Migration and Children's Psychosocial Development in China:

When and Why Migration Matters

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Abstract

Migration has affected a large number of children in many settings. Despite growing attention to these children, important gaps remain in our understanding of their psychosocial development, as well as the factors that mediate and moderate the impact of migration on children. The present study examines the influences of migration on children's psychosocial well-being in China using a new nationally representative survey. We compared different groups of children age 3-15, including migrant children, left-behind children, and rural and urban children in nonmigrant families. Results show that rural children left behind by both parents were significantly worse off in psychological and behavioral well-being than rural nonmigrant children. By contrast, rural children left behind by one parent and migrant children were no worse off. The disadvantage of left-behind children was mediated by their caregivers' emotional well-being and parenting practices. Frequent contact with migrant parents, but not receipt of remittances, helped ameliorate the vulnerability of left-behind children. These results add to our understanding of how migration affects child development in general.

Introduction

Internal and international migration have altered the state of the family in many societies. A sizeable fraction of children has experienced parental migration during the course of childhood, either accompanying their parents (migrant children) or being left behind by one or both parents (left-behind children). China represents a prominent example, where more than 168 million rural people have left their villages to seek work in cities (China National Bureau of Statistics, 2016). As a result, children affected by migration constitute over 32% of the population under age 18 (All China Women's Federation, 2013). Exacerbating the effect of migration are distinct state institutions, in particular the *hukou* (registration) system that limits access to urban social benefits such as housing, health care, pensions, social security, and schooling for migrants (Chan and Buckingham, 2008).

Migration represents a distinct form of family transition that likely has important ramifications for children because it shapes both material and non-material resources in the family, which are central to child development (Becker and Thomes, 1986; Danziger and Waldfogel, 2000; Duncan et al., 1994; Yeung et al., 2002). Migration can affect children in two ways, by uprooting them or separating them from parents. Both types of children are salient in China. First, many migrants leave their children behind because the structural barriers in cities impose substantial difficulties in arranging adequate childcare and schooling. As of 2010, 61 million rural children, or about 22% of all Chinese children under age 18, had spent at least part of their childhood with only one or neither parent at home (ACWF, 2013; Duan et al., 2013). Almost half of these children lived with neither of their parents. Parent-child separation can lead to substantial disruptions in family relationships, in spite of often sizeable monetary remittances

from migrant parents. Second, some migrants are able to bring their children or start families in cities. The number of these migrant children is estimated to be over 28 million, representing over 10% of all Chinese children (ACWF, 2013). While migrant children enjoy preserved family unity and improved economic conditions, they confront various forms of institutional and social discrimination that prevent them from fully integrating into their host communities (Huang et al., 2016).

The well-being of children of China's tidal wave of migrants presents a great challenge to successful child development and societal development. This topic has drawn substantial scholarly attention and has yielded many useful insights. However, several important gaps remain in our understanding of the development of children affected by migration. First, there is much less systematic research on the psychological and behavioral development of these children than on other dimensions of child development, especially educational and health outcomes, for which data are more readily available (Liang and Chen, 2007; Lu, 2012; Zhou et al., 2014). This is unfortunate because psychosocial development is potentially a key area where migrant children and left-behind children face especially severe vulnerabilities. This limitation is largely due to a lack of data with systematic psychosocial assessments.

Second, a large number of previous studies collected data either only in urban areas or only in rural areas, or were based on small local surveys that are sensitive to regional particularities. Restricting the sample to either rural or urban China makes it impossible to compare in a single framework different groups of children affected by migration with appropriate comparison groups of nonmigrant children. This is particularly problematic when

migrant children are compared to urban children, which conflates the effect of migration with long-standing socioeconomic disparities between rural and urban areas. The more appropriate comparison for migrant children is rural nonmigrant children. There are several notable exceptions based on recent national surveys, a major advancement (Hao and Yu, 2016; Ren and Treiman, 2016; Xu and Xie, 2015; Xu et al., 2018; Yeung and Gu, 2016), although their focus was not necessarily on children's psychosocial well-being.

Lastly, previous research has centered on children's outcomes and has paid less attention to mediating and moderating factors that can explain or condition the effects of migration. Thus, we are left with the questions of why might particular groups of children suffer from migration, and when are these children especially vulnerable. For example, anecdotal evidence suggests that possible emotional deficits of left-behind children may be related to their less desirable family environments (Wang and Mesman, 2015). Which aspects of the post-migration family environments represent important mediating mechanisms? Also, even when certain groups of children are exposed to negative effects of migration, some of them display considerable resilience (Wang and Mesman, 2015). What factors help ameliorate the adverse impacts of migration? The role of mediating factors (such as caregiver characteristics) and moderating factors (such as frequency of contact with parents and receipt of remittances) has not been systematically examined in previous research using rigorous statistical methods and national data.

To fill in these gaps, we conducted a nationally representative sample survey in 2012-2013 in China, designed specifically to examine the impacts of migration on families and children. The survey collected detailed information on key aspects of child development as well

as family environments. Among other items, we collected information on the Behavior Problems Index (BPI), a battery of questions that has been widely utilized with demonstrated validity (Peterson and Zill, 1986; Achenbach and Edelbrock, 1981; Baker et al., 1993). The BPI represents a more comprehensive and reliable measure of children's psychosocial functioning than separate scales composed of one or only a few items. The BPI encompasses a broader range of child psychological and behavioral problems than depression or anxiety, two topics studied elsewhere, which are included in the index. Moreover, the BPI is a composite index based on multiple items, which are generally more reliable than separate scales composed of one or only a few items. In the analysis, we compared several main groups of Chinese children: migrant children, left-behind children, and rural and urban children in nonmigrant families. We made further distinctions within migrant and left-behind children. Moreover, we examined several mediating and moderating factors that may explain why and when children are affected by parental migration, taking advantage of the information available on the characteristics and behaviors of children's primary caregivers and on the contact between migrant parents and children and the remitting behavior of migrant parents.

Background

A large literature in child development has shown that parental monetary and social resources (especially time spent and care provided to children) are critical for child development (Becker and Thomes, 1986; Danziger and Waldfogel, 2000; Duncan et al., 1994; Yeung et al., 2002). The migration process is closely linked to child development because it shapes both dimensions of family resources. Specifically, migration typically brings considerable economic improvement but at the same time may adversely affect children by separating children from their parents or

by requiring that they adjust to new environments often fraught with institutional and social barriers.

Development of Left-behind Children in China

Family reorganization and attachment theory are relevant to understanding children's separation from their parents due to migration. Family reorganization, such as that due to separation, triggers change at multiple levels of the family system and creates adaptive challenges for all family members (Hetherington, 1992). In the context of migration, parent-child separation leads to change in family functioning and in multiple relationships--children and parents, children and other caregivers, parents and other caregivers--which creates disruptions in child development. The processes are summarized in Figure 1.

Specifically, when children are left behind, they inevitably experience prolonged periods of separation and reduced parental input and supervision essential for their development (Dreby, 2010; Graham and Jordan, 2011; Hoang and Yeoh, 2012; Parreñas, 2005; Toyota et al., 2007). A large body of literature provides conclusive evidence that parental absence leads to lower educational attainment, reduced cognitive development, and diminished physical and psychological well-being of children (Demuth and Brown, 2004; Duncan and Brooks-Gunn, 1997; McLanahan and Sandefur, 1994; Strohschein, 2005; Teachman et al., 1998). In industrialized societies, parental absence often results from divorce or non-marital fertility. In developing settings such as China, parental absence most often arises when parents migrate for work.

[Figure 1 about here]

As a result of parental out-migration, the reduced social and psychological resources that parents are able to invest in children can have a detrimental impact on children's development. These disruptions include the lack of parental involvement and of supervision for emotional and behavioral regulation and lack of a stimulating home environment for healthy development (Galambos et al., 2003). Concomitantly, remaining caregivers not only experience additional household responsibilities for childcare, home maintenance, and agricultural production, but also endure emotional burdens because of separation from their loved ones, usually their spouse or children (Lu, 2012). These physical and psychological burdens subject the remaining caregivers to heightened stress, which further aggravates parenting deficits. Under these challenges, remaining caregivers may show lower levels of warmth and support and may be more punitive in their interactions with children (Ponnet et al., 2014; Yeung et al., 2002). Exposure to such rearing practices undermines the social and psychological well-being of the children. The impaired psychological functioning of the caregivers may be inadvertently transferred to children, giving rise to emotional instability and depression (Hammen et al., 2012). In all these respects (displayed as the three mediating channels in Figure 1), parental migration is likely to have an adverse effect on left-behind children, especially their emotional and behavioral well-being, which hinges strongly on parental non-material resources (Haveman and Wolfe, 1995; Paxson and Schady, 2007).

Children themselves also face profound emotional challenges because, according to attachment theory, separation from parents undermines affectional bonds with primary

attachment figures (Ainsworth et al., 1978). The disruption in attachment figures can trigger problems in emotion regulation such as heightened feelings of insecurity and abandonment (Kobak and Madsen, 2008). This also is likely to give rise to the feeling of ambiguous loss (Boss, 2000), as children struggle to reconcile themselves to the absence of their parents and uncertainty as to when they will reconnect with parents. These processes are characterized as a direct link between parent-child separation and children's psychosocial outcomes in Figure 1.

The family processes just discussed tend to vary by children's relationships with migrant parents. The literature on child development demonstrates that children are more adversely affected by maternal absence than by paternal absence, reflecting the traditional role of mothers as primary caregivers (Brooks-Gunn et al., 2002). In this respect, mother's migration is likely to be felt more acutely than the out-migration of fathers (Yeoh and Lam, 2006). It follows that children left behind with no parent may endure the greatest disruptions in family arrangements and face particularly severe emotional challenges because of the absence of both attachment figures and especially weak parental support and supervision. The previously stable caregiving arrangement is most disrupted in this case, as neither parent is available to continue their roles as caregivers.

However, migration is distinct from other types of parental absence such as marital dissolution, which often entails economic hardship. Households with migrants typically benefit from migrants' substantial economic contributions (Lopez, 2015; Stark and Lucas, 1988; World Bank, 2016). A high level of family economic resources benefits children's intellectual and emotional development because well-off families are better able to invest in children and provide

a stimulating home environment (Yeung et al., 2002). As such, migrants' remittances can raise household living standards and improve educational and health expenditures on children (Lu and Treiman, 2011).

Giving these competing processes, a critical question is whether migrant parents' financial contributions outweigh the family disruptions caused by their absence. While family economic and social environments are both important, they operate differentially for different aspects of child development. Income generally exerts a large impact on children's educational and cognitive achievement. Hence, the positive material impact of migration may dominate in these developmental areas (Paxson and Schady, 2007). When it comes to children's emotional and behavioral well-being, familial social (non-material) environments become the key (Haveman and Wolfe, 1995). As such, the direct role of remittances can be limited with respect to children's psychosocial development. Reduced social and emotional support from parents due to out-migration can take an especially heavy toll on children's psychosocial development, leading to an overall negative impact of parental migration on this outcome. Remittances may instead assume a moderating role to the extent that they relieve the stress and distress of the remaining caregivers (Brown and Poirine, 2005), which in turn enhances their ability to parent.

Previous work, mostly based on small local studies, provides mixed evidence on the psychosocial development of left-behind children in China. Some studies found these children to be more likely to experience depression, anxiety or loneliness than their rural counterparts living with both parents (He al., 2012; Jia and Tian, 2010; Shi et al., 2016; Su et al., 2013; Zhao et al., 2014). Other studies, in contrast, suggested that left-behind children do not differ significantly in

emotional well-being from other rural children (Fan et al., 2010; Hu, Lu, and Huang, 2014; Wen and Lin, 2012). Accumulating evidence from national-level studies also remains inconclusive. Some studies reported no impact of parental out-migration on children's depression and self-concept (Ren and Treiman, 2016; Xu and Xie, 2015; Yeung and Gu, 2016), whereas others showed a negative impact (Xu et al., 2018).

Development of Migrant Children in China

Parents are motivated to improve the prospects for their children by moving to more developed areas with greater earning opportunities and better infrastructures. Because of large rural-urban disparities in developing nations, rural-to-urban migration has the potential to benefit migrants and their children (Brockerhoff, 1994). Unlike left-behind children, migrant children can garner economic benefits without sacrificing family unity.

However, improved economic condition is not the entire story. Migration is compounded with discontinuity in children's life and stressors in adjusting to a new environment. Adjustment of migrant children to the host society is a complex process, which is often fraught with acculturation stress that can undermine children's psychosocial development (Berry et al., 2006). This is likely the case for migrant children in China, who are uprooted and suffer the loss of support networks. In addition, migrant parents may struggle not only with acculturation stress but also with economic pressures as they work tirelessly to make ends meet in cities. These processes may diminish their ability to provide sufficient social and emotional support to children, leading to parenting deficits (Emmen et al., 2013).

Beyond the adjustment difficulties facing migrant children in general, children in China face a unique set of challenges that exacerbate their difficulties. The challenges result from China's broader institutional context: a long-standing bifurcated social system separating urban and rural citizens, which preclude rural migrants from acquiring full citizenship and accessing social welfare in cities (Chan and Buckingham, 2008). Although migrant families typically achieve better economic conditions than they otherwise would in the countryside, the institutional constraints marginalize migrants, relegating them to undesirable living and working environments. The structural barriers also give rise to social discrimination (Wong et al., 2009). Migrant children often fall victim to prejudice, stereotyped as undisciplined, lacking manners, and incompetent. They are sometimes rejected by local peers and adults such as teachers and local parents (Wong et al., 2009). This social discrimination creates psychologically stressful experiences and can have a detrimental impact on migrant children's well-being. Altogether, the challenges facing migrant children can offset their potential gains from migration.

A strand of literature has documented psychological problems facing migrant children (Chen et al., 2009; Duan and Zhou, 2001; Guo, 2002; Lu and Zhou, 2013; Wong et al., 2009). But most of these studies compared migrant children with urban children, which is not the appropriate group for comparison because urban children have very different life chances and experiences from migrant children. Several recent studies using national data (Ren and Treiman, 2016; Xu and Xie, 2015; Xu et al., 2016; Yeung and Gu, 2016) found no clear difference in self-concept or the risk of depression between migrant children and rural nonmigrant children.

Current Study

The current study examines the psychosocial well-being of both left-behind and migrant children in a national sample, by comparing them with rural children in nonmigrant families. We expect both left-behind and migrant children to face challenges to their emotional and behavioral well-being, but for different reasons and to different degrees. For migrant children, acculturation stress can offset the positive effect of economic improvement and preserved family unity, and may lead to overall neutral or unfavorable psychosocial outcomes. Left-behind children tend to be particularly vulnerable to psychosocial problems, conceivably even more so than migrant children. This is because they suffer multiple sources of stress, from separation from parents as well as disruption in family practices, whereas parental support is the most influential factor shaping children's psychosocial development. Left-behind children's vulnerability can be especially severe when they lose both attachment figures.

Mediating and Moderating Factors

We further investigate potential mediating and moderating factors in the relationship between migration and child development. We focus on factors shaping the psychosocial well-being of left-behind children, especially those left behind with no parent, because our results (shown later) suggest that this group is the most vulnerable.

With respect to mediating factors, we examine the characteristics and behaviors of the primary caregiver of left-behind children, which shape the overall home environment (see Figure 1). As discussed above, one key mechanism through which parental migration adversely affects children's emotional and behavioral development is the reduced quality and quantity of the

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parenting children receive. Child development is the product of ongoing interactions between children and the surrounding environment, in particular parent-child interactions and parenting practices (Brody and Ge, 2001). Parenting deficits are associated with poor self-regulation and executive function, subsequently leading to the development of internalizing problems (Fanti et al., 2008) and externalizing problems (Gross, Shaw, and Moilanen, 2008). The deficits are especially likely to occur when both parents migrate, leaving children in the care of grandparents or other relatives. Anecdotal evidence suggests that grandparents and other relatives are less involved with children than do parents and show insufficient support of children's psychological needs (Ye et al., 2006). Such parenting deficits can arise partly because of the time and energy constraints on the caregivers, who may be overburdened with maintaining the household while taking care of children and may thus be less likely to provide the warmth and nurture needed by children. It also could be due to the general tendency for non-parent figures to make smaller time and resource investments in children than do parents (Haveman and Wolfe, 1995). Therefore, we expect left-behind children to show less favorable psychosocial outcomes than rural children in nonmigrant families partly because they receive less attentive and supportive parenting after parents migrate.

Migration also increases the emotional distress of the remaining caregivers because of separation from loved ones as well as added physical burdens (Lu, 2012). The emotional well-being of caregivers is a key environmental factor with important implications for children's development (Gross et al., 2008). Stressed caregivers are less able to foster nurturing and engaged relationships with children and to provide warm and supportive caregiving (Conger and Donnellan, 2007). Rather, they are more likely to be aggressive towards children and to

demonstrate negative affect, which harm children's emotional and behavioral functioning. In addition, the negative emotions of caregivers can be directly transmitted to children (Goodman et al., 2011; Cummings and Davies, 1994). Being around a depressed caregiver generates a heightened level of aggression and negativity, disrupting children's ability to regulate their emotions and behavior. It also triggers grief and stress responses from children that affect their internalizing and externalizing behaviors (Liu and Wang, 2015). In sum, a second possible mechanism linking left-behind children with worse psychosocial outcomes is the degree of emotional distress experienced by the caregivers.

Previous research suggests that grandparents and other relatives charged with taking care of left-behind children in China often possess limited human capital because they are older and missed the educational expansion (Wang and Mesman, 2015). A higher level of education of caregivers is associated with a lower risk of children's behavioral problems because educated caregivers have greater aspirations for children, are more committed to the well-being of children, and are better able to communicate with children and meet their developmental needs (Bradley and Corwyn, 2002). In contrast, low human capital interferes with caregivers' capacity to effectively support and stimulate children. Thus, a third hypothesized mechanism is the limited education of left-behind children's caregivers.

Adverse conditions resulting from parental out-migration do not necessarily have a negative impact on all children left behind. The psychosocial repercussions of parental migration are likely to be conditioned by whether migrant parents undertake compensatory strategies to mitigate family disruptions. If the separation is managed in such a way as to minimize the

accompanying losses (or feeling of losses), its negative consequence may be buffered. One potentially effective strategy is maintenance of regular communication with children. Regular contact between migrant parents and children reinforces a sense of family cohesion and normalcy and plays a symbolic role in keeping the family relationship alive. This helps reduces the direct emotional effect of parental migration on children. Regular contact also reinforces parents' commitment to children and allows for long-distance parenting, which in turn increases the level of parental supervision and attention available to children. Instead of feeling abandoned and estranged from parents, children in regular communication can bond with their parents and expect a stable level of love and support from parents, albeit from afar (Parrenas, 2005). We expect these processes, which are fostered by regular parent-child contact, to act as a protective factor in children's psychosocial adjustment to parental out-migration.

Another possible moderating mechanism is through sending remittances. Remittances can cover the financial needs of children (Hilderbrandt and McKenzie 2005) and mitigate the time and energy constraints on the remaining caregiver (Brown and Poirine 2005). In this respect, remittances may lessen the stressful circumstances resulting from the out-migration of family members. The receipt of remittances also may bring non-pecuniary psychological benefits to children and caregivers as a result of improved economic status, in accord with the documented protective effect of economic resources on mental health (Kahn et al., 2000). This helps boost the emotional wellbeing of both the caregivers and children. Overall, these processes may counteract the negative social costs of parental out-migration.

Methods

Data and Sample

Data are from a recent national probability sample survey, which was designed specifically to understand the effect of migration on children in China. The Survey, *The Urbanization and Child Development Study*, designed by Lu, Yeung, and Treiman, was conducted as the child component of the *Urbanization and Labor Migration Survey* designed and led by Liu at Tsinghua University during 2012 and 2013. The survey covered 500 villages and neighborhoods in 28 provinces across the nation. The survey was based on a multi-stage stratified probability sample with an oversample of townships with high rates of in-migration and out-migration. The survey additionally collected a probability sample of migrants. These procedures were undertaken to ensure a sufficient number of migrant children and left-behind children. Weights were constructed to combine the overall and migrant samples. In the fieldwork, small area mapping and listing was used to select households within each sampled community. This is crucial in identifying migrants because many of them live in non-standard housing (Treiman et al., 2006). This strategy has been increasingly adopted in national surveys in China. The survey resulted in good national representation. As shown in Appendix A, the age, sex, and region distribution of our sampled children is similar to that from the 2010 census.

The survey collected data on 6,796 children aged 0-15 at the time of the survey. It includes children in the main groups of interest: children living with one or both migrant parents, children left behind by one or both migrant parents, as well as, for comparison, children of rural nonmigrants and children of urban nonmigrants. Information was collected from children's primary caregivers (PCG), defined as those primarily responsible for taking care of the child. A

rich set of information was gathered, including family SES, home environment, parenting practices, household socioeconomic status, and a range of child outcomes (emotional, behavioral, cognitive, health, and education). The questionnaires and instruments were initially prepared in English, then translated into Chinese, and back-translated to ensure accuracy. They also were pre-tested before field implementation.

We restricted our analysis to children aged 3-15 because information on psychosocial well-being was collected starting at age 3, consistent with other surveys. This age restriction dropped 1,740 children. Because our study focuses on children affected by migration, we excluded a small proportion of children in other types of non-intact families due to divorce or the death of one or both parents (326 children). Moreover, we focus on rural-to-urban migration across counties or a higher level. Children in other types of migration arrangements, such as rural-to-rural, urban-to-urban, urban-to-rural, and migration within the same county, were dropped from the analysis (392 children). The final analytic sample size was 4,338.

Variables

The key outcome variable is the child's Behavior Problems Index (BPI). The BPI was created by Peterson and Zill (1986) to measure the frequency, range, and type of childhood emotional and behavioral problems. It has been shown to be associated with clinically significant psychosocial symptoms (Studts, 2008). It is a well-established index used in many major surveys such as the National Longitudinal Study of Youth and the Panel Study of Income Dynamics. In our survey, we translated and back-translated the BPI questions to ensure accuracy and equivalence. We pre-tested the battery of questions in the Chinese setting before field implementation. A list of the

questions and their loadings on the two subscales (see below) is presented in Appendix B. As shown, the questions are clear and represent typical (rather than culturally specific) problem behaviors found in children. We found in both the pretest and main fieldwork that these questions were easy to understand and answer, thus yielding a high response rate and sufficient variation. We used a total of 26 items that were available for children aged 3 and above. For each question, the PCG was asked to rate the child using a 3-point Likert scale (not true, sometimes true, often true). We used factor analysis to determine the loading of each question on internalizing and externalizing BPI subscales, and then summed scores across items, with a higher value indicating more severe problems. The internalizing BPI subscale measures problems that are directed inwardly, including sadness, depression, anxiety, fear, and withdrawal from social situations. The externalizing BPI subscale includes such behaviors as aggression, delinquency, and hyperactivity. Cronbach's alpha for the internalizing and externalizing BPI subscales are, respectively, 0.86 and 0.79. The relatively high level of the Cronbach's alpha provided suggested high reliability of the BPI in our study setting.

The key predictor is the child's migration status, which was divided into several categories: rural children (with local rural *hukou*) living with both parents; urban children (with local urban *hukou*) living with both parents; migrant children living with both parents; migrant children living with one parent; left-behind children whose father was a migrant; left-behind children whose mother was a migrant; and left-behind children whose father and mother were both migrants. Specifically, migrant children were defined as those living in an urban area but having a rural *hukou* outside the county of current residence. Left-behind children were defined as those whose parent(s) had migrated outside the county for work and were living outside the

county at the time of the interview. We focused on cross-county migration, following the standard definition in China (ACWF, 2013). This is because within-county (e.g., cross-village or cross-township) migration involves shorter distances and more limited change in the socioeconomic environment than longer-distance migration. Parents who migrate within the same county often commute daily or regularly, which is different from the typical left-behind situation where parents spend most of their time away from children.

We explored the effect of three mediating variables, which reveal the social mechanisms linking children's migration status and BPI. "PCG's parenting practices" is a scale comprised of a series of questions adapted from the parental warmth scale designed by Child Trends and the parenting scale in PSID-CDS (Hofferth et al., 1997). The scale taps into parental warmth and involvement in the last month. Sample items include how often the PCG spent time with the child doing the child's favorite things, talked to the child, and joked or played with the child. Responses were coded on a 1-5 scale where 1 indicates "Not in the past month" and 5 indicates "Every day." Items were coded in such a way that higher values indicate better parenting and were then summed. The Chronbach's alpha is 0.86. The second mediator, "PCG's emotional distress" scale, is based on the "Kessler K-6 Psychological Distress Scale" (Kessler et al., 2002). The scale is designed to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced during the previous four weeks. Response items are based on a 1-5 scale where 1 indicates "All the time" and 5 indicates "None of the time." The items were reverse coded and summed, with a higher score indicating greater emotional distress. The scale has a Chronbach's alpha of 0.85. The third mediator is the PCG's

education, measured by years of schooling. This variable was converted from the highest level of education attained. Details for all these variables are shown in Appendix C.

To examine the moderating role of parent-child contact, we expanded the typology of left-behind categories to include information on the frequency of contact, through a question that asked how often the migrant parent contacted the left-behind child in the past year by phone, text message, internet, letter, or other means. Response categories are "Daily," "Once or a few times a week," "A few times a month," "Monthly," "Once every several months," and "Less often." We subdivided each group of left-behind children to distinguish children who maintained at least weekly contact with migrant parents and those with less frequent contact. We used weekly contact as the cutoff because it was the median level of contact. If both parents were migrants, we used information from the parent with more frequent contact.

In a similar vein, to examine the moderating role of remittances, we expanded the typology of left-behind categories to include information on the frequency of remittances, through a question that asked how often the migrant parent sent monetary remittances. Response categories are "Once a week or more," "1-3 times per month," "Several times per year," "Once every year," and "Less often or never." We used "Once every year" as the cutoff. About 30% of migrant parents remitted once a year or less often. The rest, roughly 70%, remitted at least several times per year. If both parents were migrants, we used information from the parent sending more frequent remittances. We subdivided each group of left-behind children to distinguish children who received remittances from parents at least a few times a year and those receiving less frequent remittances.

Control variables included the child's age and sex, whether there were siblings present at home, whether the child was a member of an ethnic minority, the PCG's age and sex, per capita family income (in quartiles), and region of residence. Previous research shows that children's psychosocial development varies by age and sex (Leadbeater et al., 1999). We included both linear and quadratic age terms to capture possible nonlinear trajectories of change. The number of siblings, as well as the age and sex of the PCG, are likely to affect parenting style and intra-household resource allocation (Li et al., 2008). Family income is known to strongly predict various domains of child development, including the BPI (Yeung et al., 2002). We included region of current residence because of possible regional differences both in children's migration status and in children's psychosocial development (children in less developed regions may be more likely to be left behind and to exhibit worse BPI). Including region allowed us to account for this source of confounding and at the same time specifically to assess underexplored regional variation in children's BPI. We categorized region by a conventional four-region classification (North and Northeast, East, South-Central, and West).

About 19% of the cases had missing data on at least one of the variables included in the analysis. We thus used multiple imputation procedures to generate 10 complete datasets for analysis (Rubin, 2004). Results with and without multiple imputation were consistent.

Data Analysis

To evaluate the overall effect of migration and the mediating mechanisms through which migration affects children's psychological well-being we used a structural equation modeling

(SEM) framework. This permits jointly estimating models that predict the mediators and those predicting BPI. This method partitions the effect of migration on BPI into direct (unexplained) effects versus mediated (indirect) effects. Mediated effects are obtained using the product-of-coefficients method, which multiplies the coefficients from the regression of the mediating variables (MV) on the independent variables (IV) by the coefficients from the regression of the dependent variables (DV) on the MV. The sets of coefficients and their standard errors are obtained using generalized least squares in a "seemingly unrelated regression" framework (Fernald et al., 2011; Zellner, 1962), which takes account of correlated errors across simultaneous regressions involving DV, MV, and IV. The seemingly unrelated regression procedure is subsumed in the SEM framework as a structural model with no latent variables (Baum, 2006; Beasley, 2008). It combines estimates from each regression (parameter estimates and associated covariance matrices) into one parameter vector and simultaneous covariance matrix. This approach has been adopted in child development research (Fernald et al., 2011; Watts et al., 2015). We chose to estimate the mediating effects in a regression-based path model framework because it can be combined with multiple imputations.

For each outcome variable, we estimated four equations. The first includes only children's migration status as the predictor. The second adds a series of control variables at the individual and family level. In our third model we further included region. This allowed us to evaluate regional variations in child development and the confounding role of region. In the fourth model, we included mediators measuring PCG characteristics and behaviors. In all models we used rural children in nonmigrant families as the reference category. This group provides a useful benchmark for both migrant children and left-behind children. In all models we adjusted

for sample weights and clustering of children at the village level. For the mediation analysis we focused on differences between children left behind by both parents and rural children with nonmigrant parents since they were significantly different and represented the analytically appropriate comparisons.

To assess whether frequent contact or remittances can ameliorate the costs of parental out-migration, in additional analyses we restricted the analytic sample to rural nonmigrant children (the reference group) and several groups of left-behind children subdivided by frequency of contact with migrant parents (those with at least weekly vs. less frequent contact), or frequency of remittances (those receiving remittances multiple times a year vs. less often). By defining groups by the combination of left-behind status and frequency of contact (or remittances), we created estimates equivalent to those in which the left-behind plus frequency of contact (or remittances) groups are represented by separate variables plus interactions between each combination of variables.

We performed two sensitivity analyses. First, we conducted propensity score matching to mitigate the effect of potential confounding bias (Morgan and Winship, 2014). This method allows us to compare children who are similar across a wide range of characteristics except for their migration status. This is done by matching on a summary measure of factors that predict migration status. The rationale is that if different groups of children are identical on observed characteristics included in the matching, the remaining differences between the groups tend to reflect the effects of migration. Because propensity score matching procedures cannot be combined with multiple imputation algorithms, we randomly chose one imputed dataset for each

child to perform matching. Also, propensity score matching can only be performed for paired

comparisons. We thus focused on the differences between children left-behind with neither

parent and rural nonmigrant children, which, as shown later, were the only statistically different

comparisons. Because the results of the propensity score matching were consistent with those of

the regression approach, we focus on the regression results.

Second, we conducted a sensitivity analysis using the framework of causal mediation

analysis (Imai et al., 2010). This method takes into account correlation between error terms in the

mediator equation and the outcome equation (ρ), which indicate the level of unobserved factors

associated with both the mediator (e.g., PCG characteristics) and the outcome (e.g., children's

behavioral problems). This sensitivity analysis allows exploration of how the mediation effect

would change for different degrees of correlation between the error terms. In other words, the

analysis examines how robust the mediation effects are to violation of the assumption of

independent error terms for the mediation equation and the outcome equation.

Results

Descriptive Statistics

Table 1 shows the distribution of children by migration status. About 16% of our analytic sample

were rural children living with both parents. Migrant children made up 13% of the sample, with

the vast majority of them living with both parents. This is not surprising because migrants tend to

bring their children or start a family after they establish some degree of stability. Another 19% of

children were left behind by one or both migrant parents. The percentage of children with

migrant mothers only was quite low. A little over half of the left-behind children had no parent at

home. Taken together, 32% of all children in China—66% of rural children—were affected by migration. Of children with migrant parents, 60% were left behind rather than accompanying their parents to cities. Also, 7% of Chinese children age 3-15 lived in non-intact families due to divorce or parental death. Another 6% of children underwent other types of migration experience. Appendix D shows family arrangements for left-behind children in our sample. When children were left behind by fathers, mothers usually remained the primary caregiver (95%). When mothers migrated, fathers undertook the primary caregiving role in 68% of the cases. When both parents migrated, almost all children were taken care of by their grandparents.

[Table 1 about here]

Descriptive statistics are shown in Table 2, which is subdivided by children's migration status. We see that migrant children and left-behind children were slightly younger than were rural and urban children in nonmigrant families; this reflects the fact that migrants are disproportionately young. The PCGs for left-behind children were much older than those for other groups of children, reflecting the fact that PCGs for left-behind children were often grandparents. Most urban children had no siblings, about 70% compared to no more than about 40% of rural children, which reflects the much stronger enforcement of the one-child policy in urban than in rural areas. Rural children were more likely to belong to a minority group than were urban children. The distribution of income reflects both the higher incomes in urban than in rural China and the motivation of people to migrate to secure higher incomes: urban children were from the highest income families, followed by migrant children, then left-behind children, and finally rural nonmigrant children. There also was regional variation in the distribution of

children. Migrant children were more often found in the highly developed Eastern region, whereas left-behind children were concentrated disproportionately in the less developed West and South-Central regions.

As for the outcome variables and mediators, at the descriptive level there seem to be few differences among the various categories of children with respect to BPI scores. The PCGs of left-behind children were least warm and involved, followed by the PCGs of other rural children and of migrant children, with urban children enjoying the most favorable parenting. The PCGs of left-behind children also reported the highest level of emotional distress and the lowest level of education of all groups.

[Table 2 about here]

Regression Results

Results from regressions estimated by SEM procedures with multiple imputations are presented in Table 3. Several key findings emerge. Rural children left behind by both parents were worse off in psychosocial development than were rural nonmigrant children. This result held in the baseline model (Model 1), as well as Model 2 and 3 that adjusted for family socioeconomic status and region. In Model 3, the difference remained significant and substantial for internalizing BPI but became marginally significant for externalizing BPI. The disadvantage of these left-behind children was largely reduced in Model 4 after the inclusion of mediating factors. (We defer discussion of the mediating mechanisms until the next section.) While the difference between children left behind by both parents and rural nonmigrant children was statistically

significant, the size of the difference was relatively small (in most cases, less than a one-point difference).

The differences for other groups of children were not significant. These results suggest that children residing in urban areas, including both urban children and migrant children, exhibited a similar level of psychosocial well-being to that of rural children in nonmigrant families, net of individual and family characteristics. In particular, the psychosocial outcomes of migrant children did not differ significantly from how they would fare if they were to stay with their parents in the countryside. On the one hand, migrant children did not show increased vulnerability in psychological and behavioral well-being relative to their rural nonmigrant counterparts. On the other hand, migration also did not produce any psychosocial benefits for these children.

[Table 3 about here]

As shown in Model 3, region of residence was correlated with children's BPI. Children in less developed areas (South-Central and West) were more likely to exhibit internalizing and externalizing behavior problems than were children in Northern and Eastern China. Also, controlling for region helped explain part of the difference between children left behind by both parents and rural nonmigrant children.

At the bottom of Table 3, we systematically compare changes across models in the coefficient for children left behind by both parents. The difference increased between Model 1

and 2, suggesting that certain individual and familial characteristics were associated with children's migration status and BPI in opposite ways. Starting from Model 2, the difference was reduced over successive models as we controlled for region and the mediating variables. The change in the size of the coefficient across models was significant in most cases.

Other covariates in Model 3 had little effect on either internalizing or externalizing BPI. There were no significant coefficients associated with gender. Children's age had a curvilinear relationship with externalizing BPI: older children were less likely to develop externalizing behavior problems than were younger children, but the rate of decline tapered off at older ages. PCG demographic characteristics did not seem to matter. Having a sibling increased the risk of externalizing BPI problems but the effect disappeared when the child had two or more siblings. Being a minority child had the opposite effect, as they were less likely to exhibit externalizing BPI problems. There was also an income gradient in BPI, with children in more affluent families exhibiting fewer BPI problems. This was especially true for externalizing BPI.

Sensitivity analysis using propensity score matching (PSM) is shown in the last row of Table 3. We focus on the most significant pairwise comparison, that is, between children left behind by both parents and rural children in nonmigrant families. The PSM estimators show the average difference in BPI scores between the two groups after matching (before introducing the mediating variables). The results are qualitatively similar to those based on regression analysis. Left-behind children reported an internalizing BPI two points higher, and an externalizing BPI almost four points higher than did rural nonmigrant children. These results offer supportive evidence that parental out-migration led to more psychosocial problems in children.

Mediating and Moderating Mechanisms

PCG's characteristics and behaviors play an important role in explaining the vulnerabilities of children left behind by both parents. In Table 3 the difference between these children and rural nonmigrant children was substantially reduced and became insignificant in Model 4. The bottom of Table 3 shows that the reduction in the size of the coefficient from Model 3 to 4 (without and with the mediators) was large and significant. About 70% and 45% of the observed effect of being left behind by both parents on internalizing BPI and externalizing BPI, respectively, was accounted for by the three hypothesized mediators. Inspecting the association of the three mediators with BPI (Model 4 in Table 3), we see that better parenting practices significantly reduced the risk of internalizing BPI problems, though not externalizing BPI problems. The emotional distress of the PCG was especially important, as it constituted a significant risk factor for both internalizing and externalizing BPI. The education of the PCG was not significantly associated with children's psychosocial outcomes.

The mediating effect of each of the PCG's characteristics and behaviors was examined in Table 4. The PCG's emotional distress had the largest and most consistent mediating role. It accounted for almost 50% of the total effect of being left-behind by both parents on internalizing BPI problems and 45% on externalizing BPI problems. PCG parenting practices was the next most important mediator. It channeled 17% of the effect on internalizing BPI but was not a significant pathway for externalizing BPI. A mediating role for PCG's education was not evident in these data. The bottom of Table 4 further shows substantial variation in all three mediators by children's migration status. Specifically, the PCGs of children left behind with neither parent

were more likely to experience emotional distress, to show less attentiveness and warmth in parenting, and to have a lower level of education than the PCGs of rural children in nonmigrant families.

Results from causal mediation sensitivity analysis are displayed in the bottom of Table 4. They show the value of ρ (correlation between error terms of the mediator equation and outcome equation) where the mediation effect for a particular mediator becomes zero. This correlation indicates the strength of the effect of unobserved factor required in order to substantively change conclusions about the mediating effect. The larger the absolute value of ρ, the less sensitive the results are to unobserved bias. The results show that a relatively large error correlation (absolute values range between 0.39 and 0.47) would be required for the mediation effect of PCG emotional distress and parenting practices to approach zero. In other words, the strength of an unobserved factor would need to be quite large to negate these mediating pathways. For the role of PCG education and PCG parenting practices for externalizing BPI, a smaller error correlation would be sufficient to reduce their mediating effects to zero. However, because their mediating role was not significantly different from zero to begin with, the effect of any unobserved factors would not substantively alter our conclusions. Overall, the sensitivity analysis suggested that the key mediating mechanisms we have identified are relatively robust to unobserved bias.

Taken together, these results suggest that much of the disadvantage faced by children left behind by both parents was due to the fact that, compared with other rural children, their PCGs were more likely to be depressed and less likely to be warm and involved, both of which negatively affected children's psychosocial development. PCG's characteristics were more

important in shaping children's internalizing than externalizing BPI. The mediating mechanisms are summarized in Figures 2 and 3.

[Table 4 about here]

The results also point to an important moderating role of parent-child contact (Table 5). Although the coefficients were not statistically significant for most groups of left-behind children, children in each left-behind category (by father, mother, or both parents) with infrequent contact generally had worse psychosocial outcomes than their counterparts with more frequent contact with parents. Only one group showed a significant heightening of internalizing and externalizing BPI problems—children left behind with neither parent who had less than weekly contact with either parent. In other words, left-behind children who had infrequent contact with their migrant parents suffered the most. By contrast, children left behind by both parents but who had at least weekly communication with at least one parent did not experience a substantial disadvantage in psychosocial development relative to rural nonmigrant children. The buffering role was stronger for internalizing BPI than for externalizing BPI. It also is worth noting that the disadvantage faced by children left behind by both parents who had infrequent contact was mediated by PCG characteristics (Model 4). This reinforces the importance of the home environment for left-behind children as shaped by the well-being and parenting practices of their caretakers.

[Table 5 about here]

The bottom of Table 5 presents results exploring the moderating role of remittances. The coefficients were insignificant for children left behind by one parent. However, the two groups of children left behind by both parents, those receiving remittances multiple times a year and those receiving remittances less often, both showed worse internalizing behavior problems than their comparison group, rural nonmigrant children. With respect to externalizing BPI, children left-behind with neither parent who received infrequent remittances were marginally significantly worse off, whereas this was not the case for their counterparts receiving more frequent remittances. But the difference between these two groups of left-behind children was rather small. These results suggest that monetary remittances do not substantially offset the negative psychosocial consequences of parental migration.

Discussion

The present study examined the psychosocial well-being of children in the context of massive rural-to-urban migration in China. It sought to extend existing research on the effect of migration on children's development in several ways. First, it used a recently available nationally representative survey that includes well-established and validated measures of psychological and behavioral well-being (the Behavior Problems Index). We focused on two groups of children affected by migration, namely migrant children and left-behind children, and compared them with the appropriate benchmark (rural children of nonmigrant parents). Second, we not only assessed how these two groups of children (and subgroups within these categories) fare relative to rural nonmigrant children, but also sought to understand *why* and *when* children become particularly vulnerable by investigating potential mediating and moderating factors--a topic that has not been systematically examined in previous research.

The results show that it is children left behind by both parents who experienced the greatest deficits in psychosocial development. These children developed behavior problems at two extremes, becoming either withdrawn or aggressive. The adverse impact was especially strong for internalizing BPI problems. The difference between this group of children and rural nonmigrant children was significant and consistent across different model specifications, although the size of the difference was relatively small in magnitude. Children left behind with one parent (either the mother or the father) and migrant children did not experience significantly heightened behavioral problems. For these groups of children, family unity and improved economic resources help shield against potential disruptions due to migration. These findings add to a systematic understanding of the emotional and behavioral outcomes of left-behind children and migrant children.

Much of the disadvantage in psychosocial well-being facing children left behind is mediated through the characteristics and behaviors of their PCGs, primarily their emotional distress and parenting practices. The experience of being left behind with neither parent often entails a lack of attentive and warm parenting and the presence of stressed and distressed alternative caregivers. This deprives children of the supportive environment required for healthy psychosocial development, as suggested by the transactional theory (Brody and Ge, 2001). These conditions play a more important role for children's internalizing problems than for externalizing problems. For the latter, other factors such as adult monitoring and the presence of an authority figure may play an equally important role. It is worth noting that our study does not suggest that the PCGs of left-behind children are irresponsible or reluctant to care for children. It is quite the

opposite. More often they assume too many household responsibilities as the only adult(s)

remaining in the household to be able to monitor and support left-behind children. Many of the

PCG are elderly grandparents who themselves have health impairments and need care. In reality,

they often must not only take care of left-behind children but also maintain the household and

work in the fields. These burdens impose substantial time and energy constraints on the PCGs,

putting them at a high risk of distress and compromising their ability to provide a positive home

environment for left-behind children. As anecdotal evidence suggests, elderly grandparents are

often too exhausted to provide left-behind children with things other than food and clothes (Ruan,

2008).

Regular contact between parents and left-behind children helps buffer some of the

negative consequences of parental out-migration. The risk of internalizing and externalizing

behavior problems both decrease when left-behind children have regular contact with their

migrant parents. It is left-behind children with irregular contact with parents who suffer the most.

Steady and regular communication with children conveys family cohesion and parental support.

Inconsistent or minimal contact may be interpreted by children as abandonment and neglect,

which can exacerbate the psychological difficulties they experience. In contrast, the receipt of

monetary remittances from migrant parents does not seem to buffer the negative consequences of

family disruption due to parental migration, especially with respect to children's internalizing

behavior problems. The risk of internalizing behavior problems remains real even when left-

behind children receive frequent remittances from absent parents. For externalizing behavior

problems, there was some difference between children receiving more and less frequent

remittances, possibly suggesting the regular remittances could free up some time for the PCGs to

better allow them to monitor children's behaviors. But this difference was too small to draw a more definitive conclusion. These results point to the strong adverse social costs of family separation due to migration. It is also consistent with previous research linking children's psychosocial development more strongly to parental non-material resources than to material resources (Haveman and Wolfe, 1995; Paxson and Schady, 2007).

Overall, this research highlights the role of migration in shaping child development, as it is closely linked to two key family processes influencing children, namely monetary and social input from parents. Children left behind are deprived of adequate parental care and experience family stress, particularly when both of their parents go out for work. This presents left-behind children with psychological and behavioral challenges. The situation of the vast number of left-behind children in China is unsettling because more than half of them endure separation from both parents. It is also disheartening that parental migration has not given children left behind a developmental advantage as their parents clearly hoped—one of the primary reasons for migration is to improve the life chances of their offspring. In some cases, parental out-migration even puts children at risk for unhealthy psychosocial functioning.

Migrant children tend to be protected by an improved standard of living and family unity. They thus do not exhibit a significant disadvantage in psychosocial development relative to rural nonmigrant children. But migration does not benefit them either, as one would expect, at least with respect to psychosocial well-being. For these children, continuing social discrimination and unfair treatment in cities is a daily reality. This can exacerbate the stress that they encounter above and beyond the acculturation stress migrants typically experience. Unlike in many other

settings, where acculturation stress often results from language and cultural clashes, in China the process has a deep institutional root. Disadvantages associated with the *hukou* system can even work to offset the potential gains they can garner from migration.

We conducted additional analyses to explore variations by both children's sex and age. Results, presented in Appendix A, suggest that girls, relative to boys, appeared to be especially vulnerable to internalizing BPI problems when both parents were absent due to migration. This was especially true for young girls (aged 3-9). This vulnerability was not completely explained by mediating factors. Older girls (aged 10-15) exhibited different responses to parental migration, as they became susceptible to externalizing BPI problems. Taken together, these results underscore the more adverse ramifications of parental migration for girls' psychosocial outcomes in different developmental stages. This is consistent with previous research documenting a greater saliency of parent-child relationship for girls than for boys (Sterba et al., 2007). Among girls, younger ones were especially prone to internalizing problems. This result speaks to attachment theory, which posits a stronger attachment of young children to their parents and thus greater psychological damage of parental out-migration to them. These children can be overwhelmed by the loss of their attachment figures and develop strong feelings of abandonment, even when their alternative caregivers are devoted to their development. In our study, older girls, while better able to understand the rationale for parents' migration, fell victim to inadequate supervision and control, leading to greater propensity to externalize problems. Late childhood and adolescence is a developmental period where many changes occur. The absence of parents adds an additional level of stress, making them more likely to act out. These results, while useful in providing a more nuanced understanding, should be considered tentative because of smaller

sample sizes when we subdivided by children's age and sex. Further research using a larger sample size will provide more robust results.

Despite the merits of the survey data and the new insights we provided, a few limitations warrant discussion. One important limitation of the study is that the data are cross-sectional, thereby hindering our ability to address potential endogeneity bias in the relationship between migration, PCG characteristics, and child development. For example, it is possible that children's psychosocial problems aggravate PCG's distress, or that both are induced by some other factors. We sought to strengthen our findings by conducting sensitivity analyses, including propensity score matching and causal mediation analysis. The results increase our confidence that the findings are not driven entirely by endogeneity. There is still more to be done on this topic. Longitudinal studies are needed to more definitively pin down the effect of migration on children and its underlying mechanisms.

For the foreseeable future, rural-to-urban migration will continue to be a reality in China. The plight of rural children growing up with neither parent presents major challenges to the social development of the society. Further understanding of children of migrants, including the protective factors and mechanisms explaining their vulnerabilities, is necessary for the design of programs targeting these children. The findings highlight a need to rethink the strategies of migration of both parents. When parent-child separation cannot be avoided, devising strategies that can mitigate the negative impact of migration on children is crucial. For example, our research suggests that when migrant parents manage to maintain regular contact with their left-behind children, the children fare less poorly. In this respect, facilitating frequent communication

between children and their parents by, for example, improving communication infrastructures and rural residents' access to electronic communication, as well as lowering the cost of communication services on both ends, can mitigate the accompanying losses and improve parent-child relationships. In addition, we find that left-behind children suffer largely because their nonparental guardians often experience emotional distress and are unable to provide a supportive and warm home environment. These caregivers substitute for absent migrants in childcare and home maintenance but are themselves often in need of care and support. Unfortunately, however, initiatives targeted at supporting the alternative caregivers have been very scarce. Hence, it is important that rural governments and communities be aware of the key roles played by alternative caregivers and go beyond a solely child-centered approach to address problems facing left-behind children. This means designing policies to provide caregivers with greater support and mobilizing resources to alleviate their stress and burdens. This will enhance left-behind children's home environments and foster their healthy development. Moreover, we find no evidence that migrant children are exposed to a heightened risk of developing psychosocial problems. Urban-based policies that ease the burdens for migrant families to raise children in cities, such as extending more social benefits to them (housing, education, and health care), will increase the likelihood that children will be able to accompany their migrant parents rather than being left behind and hence will reduce the social costs resulting from family separation. Adopting a more inclusive approach may even allow migrant children to more fully enjoy the benefits of migration.

We have studied children affected by migration in China, where the sheer magnitude and societal implications of migration are unprecedented. Migrant children and left-behind children

are not unique to China. There has been very substantial migration to the U.S. from many nations, particularly Mexico. Even ignoring the recent wave of refugees, many European nations have had long-standing migration streams: from Turkey to Germany, from North Africa to France, from Morocco and Suriname to the Netherlands, from South Asia to the Great Britain, and so on. Other nations also have had, and continue to have, extensive in-migration, including Israel and South Africa. Many Asian countries such as India, Indonesia, and the Philippines have all experienced large scale internal migration or immigration. It would be helpful to conduct studies that compare children in intact families with both migrant children and those left behind to explore the role of the variables we have focused on here--namely parental caregiver characteristics, frequency of contact with parents, and remittances--on children's psychosocial well-being. Such studies would both help to establish the generality of our findings and permit devising policies that both minimize the costs and maximize the benefits of migration for children.

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Table 1. *Percentage Distribution of the Migration Status of Children Age 3-15, China, 2012-2013.*

Children's Migration Status	Weighted Percentage	Unweighted N
Rural local, both parents	16.3	775
Urban local, both parents	39.8	1692
Rural-urban migrant children, both parents	11.2	1008
Rural-urban migrant children, absent parent	1.4	96
Rural left behind, father away	8.1	297
Rural left behind, mother away	1.3	55
Rural left behind, both parents away	9.7	415
Other migration types [a]	5.6	392
Divorced or dead parent	6.6	326
Total	100.0	5,056

[a] This includes rural-rural, urban-urban, urban-rural, and within-county migration.

Table 2. *Percentages (and Means and Standard Deviations for Continuous Variables) by Migration Status.*

	Total	Rural children (w/ both parents)	Left-behind children	Migrant children	Urban children (w/ both parents)
Child is male	54.7	54.3	55.5	55.0	54.6
Child's age	8.3	8.7	8.0	7.8	8.7
	(3.6)	(3.7)	(3.6)	(3.5)	(3.6)
PCG is male	15.4	13.7	19.4	12.7	19.0
PCG's age	41.2	39.4	50.4	37.9	40.6
	(10.7)	(8.8)	(13.1)	(8.9)	(9.3)
Sibling					
Child has no sibling	39.3	29.6	25.3	42.3	70.3
Child has one sibling	44.4	49.8	51.9	44.6	25.3
Child has 2+ siblings	16.2	20.7	22.8	13.1	4.4
Child is minority	8.4	12.1	9.5	4.4	4.7
Family income quartiles					
Bottom 25%	26.8	41.1	20.7	15.9	17.2
Lower 25%	25.5	27.8	30.0	24.0	18.3
Upper 25%	27.7	20.4	33.0	34.4	28.7
Top 25%	20.0	10.8	16.3	25.6	35.9
Region					
North/Northeast	13.7	16.9	5.1	11.4	18.5
East	34.0	33.7	25.4	37.0	39.1
South-Central	31.0	30.6	34.7	33.9	24.2
West	21.3	18.8	34.8	17.8	18.2
PCG years of education	8.3	7.5	5.8	8.3	11.5
	(3.9)	(3.4)	(3.8)	(3.4)	(3.5)
PCG's emotional distress[a]	11.2	11.0	12.0	11.3	10.9
	(3.6)	(3.5)	(3.8)	(3.4)	(3.5)
PCG's parenting practices[b]	22.9	21.7	19.8	24.4	26.3
	(7.6)	(7.6)	(7.3)	(7.1)	(7.0)
Internalizing BPI	15.0	15.0	15.3	15.0	14.8
	(3.2)	(3.1)	(3.1)	(3.2)	(3.2)

Externalizing BPI	24.7	24.4	25.1	25.0	24.3
	(5.5)	(5.3)	(5.5)	(5.6)	(5.5)
N	4,338	1,692	767	1,104	775

[a] Range: 6 – 30

[b] Range: 8 – 40

Table 3. Regression Analysis of Child's BPI by Migration Status and Other Control Variables (Standard Errors in Parentheses).

	Internalizing BPI				Externalizing BPI			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Migration status (ref. rural local, both parents)								
Urban local, both parents	-0.231 (0.214)	0.009 (0.240)	-0.079 (0.240)	-0.006 (0.224)	-0.012 (0.371)	0.674 (0.409)	0.537 (0.405)	0.337 (0.403)
Rural-urban migrant, both parents	0.374 (0.387)	0.502 (0.366)	0.358 (0.353)	0.311 (0.341)	0.645 (0.525)	0.855 (0.539)	0.653 (0.524)	0.512 (0.519)
Rural-urban migrant, absent parent	0.103 (0.497)	0.391 (0.493)	0.156 (0.469)	-0.026 (0.436)	0.578 (1.032)	0.843 (1.018)	0.483 (1.020)	0.272 (0.960)
Left behind, father away	-0.130 (0.236)	-0.106 (0.244)	-0.292 (0.232)	-0.319 (0.223)	0.160 (0.457)	0.095 (0.447)	-0.158 (0.428)	-0.189 (0.414)
Left behind, mother away	-0.039 (0.431)	-0.052 (0.475)	-0.121 (0.439)	-0.217 (0.417)	0.567 (0.901)	0.796 (0.906)	0.697 (0.895)	0.642 (0.934)
Left behind, both away	0.484* (0.234)	0.829** (0.291)	0.577* (0.271)	0.177 (0.279)	0.785* (0.370)	1.231* (0.486)	0.865 (0.497)	0.486 (0.501)
Child is male		0.011 (0.146)	-0.013 (0.146)	-0.091 (0.142)		0.248 (0.242)	0.219 (0.242)	0.158 (0.238)
Child's age		-0.055 (0.107)	-0.063 (0.105)	-0.069 (0.099)		-0.730*** (0.166)	-0.747*** (0.166)	-0.735*** (0.163)
Children's age squared		0.005 (0.008)	0.005 (0.008)	0.005 (0.008)		0.025* (0.014)	0.025** (0.014)	0.024* (0.015)
PCG's age		-0.007 (0.008)	-0.010 (0.008)	-0.017* (0.008)		-0.022 (0.014)	-0.025 (0.014)	-0.026 (0.015)
PCG is male		-0.092 (0.195)	-0.101 (0.192)	-0.018 (0.195)		-0.077 (0.306)	-0.070 (0.302)	-0.024 (0.316)
Sibling (ref. no sibling)								
Child has one sibling		0.196 (0.166)	0.153 (0.161)	0.041 (0.157)		0.799** (0.277)	0.764** (0.268)	0.703** (0.268)
Child has two or more siblings		0.416 (0.328)	0.162 (0.320)	-0.250 (0.287)		0.855 (0.460)	0.525 (0.456)	0.207 (0.439)
Child is minority		-0.248 (0.300)	-0.313 (0.276)	-0.357 (0.244)		-0.768 (0.509)	-0.941 (0.491)	-0.983* (0.445)
Family income quartiles (ref. bottom 25%)								
Lower 25%		-0.379*	-0.273	-0.206		-0.736*	-0.580	-0.541

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Upper 25%	(0.180)	(0.178)	(0.173)			(0.334)	(0.332)	
Top 25%	-0.457 (0.248)	-0.298 (0.243)	-0.121 (0.232)			-0.910* (0.359)	-0.679 (0.348)	
—	-0.467* (0.232)	-0.237 (0.224)	0.039 (0.224)			-1.230** (0.391)	-0.679 (0.388)	
East		0.206 (0.226)	-0.130 (0.217)				-0.052 (0.436)	-0.413 (0.429)
West		0.835** (0.253)	0.587* (0.237)				0.924* (0.456)	0.583 (0.441)
South-Central		1.276*** (0.264)	0.757** (0.266)				1.701*** (0.477)	1.167* (0.485)
PCG level of education			-0.047*** (0.013)					-0.030 (0.019)
PCG's emotional distress			0.228*** (0.022)					0.304*** (0.019)
PCG's parenting practices			-0.011 (0.022)					0.049 (0.033)
Constant	14.988*** (0.127)	15.363*** (0.512)	14.933*** (0.509)	14.305*** (0.713)	24.361*** (0.220)	29.291*** (0.922)	28.875*** (0.949)	26.298*** (1.234)
N (number of children)	4,338	4,338	4,338	4,338	4,338	4,338	4,338	4,338
Change in coefficient (left behind by both parents vs. rural children with both parents) between current model and previous model		0.346 (0.184)	-0.253*** (0.072)	-0.400*** (0.089)		0.446 (0.332)	-0.366** (0.117)	-0.379** (0.123)
Proportion of total effect mediated by variables in current model (relative to previous model)		-2.314	0.769	0.697		-1.641	0.785	0.448
Propensity score matching estimates (left behind by both parents vs. rural children with both parents)		2.090* (1.030)	0.613 (1.011)			3.884* (1.609)	1.033 (1.347)	

Region (ref: North/Northeast)

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

Table 4. *Mediation Analysis of Child's BPI by Migration Status (N = 4,338).*

	Internalizing BPI			Externalizing BPI		
	PCG emotional distress	PCG parenting practices	PCG level of education	PCG emotional distress	PCG parenting practices	PCG level of education
Indirect effect through each mediator	0.284*** (0.082)	0.101* (0.041)	0.015 (0.029)	0.379*** (0.115)	0.064 (0.045)	-0.065 (0.050)
Proportion of total effect mediated by each mediator	0.496	0.175	0.026	0.448	0.075	-0.075
Migration status predicting each mediator (left behind by both parents vs. rural children with both parents)	1.247*** (0.343)	-2.155*** (0.656)	-1.328*** (0.327)	1.247*** (0.343)	-2.155*** (0.656)	-1.328*** (0.327)
Causal mediation sensitivity analysis (ρ)	0.39	-0.47	-0.15	0.43	-0.28	-0.11

Table 5. Regression Analysis of Child's BPI by Left-behind Status and Frequency of Contact and Remittances (Standard Errors in Parentheses).

	Internalizing BPI			Externalizing BPI		
	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
By frequency of contact						
Migration status (ref: Rural local, both parents)						
Left behind, father away with at least weekly contact	-0.150	-0.385	-0.230	0.003	-0.313	-0.173
	(0.316)	(0.296)	(0.279)	(0.623)	(0.585)	(0.553)
Left behind, father away with less frequent contact	-0.084	-0.294	-0.480	0.161	-0.109	-0.272
	(0.349)	(0.336)	(0.334)	(0.622)	(0.607)	(0.604)
Left behind, mother away with at least weekly contact	-0.557	-0.501	-0.243	1.474	1.527	1.805
	(0.614)	(0.568)	(0.516)	(1.516)	(1.534)	(1.512)
Left behind, mother away with less frequent contact	0.635	0.430	0.115	0.767	0.496	0.279
	(0.657)	(0.630)	(0.516)	(1.516)	(1.534)	(1.512)
Left behind, both away with at least weekly contact	0.259	-0.140	-0.396	0.820	0.254	-0.015
	(0.410)	(0.423)	(0.424)	(1.111)	(1.005)	(1.055)
Left behind, both away with less frequent contact	1.231**	0.850*	0.529	1.364*	0.809	0.606
	(0.405)	(0.412)	(0.380)	(0.659)	(0.665)	(0.662)
By frequency of remittances						
Migration status (ref: Rural local, both parents)						
Left behind, father away with remittances multiple times per year	-0.180	-0.424	-0.395	-0.171	-0.476	-0.465
	(0.276)	(0.259)	(0.251)	(0.509)	(0.491)	(0.481)
Left behind, father away with less frequent remittances	0.093	-0.090	-0.312	1.190	0.918	0.806
	(0.533)	(0.517)	(0.479)	(1.156)	(1.137)	(1.115)
Left behind, mother away with remittances multiple times per year	-0.022	0.018	0.052	0.426	0.464	0.531
	(0.680)	(0.599)	(0.475)	(1.050)	(1.012)	(0.984)
Left behind, mother away with less frequent remittances	-0.087	-0.229	-0.370	1.099	0.942	0.910
	(0.673)	(0.634)	(0.637)	(1.826)	(1.944)	(1.973)
Left behind, both away with remittances multiple times per year	0.787*	0.680	0.256	0.938	0.379	0.104
	(0.352)	(0.373)	(0.357)	(0.584)	(0.616)	(0.604)
Left behind, both away with less frequent remittances	0.804*	0.725	0.352	1.338	0.802	0.633
	(0.373)	(0.394)	(0.422)	(0.750)	(0.616)	(0.790)
N	2,419	2,419	2,419	2,419	2,419	2,419

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

Note: Only coefficients of children's migration status are shown. Other covariates are the same as those in Table 3.

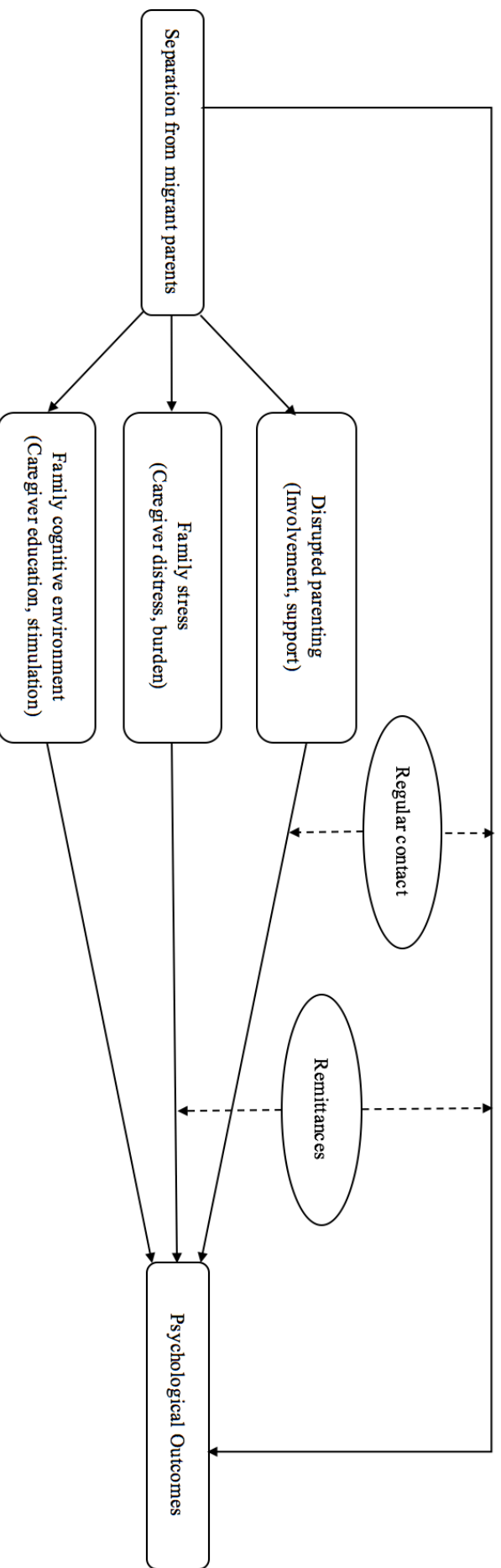Figure 1. Conceptual framework

Figure 2. Mediation model of left-behind children's internalizing behavior problems (standard errors in parentheses; coefficients significant at 0.05 level bolded)
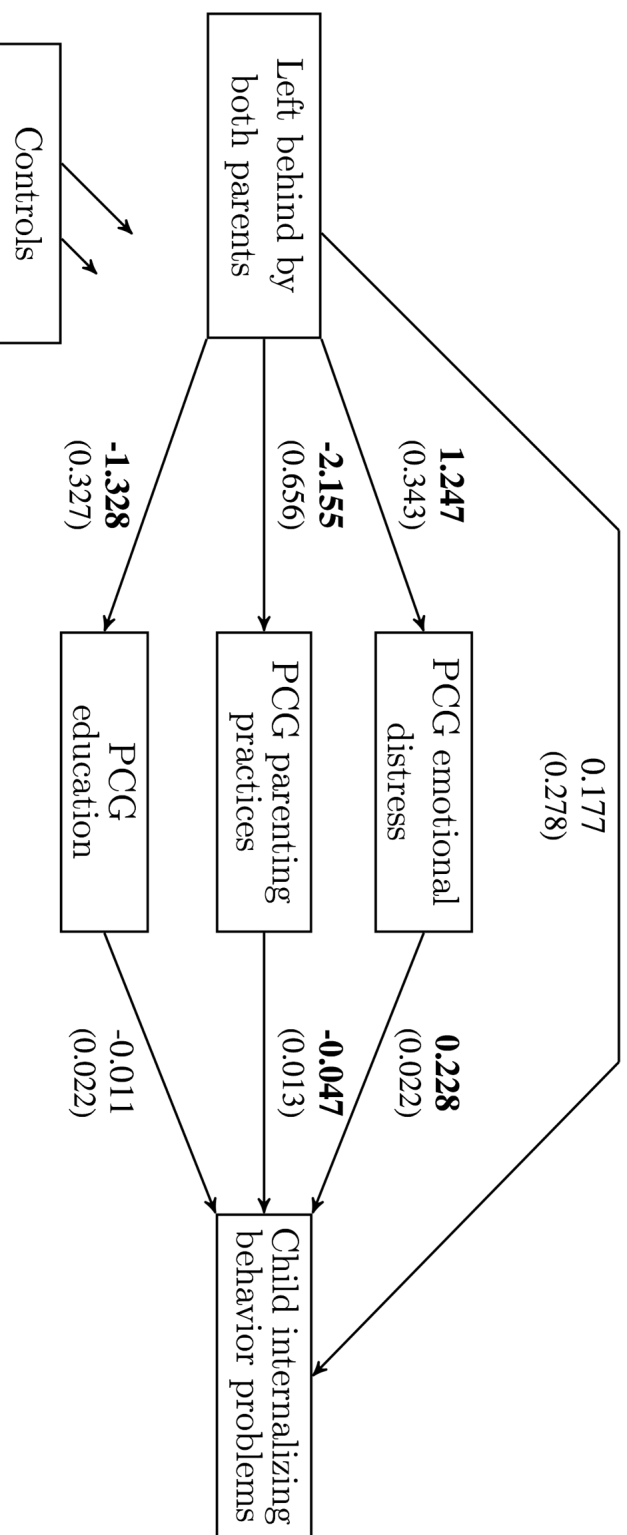
Figure 3. Mediation model of left-behind children's externalizing behavior problems (standard errors in parentheses; coefficients significant at 0.05 level bolded)

Left behind by both parents

Controls

1.247
(0.343)

-2.155
(0.656)

-1.328
(0.327)

0.486
(0.500)

PCG emotional distress

PCG parenting practices

PCG education

0.304
(0.033)

-0.030
(0.019)

0.049
(0.036)

Child externalizing behavior problems