating variable with a direct causal link to our Family Structure construct. Caregiving was thus conceptualized as a potential moderator of family structure here. This does not preclude a potential mediating role (or a moderated mediator role) for caregiving behaviors, of course, but that likelihood will need to be explored in subsequent research.

Prior studies of labor migration and/or LBC effects on children's adjustment

The studies of international labor migration have reported psychological difficulties in LBC in the Philippines (Asis, 2006), Ecuador (Camacho & Hernandez, 2007), Mexico (Familiar et al., 2011), and Jamaica (Pottinger, 2005). The results from four Southeast Asian countries (Indonesia, the Philippines, Thailand, and Vietnam) showed that children who were separated from migrant fathers in Indonesia and Thailand were more likely to have poor psychological well-being compared to children in non-migrant households (Graham & Jordan, 2011). Another study of adolescents from China,

Central America, the Dominican Republic, Haiti, and Mexico indicated that children who were separated from their parents were more likely to report depressive symptoms than children who lived together with their parents (Suarez-Orozco, Todorova, & Louie, 2002).

The influence of a family structure on children's well-being is further exacerbated in China, where collectivism is pre-dominant. Cultural psychologists have suggested that the social-cultural environment plays a critical role in shaping the emotional development (Triandis, 1995). For example, values in collectivist culture could buffer against some negative emotions like depression (Chiao & Blizinsky, 2010). This notion offers great implications for understanding the emotional development in different cultural settings.

In China, a family has been found to play a critical role in the overall development of a child. Confucianism places a high emphasis on family belongingness and interrelatedness across generations. A family system often serves as the cornerstone of all social activities (Xie & Xia, 2011). Historically, in China, the nation (*guo jia, nation family* in Chinese) evolved from family clan systems (*jia*, *family* in Chinese). The family as a model for organization of the nation is a basic political philosophy of Confucianism (Ivanhoe & Van Norden, 2001). Subjects were expected to be subordinate to the sovereign as children should be subordinate to their parents. An individual starts developing a self-identity in the process of social interaction within a family and then expands to the identity of a nation. Self-worth in China, to a great extent, is defined by multiple relationships with others in a family. An ability to fit in a family could maximize one's success and expand social networks. Such a social connection is a key factor for effective functioning in China. Meanwhile, individuals are obligated to fulfill their responsibilities to the family system. The family cohesiveness tends to

exist over and above individual needs and desires. In such an interdependent construal of self and family, an individual is an extension of a family system while personal achievements are interconnected with the family success.

Being interdependent also means a constant awareness and sensitivity to others' reactions (Markus & Kitayama, 1991). Our personal expressions and interpretations of emotions tend to be significantly affected by the attitudes of others. A typical example is that one's self-worth is often heavily contingent on the approval from others, especially those who are intimate family members. Adhering to the value of family connectedness and interdependence, individuals often possess stronger values for and have greater expectations of obtaining family approval and support, placing a high value on harmony, integrity, and obligations within a family (Fuligni, Tseng, & Lam, 1999; Gil-Rivas, Greenberger, Chen, & Maria Montero, 2003). Several cross-cultural studies have indicated the critical role of the family in children's development (e.g., Greenberger et al., 2000; Ho, 1994; Li et al., 2010; Wu & Chao, 2005). Unfortunately, parental labor migration has undermined the highly valued family connections in China, disrupting and changing the traditional family structure. The parental involvement in everyday activities of the children, and the attachment relationship between parents and children are likely to be compromised in such non-traditional families.

A considerable number of studies have shown a higher prevalence of psycho-social adjustment issues in LBC than children from intact families. Such psycho-social adjustment issues include anxiety and depression (Ding & Buhs, 2017; Chan, 2009; Cheng & Sun, 2015; Liu, Hu, & Zhou, 2014; Xu, Ci, Jiang, & Sui, 2016), loneliness and low self-esteem (Gao, Wang, Liu, & Wang, 2007; Jia & Tian, 2010; Zhao, Chen, Chen,

Lv, Jiang, & Sun 2014; Zhan et al., 2014), emotional and psychological distress (Burnette, Sun, & Sun, 2013), personality disorder (Liu, Zhu, Liu, & Zhang, 2009; Wang, 2002; Xiao & Chen, 2009), and symptoms of obsession (e.g., compulsion, interpersonal sensitivity, anxiety and hostility; Yang, Wang, Feng, & Tang, 2007). A study in Western China reported that 60% of LBC in rural areas have emotional disorders such as depression, anxiety, and hopelessness (Song, Liang, Ren, Luo, & Zhou, 2012). In a separate study by Wu et al. (2015) in a sample of 701 children aged 8-17 years living in the rural counties of Guizhou Province, researchers found that children who had previously been left behind but lived with both parents at the time of the study experienced fewer depressive symptoms.

However, this relationship was not always consistent. Several other studies reported negligible differences in depressive symptoms between LBC and children from intact families (e.g., Ren & Treiman, 2016; Wen & Lin, 2012). For example, Huang (2004) found that the emotional health of LBC was only marginally worse than the emotional health of children in intact families in Fujian Province in Southeast China. Ren and Treiman (2016) found higher depression levels among LBC living without parents than non-LBC, but this difference disappeared once the community differences were controlled. And Wen and Lin (2012) in a separate study of rural Hunan children aged 8-18 in Central China showed that LBC were disadvantaged in behavioral and educational performance but not in psychological outcomes, with or without controls of the children's psychosocial environment and psychological traits. Similarly, two studies using a sample of children in Hunan Province have found no significant differences in mental health between LBC and non-LBC (He, Cao, Liu, Li, & Xie, 2006; Hu et al., 2007).

Considering the inconsistency of existing findings from Chinese regional samples, it is necessary to examine depression levels in both LBC and non-LBC using a large, nationally-representative database.

In addition, the majority of existing studies focused on examining the aggregated effects of parental absence regardless of the gender differences in parental involvement (McBride, Schoppe, & Rane, 2002). A few studies compared the rate of depressive symptoms among father-absent, mother-absent, and both-parents absent, and intact-family child group but found no significant differences in depressive symptoms among these four child groups using single level regression model (Li et al., 2009). In the present study, using longitudinal designs and accounting for multiple levels of risk factors on depression may better catch up nuanced differences in the research of LBC emotional development.

Influences of Parenting on Child Depression

In addition to family separation, parenting behaviors also play a critical role in affecting the emotional development of children and adolescents. Parenting refers to rearing behaviors towards children such as support, warmth, and supervision (McLeod, Weisz, & Wood, 2007). The importance of the quality of childrearing in children's depressive experiences has been widely acknowledged (see reviews by Maccoby, 1992; Mcleod, Weisz, & Wood, 2007). The meta-analysis results indicated that 8% of the variance in child depression outcomes was accounted for by parenting behaviors (McLeod et al., 2007). The following part reviews two conceptual approaches of parenting behaviors along with consequences in youth depression.

Baumrind's typology for global parenting styles

Based on characteristics of parenting in socialization, Baumrind (1971) proposed four global styles of parenting: authoritative, authoritarian, permissive, and neglectful. *Authoritative* parenting is characterized by high parental acceptance, warmth, and reasoning towards the child. *Authoritarian* parenting represents behaviors with high control and low warmth. *Permissive* parenting is marked by high warmth but low discipline. *Neglectful* parenting reflects behaviors with both low warmth and low discipline. These four parenting styles are conceptualized as a constellation of attitudes for childrearing and are supposed to be generalizable to multiple contexts (Darling & Steinberg, 1993). In general, studies using this typological model indicated that authoritarian and permissive parenting styles were associated with negative child outcomes (Thompson, Hollis, & Richards, 2003; Wolfradt, Hempel, & Miles, 2003), whereas authoritative parenting was found to be related to positive child outcomes (e.g., Karavasilis, Doyle, & Markiewicz, 2003; Mandara & Murray, 2002).

However, Baumrind's typologies of parenting styles may present three limitations in research about parenting behaviors. First, Baumrind's typologies are concerned with general parental characteristics and hence rarely focus on individual forms of parenting behaviors. Previous studies have suggested that different parenting behaviors might exert unique impacts on children's emotional well-being (Lewis, 1981; Pearson, Atkin, Biddle, Gorely, & Edwardson, 2010). For example, physical affection may have different influences on a child functioning when compared to the encouragement of autonomy on child development. The aggregated typology tends to override the impacts of independent parenting components and lead to inconsistent results. The association between

authoritativeness and academic achievement was the strongest among European- and

Hispanic-American adolescents but was the weakest among Asian- and African-

American youths (Dornbusch et al.,1987; Steinberg, Mounts, Lamborn, & Dornbusch,

1991). Barer et al. (1992) found no difference in the general parent-child relationship

between the U.S. and German youths. When examining the specific component of

parenting (e.g., physical affection), however, differences in parent-child relationships

between two samples were identified. Thus, examining particular parenting behaviors

tends to be more sensitive in catching parenting characteristics and associated impacts on

child development as well as in understanding the mechanisms through which parents

affect child functioning (Darling & Steinberg, 1993).

Second, the meanings and dimensions for the parenting may vary across cultures

(Russell, Crockett, & Chao, 2010). For instance, the meanings of autonomy differ

between Chinese-American and Filipino-American adolescents (Russell, Chu, Crockett,

& Lee, 2010). And parental sacrifice and acceptance have been found as distinct

dimensions of parenting among Chinese- and Filipino-American adolescents (Chao &

Kaeochinda, 2010). Moral guidance and advice were nominated as additional categories

of parental support in the sites with religious traditions (McNeely & Barber, 2010). The

aggregated typology may preclude the identification of unique components of parenting

in specific cultural contexts.

Third, Baumrind's overarching classification tends to classify a similar parenting

practice into multiple typologies. The dimension of parental warmth could be a

characteristic of both authoritative and permissive parenting style. A similar disciplinary

strategy could be conceptualized as authoritative or authoritarian parenting style,

depending on the context and the way children interpret it (Lau, Litrownik, Newton, Black, & Everson, 2006; Westbrook & Harden, 2010). For example, the authoritarian parenting is often viewed as fear and compliance among European-American children but authoritarian is usually interpreted as assertiveness among African-American girls (Baumrind, 1972). Similarly, strictness tends to be interpreted differently between American and Asian contexts, and between the first and second generation of immigrants (Chao, 2001; Chao & Tseng, 2002). Therefore, the measurement of specific parenting behaviors might be more sensitive to cultural variations in an understanding of the parent-child relationship.

The current study focused on particular components of parenting behaviors (e.g., supervision, helping with homework, spending time together, reading, playing, communicating, and encouraging autonomy), which will be discussed in the following section.

A three-dimensional model of specific parenting practices

Compared to Baumrind's model that emphasizes the global emotional climate, a three-dimensional model focuses on specific parenting practices. For the latter model, the measures of childrearing are usually centered on particular components of parenting behaviors, including warmth, control, strictness, criticism, neglect, affection, and empathy (Rapee, 1997). Using factor analysis, researchers proposed a theoretical model of three dimensions for parenting practices (e.g., Barber, 1990, 1992; Becker, 1964); Schaefer, 1965a, 1965b). This model has been widely used in the empirical studies for depression in children and adolescents. Table 1 summarizes the theoretical development of specific caregiving in terms of emotional development in children and adolescents. In

the following section, I reviewed the contribution of each of these parenting dimensions

to the development of depression in children and adolescents.

Table 1

Theoretical Development of Specific Caregiving Linked to Child Outcomes

Author	Scale	Factor Dimensions		
		Dimension I	**Dimension II**	**Dimension III**
Baldwin (1947)		Control	Democracy	Activity
Becker (1964)		Love vs. hostility	Restrictiveness vs. permissiveness	Anxious emotional involvement vs. calm detachment
Siegelman (1965)	*Bronfenbrenner Parental Behavior Questionnaire (BPB)*	Loving	Punishment	Demanding
Schaefer (1965a, 1965b)	*The Children's Report of Parental Behavior Inventory* (*CRPBI*)	Acceptance vs. Rejection	Psychological autonomy vs. psychological control	Firm control vs. lax control
Jacobsson et al. (1980)	*The Egna Minnen av Barndoms Uppfostran* (*EMBU*)	Acceptance vs. rejection	Controlling	Overprotective
Barber (1990, 1992), Barber & Thomas (1986)	Revised *CRPBI*; *Psychological Control Scale-Youth Self-Report* (PCS-YSR; Barber, 1996;	Support	Psychological control	Behavior control

five-item scale for

behavioral control (e.g.,

Brown et al., 1993).

Support. The first dimension represents parental behaviors of affection, closeness, and acceptance, or, on the other hand, rejection, withdrawal, criticism, and lack of communication (McLeod, Weisz, & Wood, 2007). The Parental Acceptance-Rejection Theory posits that rejection and unavailability are associated with children's depressive symptoms and the etiology of depression (Chen, Rubin, & Li, 1995; see reviews by Rohner, 1980; Rohner & Britner, 2002) and perceived rejection in childhood was reported to forecast consequent depression in longitudinal studies (Garber & Flynn, 2001; see the review by Rohner & Britner, 2002;).

In contrast, children with parental support (e.g., help with schoolwork, spending time together, parent-child communication, and playing together) are more likely to have higher social competence and lower depression as compared to children without parental support, and this association appears to be consistent across nations, cultures, and ethnicity (Barber, 2005; Bradford et al., 2003; Chen, Liu, & Li, 2000; Chen & Rubin, 1994; Chen, Rubin, & Li, 1997; Cheng, 1998). Even when encountering stressful events, family support could buffer against negative emotions like depression (Greenberger & Chen, 1996; Sheeber et al., 1997).

Moreover, Barber et al.'s (2005) dominance analyses indicated a differential effect of support between mothers and fathers, with mother's support reported to relate more strongly to children's lower depression and father's support associated more strongly

with children's higher social initiative. However, Rohner (1998) suggested that father's love is more strongly associated with children's depression. Cole and McPherson (1993), Barrera and Garrison-Jones (1992), Barnett, Marshall, and Pleck (1992) have provided similar evidence (see the review by Rohner, 1998).

Behavioral control. The second dimension describes disciplinary strategies in monitoring children's behaviors (e.g., surveillance of children's activities and monitoring school performance). The conceptual label of parental behavior control has been used interchangeably with parental monitoring, supervision, demandingness, family management, overprotection, and restrictiveness (see the review by Barber et al., 2005; Barber, Olsen, & Shagle, 1994).

Some studies have indicated that lax disciplinary strategies are likely to be associated with internalizing problems (e.g., anxiety and depression; Crook, Raskin, & Eliot, 1981; Wei & Kendall, 2014) and externalizing issues (e.g., delinquency, aggression, substance use, and sexual precocity; Barber, 1996; Baumrind, 1971, 1991). In contrast, the parental monitoring has been found to be negatively related to depressed mood in adolescents (Barber, 1996; Barber et al., 2005; Buchanan, Maccoby, & Dornbusch, 1996). A study of African-American girls indicated that high control was linked to lower depression (Finkelstein, Donenberg, & Martinovich, 2001). Garber and colleagues, however, found no significant evidence of parental control on children's depressive symptoms (Garber, Robinson, & Valentiner, 1997; Garber & Flynn, 2001). It appears that, in general, under-controlled environments do not benefit the development of self-regulation in children (Barber, 1996).

Psychological control. Schaefer first introduced the conceptual label of psychological control, which refers to parental overprotection, the intrusiveness of children's psychological and emotional development (Barber, 1996; Schaefer, 1965a, 1965b). Evidence indicated that the overt parental control on children's thinking and activities tends to induce perceived helplessness and self-derogation, leading to internalizing problems (e.g., depression and anxiety) as well as externalizing problems in children (e.g., acting out and rebelliousness; Barber, 1996; Barber, 2002; Barber et al., 2005; Conger, Conger, & Scaramella, 1997; Garber & Flynn, 2001; Olsen et al., 2002; Muris et al., 2004). Mother's psychological control has also been found to play the most important role in explaining adolescent depression (Barber et al., 2005).

On the other hand, the parenting behaviors that support psychological autonomy (e.g., encouragement of independence, offering explanations and reasoning) appear to benefit child development (Grusec & Goodnow, 1994). This third dimension has rarely been applied alone to studies of depression. In some empirical studies, the behavior and psychological control were combined into one concept labeled *control*. For example, parkers and colleagues assessed parental control that included both behavior and psychological control in *The Parental Bonding Instrument (PBI;* Parker, Tupling, & Brown, 1979; Parker, 1983).

Cultural contexts that moderate the parenting-depression association. Cultural variations exist in the comparative studies about the relationship between parenting and child depression. For example, the measures of specific forms of parenting behaviors (e.g., physical affection and companionship) were significantly associated with psychosocial functioning in the U.S. adolescent sample (Barber et al., 2005). The same

parent-child association did not show up in the German sample (Barber, 1992).

Greenberger et al. (2000) found that low parental warmth and support were related to

more severe depressive symptoms in Chinese adolescents as compared to the American

adolescents. Likewise, Wu and Chao (2005) reported that excessive parental warmth had

stronger positive consequences for Chinese American than European American

adolescents. The existing literature suggested a need for examining parent-child

relationships with a cultural sensitivity.

Interestingly, some researchers found that firm control in parenting had positive

meanings in Asians (e.g., Chao & Tseng, 2002). Good Confucian parents are expected to

fulfill their family responsibilities by applying relatively harsh discipline to assure the

success of their family and offspring. A restrictive/firm control (or *guan*, meaning *to

govern* in Chinese) is usually interpreted as care, concern, and responsiveness in most

Asian cultures (Chao & Tseng, 2002; Lau & Cheung, 1987; Nomura, Noguchi, Saito, &

Tezuka, 1995; Stewart et al., 1998). The positive effects of strictness on child

achievement have been confirmed in the first- and second-generation Chinese Americans

(Chao, 2001; Chao & Tseng, 2002), Japanese (Kornadt, 1987; Trommsdorff & Iwawki,

1989), Korean samples (Rohner & Pettengill, 1985), and young Pakistani women

(Stewart et al., 1999). In the present study, I am interested in determining whether the

parenting behaviors (e.g., support and control) would exert different impacts on

depression in a Chinese child population.

Parenting absence in LBC

LBC often experience the absence of parenting resources such as companionship,

interaction, guidance, and monitoring in their lives. Once left behind, they have to live

separately from their parents for a long period. Separated by thousands of kilometers, face-to-face contact with parents becomes a luxury for these children. On average, they only meet their parents for temporary reunions about once every two years during national holiday festivals (Pan et al., 2013). The lack of parent-child intimacy is especially evident for children left behind in poor regions. The resources (e.g., phones) for facilitating long-distance communication between the parents and their children are limited and thus reduce their possibility to maintain close family connections.

With no proper medium to communicate with parents during the times of need, such children are forced to cope with everyday life stressors and challenges without the proper guidance from their parents. Much evidence indicates that the parental support could buffer a child from adverse experiences (Greenberger et al., 2000; Sheeber et al., 1997). The LBC are deprived of such protection. A study by the Institute of Gerontology indicated that 61.5% of LBC responded that they would not communicate their concerns to their parent and 37% preferred not to talk to anyone (Burnette, 2013). A similar study reported that almost 30% of children would keep silent when being bullied (Lv, 2011). A lack of parenting supports in coping with adversities might increase LBC social stress and lead to an increased risk of developing depression.

In the Chinese context, the negative effects of family separation on children's emotional development might be pronounced. It has been suggested that Asian parents are not as expressive in warmth and affection to their children as Western parents, and often exercise more strict discipline (Chao, 2001; Chao & Tseng, 2002). In China, Confucianism encourages self-control of emotional expressions and restraint of personal opinions to maintain group harmony. As role models in a family, parents are expected to

always act in an inhibitory way when expressing emotions. A good Confucian parent should maintain silence and demonstrate discipline towards their children. The act of openly praising their children would undermine the virtue of humility in both parents and children. Because of this notion, Chinese parents rarely express their affection and appraisals towards their own children openly and directly (Wu & Chao, 2005). Such characteristics of Chinese parents combined with a long-term separation might elevate the risk of negative developmental outcomes in LBC. One of the most effective ways to maintain a long-distance parent-child connection is verbal communication. However, due to the pre-dominant childrearing beliefs and practices in China, the reluctance of Chinese parents to express affection and concern verbally diminishes the possible benefits of verbal communication between parent and child.

A Protective Role for Responsive Guardians in Child Depression

Although the quality and quantity of parental involvement often decline in LBC, single parents or non-parent guardians may substitute for the migrant parents and function as surrogate caregivers. Such a compensatory effect from responsive guardians may bring about a different effect on LBC. Good caregiving practices that include proper monitoring, frequent communication, and emotional supports could help children faster adapt to the changing family structure and attenuate the deleterious effects of the absence of migrant parents.

There seems to be a general agreement among researchers that a single-parent family is not an ideal environment for a child's development. Despite the considerable challenges, a single mother or father with excellent parenting practices could increase the resilience in his or her children by providing socio-emotional support when necessary,

and teaching emotional regulation strategies to effectively cope with stressful life events. Also, responsive single parents with warmth and acceptance could develop emotional intimacy with their LBC and mitigate the negative emotions following the family separation. Single parents might provide a stable family communication so that their migrating spouses could maintain regular high contact with LBC. Such positive nurturing from single parents generally leads to a better adjustment to family separation and avoids anxiety and depression among LBC.

The protective effects of good caregiving have been confirmed in previous studies (Brody & Forehand, 1993; Farrell & White, 1998; Mason, Cauce, Gonzales, & Hiraga, 1994). For example, Griffin et al. (2000) reported that positive parenting reduced negative impacts on children's behavior problems in single parent homes. In a study of predominantly Black urban high school youth, Farrell and White (1998) found that a strong parent-adolescent relationship within a single parent family helped buffer adolescents from the negative peer influences. Mason et al. (1994) reported similar results in a sample of 112 African-American adolescents, indicating that a positive mother-adolescent relationship attenuates the negative effects of father absence and protect adolescents from risk of peer problem behaviors.

The possibility of protective effects is also plausible for grandparenting. According to the evolutionary biology theory, grandparents have a "genetic incentive" to offer unconditional love to their grandchildren and to ensure the survival of a family group (Hawkes, 2003; Ruiz & Silverstein, 2007). This may be particularly true in a Chinese family context, where the interconnectedness across generations and family harmony often are highly emphasized (Hsu, 1985). In China, the young generation is

expected to carry on the family line and to fulfill filial duties to elderly family members. This filial piety theory is endorsed by the Chinese law that requires children to visit and care for their aging parents (Elderly Rights Law, 2013). The parents, in turn, are culturally obligated to take care of their children and grandchildren (Chen & Liu, 2011). It is not uncommon for grandparents to take on responsibilities as caretakers when young couples migrate to cities for employment. Grandparents, as an integral part of the Chinese family network, are often involved in the family matters of their adult children and even offer help with child rearing in times of need. In this type of corporate group/mutual aid model (Sun, 2002), all family members cooperate to handle adjustment difficulties. Grandparents could provide compensating resources for LBC and even replace young parents by providing LBC close attachment relationship, emotional support, and financial assistance.

The buffering effect of grandparents in minimizing the risks of child maladjustment has been confirmed in nontraditional families in the Western literature (Ensel & Lin, 1991; Solomon & Marx, 1995; Deleire & Kalil, 2002). The grandparents could positively affect developmental outcomes in their grandchildren by providing physical care, telling stories, teaching songs, reducing stress, and mentoring traditions (Franks, Hughes, Phelps, & Williams, 1993; King, Elder, & Conger, 2000). Grandparents are valuable resources to their grandchildren in Chinese immigrant families (Treas & Mazumdar, 2004). Grandparent's involvement has been found to promote emotional adjustment in children experiencing parental separation (Kennedy & Kennedy, 1993; Werner & Smith, 1982). Evidence suggested that a greater closeness with grandparents was associated with lower depressive symptoms, particularly among grandchildren in

single-parent families (Lussier, Deater-Deckard, Dunn, & Davies, 2002; Ruiz, & Silverstein, 2007).

Despite the rich evidence in the Western literature, the potential benefits to LBC from the supportive relationship with their grandparents are still unknown. Failure to include the potential influence from grandparents may reduce the effectiveness of prevention and intervention strategies in Chinese families. The present study addressed this gap by examining the moderating effects of responsive guardians on the association between family structure and children's depression in a sample of Chinese LBC.

Gender Differences in Child Depression

A significant gender difference has been found in depression in terms of onset time, prevalence rates, duration, severity, and coping strategies (see reviews by Maier et al., 1999; Piccinelli, & Wilkinson, 2000). Depression is more likely to occur at an earlier age in girls than in boys (Kornstein et al., 1995). The gender differences in depression have been estimated to manifest during adolescence between age 12 to age 18, and (Hankin & Abramson, 2001; Hankin et al., 1998). Starting in early adolescence, depressive disorders have been found to be almost twice as common in females than males (Bebbington et al., 1998; Regier, Burke, & Burke, 1990; Weissman et al., 1996). A similar trend of gender differences in depression development has been found in longitudinal studies (Cohen, Cohen, Kasen, & Velez, 1993; Hankin et al., 1998; Reinherz, Giaconia, Lefkowitz, Pakiz, & Frost, 1993; Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997). For example, in a longitudinal study by Hankin et al. (1998), depression in the participants, irrespective of gender, was found to increase between ages 15 and 18; however girls experienced a more dramatic increase than boys.

In addition, the duration of feelings of being depressed is longer and the severity greater in females than in males (Šagud, Hotujac, Mihaljević-Peleš, & Jakovljević, 2002). When depressed, girls have been found to use more rumination strategies and tend to focus on negative body image (Lewinsohn & Essau, 2002). However, some researchers have argued that the samples being investigated might affect the reports. The majority of reports used clinical inpatients, which might bring bias because females are more likely to seek treatment or discuss their depression (Hankin & Abramson, 2001). Thus, a nationwide community sample might be necessary to produce a more generalizable result.

Further, researchers have investigated potential mechanisms driving the gender differences in depression development, such as hormonal changes, rumination coping strategies, socialization difficulties, and cultural contexts (see the review by Nolen-Hoeksema & Girgus, 1994). The researchers generally agree that biological factors exert the greatest impact on adolescent depression. A 4-year longitudinal study found that female adolescents who experienced early puberty experienced more severe depression when compared to girls with on-time or late puberty (Ge, Conger, & Elder, 1996). Interestingly, the magnitude of the gender difference in depression development varies as a function of differences in a social-cultural context. The cross-cultural studies found that Hispanic adolescents reported the highest depression when compared to the African-Americans and Caucasians (Schraedley, Gotlib, & Hay ward, 1999; Siegel, Aneshensel, Taub, Cantwell, & Driscoll, 1998). Hayward et al. (1999) have shown greater depression to be associated with menarche only among Caucasian girls, but not among African-Americans or Hispanics.

Considering the evidence that cultural values of collectivism could function as buffers against depression (Chiao & Blizinsky, 2010), it might be meaningful to examine this gender difference in depression development in a family-oriented cultural context. Additionally, previous studies have suggested that adolescence might be a vulnerable time. These findings suggest a need to further examine the potential psychological changes among Chinese children and adolescents.

In sum, a considerable number of studies have indicated the impacts of family structure, caregiving, and gender differences on the development of depression among children and adolescents. Children experiencing family separation are more likely to experience social stress due to attachment reduction, complex living arrangement, and uncertainty about the future reunion. Although LBC often experience reduced parental involvement, responsiveness from relatives or nonrelatives might attenuate the negative effects of left-behind status. The gender difference is another factor that could profoundly affect the development of depression among LBC. However, regarding this large and rapidly increasing population in China, research about potential psychosocial challenges of LBC is inconsistent and the mechanisms are not well understood. Considering the rich evidence of social-cultural contexts on depression (Chiao & Blizinsky, 2010; Greenberger et al., 2000), I am particularly interested in exploring whether a family-oriented culture would be associated with a different pattern in the development of depression in a sample of the Chinese child population.

Research Questions and Hypotheses for Study 1

The present research described and predicted the experience of depressive symptoms in a population of Chinese children using nationally representative data. The

first purpose of this study was to quantify the extent of depressive symptoms among a sample of Chinese LBC and to identify risk factors contributing to depressive symptoms with cross-sectional analyses. In Study 1, Multilevel Modeling (MLM) was applied at three levels: (1) at the child level, where children's depressive symptoms scores were regressed on personal characteristics (age and gender), and (2) at the family level, where the depression scores were regressed on familial factors (family structure, caregiving) while controlling for urban vs. rural differences and SES, and (3) at the community level, which was used for controlling within-community non-independence. The present study also examined how the influence of family structure might vary depending on the degree of care the youth is receiving (see Figure 1 for the conceptual model and Appendix A for model equations).

Currently, few studies have examined all three levels of these factors simultaneously. The potential protective role of responsive caregivers in children's depression has been supported in Western literature but remains unclear in Chinese populations. The current study addressed this gap in the literature and proposed the following research questions and hypotheses:

    1. Did family structure predict children's depressive symptoms?

        a. I hypothesized that LBC, especially for LBC living with dad only, should display higher levels of depressive symptoms relative to non-LBC.

    2. Was caregiving predictive of children's depressive symptoms?

        a. I hypothesized that youth who receive more positive caregiving should report fewer depressive symptoms.

3. Did the influence of family structure vary depend on the degree of care the youth is receiving?

     a. I hypothesized that positive caregiving should mitigate the negative effects of family separation.

L: 3 Community

Family Structure

Caregiving

SES/urban vs. rural

L: 2 Family

L: 1 Child

Age

Gender
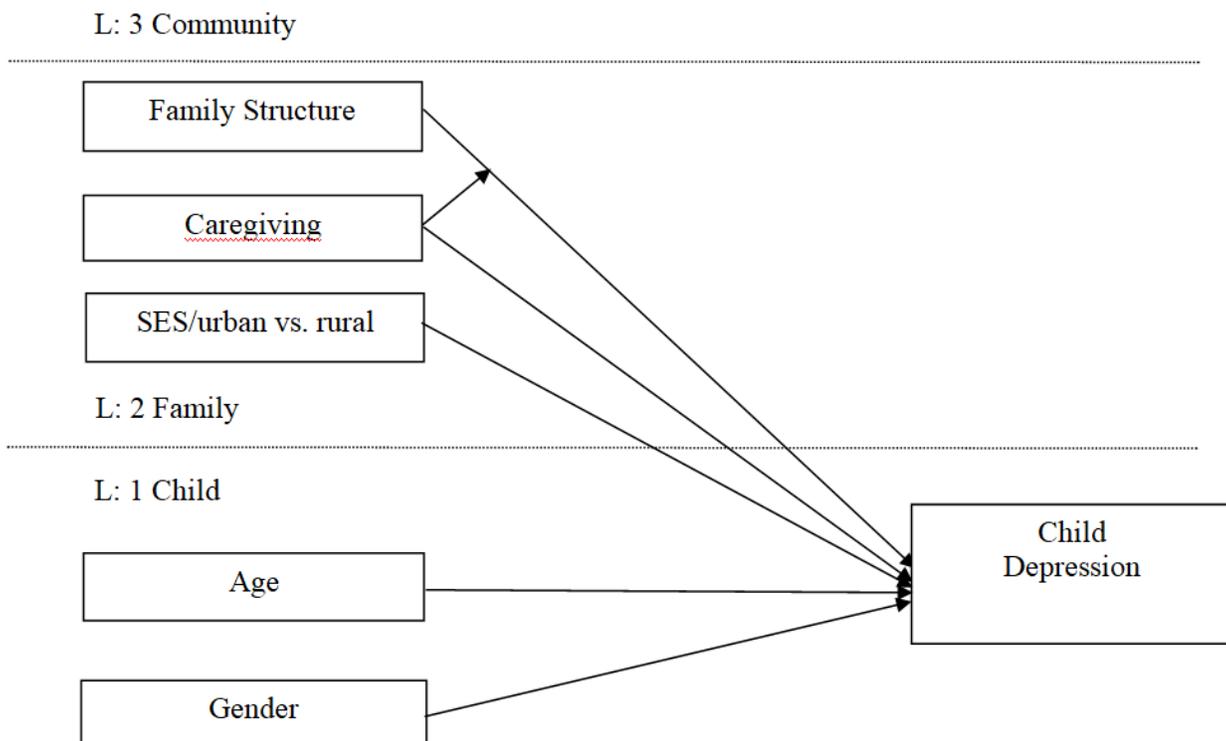
Child Depression

Figure 1. Conceptual MLM of the Community, Familial, and Individual Factors on Chinese Children's Depression in 2012 (see Appendix A for equation details). Family structure was coded into three dummy variables (no-parent vs. non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). Male = 1; female = 0. Urban = 1; rural = 0. The community level was used for controlling within-community non-independence.

Research Questions and Hypotheses for Study 2

Furthermore, Study 2 used Latent Growth Modeling (LGM) to examine intra- and inter-individual differences in the intercept (baseline depression) and in the slope (rate of change over time) and potential contributing factors (family structure and age/gender). Children's depressive symptoms were measured repeatedly in 2010, 2011, and 2014. The model depicted in Figure 2 represents the proposed LGM (see Figure 2 for the conceptual model and Appendix B for model equations).

A majority of Chinese family studies have focused on the association between one time of being left behind and concurrent child outcomes. Few researchers have examined how the one-time experience of being left behind can impact the developmental trajectory of child depression over time (Fan et al., 2009). To fill this gap in the literature, the present study used longitudinal analyses to identify and explain changes in depressive symptoms as a result of one-time experience of being left behind using a sample of Chinese LBC. Also, I expected to observe that personal characteristics such as age and gender can predict the developmental trajectory of depressive symptoms over time. Two key research questions were proposed to guide Study 2:

1. Does the status of being left-behind (i.e., no-parent, mom-only, and dad-only families) predict the initial levels of depressive symptoms and the rate of change in depressive symptoms over time?

a. I hypothesized that children in left-behind families, especially for LBC living fathers only, should positively predict the initial levels of depressive symptoms.

b. I hypothesized that the left-behind status, especially for LBC living with fathers only, should predict a steeper increase in depressive symptoms over time.

2. Did personal characteristics (i.e., age and gender) predict the initial levels of depressive symptoms and the rate of change in depressive symptoms over time?
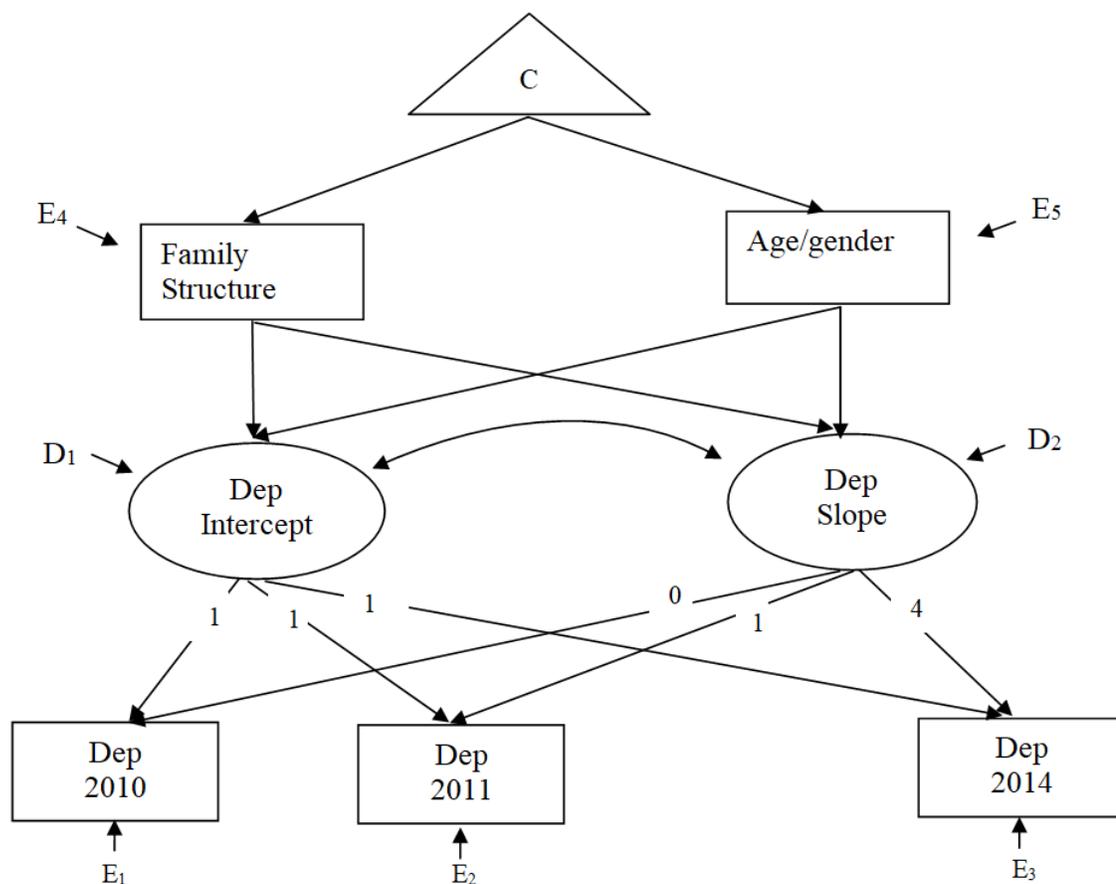
Figure 2. Conceptual and Path Model Framework for LGM of Depression with Family

Structure and Age/gender as predictors to Growth Factors (see Appendix B for equation

details). Intercept parameters were fixed at 1, and slope parameters were fixed at 0, 1, and

4. The residuals were constrained to be equal across repeated measurements of depressive

symptoms. Family structure was coded into three dummy variables (no-parent vs. non-

LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). Dep = Depressive symptoms. C =

Constant. E = Errors. D = Deviations.

CHAPTER 3 Methods

The CFPS Data Sample

The present research used archival data from the China Family Panel Studies (CFPS), funded by 985 Program of Peking University and carried out by the Institute of Social Science Survey of Peking University, China. CFPS is a nationwide longitudinal survey with multistage probability sampling method, in which data were collected first at the level of communities, and then at the level of families, and finally at the individual level. The baseline survey was conducted in 2010 in which 42,590 individuals (8,990 children from age 0 to 15 and 33,600 adults aged 16 or above) from 2,735 households in 635 communities were recruited (Ding, 2012; Xie & Hu, 2013). Five waves of survey data (2010, 2011, 2012, 2014, and 2016) have been collected thus far. With a cross-sectional design, the sample in Study 1 includes children aged 10 to 15 years in CFPS 2012 data (for further characteristics of sample see Table 3). With a longitudinal design, Study 2 used three waves of CFPS data (2010, 2011, and 2014). The CFPS 2012 and CFPS 2016 were not used for longitudinal analyses because the measurement for the outcome variable (i.e., depressive symptoms) has been changed.

Measures

Depressive symptoms in children. In Study 1, the depressive symptoms of children in 2012 were measured by a 20-item scale of the *Center for Epidemiologic Studies Depression* (*CES-D*; Radloff, 1977, 1991). The *CES-D* has been widely applied in Western samples (e.g., Benjet, Hernandez-Guzman, Tercero-Quintanilla, Hernandez-Roque, & Chartt-Leon, 1999; Devins & Orme, 1985; Gil-Rivas, Greenberger, Chen, & Lopez-Lena, 2003; Guarnaccia, Angel, & Worobey, 1989; Radloff, 1991) as well as in

national surveys such as Health and Retirement Study (HRS), National Health and

Nutrition Examination Survey (NHANES), and National Longitudinal Survey (NLS).

The Chinese version of the *CES-D* used in the current research was validated in studies of

Chinese adolescents (Chen, Yang, & Li, 2009; Liao et al., 2017; Ling et al., 2008; Zhang

et al., 2010) and adult populations (Feng, Guo, & Liu, 2016). Child participants were

asked to report the frequency of their depressive symptoms in the past week on a 4-point

Likert scale, with 1 indicating rarely or none of the time (less than 1 day), 2 indicating

some or a little of the time (1-2 days), 3 indicating occasionally or a moderate amount of

time (3-4 days), and 4 indicating all of the time (5-7 days).

The *CES-D* includes four factors representing somatic symptoms (e.g., "My sleep

was restless"), depressed affect (e.g., "I felt depressed"), interpersonal problems (e.g.,

"people were unfriendly"), and positive affect (e.g., "I enjoyed life"). The items for

positive feelings were reverse-coded. Since evidence suggested that children after age 9

could accurately identify and report their own emotions (Hankin & Abramson, 2001;

Harter, 1999; Kazdin, 1994), all family members aged 10 or older answered the

depression items by themselves in a face-to-face interview. A total score was calculated

based on all items of the scale. Higher scores indicate a higher level of depressive

symptoms (see Appendix C for scale details).

In Study 2, children's depressive symptoms were repeatedly measured in CFPS

2010, 2011, and 2014 by a short version of the *CES-D* (Radloff, 1977, 1991). The sample

items are "feel depressed and cannot cheer up no matter what you are doing" and "feel

hopeless about the future". Participants were asked to report the frequency of their

depressive symptoms in the past month on a 5-point Likert scale, with 1 indicating almost

every day, 2 indicating 2-3 times a week, 3 indicating 2-3 times a month, 4 indicating once a month, 5 indicating never. All items were summed to produce a total score with higher scores indicate greater depressive symptoms (see Appendix C for scale details). Psychometric characteristics of *CES-D* were discussed in the results section (see Table 4 and Table 5).

Short versions of *CES-D* have been widely used in previous research and have demonstrated adequate validity and reliability. For example, Tuunainen , Langer, Klauber, and Kripke (2001) examined depression among post-menopausal women by using a 6-item version of *CES-D*, which demonstrated a good sensitivity and specificity in detecting depressive mood. Similarly, three studies used the 8-item format of the *CES-D* to assess depressive symptoms in community-based samples, displaying the expected four factor structures of the *CES-D* and good internal consistency (.87 - .89; Melchior, Huba, Brown, & Reback, 1993; O'Halloran, Kenny, & King-Kallimanis, 2014; Turvey, Wallace, & Herzog, 1999).

Family structure. Consistent with previous studies, the present study defined the LBC as children who were under 18 and who had at least one parent absent for no less than six months because of labor migration (Zhou & Duan, 2006). Based on children's primary caregivers, their family structure type was categorized into four subgroups: (1) LBC who are living with relatives because both of their parents have left to work in another place; (2) LBC who are living with their mother only; (3) LBC who are living with their father only; and (4) non-LBC who are living with both parents. For both cross-sectional and longitudinal analyses, family structure was coded into three dummy

variables with non-LBC as the reference group (no-parent vs. non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC).

Caregiving behaviors. Caregiving behaviors were measured by 14 items adapted from the *Childrearing without Violence* (2008). Child participants were asked to rate caregiving practices they perceived from parents or guardians. Sample items include: "Parents/ guardians liked to talk with you" and "Parents/guardians told stories to you." Each item was graded on a 5-point Likert scale (1 = never, 2 = seldom, 3 = sometimes, 4 = usual, 5 = always). Among these 14 items, one item ("Parents/guardians criticized you", item 13) was reversely scored for data analysis. Scores for all items were added up to calculate a sum score ranging from 14 to 70, with the higher score indicates the more supportive and optimal parenting practices (see Appendix D for scale details). Psychometric properties of the Caregiving scale were reported in the results section (see Table 6 and Table 7).

For the MLM analysis, caregiving was estimated as a continuous variable and centering was applied to the caregiving scores such that the mean of the distribution becomes zero and results could be appropriate for interpretation (Enders & Tofighi, 2007; Kreft, De Leeuw, & Aiken, 1995). Since caregiving is a level-2 predictor, grand mean centering is recommended (Newsom, 2017). Also, grand mean centering is desirable for more accurate estimates of the intercepts (Enders & Tofighi, 2007).

Demographic information. Participants responded to a variety of demographic questions. The demographic information obtained included age, self-reported gender, residence type (urban and rural), residential community level, and per-capita household income. Gender was dummy-coded as 1 = female, 0 = male. The residence areas were

classified into urban or rural according to the guidance by the National Bureau of

Statistics of the People's Republic of China. The Chinese geographic administrative

divisions are divided into three major levels: the Provincial level, the County level, and

the Township level (in urban areas) or Village level (in rural areas). The residential

communities (also called *Shequ*, neighborhoods in rural areas and *Cunminxiaozu*,

villagers' groups in rural areas) are the subdivisions of Township/Village level of

political divisions in China. The classification of communities was guided by local

government rules (see the guidance of Administrative divisions of China). The per-capita

household income was used as a proxy for the family-level differences in socioeconomic

status (SES).

Statistical Analysis for Study 1

The purpose of Study 1 was to examine the impacts of contextual and personal

factors on children's depressive symptoms. The CFPS dataset used in Study 1 consisted

of three levels: a children level nested within a family level, which is nested within a

community level. A cross-sectional MLM model was adopted in Study 1 to process the

hierarchical nesting of the dataset and to take into account potential shared variances

within the same higher level unit (Heck & Thomas, 2000; Hox, 2010; Klein & Kozlowski,

2000; Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). For example, children from

the same family are likely similar to each other because of shared genetic makeup,

parenting characteristics, and childrearing beliefs. Families in the same community are

more likely to share variability due to the similarity in social resources and geographical

vicinity.

The influence of family structure and caregiving on children's depression scores was estimated at three levels: (1) the child level for measuring the influence of child age and gender on children's depression, (2) the family level for estimating the influence of family structure and caregiving when controlling for urban vs. rural differences as well as SES, and (3) the community level for controlling within-community non-independence (see Table 2 for the conceptual model and Appendix A for model equations).

Table 2

Conceptual MLM of the Community, Familial, and Individual Factors on Children's

Depression in China in 2012

MLM		Variables
Level 3	Community	
Level 2	Familial IVs	Family structure (non, mom-only, dad-only, non-LBC)
		Caregiving
		SES /urban vs. rural
Level 1	Individual IVs	Age
		Gender
	Interaction effects	Caregiving $\times$ Family structure
	DV	Child depression

Note. Family structure was coded into three dummy variables (no-parent vs. non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). Male = 1; female = 0. Urban = 1; rural = 0. SES was measured by per-capita household income. IV = Independent variable; DV = Dependent variable. The community level was used for controlling within-community non-independence.

SPSS 25 was used for preliminary analysis. T-test and the one-way ANOVAs followed by Bonferroni post hoc tests, were applied to assess statistical differences in child depressive symptoms by demographic characteristics. Mplus 7.0 was used for the psychometric analysis of *CES-D* and the scale of caregiving behaviors. The MLM was estimated in SAS 9.4 with Restricted Maximum Likelihood estimation (REML). REML was adopted to improve the accuracy of random effect estimates and fixed effect standard errors (Snijders & Bosker, 1999). SAS PROC MIXED was used for the estimation in MLM. Assumptions of HLM were checked, including multicollinearity, normality, and residual independence (Raudenbush & Bryk, 2002). Effect size was calculated using the proportion of variance explained (PVE).

A typical four-step approach was used to construct the model in which unconditional effects (empty model), main effects at the child level (random-intercepts model), main effects at the family level (means-as-outcomes model), and interaction effects between family structure and caregiving (random-intercepts-and-slopes model) were added sequentially (Hofmann, 1997; Raudenbush & Bryk, 2002; Woltman et al., 2012). The first model provided a statistical justification for running MLM analyses (Hofmann, 1997; Raudenbush & Bryk, 2002). The second and third models were used to estimate main effects of predictors at the child level and family level separately, while the last model was applied to test interaction effects. The model comparisons were performed based on the -2 Res Log Likelihood *(-2RLL)*, Akaike Information Criterion (*AIC*), and the Bayesian Information Criterion (*BIC*) statistics (Hofmann, 1997; Raudenbush & Bryk, 2002; Woltman et al., 2012).

Statistical Analysis for Study 2

The purpose of Study 2 was to identify and explain the developmental trajectory of depressive symptoms among Chinese LBC. LGM was adopted as it takes into account the fact that there are correlated effects (e.g., error terms) for repeated measures (Murphy & Berry, 2014). Using three-wave longitudinal data, LGM was applied to estimate the intra- and inter-individual differences in changes and predictors that could account for these changes (Duncan & Duncan, 2004; Nesselroade, 1991). The LGM model-building followed two steps: Step 1 investigated intra-individual change and inter-individual differences; and Step 2 incorporated predictors of family structure and gender that could account for these changes (Byrne & Crombie, 2003).

SPSS 25 was used for descriptive statistics. Mplus 7.0 was used for the psychometric analysis of *CES-D*. Assumptions underlying LGM were checked, including linearity, residual independence, and residual homoscedasticity (Byrne & Crombie, 2003). LGM analysis was estimated by SAS 9.4 with REML (Snijders & Bosker, 1999). The best model was selected with the smallest magnitude of *-2RLL*, *AIC*, *BIC*.

CHAPTER 4 Results

The purpose of this research was to explain and predict depressive symptoms in a sample of LBC using the nationally representative data from CFPS. Two studies have been conducted to examine the potential factors affecting depressive symptoms in both cross-sectional and longitudinal analyses. In Study 1, MLM was applied to investigate how contextual factors (family structure and caregiving) and personal characteristics (age and gender) relate to depressive symptoms while controlling for urban vs. rural differences and SES in a sample of Chinese LBC. In Study 2, LGM was used to examine the inter-individual differences in intra-individual change in depressive symptoms as well as predictors (family structure and gender/age) that could account for the change over time.

Study 1 Results

The Sample Demographics

In Study 1, valid data were obtained from 2,936 children aged 10-15 from 2,635 households in 590 communities, with 1520 (51.8%) males and 1382 (47.1%) females from CFPS 2012. A total of 936 children (32.3%) lived with non-parent guardians, 471 (16.2%) lived in mom-only families, 98 (3.4%) lived in dad-only families, and 1397 (48.1%) lived in intact families. The numbers of children for each age from 10 to 15 years are 484 (16.7%), 437 (15.1%), 488 (16.8%), 520 (17.9%), 469 (16.2%), and 504 (17.4%), respectively. 2191 children (75.8%) lived in rural areas and 699 (24.2%) lived in urban areas (for further characteristics of sample see Table 3).

Table 3

Characteristics of the Sample for Study 1 (N = 2,936)

		Males		Females		Total	
		N	%	N	%	N	%
Family	No-parent	497	32.3	439	31.8	936	32.3
Structure	Mom-only	229	15.1	242	17.5	471	16.2
	Dad-only	53	3.5	45	3.3	98	3.4
	Non-LBC	741	48.8	656	47.5	1397	48.1
Age	10	264	17.4	220	15.9	484	16.7
	11	234	15.4	203	14.7	437	15.1
	12	238	15.7	250	18.1	488	16.8
	13	288	18.9	232	16.8	520	17.9
	14	248	16.3	221	16.0	469	16.2
	15	256	18.5	248	16.3	504	17.4
Urban vs.	Urban	367	24.2	332	24.1	699	24.2
rural	Rural	1148	75.8	1043	75.9	2191	75.8

Note. No-parent = Children who were living with no parent present; Mom-only = Children who

were left behind with their mother; Dad-only = Children who were left behind with their fathers;

Non-LBC represents children living with both parents.

Measure Validation

   CES-D

   EFA. Since the *CES-D* was originally developed for measuring symptoms of depressed mood in older adults in Western populations and variations in psychometric characteristics have been found in cross-cultural studies (e.g., Cheng, Chan, & Fung, 2006; Gupta & Yick, 2001; Ying, 1988), factor analyses were conducted for the sample of Chinese children in the present study. The entire sample of 2,936 students was randomly split into two subsamples and analyzed separately for structural validation. The first half of the sample was used in an exploratory factor analysis (EFA) to identify the factor structure of the *CES-D* using SPSS ($N = 1,482$). The estimation of assumptions indicated that factor analyses are appropriate for this data: The sampling adequacy was acceptable (The Kaiser-Meyer-Olkin, KMO = .89) and Bartlett's test of sphericity was significant ($p < .001$).

   The initial EFA with principal components analysis indicated four factors with relatively clean factor loadings. Two items (the item 9 and 11) were removed due to low loadings on corresponding factors. A cutoff of .50 in factor loadings was applied to assure that items were clearly related to the factor (Tabachnick & Fidell, 2007). After rerunning the EFA with the remaining 18 items in SPSS, results indicated four factors with eigenvalues greater than one, which together accounted for 46.99% of the total variance in the *CES-D*. Including items with high loadings on corresponding factors ($> .50$), the four factors could be presented as somatic symptoms (e.g., "sleep was restless", "have trouble keeping my mind on what I was doing", "everything I was doing was an effort"), interpersonal problems (e.g., "people were unfriendly", "people dislike

me"), depressed affect (e.g., "I felt depressed", "crying", "sad"), and positive affect (e.g.,

"enjoyed life", "happy"). The pattern of factor loadings found in the present sample is, to

a large extent, consistent with the factor structure of the original form proposed by

Radloff (1977). Each factor generated decent internal consistency, ranging from .68

to .78 (Bagozzi & Yi, 1988).

Table 4

Factor Structure of EFA Models and Corresponding Reliability for CES-D

Factors	No. of Items	N	M	SD	α
Somatic	6	1482	1.20	.58	.78
Interpersonal	5	1482	2.16	.65	.68
Affect	3	1482	1.35	.47	.75
Positive	4	1482	.51	.21	.74

Note. Somatic = Somatic symptoms in depression; Interpersonal = Interpersonal

problems that are related to depression; Affect = Depressed affect; Positive = Positive

affect which is conceptualized as an inverse of depression.

CFA. Based on the results from the EFA, the confirmatory factor analysis (CFA) was tested using the second half of the sample in Mplus with Maximum Likelihood estimation (ML; Brown, 2006; N = 1,454). Items with factor loadings (items 2, 3, 4, 8, 10, 13, 14 and 20) lower than .50 were removed to increase the validity of the *CES-D* (Fornell & Larcker, 1981). Several trials were made to confirm the factor structure that was extracted from the EFA. As shown in Table 5, fit indices suggested that 10 items with 4 factors produced the best fit to this data (χ^2 (29) = 93.48, *CFI* = .98, *RMSEA* = .04, *SRMR* = .03; Hu & Bentler, 1999).

The adapted version of *CES-D* indicated factorial dimensions comparable to that of the original form (Radloff, 1977). Total scores of the derived 10-item scale correlated .93 with total scores of the full scale in this sample (Silverstein, 1989). And results of the revised *CES-D* demonstrated a similar pattern of frequency distribution in depressive symptoms as the full scale in the present sample. In addition, the item composition of the revised *CES-D* in the present study is similar to the item composition of the Boston's 10-item form, which is a shortened of Radloff's *CES-D* and has been validated in Western populations (e.g., Kohout et al., 1993; Grzywacz et al., 2006). The comparison of the item composition between existing 10-item forms and the revised scale in the present study are presented in Appendix E (Andresen et al., 1994; Cole et al., 2004; Kohout et al., 1993; see reviews by Carleton et al., 2013; Grzywacz et al., 2006). The Cronbach's alpha for the full scale of *CES-D* proposed by Radloff (1977) was .85 and for the full scale in this sample was .81. After removing items with poor construct validity, the Cronbach's alpha for the derived 10-item scale in this sample was .84.

Table 5

Goodness-of-Fit Indicators of CFA Models for CES-D

Factor Models	AIC	χ^2	CFI	RMSEA	SRMR
18 items with 4 factors	48097.97	613.71***	.92	.05	.04
10 items with 4 factors	**24368.18**	93.48***	.98	.04	.03
10 items with 3 factors	24462.55	280.68***	.91	.08	.04
10 items with 2 factors	24545.38	280.68***	.91	.08	.04

Note. **$p < .01$. ***$p < .001$. *AIC* = Akaike Information Criterion; *CFI* = Confirmatory Fit

Index; *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standard Root

Mean Square Residual. The *AIC* with the smallest indices is in boldface.

Caregiving behaviors

EFA. The internal consistency reliability alpha (Cronbach, 1951) for the entire

scale was .82. The entire sample of 2,936 students was randomly split into two

subsamples for the EFA and CFA analyses. The first subsample was used in an EFA to

identify the factor structure of caregiving measurement using SPSS ($N = 1,482$). Two

assumptions were examined (Cerny & Kaiser, 1977): The sampling adequacy was

acceptable (The Kaiser-Meyer-Olkin, KMO = .86) and Bartlett's test of sphericity was

significant ($p < .001$). The initial EFA indicated two factors with relatively clean factor

loadings. All factor loadings were larger than .50, which could explain 40.82% of

variances in the caregiving scale. The two components of caregiving behaviors could be

presented as: (1) supportive behaviors, characterized by affective and supportive ways of

childrearing (e.g., "encourage to do things with great effort", "encourage to think

independently", "tell you the reasons when asking you to do something", "like to talk

with you"), and (2) controlling behaviors, characterized by monitoring and regulating

children's behaviors (e.g., "check homework", "help with school work", "asked about

what happened at school"). Each factor generated decent internal consistency reliability,

with .79 to .88, respectively (Bagozzi & Yi, 1988). The EFA results are shown in Table 6.

Table 6

Factors Structure of EFA Models and Corresponding Reliability for Caregiving

Behaviors

Factors	No. of Items	N	M	SD	α
Supportive Behaviors	7	1482	22.65	3.58	.79
Controlling Behaviors	7	1482	23.51	4.65	.88

CFA. The CFA was tested with the second half of the sample in Mplus with

Maximum Likelihood (ML; $N = 1,454$). Items with factors lower than .50 were removed

to increase the validity of the caregiving measure (Fornell & Larcker, 1981). Several

trials were made to confirm the factor structure that was extracted from the EFA. As

shown in the following table, the model with 11 items and 2 factors possessed the

smallest *AIC* indices and produced the best model fit (χ^2 (43) = 264.74, *CFI* = .89,

RMSEA= .08, *SRMR* = .05; Hu & Bentler, 1999).

Table 7

Goodness-of-Fit Indicators of Models for Caregiving

Two-Factor Models	**AIC**	χ^2	*CFI*	*RMSEA*	*SRMR*
14 items	24609.87	345.99[***]	.88	.08	.05
13 items	23012.69	318.52[***]	.88	.08	.05
12 items	21391.25	275.58[***]	.89	.08	.05
11 items	**19130.10**	264.74[***]	.89	.09	.05

Note.[***]$p < .001$. *AIC* = Akaike Information Criterion; *CFI* = Confirmatory Fit Index;

RMSEA = Root Mean Square Error of Approximation; *SRMR* = Standard Root Mean

Square Residual. The smallest *AIC* is in boldface.

Preliminary Analyses

Table 8 presents results of preliminary analyses on children's depressive symptom scores by family structure, urban vs. rural differences, age, and gender. The one-way ANOVA test revealed a significant difference in the scores for children's depressive symptoms among four types of family structure (F (3, 2555) = 3.12, $p < .05$). LBC living in the dad-only families reported the highest scores on depressive symptom indices ($M = 16.86$, $SD = 4.04$), followed by LBC in no-parent families ($M = 15.85$, $SD = 3.85$) and then those in mom-only families ($M = 15.68$, $SD = 3.87$). The Bonferroni post hoc tests showed that, in comparison with the non-LBC, LBC in dad-only families reported significantly higher scores on depressive symptom indices ($p < .05$). Children's age appeared to have no significant relationships with depressive symptoms ($r = -.01$, $p = .84$). The t-test showed statistically higher scores for depressive symptoms among children living in rural areas (t (2550) = 5.36, $p < .01$). No significant difference in depressive symptom scores were found between genders (t (2527) = 1.10, $p = .32$).

Table 8

Preliminary Analyses for Child Depressive Symptoms by Family Structure, Urban vs.

Rural Differences, Age, and Gender (N = 2,936)

| | | Depressive Symptoms | |
		M	SD
Family Level			
Family Structure	No-parent	15.85	3.85
	Mom-only	15.68	3.87
	Dad-only	16.86	4.04
	Non-LBC	15.62	3.86
Urban vs. rural	Urban	15.05	3.61
	Rural	15.98	3.93
Individual Level			
Age	10	31.69	6.74
	11	32.24	6.55
	12	30.76	6.50
	13	31.70	6.82
	14	31.37	6.03
	15	31.77	6.62
Gender	Males	15.66	3.86
	Females	15.82	3.88

Note. No-parent = Children who were living with no parent present; Mom-only =

Children who were left behind with their mother; Dad-only = Children who were left

behind with their fathers; Non-LBC represents children living with both parents.

Table 9 presented the descriptive statistics for perceived caregiving quality by family structure. Results indicated that LBC living with their mother only reported the highest level of perceived caregiving, followed by children living in intact families and then LBC living with no parent present. For LBC who were cared for by non-parental guardians, LBC who were left behind with grandparents reported higher levels of caregiving quality than LBC who were living with relatives or others. No significant difference has been found in the perceived caregiving quality among different family structure cohorts.

Table 9

Descriptive Statistics for Caregiving by Family Structure

Family structure	Caregiving	
	Mean	*SD*
No-parent	32.71	6.83
grandparent	33.15	6.57
No grandparent	32.27	6.45
Mom-only	34.96	6.55
Dad-only	32.52	6.67
Intact families	33.74	6.77

Note. No-parent = Children who were living with no parent present; Mom-only = Children who were left behind with their mother; Dad-only = Children who were left behind with their fathers; Non-LBC represents children living with both parents.

Results for MLM

Correlations among variables. Initial correlational analyses were conducted to examine correlations between depressive symptoms and family structure, caregiving, age, gender, SES as well as rural vs. urban differences. Results indicated that caregiving, SES, and urban vs. rural differences were significantly related to children's depressive symptoms, respectively (see Table 10).

Table 10

MLM Correlations among Variables

	1	2	3	4	5	6	7	8	9
1.Depression	1								
2.No-parent	.03	1							
3.Mom-only	.02	.03	1						
4.Dad-only	.05*	.02	.03	1					
5.Careging	-.22***	-.07	.05	-.04	1				
6.Age	-.01	.11*	.02	.01	.02	1			
7.Gender	-.02	.03	.05	.08*	-.03	.01	1		
8.SES	-.15**	-.26**	.02	.03	.14**	.05	.03	1	
9.Urban vs. rural	-.11**	-.56**	-.21*	-.32*	.15*	.03	.03	.24***	1

Note. $^*p< .05.$ $^{**}p< .01.$ $^{***}p< .001.$ Family structure was coded into three dummy variables (no-parent vs. non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). No-parent = Children who were living with no parent present; Mom-only = Children who were left behind with their mother; Dad-only = Children who were left behind with their fathers; Non-LBC represents children living with both parents. Female=0, male=1; Rural =0; urban=1.

Unconditional MLM. A typical four-step approach was used to construct the model (Hofmann, 1997; Raudenbush & Bryk, 2002; Woltman et al., 2012). To begin, an unconditional three-level model was created to estimate the *Intraclass Correlation Coefficient* (*ICC*), and this indicated that a significant amount of variability in the depression scores could be attributed to family-level groupings and community-level groups (Raudenbush & Bryk, p. 230, 2002). The *ICC*s can also indicate how children from the same family or the same community were similar to one another (Peugh, 2014). A sufficient amount of variability at higher-level groupings must be met to use a hierarchical model. It is common for 5 - 25% of the outcome variance to be "between groups" in social science research (Snijders, p.12, 2012). An *ICC* that is smaller than 5% suggests that an analysis for grouped data is unnecessary (Bliese, 2000). The present study calculated two *ICC* values with $ICC_{family} = 19.81\%$ and $ICC_{community} = 17.46\%$. This means that 19.81% of the variation in the outcome (i.e., depressive symptom scores) exists between families and 17.46% exists between communities, leaving 62.73% of the variance in the outcome existing within children. Given the significant effects of clustering between children within the same community, a three-level analytical model was necessary to test the family-level effects and community-level effects. Since insufficient information is available for the community-level variables, the community-level variance was tested for controlling non-independence within communities in the present study. The REML estimation and SAS PROC MIXED was used in the data analysis.

Model evaluation and comparison. In the following steps of MLM analyses, variables were entered in the regression equation as follows: personal-level variables (age

and gender) were entered subsequently to Model 1; family-level variables (family

structure, caregiving, SES, and urban vs. rural differences) were entered subsequently to

Model 2. Finally, an interaction between caregiving and family structure was added to

Model 3.

A sequence of nested models was tested to compare the model fit based on *-2RLL*,

AIC, and *BIC* statistics (Hofmann, 1997; Raudenbush & Bryk, 2002; Woltman et al.,

2012). As shown in Table 11, for each additional step that was added to the model, the

AIC and *BIC* values in the more complex models became smaller than the previous model.

Therefore, Model 3 was selected as the best model for this data by examining the

significant log likelihood difference and choosing the smallest magnitude of fit indices as

-2RLL = 5857.7, *AIC* = 5865.7, *BIC* = 5882.2.

Table 11

MLM Model Fit Indices

Four-Step Models with Predictors		*-2 RLL*	*AIC*	*BIC*
Model 0	Unconditional model	14025.5	14031.5	14044.6
Model 1	Age, Gender	16494.6	16500.6	16531.6
Model 2	Age, gender	7016.1	7022.1	7034.6
	Family			
	Caregiving			
	Urban, SES			
Model 3	Age, gender	5857.7	5865.7	5882.2
	Family, Caregiving			
	Urban, SES			
	Caregiving $\times$ family			

Note. $^{*}p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$ Family = Family structure, which was coded into three dummy variables (no-parent vs. non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). Female = 0; male = 1. Urban = urban vs. rural (rural = 0; urban = 1).

Regression of depressive symptoms on familial and personal variables. The final

model (Model 3) included the predictor of family structure (no-parent vs. non-LBC,

mom-only vs. non-LBC, dad-only vs. non-LBC), caregiving, and the interaction effects

while controlling for the SES and urban vs. rural differences. As can be seen in Table 12,

the family structure did not have a significant effect over and above the influence of

caregiving. Children with more positive caregiving reported lower level of depressive

symptoms after holding constant other predictors. Urban children reported lower level of

depressive symptoms than rural children. Results of the final model indicated a non-

significant interaction effect between caregiving and family structure. For the final model,

the effect size at community level (level 3) was .14 and the effect size at the family level

(level 3) was .79.

Table 12

Regression of MLM for Depressive Symptoms on Familial and Personal Variables (N =
2,936)

Levels	Variable	b	SE	t
Familial level	No-parent	-.18	.47	-.79
	Mom-only	-.23	.26	-.89
	Dad-only	.55	.23	1.18
	Care	-.10**	.03	-3.77
	Urban	-.64*	.30	-2.15
	SES	-3.97	9.85	-.40
Individual level	Age	-.10	.07	-1.42
	Gender	-.35	.22	-1.61
Interactions	Care $\times$ Non-parent	-.04	.03	-1.13
	Care $\times$ Mom-only	-.01	.04	.02
	Care $\times$ Dad-only	.05	.07	.46
Model fit	-2RLL	5857.7		

Note. $^{*}p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$ Coefficients with significant *p*-values are in boldface.
Family= Family structure, which was coded into three dummy variables (no-parent vs.
non-LBC; mom-only vs. non-LBC; dad-only vs. non-LBC). Non-parent = Non-parent
families; Mom-only = Mom-only families; Dad-only = Dad-only families. Care =
Caregiving behaviors. Urban = urban vs. rural (rural = 0, urban = 1). Female = 0; male =
1. $ICC_{family} = 19.81\%$; $ICC_{community} = 17.46\%$. Values based on SAS PROC MIXED.
Estimation Method = REML.

In sum, the three-level MLM was used to evaluate the main and interaction effects of family structure and caregiving on children's depressive symptoms while controlling for age and gender as well as controlling non-independence within a community. MLM is desirable because it can account for clustering between children who have been sampled from the same family nested within the community. A four-step approach was used to construct the model in which unconditional model, level-1 factors, level-2 factors, and interaction effects were added consequently to the model. Effect sizes were estimated. The best model (i.e., Model 3) with lowest fit indices on -2*RLL*, *AIC*, *BIC* statistics was selected as the best fit to the data.

Study 2 Results

The Sample Demographics

Results from Study 1 indicated no significant association between the left-behind status and concurrent depressive symptoms. However, it is possible that the deleterious effects of being left behind may show up later. Study 2 further examined how the one-time experience of being left behind may affect subsequent depressive later. Specifically, Study 2 used three waves of CFPS data (2010, 2011, and 2014) with a longitudinal approach to examine the developmental trajectory of depressive symptoms over time. Study 2 data were collected from a sample of 1,588 children who were repeatedly assessed across the three waves. Specifically, at Wave I of the study (2010), children in the sample were aged from 10 to 15. At Wave II (2011), the age of children was in the range from 11 years to 16 years. At Wave III (2014), the age of children ranged from 14 to 19 years.

Measure Validation

In Study 2, the reliability of the 6-item *CES-D* scale was tested for all three waves of data. Using the whole sample, the Cronbach's alpha was .80 in the Wave I data, .78 in the Wave II data, and .85 in the Wave III data, which were acceptable. The total scores of the 6-item *CES-D* scale were calculated and used in the analyses. The 1,588 subjects were randomly split into two subsamples and analyzed separately for the assessment of factor analyses. The first half sample ($N = 794$) was used to test the EFA in SPSS. All items loaded on one factor for three waves of data, explaining 49.9%, 47.4%, and 58.24% of variances in the *CES-D* scale in three waves, respectively. The second half sample ($N = 794$) was used for the CFA in Mplus. Results confirmed the EFA results and indicated acceptable model fit for three waves of data (see Table 13).

Table 13

Goodness-of-Fit Indicators of Models for the 6-item Version of CES-D (N = 794)

Factor model	AIC	χ^2	CFI	RMSEA	SRMR
6 items in Wave I	4807.97	713.71***	.93	.06	.04
6 items in Wave II	4368.18	193.48***	.98	.05	.03
6 items in Wave III	4462.55	180.68***	.92	.08	.04

Note. **$p < .01$. ***$p < .001$. *AIC* = Akaike Information Criterion; *CFI* = Confirmatory Fit Index; *RMSEA* = Root Mean Square Error of Approximation; *SRMR* = Standard Root Mean Square Residual.

Preliminary Analyses

Study 2 explored how depressive symptoms changed over time in a sample of Chinese children. Furthermore, the study examined the predictive effects of family structure and child age/gender on the change trajectory of depressive symptoms from 2010 to 2014. Despite the significant influences of caregiving on child depression in Study 1, the caregiving variable was not included in Study 2 because only 11-year-olds were selected to answer questions concerning caregiving behaviors in the CFPS 2010 wave. The same situation happened in the CFPS 2011 wave.

The total, family structure, age groups means, and standard deviations of depressive symptoms at each wave are reported in Table 14. The total means of 1,588 children's Depression scores ranged from 8.81 to 9.09 across waves. The mean in 2014 was the highest, and the mean of 2010 was the lowest.

The family structure was categorized into no-parent families, mom-only families, dad-only families, and non-LBC families. The means of depression scores were compared among four cohorts of family structure. The details of the means of depression scores for each family structure were presented in Table 14 and Figure 3. Also, the means of depressive symptom scores were compared among children from six age cohorts and presented in Table 14 and Figure 4. The one-way ANOVA test indicated significant differences in depressive symptoms among the six age cohorts in 2010 (F (5, 1576) = 4.10, $p < .001$) and in 2011 (F (5, 1578) = 2.15, $p < .05$). Bonferroni post hoc tests indicated that the level of depressive symptoms was significantly higher in children aged 15 relative to children aged 10 in 2010 ($p < .01$). Similarly, the Bonferroni post hoc comparisons indicated that the Age-12 cohort (aged 13 at Wave 2) reported significantly

higher depressive symptoms than the Age-15 cohort (aged 16 at Wave 2) in 2011 (p

$< .01$). No significant differences in depressive symptoms were found among the six age

cohorts in 2014.

Table 14

Means and Standard Deviations for Depression for Total Sample, Family Structure, Age,

and Gender Groups across Time (N = 1,588)

	2010	2011	2014
	M (SD)	M (SD)	M (SD)
Depression for the Total			
	8.81 (3.74)	8.99 (3.50)	9.09 (3.26)
Depression Among Family Structure			
No-parent	8.78 (3.65)	9.40 (3.88)	9.33 (4.47)
Mom-only	9.25 (3.82)	8.80 (2.89)	8.72 (2.61)
Dad-only	8.17 (3.69)	9.22 (4.58)	10.35 (3.81)
Non-LBC	8.80 (3.74)	8.99 (3.50)	9.08 (3.24)
Depression Among Age			
Age 10	8.23 (3.54)	8.73 (3.70)	9.10 (3.23)
Age 11	8.52 (3.64)	8.93 (3.50)	9.18 (3.36)
Age 12	9.02 (3.75)	9.49 (3.69)	8.98 (2.96)
Age 13	9.06 (4.06)	9.06 (3.61)	9.30 (3.70)
Age 14	8.69 (3.37)	9.16 (3.51)	9.09 (3.31)
Age 15	9.56 (4.00)	8.60 (2.79)	8.84 (2.91)
Depression between Genders			
Males	8.85 (3.66)	9.21 (3.70)	9.02 (3.26)
Females	8.78 (3.82)	8.79 (3.30)	9.16 (3.26)

Note. No-parent = Children who were living with no parent present; Mom-only =

Children who were left behind with their mother; Dad-only = Children who were left

behind with their fathers; Non-LBC represents children living with both parents.
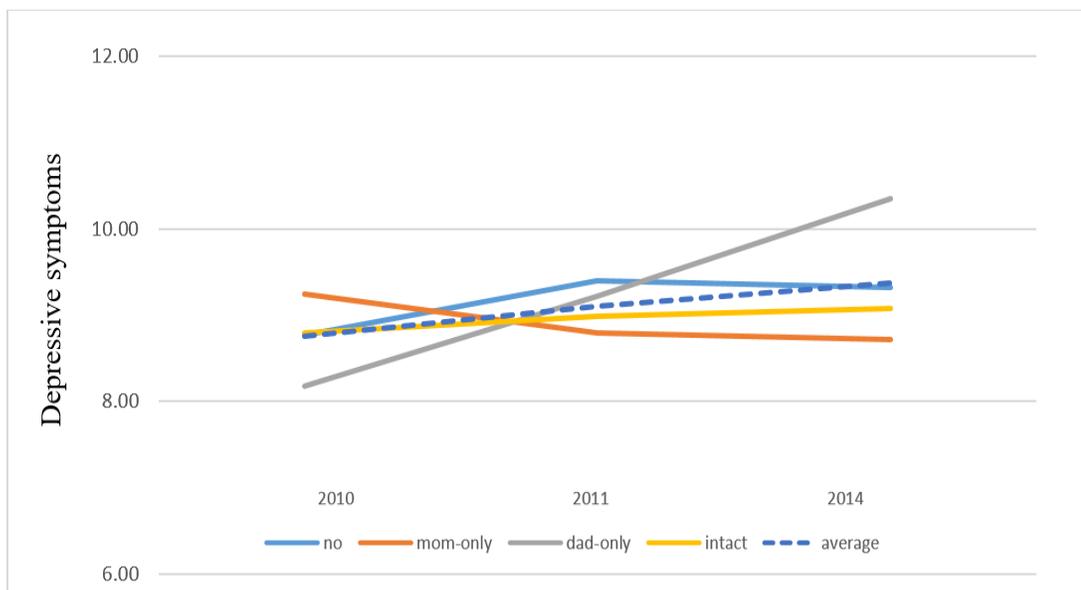
Figure 3. Change in depressive symptoms among family structure groups. Non = no-parent families; mom-only = mom-only families; dad-only = dad-only families; intact = non-LBC.
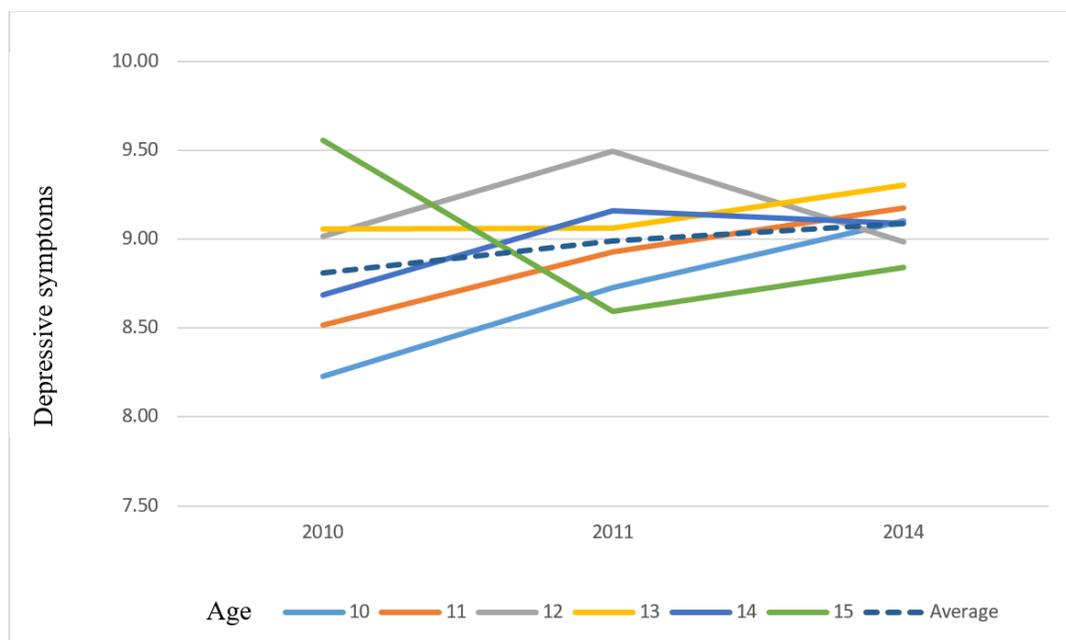

Figure 4. Change in depressive symptoms among the six age cohorts from age 10 to age 15.

Results for LGM

Model evaluation and comparison. A series of models were specified in order to select a best fitting model. Given the fact that the same group of participants was repeatedly assessed across three waves, I expect the residual variances within each measurement condition are the same or similar. Accordingly, a linear random-intercept-slope conditional model was tested with equal error variances in repeated measures. Alternatively, a linear model with error in the repeated measure freely estimated was estimated to identify the optimal model design.

In addition, it is possible that youth depressive symptoms may display a nonlinear trend. One possibility is that youth depressive symptoms increase from childhood to adolescence and decrease from adolescence to adulthood (Costello, Copeland, & Angold, 2011). Also, children may experience greater depressive symptoms at the beginning of separation from parents and have decreased depressive experiences because of emotional regulation over time. Therefore, a quadratic growth model with factor loadings of 0, 1, and 16 for the slope factor was tested.

The quadratic model was rejected due to bad model fit indices. Compared to the linear unconditional model, the conditional model showed a significant χ^2 difference, indicating a significant improvement in model fit in terms of all fit indices when error variances were constrained to be equal. Although the linear model with the freely estimated error variances in repeated measures showed equally well model fit indices, it is less parsimonious. Therefore, I selected the linear conditional model with equal error variances in repeated measures as the best fitting model and concluded that the children showed a linear pattern in individual development in depressive symptoms.

Unconditional LGM for changes in depression. The linear longitudinal analyses first examined the shape of within-person growth trajectory, which serves as a priori step for using LGM (Byrne & Crombie, 2003). The intercept represents initial levels of depressive symptoms in 2010 and remains constant for any given individuals over repeated measures. Hence, the intercept factor loadings were fixed to 1 (Byrne& Crombie, 2003; Chan, 2002; Duncan, Duncan, Stryker, Li, & Alpert, 1999; Preacher, 2008). The slope represents the average rate of change in depressive symptoms from 2010 to 2014. The loadings on the latent slope in the model were set to 0, 1, and 4 to represent a linear growth from 2010, 2011, to 2014 (Bentler, 2006; Bollen, 1989; Byrne, 1994, 1998, 2001; Preacher, 2008). The residuals were constrained to be equal across repeated measurements (Chan, 2002).

At the within-person part of the model, as shown in Figure 5, the estimate of the intercept was 8.86, $p< .001$, which indicated that the estimated average of depressive symptoms across children was 8.86 in 2010, and it was significantly different from 0 in the sample. The estimate of the slope was .06, $p < .05$, representing the estimate of the average rate of change across adolescents.

Over and above within-person differences in change over time, the unconditional LGM analyses investigated individual differences in developmental trajectories. The intercept variance and the slope variance were allowed to covary (Byrne & Crombie, 2003). At the between-person part of the model, as shown in Figure 5, the variance of the intercept factor was significant ($\sigma^2_I = 4.41$, $p < .001$), indicating that there were significant inter-individual differences in the initial levels of depressive symptoms. Also, the variance of the slope factor was significant ($\sigma^2 s = .10$, $p = .04$), indicating significant

inter-individual differences in the rate of change in depressive symptoms. Given these inter-individual differences in initial depression and the rate of change, it is necessary to incorporate predictors in subsequent analyses to explain the inter-individual differences in intra-individual change in depressive symptoms.
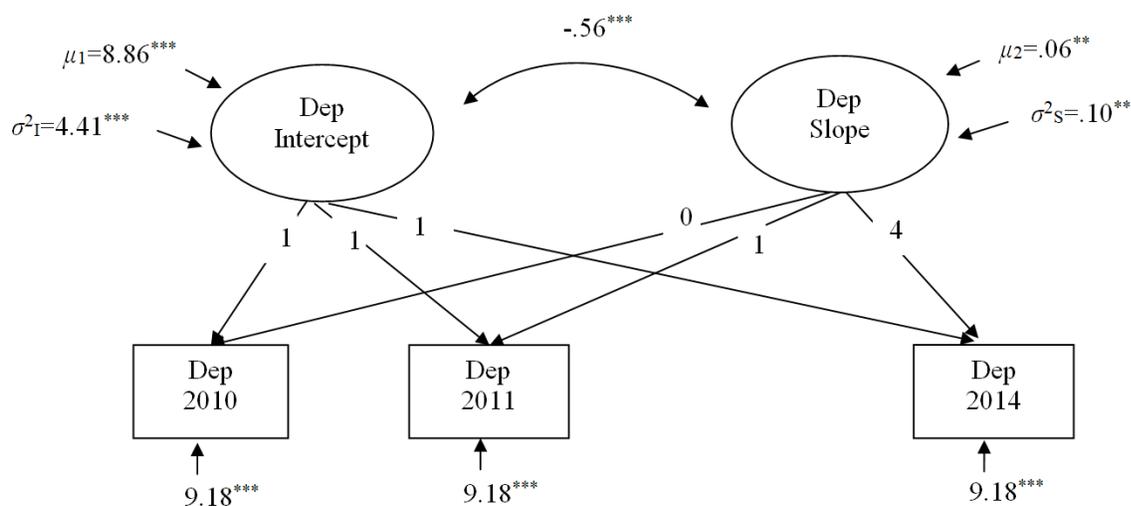
Figure 5. Unconditional LGM. Intercept were fixed at 1, and slope parameters were fixed at 0, 1, and 4 respectively. The residuals were constrained to be equal across repeated measurements. μ_1 is the mean of intercept; σ^2_I is the variance of intercept; μ_2 is the mean of slope; σ^2_S is the variance of slope. The two-headed arrow represents the correlation between intercept and slope. Dep = Depressive symptoms. ***$p < .001$. **$p < .05$. *-2RLL =* 25219.8, *AIC =* 25223.8, *BIC =* 25234.6.

Conditional LGM for change in depression. Based on the evidence for inter-individual differences, a conditional model was used to estimate the effects of two predictors (the family structure and child age/gender at Wave 1) on initial levels and change in depression.

The predictive role of family structure. The family structure was included in the linear model to predict or explain the between-person variation in the initial depression and the rate of change. The construct of family structure was dummy-coded into three categorical variables (no-parent vs. non-LBC, mom-only vs. non-LBC, dad-only vs. non-LBC). As shown in Figure 6, the association between mom-only families and the slope (the rate of change) is positive and significant ($b = -.23$, $p < .05$), indicating that children who were left behind with mothers (vs. non-LBC) reported less of an increase in depressive symptoms over time. Children who were left behind with fathers (vs. non-LBC) evidenced a steeper increase in depressive symptoms over time ($b = .34$, $p < .05$). The LBC from no-parent families revealed no significant relationship with the slope factor. The family structure showed no significant association with the intercept factor.

Post hoc examine of the model suggests that duration might be another potential factor. Therefore, the present study also examined the impact of duration of being left-behind on child depressive symptoms by using an alternative coding strategy. The duration of being left-behind was assessed as the number of months for separation between parents and their children. The duration of mother-child separation and the duration of father-child separation were included in LGM analyses, indicating no significant effects of separation duration on child depressive symptoms. Also, the

frequency of the left-behind status across three time points were entered into the model
and revealed no significant association with child depressive symptoms.

The predictive role of children's age. Using the children's age reported in 2010, I
examined age at Time 1 as a predictor of initial level and slope of depression. As shown
in Figure 6, after controlling for the family structure, the association between children's
age at Wave 1 and the intercept factor is significant and positive ($b = .14$, $p < .01$),
indicating that older children had higher levels of initial depression in 2010. Also, the
association between children's age at Wave 1 and the slope is significant and negative ($b
= -.05$, $p < .01$), indicating that older children evidenced less of an increase in depressive
symptoms over time compared to their younger peers.

I also modified the model to be more parsimonious. The initial conditional LGM
analyses were tested with three variables including family structure, child age at Wave 1,
and child gender. Since child gender was not significantly associated with the initial level
of depressive symptoms or the slope (rate of change), child gender was eliminated to
improve the parsimony of the model.
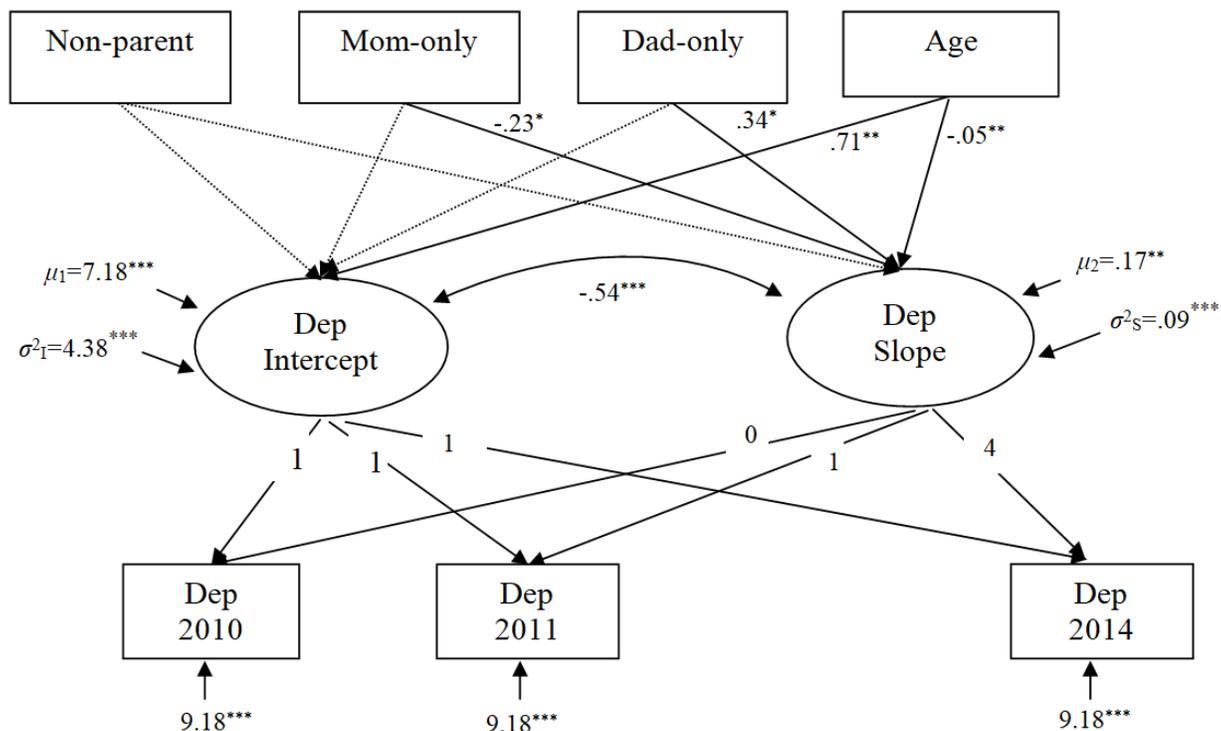
Figure 6. The final LGM for changes in depressive symptoms. Intercept were fixed at 1,

and slope parameters were fixed at 0, 1, and 4 respectively. The residuals were

constrained to be equal across repeated measurements. The construct of family structure

was coded into three categorical variables with the intact families as reference group (no-

parent vs. non-LBC, mom-only vs. non-LBC, dad-only vs. non-LBC). Dep = Depressive

symptoms. [***]$p < .001$. [**]$p < .01$. [*]$p < .05$. *-2RLL* = 25185.5, *AIC* = 25193.5, *BIC* = 25214.

Paths with non-significant coefficients were presented as dashed lines.

In sum, the LGM was used to explain the developmental trajectory of children's depressive symptoms over a 4-year period as well as to longitudinally verify the influence of family structure and age on the development of depression. The results first indicated that, on average, depression increased over time. But there were considerable inter-individual differences in the initial levels of depressive symptoms among children and in the rate of change over time. In addition, results indicated that the LBC from mom-only families (vs. non-LBC) reported less of an increase in depressive symptoms over time. LBC living with dad-only indicated a steeper increase in depressive over time. Third, child age showed a significant positive association with the initial level of depressive symptoms and a significant negative relationship with the rate of change in depression over time. However, child gender seemed to have no significant impacts on the developmental trajectory of depressive symptoms over time.

CHAPTER 5 Discussion

LBC is a large and rapidly increasing population in China. The radical changes in family structure and long-term parental absence put LBC in a vulnerable position for mental health development. The present studies examined the potential impacts of familial and individual factors on child depressive symptoms using both cross-sectional and longitudinal analyses in a family-oriented cultural context. Two studies were conducted in a sample of Chinese LBC. Study 1 examined how contextual factors (family structure and caregiving) and child personal characteristics (age and gender) related to children's depressive symptoms using MLM analyses. Study 2 investigated the developmental trajectory of depressive symptoms over time and factors that could account for this trajectory using LGM. Two important overall findings, discussed in greater detail below, emerged from the present research.

First, family factors were predictive of child depressive symptoms in both of the studies. Maternal absence for LBCs (vs. the non-LBC group) was associated with more negative effects on LBC's emotional well-being whereas paternal absence (vs. non-LBC) was linked to less negative effects on LBCs emotional well-being. However, LBC who are left in the care of non-parent guardians are barely disadvantaged in depression levels compared to intact-family children. Second, MLM analyses showed that children reporting more positive caregiving tended to have fewer depressive symptoms.

Influence of Family Structure on Child Depression

My first research question for Study 1 was concerned with the main effects of family separation on child depressive symptoms. As expected, preliminary results

indicated that LBC living with dad-only reported significantly higher depressive symptoms than non-LBC. However, this relationship became absent after controlling for caregiving quality and demographic factors. In addition, LGM analyses revealed that children who were left behind with fathers (vs. non-LBC) experienced increasingly a steeper increase in depressive symptoms over and above child personal characteristics. Results illuminate the dad-only family composition without adequate supports as a key risk factor threatening the emotional well-being of LBC.

According to the relatively strict gender norms that are typical in China, fathers often migrate to increase family income. These fathers who were left behind with LBC may have health problems and face challenges in childrearing. Also, mothers in China traditionally take on greater responsibility in childrearing and domestic responsibilities (Marchetti, 2018). Fathers may be much less involved in child care and many fathers may lack detailed knowledge about the care, nutrition, and mental health for their children. Our results indicated that children who were left behind with fathers reported a lower level of perceived parenting quality compared to children from intact families. Considering the fact that the family structure did not matter for child depression when controlling for caregiving quality, education programs targeting enhancing parenting skills for custodial fathers might support more positive LBC development. Supports from extended family members and community services might also be helpful when fathers feel overwhelmed by childcare.

In addition, LGM analyses revealed that the mom-only family structure predicted no significant difference in the initial level of depressive symptoms compared to intact families. And children who were left behind with mothers (vs. non-LBC) showed less of

an increase in depression over and above the influence of personal characteristics. One possible explanation is that youth view moms who stay behind as more invested in them than youth from two-parent families (Amato, 2000). In addition, father's labor migration could increase household incomes. The money sent from migrant fathers can increase life satisfaction and adaptive outcomes for both mothers and children by promoting quality-of-life and increasing investment for children's education. With such compensatory supports, children left with mothers were less likely to develop emotional problems.

Influence of Caregiving on Child Depression

Findings for the second research question of Study 1 also confirmed hypotheses about the predictive role of positive caregiving in promoting children's emotional well-being. MLM analyses indicated that children with more positive caregiving practices (e.g., support and monitoring) reported fewer depressive symptoms, whereas children with less caring caregivers reported a higher level of depressive symptoms. Results were consistent with previous reports (Formoso, Gonzales, & Aiken, 2000; Garber, Robinson, & Valentiner, 1997; Walker, Garber, & Greene, 1993).

The family environment plays a critical role in child development. Positive caregiving behaviors, characterized by high levels of responsiveness and support can typically promote the development of a positive sense of self and social confidence, which, in turn, is linked to fewer depressive symptoms (Baumrind, 1978). In contrast, children experiencing negative caregiving (e.g., unresponsiveness and neglect) tend to develop degraded judgments about the self and the world, and hence are more likely to become depressed (Milevsky, Schlechter, Netter, & Keehn, 2007). Understanding how caregiving quality may affect children's emotional development has important

implications for the design of caregiving interventions. For example, caregiving skills training can be developed to educate caregivers about children's mental health care, how to set up limits in discipline, and how to cope with children's psycho-emotional needs. Caregivers' encouragement for children to express their thoughts and feelings might be another good way to benefit their mental health (Hayslip & Kaminski, 2005).

In fact, parenting education might be especially helpful for migrant parents considering the evidence that the family structure did not matter for child depression when controlling for caregiving quality. In China, parental labor migration disrupts the family integrity, often resulting in long-lasting negative emotions among both migrant parents and LBC. Therefore, if the parents have to work far away from home for a long period of time, it is important to increase the sensitivity and supervision their children experience in order to detect potential mental health problems. Using modern technologies such as smart phones to maintain regular and frequent communication between migrant parents and their children would likely provide some benefits to LBC's mental health.

Protective Effects from Responsive Caregivers in Child Depression

Numerous studies have shown that Chinese LBC are at greater risk of emotional disorders compared to the non-LBC (e.g., Ren & Treiman, 2016). There is a compelling need to understand the psychological challenges among LBC and identify protective factors to support adjustment in the face of family separation. In Study 1, I hypothesized that LBC should display higher levels of depressive symptoms relative to children in intact families. Contrary to my hypotheses, LBC who are left in the care of non-parent guardians are barely disadvantaged in depression levels compared to intact-family

children. MLM analyses revealed that caregiving accounted for the influence on child depression and the no-parent family structure was not significantly associated with depressive symptoms. Additionally, LGM analyses indicated that LBC who have been cared for by non-parent guardians (i.e., LBC living with no parent present) indicated no significant association with concurrent depressive symptoms or the developmental trajectory in depressive symptoms over time compared to the non-LBC.

This finding could explain some of the inconsistency in previous reports about LBC's psychological adjustment (e.g., He et al., 2006; Hu et al., 2007; Ren & Treiman, 2016; Wen & Lin, 2012). Previous studies tended to focus on aggregated effects of parental labor migration and often failed to account for the influence of variations in family structure. In general, we expected that LBC should have a greater vulnerability to depression as a result of parental absence. The extent of negative emotions may, however, vary across diverse family structures. The present research found that LBC who are living with no present are barely disadvantaged in concurrent or subsequent depression level compared to intact-family children.

This may be attributable to the compensatory influence of responsive caregivers (e.g., grandparents) in left-behind families. In China, usually the grandparents take the responsibility of childrearing when one or both parents leave home for long-term work, but grandparents also typically take an important role in rearing grandchildren regardless of whether or not parents migrate for work. Thus Chinese LBC children may be very familiar and comfortable with grandparent caregiving even prior to parent migration. The present study indicated that around 52% of LBC in no-parent families are cared for by their grandparents, which is consistent with previous reports (Duan & Zhou, 2005; Fan,

2010; Wang, 2016). Usually the grandparents have a "genetic incentive" and more time (relative to working fathers, for example) to take care of their grandchildren (Hawkes, 2003). And our results indicated that children who were living with non-parental guardians reported no significant difference in caregiving quality compared to children from intact families. Children living with relatives reported a lower but non-significant level of caregiving quality than children who were cared for by grandparents.

Surprisingly, the interaction effects between family structure and caregiving was not significantly associated with children's depressive symptoms. It is possible that the lack of moderation actually indicates that LBC still often manage to receive adequate caregiving from separated parents (perhaps via electronic communication and phone contact) and other caregivers despite separations. It is also possible that other more relevant moderators were not included in the present study.

Age Differences in Child Depression

In addition to the family factors, the predictive role of children's age in child depression was also examined in the present research. LGM analyses indicated that older children had higher levels of initial depression than younger children at the first assessment time-point. Further, the results demonstrated that older children had a slower rate of increase in depressive symptoms over time.

This finding of declining depressive levels for children aged 15 was consistent with previous analyses (Brooks-Gunn & Peterson, 1991; Wickrama, Conger, Lorenz, & Jung, 2008). When children grow older, they begin to expand social networks outside of the family environment. Older children tend to become less dependent upon their parents and may be more likely to overcome the family-related stress such as parental separation.

Also, older children begin to develop an increasing capacity in emotional regulation that could reduce the severity and longevity of being depressed (Carstensen, Isaacowitz, & Charles, 1999; Larson, Moneta, Richards, & Wilson, 2002). Thus, the influence of stressful events such as family separation may usually be a less potent risk factor for children during late adolescence and young adulthood.

The LGM analyses also demonstrated that younger children had lower initial levels of depressive symptoms but being younger was associated with a higher rate of increase in depressive symptoms over time. Also, children who started with higher depression showed less of an increase in depressive symptoms. This finding was also consistent with previous results (e.g., Wang et al., 2015). Evidence suggests that depression and other internalizing disorders increase at the time young people transition to adolescence and continue to increase during early adolescence. This is attributed to the stress of transitioning to new schools and social environments while simultaneously having to cope with an increased academic burden and understand and accommodate physical changes related to maturation (Forrest, Bevans, Riley, Crespo, & Louis, 2013). The absence of supportive parents during this time of adolescent transition can be especially troublesome as a result of reduced socialization guidance. Future studies might benefit by examining LBC by age as well as grade level in school.

Limitations

There are several limitations of this study, indicating several directions for future research. First, I do not have information regarding the emotional state of these LBC prior to being left behind. It is possible that children already had high levels of depressive symptoms before they were left behind and their emotional difficulties may be due, in

part, to biological factors (Lee et al., 2007) or stressors present before parent migration. (e.g., academic burden and negative peer relationships). A future study that can account for children's emotional condition before their parents' migration would allow a better understanding of LBC emotional development. Second, the interaction effects between family structure and caregiving were non-significantly associated with children's depressive symptoms. This might be due to the small sample size for the group of LBC living in dad-only families (N = 98) since statistical significance is often highly sensitive to sample sizes (Diallo, Morin, & Parker, 2014). Future research is needed using a sample size that could provide enough power for more nuanced analyses. Third, the present research was limited by the data sources. Analyses were conducted based on CFPS data from years 2010, 2011 and 2014. The measurements of depressive symptoms changed across these time periods, limiting my ability to run some longitudinal tests. Future research might incorporate more continuous and updated data to provide more accurate results. Fourth, this is a single-reporter dataset with children filling out information about both depression and caregiving practices. Children who are more depressed may be more likely to view their caregiving relationships as poor. The caregiving assessment was limited to broad support and control - future research might take a more nuanced look at the care being received. In addition, it is impossible to obtain the distinct and detailed information of caregiving differences in the given dataset. Thus I am unable to investigate the caregiving that is unique to each type of family structure or examine the potential mediating effects of caregiving in the association between family structure and child depressive symptoms. A future research direction might investigate the role of caregiving in greater detail.

Conclusion

The present research has described important factors related to understanding depressive symptoms in Chinese LBC using the nationally representative data from CFPS. Two studies were conducted to examine the potential affecting factors in both cross-sectional and longitudinal design. In Study 1, MLM was applied to investigate how familial factors (family structure and caregiving) and personal characteristics (age and gender) relate to child depressive symptoms while controlling for urban vs. rural differences, SES, and within community non-independence. In Study 2, LGM was used to explore intra- and inter-individual changes in depressive symptoms in a sample of Chinese LBC over a 4-year period. The predictive effects of family structure and age on these changes were also examined.

This study used a culturally appropriate framework incorporating contemporary models of parenting effects on depressive symptoms to provide an in-depth understanding of the distribution and extent of depression among LBC. Findings from the present research could increase our attention to the potential psychosocial challenges existing for LBC. The findings regarding the potential effects of family structure and parenting could bring significant implications for supporting governmental agencies, school managers, parents, and guardians. Exactly how schools and local counseling services can assist will not be addressed here, but the effects of being left behind on social and emotional development deserve serious attention by those in charge of education and mental health and this study is a first step in providing supporting research that will assist these efforts.

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APPENDIX A. Model Equations for MLM

The three-level MLM will be estimated in SAS 9.4 to examine the community,
familial factors (family structure, caregiving, and SES), and individual factors (age and
gender) on children's depressive symptoms. MLM will be desirable to account for
clustering between children who have been sampled from the same family nested within
the community. SAS PROC MIXED will be used for estimation in MLM with REML. A
four-step approach will be used to construct the model in which the unconditional model,
level 1 factors, level 2 factors, and cross-level effects will be added to the model. Effect
size will be estimated by PVE. The model comparison will be performed based on -2*RLL*,
AIC, *BIC*.

Step 1. Unconditional model

$Y_{ijk} = \pi_{0jk} + e_{ijk}$	Level 1
$\pi_{0jk} = \beta_{00k} + r_{0jk}$	Level 2
$\beta_{00k} = \gamma_{000} + u_{00k}$	Level 3

Step 2. Random-coefficients model

$Y_{ijk} = \pi_{0jk} + \pi_{1jk} \, ESTEEM_{1jk} + \pi_{2jk} \, GENDER_{1jk} + e_{ijk}$	Level 1
$\pi_{0jk} = \beta_{00k} + r_{0jk}$	Level 2
$\pi_{1jk} = \beta_{10k} + r_{1jk}$	Level 2
$\pi_{2jk} = \beta_{20k} + r_{2jk}$	Level 2
$\beta_{00k} = \gamma_{000} + u_{00k}$	Level 3
$\beta_{10k} = \gamma_{100} + u_{10k}$	Level 3
$\beta_{20k} = \gamma_{200} + u_{20k}$	Level 3

Step 3. Means-as-outcomes model

$$Y_{ijk} = \pi_{0jk} + e_{ijk} \qquad \text{Level 1}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}\,\text{FAMILY}_{jk} + \beta_{02k}\,\text{CARE}_{jk} + r_{0jk} \qquad \text{Level 2}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \qquad \text{Level 3}$$

$$\beta_{01k} = \gamma_{010} + u_{01k} \qquad \text{Level 3}$$

$$\beta_{02k} = \gamma_{020} + u_{02k} \qquad \text{Level 3}$$

Step 4. Random-intercepts-and-slopes model

$$Y_{ijk} = \pi_{0jk} + \pi_{1jk}\,\text{ESTEEM}_{1jk} + \pi_{2jk}\,\text{GENDER}_{1jk} + \pi_{3jk}\,\text{AGE}_{1jk} + e_{ijk} \qquad \text{Level 1}$$

$$\pi_{0jk} = \beta_{00k} + \beta_{01k}\,\text{FAMILY}_{jk} + \beta_{02k}\,\text{CARE}_{jk} + \beta_{03k}\,\text{FAMILY*CARE}_{jk} + \beta_{04k}\,\text{SES}_{jk} + r_{0jk}$$

Level 2

$$\pi_{1jk} = \beta_{10k} + \beta_{11k}\,\text{FAMILY}_{jk} + r_{1jk} \qquad \text{Level 2}$$

$$\pi_{2jk} = \beta_{20k} + r_{2jk} \qquad \text{Level 2}$$

$$\pi_{3jk} = \beta_{30k} + r_{3jk} \qquad \text{Level 2}$$

$$\beta_{00k} = \gamma_{000} + u_{00k} \qquad \text{Level 3}$$

$$\beta_{01k} = \gamma_{010} \qquad \text{Level 3}$$

$$\beta_{02k} = \gamma_{020} \qquad \text{Level 3}$$

$$\beta_{03k} = \gamma_{030} \qquad \text{Level 3}$$

$$\beta_{04k} = \gamma_{040} \qquad \text{Level 3}$$

$$\beta_{10k} = \gamma_{100} \qquad \text{Level 3}$$

$$\beta_{11k} = \gamma_{110} \qquad \text{Level 3}$$

$$\beta_{20k} = \gamma_{200} \qquad \text{Level 3}$$

$$\beta_{30k} = \gamma_{300} \qquad \text{Level 3}$$

Where

$$e_{ijk} \sim \text{N}\ (0, \sigma^2)\ \text{and}\ \begin{pmatrix} r0jk \\ r1jk \\ u00k \end{pmatrix} \sim MVN \left[\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00} \tau_{01} \tau_{02} \\ \tau_{10} \tau_{11} \tau_{12} \\ \tau_{20} \tau_{21} \tau_{22} \end{pmatrix} \right]$$

APPENDIX B. Model Equations for LGM

An LGM will be estimated by Mplus 7.0 with REML to model the intra- and inter-individual change in the development of Depressive symptoms. Additionally, predictors of Family Structure and Gender will be estimated as predictors of initial status and rate of change in Depression. The LGM model-building will follow three steps: Step 1 will investigate intra-individual change; Step 2 will estimate inter-individual differences; and Step 3 will incorporate predictors of Family structure and Gender on change (Byrne & Crombie, 2003).

Step 1. LGM estimating intra-individual change

$Y_{ti} = \beta_{0j} + \beta_{1i} Time_{1i} + r_{ti}$ 　　　　　　　　　　Within-person

$\beta_{0i} = \gamma_{00} + u_{0i}$

$\beta_{1i} = \gamma_{10}$

then $Y_{ti} = \gamma_{00} + \gamma_{10} Time_{1i} + u_{0i} + r_{ti}$

where $r_{ti} \sim N(0, \sigma^2)$ and $u_{0j} \sim N(0, \tau_{00})$

y_{ti} is the value of Depression for person i at time t, β_{0i} is the random intercept for person i, T_{1i} represents the numerical value of Time at time t, β_{1i} is the random slope for person i, and r_{ti} is the disturbance for person i at time t. $r_{ti} \sim N(0, \sigma^2)$

Step 2. LGM estimating inter-individual differences in change

$Y_{ti} = \beta_{0i} + \beta_{1i} Time_{1i} + r_{ti}$ 　　　　　　　　　Within-person

$\beta_{0i} = \gamma_{00} + u_{0i}$ 　　　　　　　　　　　　　　　Between-person

$\beta_{1i} = \gamma_{10} + u_{1i}$

then $Y_{ti} = \gamma_{00} + \gamma_{10} T_{1i} + \mu_{1i} Time_{1i} + u_{0i} + r_{ti}$

where $r_{ti} \sim N(0, \sigma^2)$ and $\begin{pmatrix} u_{0i} \\ u_{1i} \end{pmatrix} \sim MVN \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00} & \tau_{01} \\ \tau_{10} & \tau_{11} \end{pmatrix} \right]$

μ_{0i} is the deviation of subject's average intercept from the population average intercept.

μ_{1i} is the deviation of subject's average slope from the population average slope.

Step 3. LGM estimating predictive effects of family structure and gender on change

$$Y_{ti} = \beta_{0j} + \beta_{1i} \, Time_{ti} + r_{ti} \qquad \text{Within-person}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} \, FAMILY_i + \gamma_{02} \, GENDER_{i} + u_{0i} \qquad \text{Between-person}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} \, FAMILY_i + \gamma_{12} \, GENDER_i + u_{1i}$$

Then $Y_{ti} = \gamma_{00} + \gamma_{01} \, FAMILY_i + \gamma_{02} \, GENDER_i + \gamma_{10} \, Time_{ti} + \gamma_{11} \, FAMILY_i \, {*}Time_{ti}$

$+ \gamma_{12} \, GENDER_i \, {*}Time_{ti} + u_{0i} + u_{1i} \, Time_{ti} + r_{ti}$

γ_{00} *(intact, male intercept)*

γ_{10} *(intact, male slope)*

γ_{01} *(Δintact vs. left behind intercept)*

γ_{11} *(Δintact vs. left behind slope)*

γ_{02} *(Δ female vs. male intercept)*

γ_{12} *(Δ female vs. male slope)*

where $r_{ti} \sim N(0, \sigma^2)$ and $\begin{pmatrix} u_{0i} \\ u_{1i} \end{pmatrix} \sim MVN \left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00} & \tau_{01} \\ \tau_{10} & \tau_{11} \end{pmatrix} \right]$

FAMILY will be dummy-coded as 1=left behind, 0=intact family; GENDER will be

dummy-coded as 1 = female, 0=male.

APPENDIX C. Center for Epidemiologic Studies Depression (CES-D; Radloff, 1977)

Adapted *CES-D* for Study 1 (CPFS 2012):

      1. I was bothered by things that usually don't bother me.

      2. I had trouble keeping my mind on what I was doing.

      3. I felt depressed.

      4. I felt that everything I did was an effort.

      [*]5. I was happy.

      6. People were unfriendly.

      [*]7. I enjoyed life.

      8. I had crying spells.

      9. I felt sad.

      10. I felt that people disliked me.

CES-D for Study 2 (CFPS 2010, 2011, and 2014):

      1. I feel depressed and cannot cheer up no matter what you are doing

      2. I feel nervous

      3. I feel upset and cannot remain calm

      4. I feel hopeless about the future

      5. I feel that everything is difficult

      6. I think life is meaningless

Note. [*] Two items represented positive feelings and were reversely scored.

APPENDIX D. Adapted Scale for Caregiving Behaviors (*Childrearing without Violence*, 2008)

1. When you did something wrong, the parents/guardians would ask about the reasons and talk to you about what you should do

2. Parents/guardians encouraged you to do things with great effort

3. Parents/guardians were gentle while talking with you

4. Parents/guardians encouraged you to think independently

5. Parents/guardians would tell you the reasons when asking you to do something.

6. Parents/guardians liked to talk with you

7. Parents/guardians asked about what happened to you at school

8. Parents/guardians checked your homework

9. Parents/guardians helped you with your schoolwork

10. Parents/guardians told stories to you

11. Parents/guardians played with you, e.g., playing chess, playing outside

12. Parents/guardians praised you

13. Parents/guardians criticized you

14. Parents/guardians attended parent-teacher meetings at school

APPENDIX E. The Description of Item Composition Among 10-Item Versions of CES-D (adapted from Grzywacz et al., 2006).

Item No.	Key words of items	Andersen (10 items ×2 factors)	Cole (10 items ×4 factors)	Boston (10 items ×4 factors)	Present study (10 items ×4 factors)
1	bothered by things	√	√		√
2	appetite was poor				
3	could not shake off the blues		√		
4	as good as others		√		
5	Had trouble keeping my mind	√	√		√
6	depressed	√		√	√
7	everything was an effort	√	√	√	√
8	hopeful about the future	√	√		
9	life had been a failure		√		
10	fearful	√	√		
11	sleep was restless	√		√	
12	happy	√		√	√
13	talked less				

14	lonely	√	√	√	
15	unfriendly		√	√	√
16	enjoyed life			√	√
17	crying				√
18	sad			√	√
19	people disliked me			√	√
20	could not "get going"	√		√	

APPENDIX F. Institutional Review Board Approval

February 7, 2017 - official approval letter

Ian Newman

Department of Educational Psychology

232 TEAC, UNL, 68588-0345

Lok Wa Yuen

Department of Educational Psychology

2259 Y St Apt 36 Lincoln, NE 68503

IRB Number: 20160916332 EX

Project ID: 16332

Project Title: Drinking Patterns in Mainland China from Five National Studies

Dear Ian:

The Institutional Review Board for the Protection of Human Subjects has completed its

review of the Request for Change in Protocol submitted to the IRB.

1. It has been approved to add Lanyan Ding as a secondary investigator.

2. It has been approved to extend the study end data listed in the protocol to 6/22/2018.

3. The research purpose has change: In addition to our exploration of alcohol use in the China Family Panel Studies (CFPS) only, we will examine whether or not parental migration is linked to the development of depression in their children.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;

* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;

* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;

* Any breach in confidentiality or compromise in data privacy related to the subject or others; or

* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This letter constitutes official notification of the approval of the protocol change. You are

therefore authorized to implement this change accordingly.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,

Becky R. Freeman, CIP

for the IRB

APPENDIX G The Original 20-Item CES-D (Radloff, 1977)

1. I was bothered by things that usually don't bother me.

2. I did not feel like eating; my appetite was poor.

3. I felt that I could not shake off the blues even with help from my family.

4. I felt that I was just as good as other people.

5. I had trouble keeping my mind on what I was doing.

6. I felt depressed.

7. I felt that everything I did was an effort.

8. I felt hopeful about the future.

9. I thought my life had been a failure.

10. I felt fearful.

11. My sleep was restless.

12. I was happy.

13. I talked less than usual.

14. I felt lonely.

15. People were unfriendly.

16. I enjoyed life.

17. I had crying spells.

18. I felt sad.

19. I felt that people disliked me.

20. I could not "get going".

APPENDIX H The Original Scale of Caregiving (*Childrearing without Violence*, 2008)

1. When you did sth wrong, the parents/guardians would ask about the reasons and talk to you about what you should do

2. Parents/guardians encouraged you to do things with great effort

3. Parents/guardians were gentle while talking with you

4. Parents/guardians encouraged you to think independently

5. Parents/guardians would tell you the reasons when asking you to do sth.

6. Parents/guardians liked to talk with you

7. Parents/guardians asked about what happened to you at school

8. Parents/guardians checked your homework

9. Parents/guardians helped you with your schoolwork

10. Parents/guardians told stories to you

11. Parents/guardians played with you, e.g., playing chess, playing outside

12. Parents/guardians praised you

13. Parents/guardians criticized you

14. Parents/guardians attended parent-teacher meetings at school