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Measuring children's living arrangements in rural South Africa: A comparison of approaches and application to schooling outcomes

Sangeetha Madhavan

University of Maryland and MRC/WITS Agincourt Unit

Randall Kuhn

University of Denver

Casey Blalock

University of Colorado Boulder

Tyler Myroniuk

University of Maryland

Mark Collinson

MRC/WITS Agincourt Unit, University of Witwatersrand

Abstract

Demographers have long been interested in the relationship between family structure and children's well-being in sub-Saharan Africa. Family structure in most of these studies refers to co-residential living arrangements or simply, the household. Despite the growing knowledge gained from these studies, we have yet to clearly understand the pathways through which co-residential living arrangements, particularly extended family forms, influence children's well-being. Because various scholars have conceptualized and measured children's living arrangements in different ways, we have yet to identify the critical factors associated with extended family living arrangements that really matter for children. In this paper, we compare two ways of measuring co-residential living arrangements of children – structural and kin presence - and the effects of each on educational attainment in rural South Africa. The data come from the 2002 wave of the Agincourt and Health Demographic Surveillance System and our sample includes 22,997 Black children aged 6 - 18 in 8763 households. The results show 1) a fairly limited role for extended kin in the living arrangements of children; 2) that living in extended family structures that include both parents offers no additional advantages to nuclear arrangements for children's educational attainment; but 3) living with one parent in a vertical structure is better than being in a lateral structure with one parent particularly for boys; and 4) while the presence of both parents is overwhelmingly beneficial to educational progress, the presence of maternal grandmothers provides some additional benefit particularly for boys' education. We also found that the presence of siblings and step kin has a positive effect on educational attainment. In sum, while parental presence appears to be the most critical factor in explaining variation in educational attainment, the presence (or absence) of selected kin also has a limited role to play.

Demographers have long been interested in the relationship between family structure and children's well-being in sub-Saharan Africa (Lloyd and Desai 1992; Parker and Short 2009; Sear et al. 2002) and more recently in the context of HIV/AIDS (Hill et al. 2008; Hosegood et al. 2007). Family structure in most of these studies refers to co-residential living arrangements or simply, the household. The people who children live with are seen as conduits of physical and social capital which, in turn, plays a critical role in influencing the well-being of children. Studies that have focused on educational attainment have found that the presence of biological parents, particularly mothers, has a positive influence (Lloyd and Blanc 1996; Townsend et al. 2002). However, extended kin have long been recognized as critical players in the lives of children and, indeed, some studies have found that the presence of grandparents has a positive influence on educational outcomes (Parker and Short 2009). In addition, these studies have identified a range of other effects linked to type of headship, educational attainment of the head, migrant status and SES. Despite the growing knowledge gained from studies of family structure, and particularly, extended kin, we have yet to clearly understand the pathways through which co-residential living arrangements influence children's well-being. Because scholars have conceptualized and measured children's living arrangements in different ways – nuclear vs. extended, generational composition, household size, headship, presence of parents and specified kin - we have yet to identify the critical factors associated with extended family living arrangements that really matter for children. Is it the presence of particular kin such as grandmothers that makes the difference between a child doing well and failing in school? Alternatively, is it the structure of the household reflected in dimensions such as number of generations, extent of nucleation, and verticality vs. laterality? Finally, might it be more specific to the particular configurations of particular types of kin that help explain variation in outcomes?

In this analysis, we attempt to address this issue by 1) examining two different ways of capturing co-residential living arrangements – structural and kin presence; and 2) comparing the effects of each on children's educational attainment in a rural community in South Africa. In doing so, we pay particular attention to the difference between household structure and composition, type of kinship (maternal vs.

paternal) and take advantage of kinship relationship data that were developed directly from the vantage point of children. Our ability to address these relationships is facilitated by the unique Agincourt Health and Demographic Surveillance System, which has tracked demographic change in a former homeland in rural Mpumalanga Province since 1992. We use a wide range of sources of kinship data to reconstruct kinship connections that might otherwise be unobserved or unresolved in other data sources.

The value of this analysis can be appreciated in three ways. One, it advances our conceptual and methodological grounding in capturing what co-residential living arrangements actually provide for children. In other words, rather than take the household to be a “fact of life” we need to interrogate how closely our conceptualization mirrors lived social reality (Randall et al. 2011) and assess what type of explanatory power we actually get from each type of measurement. Two, as a result of apartheid era policies, high levels of unemployment and cultural preference, Black family organization defies simplistic, conventional categorization. Finally, Black children in rural South Africa continue to face large disadvantages in educational attainment compared to other racial groups underscoring the need to better understand which aspects of household arrangements matter for educational outcomes. Taken together, there is a clear need to improve our ability to measure living arrangements which, in turn, will elucidate the pathways through which particular living arrangements impact children’s educational attainment in South Africa and elsewhere.

Conceptual Background

The study of co-residential living arrangements has a long history in the social sciences though demographers have primarily been interested in it as a determinant of children’s well-being. Whereas anthropologists have long challenged its centrality in the social organization of societies (Guyer 1981; Hammel & Laslett 1974; McNetting et al. 1984; Yanagisako 1979), it remains important conceptually and is the most common unit of data collection in most survey and census based research. Van de Walle’s

(2006) book provides a good overview of the value and limitations of the household “concept” as it is used in surveys and censuses in sub-Saharan Africa. He starts the book by acknowledging that researchers differ on the definition of a household, and the extent to which it reflects the social reality of Africa. However, the book underscores the importance of the household as both a statistical and social unit of analysis particularly to demographers. Therefore, it is vitally important to understand what we are actually capturing through different measures of co-residential arrangements, the extent to which each approach explains variation in selected outcomes and the different interpretations of effects that result.

The household can be seen as “the basic social unit which encapsulates kinship, residence patterns and economic organization” (Harrison 2007). Because the household is also a site of social reproduction, we would add children’s (and adults’) caregiving arrangements as another important dimension. All four dimensions ultimately provide the framework for the distribution of resources amongst household members. Resources are not only economic but also include labor, emotional, social and moral support. If we adopt an altruistic model of household functioning (Becker 1981), all members would work towards the good of the unit through an optimal sharing of resources. This model has been challenged by scholars who have stressed the conflictual nature of household organization particularly along lines of gender (Folbre 1986; Sen 1990) and age (Meillasoux 1981). In such a view, resources are not equitably distributed amongst household members with some member benefitting more than others. It is our view, in line with many others, that living arrangements vary on a continuum from highly cooperative to highly conflictual with some arrangements encompassing both. One way to represent cooperation and conflict is through the lens of household structure. The structural approach refers to the generational contours and extent of nucleation in the household. Nuclear arrangements, often identified with lower fertility and changing values about family obligations (Bongaarts 2001; Mberu 2007) are likely to be cooperative because there are fewer competing interests. However, within extended arrangements, there is likely to be variation in the extent of cooperation and conflict depending on the type of extension. We would expect more cooperation in vertical arrangements in which there is less competition for resources among

members of similar ages as is found in lateral arrangements. Moreover, we might also expect vertical arrangements that are contiguous to be more cooperative than skipped formations because economic and caregiving pressures are greater in the latter. Finally, structures that encompass both vertical and lateral features would exhibit both cooperation and conflict. For example, in large extended family arrangements, members may coalesce around certain issues (e.g. care of the sick) but may be in conflict over other matters (e.g. major purchases or paying school fees for children's education).

While structure may be important, another way to think about living arrangements is through the lens of kinship and, in particular, the presence of particular kin. Such a view makes an a priori assumption that particular kin types have specific value based on factors such as common lineage, shared gender and/or age based seniority. Anthropologists have long demonstrated that allegiance based on shared lineage is found in many African societies (Fortes 1958; Goody 1958). For example, in matrilineal societies, having maternal kin may be more beneficial (though not always) than having access to paternal ones. However other factors, e.g. low marriage rates may necessitate greater reliance on maternal kin as has been shown to be the case in South Africa (Preston Whyte 1981). Further variation may be seen within kin type based on gender and age. Women tend to take on more responsibility for caregiving than men and, therefore, may be more valuable to live with (Rosaldo and Lamphere 1974). However, men's higher income earning potential may give them greater value. The presence of the elderly may be valued in gerontocratic societies (Stucki 1995) but their value is increasingly rooted in their active participation in income generation through pensions (Case and Deaton 1998). Taking these dimensions into consideration, we focus on the following kin relationships: grandmothers, grandfathers, aunts and uncles each further specified by maternal or paternal type. This approach expands the almost exclusive focus in the extant literature on grandmothers to include other potentially critical kin.

Data and Methods

Data

The data for this analysis come from the Agincourt and Health Demographic Surveillance System (AHDSS) conducted in 21 villages (another 2 villages were added in 2008) located in former homeland areas in the province of Mpumalanga in northeastern South Africa. The baseline census was conducted in 1992 followed by annual visits to each household in the site to update births, deaths, and migration and individual status such as residence, union, relationship to household head, and education of every household member. Household socioeconomic status is based on ownership of assets such as cattle, car, and cell phone as well as access to amenities including drinking water and sanitation. Migration has been classified into two categories. A permanent migrant is defined as a person moving into or out of a household with a permanent intention. Someone who left the household permanently since the last update will not appear on the subsequent household roster. A temporary migrant, on the other hand, is someone who is identified as a member of the household but has spent six or more months of the previous year out of the household for employment or other reasons.

Previous work on living arrangements using the AHDSS data has shown that between 1996 and 2003, there was considerable change between household types and that the most prominent projected long-run changes were an increase in the proportion of three generation linear households. “Simpler” household types such as single person households and nuclear households were projected to become relatively less common (Wittenberg and Collinson 2007). Related work on changes in household composition between 1993 and 2003 showed an increase in the proportion of female headed households, an increase in the number of households with orphans and (Madhavan and Schatz 2007). An analysis specifically focused on headship patterns of older persons in Agincourt found that older persons were no more likely to be heading households affected by HIV/AIDS than other age groups in the 2000-2005 period (Schatz and Madhavan 2011). In examining the influence of living arrangements on outcomes, previous work using data from 1997 found a mixed set of effects on children’s educational attainment: presence of parents benefitted all children but having a migrant father had a positive effect only for older children; female headship had no effect for the most part and being in a Mozambican household was a disadvantage for all

children (Townsend et al. 2002). More recent analysis examining the correlates of children's mobility found that the presence of women who can act as maternal substitutes lowers the likelihood of children moving when the mother is a labor migrant or when she is deceased (Madhavan et al. 2012). While providing important findings, all these studies have used different measures of living arrangements, and often, not mutually exclusive categorizations, making it difficult to identify the critical dimensions and the pathways through which effects are felt. The analysis undertaken in this paper attempts to provide the needed clarity.

Our data for kin relationships come from two sources: 1) household rosters that collect conventional data on sex, age and relationship to household head and 2) the social connections database (SCDB) which uses all waves of the AHDSS to derive robust indicators of both intra and inter household connectivity from the child's perspective. Collection of data using household rosters almost always begin with the identification of the "household head," the person deemed to be responsible for the overall welfare of the household. In many communities in sub-Saharan Africa, this person tends to be the oldest male (Posel 2001). All other household members are assigned a relationship code that indicates relationship to the head. If we wanted to identify relationships from the perspective of children, we would need to reconstruct this based on the original set of relationships. While this is relatively straight forward in nuclear and/or small households, it becomes increasingly difficult to do so in large households extended along both vertical and lateral dimensions. As a result, the process to identify kinship relationships from the perspective of children is likely to produce a number of unresolved relationships. To address this issue, we draw on data that offers direct, robust kinship relationship data from the child's perspective. The SCDB database was developed using a more comprehensive list of relationships populated from other sources such as parent ID linkages, union ID linkages, relationships formed over past co-residence episodes, and the recursive reconciliation of all those relationships to one another.

We use data from the 2002 update which covered a population of approximately 70,000 people living in 11,900 households. We chose 2002 because the results can be compared to an earlier analysis using data from 1997 (Townsend et al. 2002). Our analytical sample includes 22,997 children aged 6 - 18 years old who are not parents themselves nor live with a partner or partner's family. The last restriction was imposed to avoid combining caregiving received by children and caregiving given to children in the case of young parents, both of which are very different contexts. We should also note that, because data on parental survival, particular paternal, is incomplete, we cannot examine how living arrangements differ by parental survival. Even using the SCDB, we were able to identify the exact relationships for 96.2 % of alters (kin relationships) with high confidence; as a result, 7.7% of children live in households with at least one unidentified alter. In analyzing possible bias in this sample, we found that the majority of unresolved relationships are those in which the alter is aged 19-30 and unrelated or very distantly related.

Methods

Measuring Living Arrangements: In line with the conceptual framework, we develop two different typologies to measure adult co-residential living arrangements. We restrict both typologies to include only adults (aged 18+) because they are most critical for channeling resources to children. However, because children are an indicator for the competition for resources, we include total number of children under age 18 as a control variable when we examine effects on education.

- 1) Structural: This typology includes seven categories: 1) exclusive nuclear defined as having only both parents and/or adult siblings (reference); 2) exclusive continuous vertical (one or both parents, grandparents); 3) exclusively lateral (one or both parents, aunts, uncles); 4) both vertical and lateral (one or both parent and having at least one member from vertical and lateral arrangements); 5) no parents/any kin; 6) lone mother (no kin) and 7) other. Other includes "lone father" "only adult siblings and/or spouses" "only adults with unknown relationships" or "no

adults” and “other unusual combinations that come out of sub optimal adaptation” or “rare combinations.” Generational divisions are determined by age and relationship. This mutually exclusive classification goes beyond conventional typologies that are usually limited to capturing nuclear and multigenerational arrangements.

- 2) Kin Presence: Using the distribution of all kin who children live with, we focus on the presence of the four dominant types: grandmother, grandfather, aunt and uncle each further divided by maternal or paternal classification.

Comparing Effects of Living Arrangement on Educational Outcomes: We employ OLS and logistic regression models to examine the relationship between living arrangements as specified in each of the two approaches and educational outcome. The outcome measure for the OLS models is pace of education which is modeled as a continuous variable that captures the difference between years of schooling attained – age + a constant for normal age of entry into school which is 6 in this community (Kuhn 2006). A pace of 0 would mean that the child is meeting grade for age expectations. A pace less than 0 would mean that the child is falling behind and a pace greater than 0 means that the child is moving faster than expected. The mean pace of education for the total sample is -.49 with boys further behind (-.70) than girls (-.29). We use logistic regression models to examine the effects on two other dependent variables: loweduc defined as being 2 years or more behind grade level and higheduc, being more than 1 year ahead of grade level. About 24% of the sample is more than 2 years behind grade level while 31% is more than 1 year ahead.

Control Variables: We control for age of child, educational attainment of the household head, whether the house is headed by a refugee, whether there are labor migrants in the household, and number of children under the age of 18 in the household (not including focal child). The kin presence models also include controls for number of adults in household, and the presence of other members, namely, sibling and step kin.

All analyses are stratified by sex of the child. To control for correlated standard errors arising from having multiple children from the same household, we use the cluster command in STATA at the household level. A comparison of goodness of fit statistics will provide some insight into what the models are and are not capturing and whether one approach is better than another. It will also help identify parsimonious models of co-residential arrangements that identify which dimensions are crucial to operationalize in any analysis of family structure and children's outcomes.

Results

Structural Approach

Table 1 shows the distribution of children categorized by the structural typology of households in which they live.

Insert Table 1 here.

Almost 40% of children live in exclusively nuclear structures with the remaining 60% distributed over extended arrangements with at least one parent (27.4%), extended arrangements without any parents (11.4%), lone mother (14.4%) and "other" arrangements (8.2%). It is interesting to note that the proportion of children living in households structured along vertical and lateral divisions is double the number of children living in either vertical or lateral households. While the proportion of children living in "lone mother" is quite high, it should be noted that this captures a cross sectional picture; it is likely that most of these households will evolve into other arrangements that include other adults over time. We now turn to examining the relationship between residential living arrangements and educational outcomes using the structural approach (Table 2).

Insert Table 2 here.

Being in an exclusively continuous vertical, exclusively lateral or lateral and vertical arrangements has no effect on the pace of education or being ahead of grade expectations for boys or girls. Conversely, being in an exclusively lateral arrangement appears to increase the likelihood of being 2 or more years behind grade for age. This suggests that you are more likely to get resources in competition with cousins and nephews if you are a good student or at least are currently caught up. Being in a structure with either no parents and kin or only mother and no kin has the expected negative impact on all measures. Finally, being in the “other” category also appears to compromise educational attainment. The independent effects of the control variables are as expected with age of child decreasing the pace, increasing the likelihood of being more than 2 years behind and decreasing the chances of being ahead of grade expectations. Interestingly, number of labor migrants has no impact on any of the three outcome measures. Educational status of the head has the expected positive impact whereas being in a refugee headed household has a negative effect. Effects are similar for boys and girls. Table 3 shows the results of models using a more refined categorization that disaggregates these structural categories according to parental status resulting in 12 categories.

Insert Table 3 here.

From these results, it seems like a grandparent is a partial substitute for a parent, especially for boys; one parent plus vertical is as good as the reference category, nuclear, for boys but not for girls. No parents plus vertical is still very disadvantageous, but considerably better than some of the other non-vertical categories for both boys and girls. This more nuanced effect does not show up in the more parsimonious modeling (Table 2) because being in a vertical arrangement really does not matter so much if you have both parents. In short, grandparents are not supplements but rather substitutes. We now turn to our second approach based on kin presence.

Kin Presence Approach

Figure 1 shows the distribution of children living with mothers, fathers, siblings and different types of extended kin in 2002.

Insert Figure 1 here.

Consistent with expectations, we find that most children (82%) live with their mothers, about 55% with their fathers, about 51% with both parents (not shown) while 11.4% live with neither parent (not shown). Nearly 30% live with mother only and 7% live with father only (not shown). Interestingly, less than 20% of children live with some type of extended kin, namely, grandmothers (mm), uncles (mb) and aunts(mz) and less than 10% live with paternal extended kin (fm or fb). Other types of maternal or paternal vertical kin are exceedingly rare while living with other types of maternal or paternal lateral kin is somewhat higher between 7-9% of children. While the proportion of children living with extended kin is smaller than we expected, there is enough variation in co-residence patterns to justify asking the question “does living with x make a difference to educational progress?”

Table 4 shows the results of OLS models estimating the effects of having particular types of kin on pace of educational attainment for boys and girls. Model 1 is the basic model with only type of parental presence included. Model 2 includes four types of grandparents – ff, fm, mf and mm and Model 3 includes two types of aunts and uncles – maternal and paternal. Model 4 is the full model that includes parents, grandparents, aunts/uncles as well as siblings and step kin.

Insert Table 4 here.

Not surprisingly, type of parental presence exerts a strong effect on the pace of educational attainment in all the models. Children who live with mother only, father only or neither parent all fare worse compared

to those who live with both parents. This holds true for boys and girls even after controlling for age which has a negative independent effect. It is noteworthy that the effect of having “father only” is far weaker for girls compared to boys. The only grandparent variable (model 2) that is significant is maternal grandmothers which exerts a positive effect for boys but not girls. This effect holds in the full model (model 4) as well. The presence of either paternal or maternal aunts/uncles has no significant effect for boys or girls (model 3) and holds in the full model as well. We find significant positive effects of siblings and step kin in model 4 but the presence of siblings’ families is markedly disadvantageous for girls. This may be due to child care needs that draws girls away from their studies. All the control variables behave the same way as in the structural models.

When we ran these models using the likelihood of being 2+ years behind grade for age as the outcome, the results were very similar (hence, we chose not to show the results) with one exception: presence of maternal grandmothers had a negative effect for both boys and girls while the presence of paternal grandmothers had a negative effect for girls only. These same variables exerted a positive effect on the likelihood of being more than 1 year ahead for both boys and girls.

Discussion

In this analysis, we set out to unpack the components of household co-residential arrangements through two approaches: structural and kin presence – and apply each approach to explaining variation in children’s educational attainment in a rural community in South Africa. Perhaps the most surprising finding is the relatively limited role of extended kin in the lives of these children, a departure from the dominant narrative that emphasizes extended kin. Both approaches show that about 50% of children are living with both parents, though not necessarily exclusively. This figure is higher than what might be expected based on popular projections of African family structure and some academic research but lower than the estimates using the 1997 data (Townsend et al. 2002). It is also clear that most children share a residence with their mothers though, in about 16% of cases, it is a lone mother. It is interesting that

among those children who live in extended structures, more of them live in structures that have elements of both lateral and vertical extension than in those with either one or the other. Perhaps what is most surprising is the relatively low proportion of children living with any extended kin; the figure never exceeds 15% for any category of kin. This too deviates from both popular and academic representations of rural African family life.

When we examined the effects on pace of educational attainment, we found that both approaches offer similar levels of explanatory power but they tell somewhat different stories. The structural approach suggests that the effects of living in extended structures that include both parents is not different from living in nuclear households. In other words, there is no added benefit of having other kin. However, when we break this down by parental status, we find more interesting results. Living with one parent in a vertical structure is far better than living in a lateral arrangement particularly for boys. Moreover, while any extended structure in the absence of both parents is particularly disadvantageous, doing so with vertical is better than with a lateral arrangement. The kin presence approach is consistent with the structural effects by showing that the presence of both parents is highly beneficial to educational attainment. However, it also suggests that while, in general, extended arrangements may not offer any added benefit, the presence of particular kin may do so. Specifically, we find that grandmothers exert a positive effect particularly for boys. While access to pension income could explain some of this effect, it is puzzling that we do not find any effect of grandfathers suggesting that gender specific characteristics (e.g. caregiving) may be salient. We also found positive effects of siblings and step kin. ^[s1]The absence of any effect of maternal or paternal aunts/uncles may be a reflection of their marginality as a result of unemployment which also may result in a depletion of limited household resources. In sum, while structure appears to be critical in explaining variation in educational attainment, the presence (or absence) of selected kin also has a limited role to play.^[s2]

The most important contribution of this analysis to the literature on household composition and family structure in sub-Saharan Africa is its explicit focus on the difference between household structure and

composition which are often used interchangeably and in some cases, erroneously, in the extant literature. The structural approach is concerned with the general contours of living arrangements which can be represented by the extent of nucleation, generational spread and whether the extension is vertical or horizontal. The kin presence approach, on the other hand, focuses on particular dyadic relationships such as that between children and maternal grandmother or paternal uncle. Each places emphasis on different dimensions of children's social positioning – whereas the structural embeds children within a larger kin structure, the latter is concerned with how particular kin either protect or put at risk children's welfare. This conceptual difference – structure or individuals -, we believe, is critical to appreciate if our ultimate goal is to improve the welfare of children.

In assessing the value of this work, it is important to consider some limitations. First, using a cross sectional indicator of residential arrangements to examine a cumulative process such as schooling tends to result in low explanatory power in general. We plan to pursue this line of research in future work. Second and related is the dynamism of living arrangements which is likely to play a large role in influencing children's outcomes. Third, due to data limitations, we did not include potentially important co-variables such as access to pensions and other social grants and employment status. Finally, by focusing on co-residential living arrangements, we have left out what may be a very critical factor – intra household relationships – in understanding children's outcomes. Despite these limitations, we believe that this analysis makes a worthwhile contribution to the ongoing discussion of family structure in all its complexity, in particular, intergenerational relationships, and living arrangements in its myriad forms and children's welfare in the African context.

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