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Distance or location? How the geographic distribution of kin networks shapes support given to single mothers in urban Kenya

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With increasing urbanisation and mobility underway across sub-Saharan Africa, kin groups are becoming spatially dispersed. The extent of support provided by kin to one another is likely to vary with this geospatial positioning. Because most data collection is restricted to the co-residential household, we have little knowledge of the geospatial dimensions of kin groups of which a large part is beyond household boundaries, and even less insight into how spatial variation might impact on intra-familial support patterns. Drawing on recently collected data on single mothers and their kin in Nairobi, Kenya, we describe the geospatial positioning of non-residential kin; examine the relationship between objective and subjective measures of distance and location of kin and support for single mothers; and analyse the relationship between kin clustering and receipt of support. Our results show several important findings. First, financial support from non-residential kin is geographically quite dispersed but emotional support is more concentrated among kin living near the mother. Second, whereas there is no effect of the objective measures on financial or emotional support, we find strong effects of subjective measures. Third, we find that the clustering of kin around the mother by distance has no effect on either outcome but having the majority of kin living in rural areas has a negative effect on emotional support even after controlling for distance between kin and kin location.

KEY WORDS: Kenya, kin, space, location, financial support, emotional support

Introduction

Population researchers have long understood the importance of considering spatial proximity in addressing key demographic issues. Examples include studies on the effects of parental co-residence on children's and adolescents' outcomes in Africa (Grant and Hallman 2008; Lloyd and Blanc 1996; Marteleto *et al.* 2016), spatial proximity and intergenerational support (Pezzin *et al.* 2007; Shelton and Grundy 2000), access to employment opportunities (Mouw 2002; Parks 2004), and health care utilisation (Rosero-Bixby 2004; Wang and Luo 2005). Additionally, the large literature on social networks has paid close attention to spatial location and patterns of support (Cassidy and Barnes 2012; Faust *et al.* 2000; Viry 2012; Wellman 1990). However, because most demographic surveys are limited to the co-residential household, there is a notable gap in the family demography literature on how distance and geographic positioning of kin influence patterns of intra-familial support. Some surveys ask about financial support from non-

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residential members (see Lam *et al.* 2008; Weinreb 2002) but they do not collect data on non-resident kin who do not provide support, nor do they identify the exact location of kin. Additionally, none of these surveys include data on emotional or child care support. This issue is particularly salient in sub-Saharan Africa which is experiencing some of the world's highest rates of population mobility and urbanisation (UN Habitat 2014) but where research is still driven by assumptions grounded in static models of family/household altruism (Becker 1991). It would be expected that families in such dynamic contexts are spatially dispersed and that variation in support amongst family members is at least partly a function of geospatial attributes.

In this analysis, we investigate the relationship between geo-spatial attributes of kin and support received by kin in an informal settlement in Nairobi, Kenya. We use the term, 'geo-spatial' to refer to physical distance, type of location and clustering of kin. Drawing on recently collected data on kinship structure and support for single mothers in this community, we describe the geo-spatial positioning of non-residential kin; examine the relationships between objective and subjective measures of distance and location of kin and support for single mothers; and analyse the relationship between kin clustering and receipt of support.

The importance of this investigation can be appreciated in a number of ways. First, it makes an important conceptual contribution to understanding the spatial dispersion of kin in a recently urbanised African context. By going beyond the co-residential household, we can assess the extent of overlap between spatial and social units of kinship structure and support. To this end, we are extending the concept of 'stretched household' – a term used to describe the spatial unit of black African families in South Africa under apartheid when spaces of reproduction and production were separated by labour migration (Spiegel *et al.* 1996). Second, it highlights both the benefits and burdens of having spatially dispersed kin in terms of social support. This is particularly important in contexts with limited employment prospects often concentrated in specific locations, and with changing perceptions of kin-based obligations. Third, this study provides an opportunity to assess the extent to which spatial factors matter amidst widespread use of mobile technology, in particular, mobile banking, fairly extensive transport options, improved internet access and communication technologies, and social media, all of which tend to compress the appearance of distance between individuals. Finally, it demonstrates the value and challenges of collecting and analysing geo-coded data on non-residential kin for better understanding of kin structure and support, particularly in relation to the more conventional data on perceptions of distance and ease of access. Despite the increased interest in geo-spatial research, which has been aided by technological innovations such as GIS (Cooper *et al.* 2014; Kumar 2007), these tools have rarely been applied to the study of kinship (see Madhavan *et al.* 2014 as one of the few exceptions). This analysis is an effort to advance this line of research.

Conceptual approach

Do distance, location and clustering of kin matter for kin support? To answer this question, we draw on three conceptual anchors from the literature: changing norms about kin obligations; employment constraints that limit kin support; and technological innovations that facilitate kin linkages. The voluminous scholarship on kinship in Africa has evolved from a structural functionalist perspective centred on fixed roles and expectations of kin members to a social constructivist orientation that places emphasis on individual agency in determining who, when and how connections are formed and maintained (Alber and Bochow 2011). This has happened alongside or as a result of both urbanisation and increased mobility, which have, in turn, engendered a debate about the role of spatial dispersion in determining kinship obligations. In other words, do spatial factors alter normative expectations of kin? On the one hand, the move from rural to urban areas has allowed people and specifically, the younger generation, to liberate themselves – both physically and socially – from kin obligations particularly towards the elderly (Aboderin 2004; Apt 2001; Cliggett 2005; Oppong 2006). Moreover, concomitant changes in union formation and childbearing have altered the reliance on particular types of kin support (Madhavan *et al.* 2013) and the expectations and roles of maternal and paternal kin. On the other hand, a long line of research on kinship and migration has emphasised the continued importance of kinship (Aldous 1962; Ferguson 1999; Kakonde 2009). In fact, one study situated in the same study site as our analysis has shown that older people are able to maintain ties to rural areas over time (Mberu *et al.* 2012). While there is little doubt that the meaning and function of kinship has changed over time, the linkages continue to be important both symbolically and practically (Ankrah 1993; Geschiere 2009) even in highly educated urban contexts where we might expect such ties to be weakening (Smith 2011). In fact, it is possible that such linkages are even more critical in low-income urban contexts where people have limited avenues for income generation.

Even if the cultural scripts governing kinship obligations continue to have currency, the challenges of securing employment and maintaining a livelihood inhibit the ability of kin to help one another, particularly with financial transfers. A large body of

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scholarship describes these challenges in the African context (Eloundou-Enyegue and Stokes 2002; Murray and Myers 2006; Potts 2012; Simone 2009). Contrary to the conventional model of urban migrants supporting rural kin through remittances, urban residents, particularly women, usually find themselves barely surviving amidst deplorable living conditions and minimal job prospects (Singh 2007). At the same time, rural livelihoods have also been threatened as a result of land shortage, climate change, and the caprices of the agricultural sector (Cassidy and Barnes 2012; Setel 1999), making it difficult for kin to provide support. Therefore, access to local labour markets may be the key determining factor for kin to provide financial support. It is for this reason that family-based migration strategies resulting in spatial dispersion of kin to several locations with employment potential is seen as an effective strategy for ensuring some access to kin-based support by new economics of migration scholars (Stark and Bloom 1985). Moreover, Kenya has been hailed as a leader in innovative uses of mobile technology and, in particular, the development of mobile banking, which enables people to send and receive money conveniently and safely without having a bank account (Hughes and Lonie 2007). Therefore, distance itself may not be a major obstacle for accessing financial support.

While financial transfers receive the lion's share of attention in most research on intra-familial support, it is important to consider other forms of support that may be affected by the spatial distribution of kin. Childcare and emotional support are both critical aspects of individual and family well-being yet have been understudied in the migration and urbanisation literatures. With increasing female migration across the African continent (Adepoju 2008; Collinson *et al.* 2006; Posel 2004), the practice of leaving children in the care of rural kin has been documented in several African contexts (Isiugo-Abanihe 1985; Madhavan *et al.* 2012). Beyond providing long-term residence options for children, non-residential kin who live in close proximity can provide necessary child care regularly, or as needed, particularly to single mothers. Studies on emotional support are scarce [see Nauck and Becker (2013) for a recent example of a cross-national study on kinship solidarity], and none exist that we are aware of that examine how emotional support is affected by spatial dispersion. On the one hand, it might be argued that long distances undermine emotional connectivity because maintaining a relationship through visits and phone calls is expensive. However, technological innovations, particularly mobile phones and social media and better transport options help to bridge the physical distances between people (Fischer 1982; Williams and Merten 2011); although some studies have highlighted challenges (Ureta 2008; Wyche *et al.* 2010).

Drawing on this scholarship, we conceptualise the relationship between geo-spatial attributes of kin and kin support in two ways: dyadic linkages between kin; and kin clustering. The term, 'dyadic' refers to spatial and location proximity between two people and the potential influence of one on another. The emphasis, therefore, is on individual geo-spatial positioning. Moreover, these measures can be further categorised as objective or subjective. Whereas objective measures capture actual distance and location, subjective measures reflect a person's perception of distance and accessibility. This is important because it enables us to discern more clearly whether geography has a direct effect or is serving as a proxy for underlying perceptions of the value of specific relationships. For example, a sister who is not seen as particularly helpful may be reported as living 'far away' even if her actual distance is not. Kin clustering captures the potential value of connection density as opposed to individual location and can be considered in two ways. First, it refers to the presence of multiple kin in close proximity to an individual, which may be very advantageous for accessing practical assistance such as child care, but not beneficial for financial support if employment opportunities are scarce. Second, it can also reflect the concentration of kin in specific locations. For example, having the majority of a kin group residing in rural areas may be particularly detrimental for accessing financial support but may be conducive to strengthening emotional support through the maintenance of strong group identity. Taken together, these dimensions reflect individual and group adherence to cultural scripts governing kin obligations, the weight of labour market constraints on relationships between kin, and the potential value of pooling resources (economic and social) amongst several kin to optimise economies of scale. This is articulated in the following research questions:

1. Do physical distance and location affect financial and emotional support to individuals?
2. Do perceptions of distance and difficulty of access affect financial and emotional support to individuals?
3. Does the clustering of kin in close proximity to an individual and in specific locations affect financial and emotional support to that individual?

We now turn to the empirical section to describe the context, data and methods for the analysis that will address these questions.

Description of research

Research site

The data for this analysis were collected using a new instrument – the Kinship Support Tree (KST) – designed to collect kinship structure and support data on both co-resident and non-resident kin of single mothers and their young children (see Madhavan

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et al. 2014 for details of survey)[1]. The KST was tested in Korogocho, a slum community in Nairobi, Kenya. Nairobi epitomises the rapid urbanisation occurring in many African countries, with its population having increased from 293,000 to about 3.4 million over the past 40 years. The last decade alone saw a jump from just over two to four million (UN Habitat 2014). The proliferation of slum communities that accompanies such rapid urbanisation necessitates a better understanding of kin connectivity to family living elsewhere, and how people survive amidst formidable economic insecurity. Korogocho is also part of the Nairobi Urban Health and Demographic Surveillance System (NUHDSS), an ongoing longitudinal data collection system in place since 2002, administered by the African Population and Health Research Center (APHRC). The NUHDSS collects census data every 4 months on fertility, mortality, migration, marital status, educational attainment, ethnicity, household composition, selected child health indicators, and household socio-economic status from approximately 29,250 people living in 10,260 households. These data show that about 25 per cent of Korogocho residents aged 12 years and older were born in the area. The main ethnic groups in this community include Kikuyu (30%), Luo (29%), Luhya (18%) and Kamba (7%). Predominantly Kikuyu and Kamba areas are geographically closer to Nairobi compared with Luo and Luhya areas which are located farther away in western Kenya. Like other slum communities, the areas covered by the NUHDSS are characterised by a lack of sanitation, limited health care facilities, congested and low-quality housing, high levels of violence and crime, and widespread unemployment and poverty. Child health outcomes – nutritional status, vaccination coverage, and educational progress – are very poor (APHRC 2014). Working in a DSS site affords a number of advantages, including access to highly trained interviewers, community access and access to years of knowledge. However, data from this site cannot be generalised because it has been exposed to research and intervention for an extended period of time. Nevertheless, the conditions of the slums are similar to other slum communities both in Kenya and other African countries.

Sample

The KST instrument was administered to 462 single mothers with at least one child born between 2009 and 2015. Single is defined as not married to or cohabiting with a partner at the time of the interview. We only included single mothers because the study was a feasibility assessment to determine whether we could collect robust data, including geo-spatial data, on non-residential kin. Our limited resources did not make it possible to increase the sample size to include sufficient cases of all union statuses. We asked each respondent to enumerate her close kin – surviving and deceased – from the child's perspective. In total, mothers provided reports on 5344 of their close kin, which include the child's siblings (full, half and step), biological father, maternal and paternal grandparents, and maternal and paternal aunts and uncles. We also asked the respondent to name any additional distant kin or non-kin who provide her with support, which yielded only 27 responses. Given there are so few and that our primary interest is kin, we exclude consideration of these individuals from analysis presented in this paper. After removing deceased kin (595), those for whom survival status is unknown (1075) and kin 7 years or younger (221), we are left with 3453 potential kin (see Madhavan *et al*. 2017 for details of study design and Clark *et al*. 2017 for a detailed description of the mother and kin samples). Potential kin are those who *can provide* support and are distinguished from active kin who are those who actually *do provide* support. Because we are interested in geo-spatial influence on kin support, we further restrict this analysis to only non-resident kin, which brings the final analytical sample to N=2368. By asking about types of support provided by every resident and non-resident kin, we ensure that support from circular migrants, whose residence status is often difficult to establish, is included.

Collection of geo-spatial data

One of the innovative features of the KST is its attempt to record multiple geo-spatial measures between the respondent and her kin. Geo-spatial data were only collected for those members who did not live with the respondent (68.6% or N=2368). These data include three self-reported or *vernacular or perceived* measures: travel time, cost of travel and distance; as well as two objective measures: name of place and distance based on geo-codes of location. Geo-codes were collected using Google Maps interfaced with the questionnaire administered on tablet computers, which allowed the interviewer and respondent to identify the location of each kin and, by extension, the GPS coordinates. We also asked interviewers to record their perceptions of accuracy on a scale from 0 (lowest) to 5 (highest). Table 1 provides the distribution of locations for KST members, the proportion with missing data for each type of location, and mean interviewer accuracy for each category.

Interviewers had a 90 per cent success rate in obtaining GPS data. Missing GPS coordinates are a result of technical challenges accessing Google Maps during the interview or difficulty identifying the stated location on Google Maps. For the 242 missing cases, we successfully imputed 68 cases using the location name provided, leaving 174 KST members without GPS coordinates. We entered the geographic coordinates of respondents and kin

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Table 1 GPS data quality

		Missing GPS	Interviewer accuracy (mean)
Korogocho	29.1% (689)	2.8%	4.1
Other NBO slum	4.1 (97)	3.1%	4.0
NBO non-slum	19.5 (461)	2.8%	4.4
Other urban Kenya	9.9 (234)	4.7%	4.1
Rural Kenya	28.1 (665)	3.0%	4.1
Outside Kenya	2.0 (48)	2.1%	3.6
Don't know	7.4 (174)	n/a	n/a
N	2368	242	2194

members into a geographic information system (ArcGIS), where we converted the coordinates into points illustrating the location within Kenya of each respondent and kin member. Then, we coded kin members to reflect whether they provide support to the focal child or not. This visualisation allowed us to produce maps showing the distribution of respondents and their kin members in Kenya (Figures 1–3).

Explanatory variables of interest

Using the geocoded locations of respondents and kin, we developed measures to capture dyadic kin attributes and kin clustering. Dyadic measures were of two types: objective and subjective. The objective measures are road distance between mother and kin; and type of location of kin categorised into three groups: urban slum, urban non-slum, and rural area. For road distance, we incorporated road network data for Kenya from OpenStreetMap, which is publically available online, with our geo-coded data for individual kin. The data from OpenStreetMap and our calculations in ArcGIS use a Mercator projection to correct for the distortion of distances for points away from the equator. Road distance is preferred over 'distance as the crow flies' because it is a better reflection of actual accessibility. The type of location measure is meant to capture the effect of any unique geo-spatial attributes of the living environment. Subjective measures include responses to the question 'Do you think the person lives far away?' and 'What are the biggest obstacles to visiting the person?' The correlation coefficient between objective and subjective distance is 0.34 and there is a significant relationship between type of location and perceptions of obstacles. In other words, respondents are more likely to say there are obstacles for kin living in rural areas. Kin clustering measures include the proportion of *potential non-resident* kin living within 10 km of the mother (through road network not straight line) categorised into three groups (0–0.25, 0.26–0.60, 0.61–1); and the proportion of *potential non-resident kin* living in urban slum, urban non-slum and rural locations. It should be noted that it would be possible for a large proportion of the kin group to be clustered in a specific location type but be spread out across Kenya. In other words, type of location is not a proxy for distance.

Dependent variables

For each KST member named by the mother, we asked about three types of support provided to the mother and child over the preceding month: financial, childcare and emotional. In this analysis, we examine financial and emotional support. We exclude child care support because the overwhelming majority of child care support is provided by co-resident kin (85%). For financial support, we asked the mother whether the kin member had provided her or her child with monetary or material support in the last month and dichotomised the responses as yes or no. For emotional support, we asked the mother for degree of agreement with four questions about emotional closeness to herself and her child: (1) You can talk to (member) about a personal issue; (2) (Member) shares an affectionate, warm relationship with you; (3) If there is a crisis for yourself, you can count on (member) to help; and (4) (Member) shares an affectionate, warm relationship with your child. If she expressed strong agreement to all four questions, the kin member was categorised as providing strong emotional support resulting in a dichotomised response of yes or no. Table 2 presents descriptive data on explanatory and dependent variables for the kin (left column) and mother (right column) samples.

Eleven per cent and 36 per cent of non-residential potential kin are reported as giving economic assistance and strong emotional support to the mother, respectively. From the perspective of single mothers, 65 per cent and 74 per cent report receiving financial and strong emotional support, respectively, from at least one non-residential kin. In terms of objective geo-spatial measures at the kin level, location is known for about 93 per cent of kin. Among those for whom location is known, we were able to ascertain GPS coordinates for about 85 per cent. The distance distribution shows that 24 per cent of non-residential potential kin live within 1 km and another 22 per cent between 1 and 10 km of the mother. We also find that nearly 28 per cent live between 10 and 500 km from the mother, an additional 12 per cent beyond 500 km and the final 14.7 per cent have distance unknown. Interestingly, only 3 per cent live between 10 and 100 km (not shown), which could be a reflection of an unusual migration pattern, or a result from challenges getting accurate GPS measures using Google Maps. In terms of location type, about a third of non-residential potential kin live in a slum community, 31 per cent

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in an urban non-slum, 28 per cent in a rural area and the remaining 7 per cent are unknown. For the subjective measures, nearly 41 per cent are perceived as living close, 15 per cent as living far and the rest unknown. When asked about obstacles to visiting each kin, 'no obstacles' was reported for more than 50 per cent of kin, 'having obstacles' was reported for 40 per cent, and the remaining were unknown.

Moving to the clustering measures at mother level (second column, Table 2), on average, women report having just over half of non residential potential kin living within 10 km radius of the mother (0.54). Stated another way, slightly more than half of an individual respondent's non-residential kin live within 10 km. If we break this down by categories, we find that about 27 per cent of respondents report having 25 per cent or fewer of their kin groups within 10 km; 23 per cent have 25–60 per cent; and nearly 45 per cent report having 60 per cent or more of their kin groups within 10 km. In terms of location clustering, about 27 per cent of women report having the majority of their kin groups living in slum areas; 19 per cent in urban non-slum contexts; and 25 per cent in rural areas. The remaining 28 per cent have kin groups that are more dispersed with no concentration in any one type of area. The mean number of potential kin (including co-residents) is 7.5.

Modelling

We use a series of multivariate, multilevel logistic models to account for the hierarchal nature of the data (e.g. each mother has multiple kin). First, we examine the effect of *objective* measures of distance on the odds that a non-resident potential kin member provides financial and strong emotional support. Second, we examine the additive effect of *subjective* measures of distance on the odds that a non-resident potential kin member provides financial and strong emotional support *net* of the objective measures. We repeat this process with objective and subjective measures of location. Third, we examine the effects of spatial and location clustering on the odds that a non-resident potential kin member provides financial and strong emotional support. All models include controls for mother characteristics (measured at level 2): age, employment status, wealth status of household; and number of total potential kin and kin member attributes (measured at level 1): age, employment status, perceived wealth status, and kinship type (immediate which includes biological father and siblings and extended maternal or extended paternal). The clustering models include the same controls and, in addition, dyadic measures of distance and location. Emotional support models are restricted to immediate and maternal kin (N=1783) because only a handful of paternal kin were reported as providing emotional support. Therefore, including the paternal kin category would make the coefficients highly unstable. All analyses were conducted in STATA.

Results

What does the spatial dispersion of kin and kin support look like?

One of the biggest advantages of having geocoded data is the ability to create maps with high levels of precision which serve as a highly effective means of conveying a visual image of both kinship structure and support. Figure 1 presents a view of where kin are located in Kenya with reference to Nairobi where our sample of respondents is located. An inset of Korogocho is provided to show a close up of the distribution of kin in the immediate vicinity of the respondents. This figure shows all enumerated potential kin except those living outside Kenya (dots are outside of this map) and those with missing GPS data resulting in N=3267.

This visual image complicates the common description of traditional 'rural–urban' migration wherein recent urban residents are expected to have moved away from their kin scattered in the rural hinterlands to move to a major city, which is often the capital. Instead, we see kin residing primarily around other (smaller) urban hubs and along major roadways. Kin are concentrated in two particular urban areas, Nairobi and Kisumu, reflecting the ethnic composition of Korogocho primarily made up of Kikuyu (south central region) and Luo and Luhya (western region). Each grouping is also linked to a major city/labour market hub: Nairobi and Kisumu in the west. Smaller concentrations are found in the southeast, northeast and north of the country, reflecting the area's growing Somali population as well as members of other ethnic groups. Not shown is a global map which includes kin as far away as Saudi Arabia, India and the USA. Figures 2 and 3 presents the breakdown of kin by those who do and do not provide financial and strong emotional support, respectively.

Several features are worth noting about the patterns of financial support. First, financial support comes from a small proportion of potential kin. Second, this support is geographically diverse coming from relatives living both near and far from Korogocho. Third, it is clustered around major towns which serve as labour market hubs. However, the inset of Korogocho does show a very dense clustering of financial support providers in the immediate vicinity of the mother, suggesting the importance of spatial proximity. The strong emotional support map (Figure 3) highlights three features. First, unlike financial support, a much larger proportion of potential kin provide such support. Second, providers are much more tightly clustered around the

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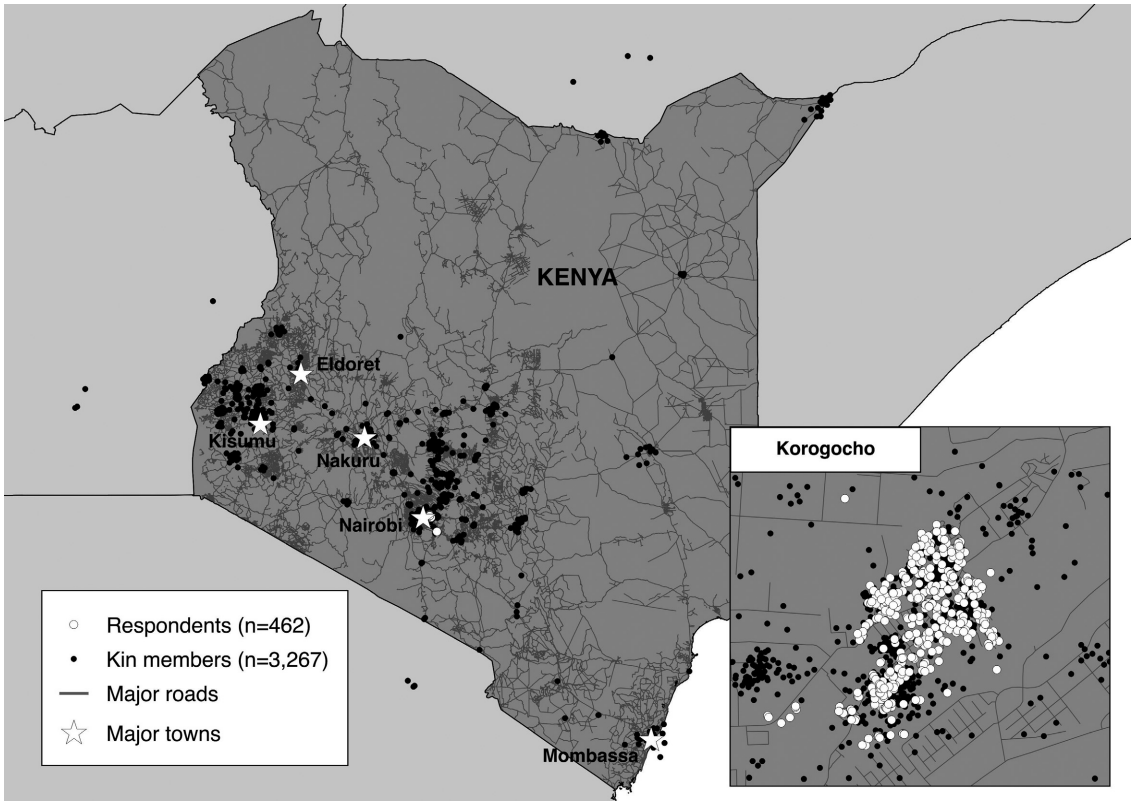

Figure 1 Kin location in Kenya and Korogocho

respondent than financial support providers. Third, while the majority of kin provide emotional support, it is notable that there are kin living in close proximity to the mother who do not. Not shown on these maps – for legibility – but important to note is the dominance of maternal kin as providers for both financial and strong emotional support. Biological fathers and paternal kin do play a limited role in financial support provision but maternal kin provide the lion's share of support, and in particular, emotional support, as one might expect for a sample of single mothers.

Does distance matter?

Table 3 presents the results of models examining the effects of objective and subjective measures of distance on the odds of single mothers receiving financial support (models 1 and 2) and strong emotional support (models 3 and 4) after adjusting for socio-demographic attributes of kin and mother. We do not show coefficients for all controls but explain any significant effects to facilitate interpretation. Confidence intervals are presented to assess the strength of effects.

Road distance to kin has no effect on the odds of receiving either financial or strong emotional support. However, perceived distance to kin has a significant effect for both types of support, confirmed by the relatively narrow confidence intervals. Moreover, there is no evidence of strong multi-collinearity between the two as explained earlier. Perceiving the kin member to be far away decreases the odds of receiving financial support by about 56 per cent compared with perceiving the person as living close by, independently of the actual distance (though there is no effect for emotional support). A response of 'don't know' decreases the odds by 65 per cent and 64 per cent for financial and strong emotional support, respectively. Lack of an objective distance effect may be reflective of the ubiquity of mobile phones to facilitate financial transfers and keep people in touch. However, the strong effect of the subjective measures – and, in particular, 'don't know' suggests that the way in which people perceive distance may be a reflection of how connected they feel to the individual. For example, a response of 'don't know' suggests that there has been little contact with the person. In addition, we find that a large

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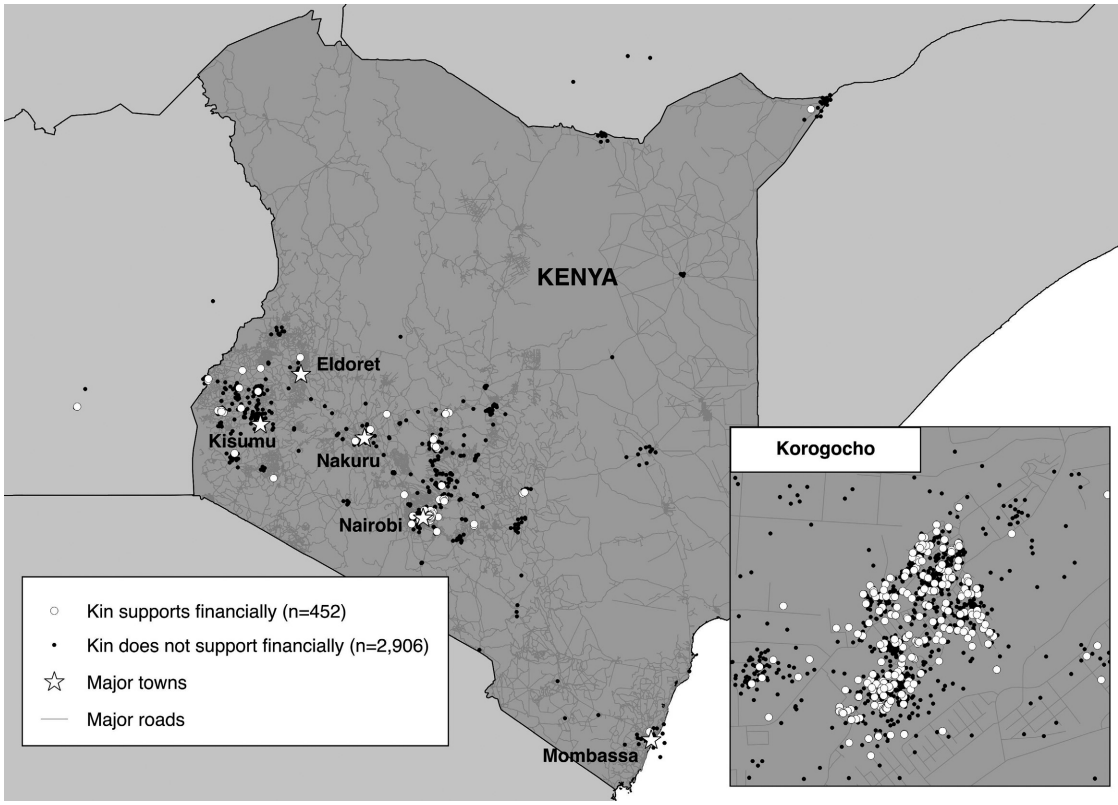

Figure 2 Kin financial support

potential kin group actually decreases the odds of receiving emotional support by 12 per cent but no such effect is apparent for financial support. All kin attributes (not shown) are significant. The perception of a kin member as wealthy has a positive effect on receiving financial support but a negative effect on emotional support. Being older than 49 and employed both have strong positive effects on receiving both forms of support. If the relationship of the kin member to the child is extended on either the maternal or paternal side, the odds of receiving financial support decreases compared with being immediate kin. However, a maternal kin link significantly increases the odds of receiving emotional support compared with immediate kin. This would be expected of single mothers who may rely on financial support from biological fathers, but not emotional support which is more likely to come from their natal kin. In terms of mother attributes, being older than 24 years lowers the odds of receiving support but increases the odds of receiving emotional support compared with the youngest mothers. Interestingly, mothers in the wealthiest households are more likely to receive financial support but less likely to receive strong emotional support. We also find that unemployed mothers experience lower odds of receiving support in model 2 but not in model 1.

Does location matter?

Table 4 presents the results of models examining the effects of objective and subjective measures of location on the odds of mothers receiving financial support (models 1 and 2) and strong emotional support (models 3 and 4).

The odds of mothers receiving financial support from kin living in rural areas decreases by 62 per cent compared with those living in slum communities (model 1) independently of distance, which has no effect, and other socio-demographic attributes. However, this effect becomes non-significant (model 2) once we include 'perceived obstacles to visiting kin', suggesting that perception of obstacles is at least partly driving the location effect. The correlation coefficient between the two variables is 0.54. No such effects are evident for receiving strong emotional support. Taken together, these results suggest that the negative effects of rural location are capturing an

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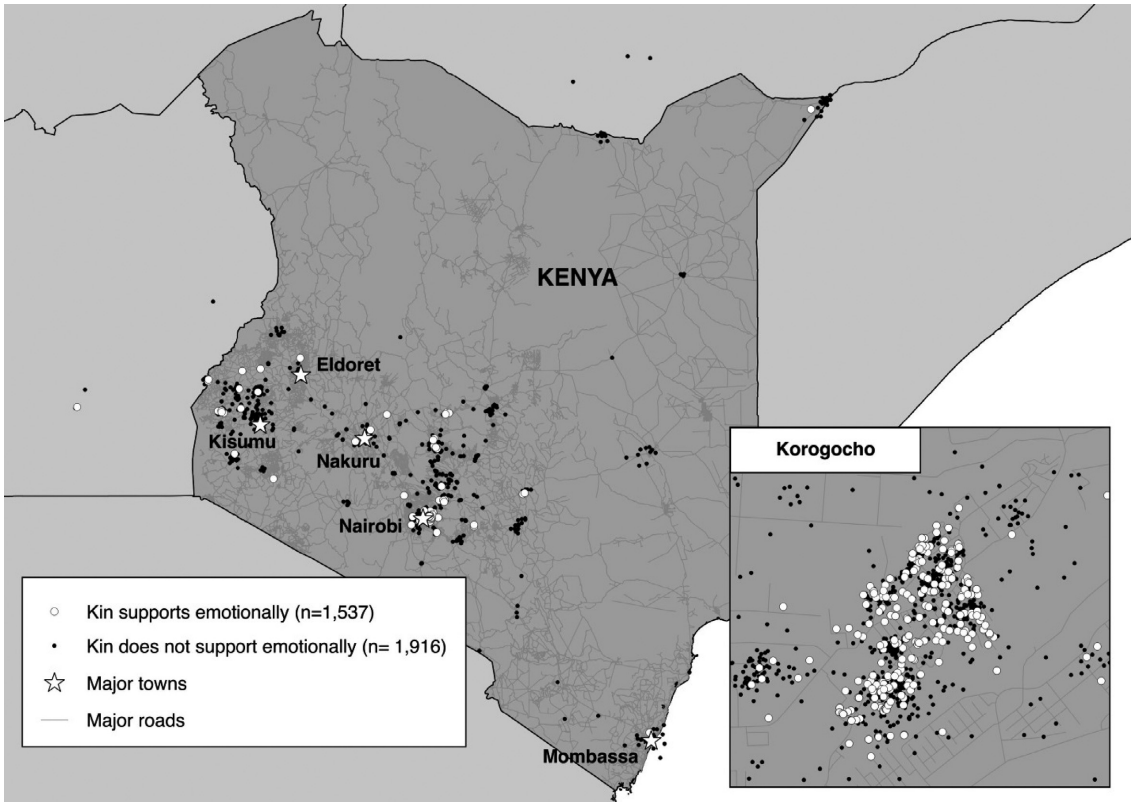

Figure 3 Kin emotional support

access issue. In other words, it is not distance to the area but rather the difficulty of getting there because of unreliable transport or safety. The fact that it is only apparent for financial transfers underscores concerns that Kenyans have about carrying valuables on public transport. All control variables behave in the same way as in the spatial models described in Table 3.

Does kin clustering matter?

Table 5 presents the results of logistic models examining the influence of kin clustering on the odds of receiving financial and strong emotional support independently of dyadic distance and kin location.

There is no effect of spatial clustering on the odds of receiving financial or emotional support independently of dyadic measures. However, there are significant effects of location clustering on strong emotional support. Specifically, having more than 50 per cent of non-residential potential kin concentrated or clustered in rural areas reduces the odds of receiving emotional support by 75 per cent compared with having the majority of kin living in a slum area *net of* dyadic distance and location. This finding is all the more intriguing given the absence of any location effects at the dyadic level (Table 4). This hints at the challenges of maintaining strong emotional bonds within kin groups when only a few members move away from a rural base. It may also belie a selection effect of mothers who are actively distancing themselves from their rural kin. We also find that having no concentration of kin in any one location reduced the odds of receiving emotional support by 56 per cent. This suggests that having kin dispersed in different types of location may make it difficult to maintain emotional bonds. All control variables have similar effects to the dyadic models.

Discussion and conclusion

This analysis makes an important contribution to the growing scholarship on geo-spatial determinants of family well-being. In fact, it is the first effort, to our knowledge, to describe what the geo-spatial distribution of non-residential kin groups looks like in an African context marked by geographical mobility, limited employment opportunities and growing use of communications technology; and to understand the

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Table 2 Selected descriptive attributes of samples

Kin level	N=2368	Mother level	*N*=462
Dependent variables		Dependent variables	
Provides financial support	10.8	Receives financial support	64.9
Provides strong emotional support	36.0	Receives strong emotional support	74.1
Objective measures (%)		Distance clustering measures (%)	
Location known	92.6	Proportion of non-resident potential kin in 10 km of mother (mean)	0.54
Unknown location	7.4	0–0.25	26.6
Distance from kin to mother		>0.25 and ≤0.6	22.7
≤1 km	23.8	>0.6	44.8
1–10 km	22.0	Missing	5.8
11–500 km	27.7	Location clustering (%)	
>500 km	11.8	More than 50% of non-resident potential kin living in slum areas	27.1
Unknown	14.7	More than 50% of non-resident potential kin living in urban non-slum areas	19.2
		More than 50% of non-resident potential kin living in rural areas	25.1
Type of location (%)		No concentration	28.6
Slum	33.2		
Urban non slum	31.4	Number of potential kin (mean)	7.5
Rural	28.1		
Missing	7.4		
Subjective measures			
Lives close	40.8		
Lives far	15.4		
Don't know	43.4		
No obstacles to visiting	52.5		
Obstacles to visiting	40.1		
Don't know	7.4		

extent to which geo-spatial factors matter in receiving financial and emotional support from non-residential kin. Drawing on an innovative survey instrument that collects multiple measures of distance and location from both objective and subjective perspectives, we uncovered a number of important findings. First, the maps show that financial support from non-residential kin is geographically quite dispersed but concentrated in potential labour market hubs as might be expected. Emotional support is more concentrated among kin living near the mother but is almost entirely in the hands of maternal kin. Second, regression results testing objective measures of distance and location show no effect on financial and emotional support. Third, we found strong effects of subjective measures of distance – perception of living far away – on both types of support. However, reverse causality is possible such that they are perceived as living far away because they give less money. Lastly, we found that the clustering of kin around the mother by distance has no effect on either form of support but location clustering – majority living in rural areas and no majority in any location – have negative effects on emotional support. In terms of control variables, the most interesting finding is the perception of a kin member as being wealthy, which increases the odds of receiving financial support but decreases the odds of receiving emotional support. This is suggestive of a 'patron–client' relationship which is usually limited to financial transactions and does not oblige the patron to provide emotional support. Interestingly the mother's household wealth appears to attract financial support as well as suggesting the possibility for reciprocal obligations.

These findings are important on a number of fronts. First, they offer a more nuanced picture of mobility patterns, in line with the new economics of migration literature, which stresses family-based decision-making strategies to ensure access to a safety net across multiple labour market hubs. Indeed the maps clearly show the clustering of kin around key urban centres in Kenya. Second, distance itself appears to make no difference in accessing support from kin, which may not be that surprising in a country in

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Table 3 Spatial characteristics of non-resident kin associated with receiving financial and emotional support (kin level)

	Financial		Emotional	
	Model 1 OR (CI)	Model 2 OR (CI)	Model 3 OR (CI)	Model 4 OR (CI)
Road distance from kin to mother (objective)				
≤1 km (ref.)	1.00	1.00	1.00	1.00
>1 and ≤10	0.82 (0.51–1.31)	0.89 (0.55–1.45)	1.00 (0.65–1.56)	1.11 (0.71–1.74)
>10 and ≤500 km	0.58 (0.33–1.01)	0.92 (0.50–1.68)	0.99 (0.63–1.56)	1.32 (0.78–2.22)
>500 km	0.44 (0.19–1.00)	0.87 (0.34–2.22)	0.61 (0.33–1.10)	0.75 (0.37–1.53)
Missing	0.77 (0.40–1.49)	1.32 (0.65–2.70)	0.64 (0.35–1.20)	1.04 (0.53–2.02)
Perceived distance to kin (subjective)				
Close (ref.)		1.00		1.00
Far		0.44* (0.21–0.92)		1.02 (0.59–1.76)
Don't know		0.34***(0.20–0.56)		0.36*** (0.23–0.55)
Number of potential kin	0.97 (0.91–1.03)	0.96 (0.91–1.03)	0.88*** (0.82–0.93)	0.87*** (0.82–0.93)
Observations (*n*)	2332	2332	1758	1759
Groups (*n*)	435	429	429	429
Wald chi	185.36	189.37	207.06	218.07
Rho	0.37	0.37	0.47	0.47

Note: *p<0.05, **p<0.01, ***p<0.001.
Models 1 and 3 include only objective measures whereas models 2 and 4 include both objective and subjective measures.
Controls Included: type of kinship, age of kin member, employment status of kin member, perceived wealth status of kin, age of respondent, mother's employment status, mother's wealth quintile.
The difference in observations is due to including only immediate and maternal kin in the emotional support models.

Table 4 Location characteristics of non-resident kin associated with receiving financial and emotional support (kin level)

	Financial		Emotional	
	Model 1 OR (CI)	Model 2 OR (CI)	Model 3 OR (CI)	Model 4 OR (CI)
Type of location (objective)				
Urban slum (ref.)	1.00	1.00	1.00	1.00
Urban non-slum	0.84 (0.45–1.53)	0.91 (0.49–1.70)	1.11 (0.63–1.95)	1.21 (0.68–2.13)
Rural	0.39* (0.16–0.93)	0.43 (0.17–1.07)	0.88 (0.43–1.79)	0.99 (0.48–2.07)
Perceived obstacles to visiting kin (subjective)				
None (ref.)		1.00		1.00
Yes		0.64 (0.39–1.05)		0.69 (0.44–1.06)
Number of potential kin	0.96 (0.89–1.03)	0.95 (0.89–1.02)	0.87*** (0.81–0.93)	0.87*** (0.81–0.93)
Observations (n)	2162	2157	1670	1667
Groups (*n*)	429	429	420	420
Wald chi	178.58	177.33	181.13	182.40
Rho	0.38	0.38	0.47	0.47

Note: *p<0.05, **p<0.01, ***p<0.001.
Models 1 and 3 include only objective measures whereas models 2 and 4 include both objective and subjective measures.
Controls included: distance, type of kinship, age of kin member, employment status of kin member, perceived wealth status of kin, age of respondent, mother's employment status, mother's wealth quintile.
The difference in observations is due to including only immediate and maternal kin in the emotional support models.

which mobile technology and social media have brought people together in unprecedented ways. Third, the findings enrich our understanding of kinship support amidst urbanisation and mobility. Specifically, they offer some support for both sides of the 'kinship and urbanisation' debate. On the one

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Table 5 Distance and location clustering associated with mother receiving financial and strong emotional support (kin level)

	Financial support OR (CI)	Strong emotional support OR (CI)
Proportion of potential non-resident kin in 10 km radius to mother		
0–0.25 (ref.)	1.00	1.00
>0.25 and ≤0.6	0.51 (0.24–1.10)	0.74 (0.37–1.49)
>0.6	0.64 (0.27–1.51)	0.46 (0.20–1.06)
Location distribution of potential kin		
More than 50% living in slum areas (ref.)	1.00	1.00
More than 50% living in urban non slum areas	0.51 (0.22–1.14)	0.72 (0.21–1.03)
More than 50% living in rural areas	0.83 (.29-2.36)	0.25** (0.09–0.67)
No concentration	1.53 (0.72–3.2)	0.44* (0.21–0.94)
Number of potential kin	0.95 (0.89–1.02)	0.86*** (0.81–0.93)
Observations (*n*)	2162	1670
Groups (*n*)	429	420
Wald chi	181.77	184.37
Rho	0.36	0.46

Note: *p<0.05, **p<0.01, ***p<0.001.
Controls included: distance to kin, location of kin, type of kinship, age of kin member, employment status of kin member, perceived wealth status of kin member, age of respondent, mother's employment status, mother's wealth quintile.
The difference in observations is due to including only immediate and maternal kin in the emotional support models.

hand, kinship linkages – particularly, maternal connections in an urban setting – continue to have salience for single mothers living in low-income, urban settings despite pervasive economic precarity faced by all kin. This is brought out in a more subtle way through subjective reporting of distance. Our respondents' response to this question indicates underlying expectations of their kin which, in turn, requires active work to be met satisfactorily. Stated another way, despite the easy access to mobile technology, people may still feel socially distant from their kin. On the other hand, the negative effect of clustering in rural locations on strong emotional support belies a more complex narrative. It may be that the very process of separating from rural kin weakens emotional linkages, as theorised by Wirth (1938), particularly for women as they seek more liberation from structures that constrain their choices.

The interpretation of these results must take into account some methodological limitations, the biggest of which is endogeneity. Because we are relying on a cross-sectional analysis, it is highly likely that unobserved factors could influence both the perception of distance and the outcome variable. We may be able to address this by analysing data from a second phase of the project in which we asked these same questions again. Therefore, we might be able to use a fixed effects approach to isolate the effects better. Moreover, there are also likely to be selection issues with the respondents themselves, in particular, their own preferences about being geographically close to their kin. Third, while we have relatively high confidence in the collection of GPS data, variation in the level of precision may have affected the results. Fourth, we may have underestimated financial contributions if particular time-specific expenses (e.g. payment of school fees) were missed in the time frame of our question. Finally, the patterns presented here reflect the conditions in a single slum community, which limits generalisability. Indeed, it is quite possible that this community has a unique 'social life' with particular norms about kin obligations. We plan to replicate this data collection effort in non-slum and rural contexts. Despite these limitations, the findings from this analysis offer more insight into the implications of kin dispersion and should motivate more studies of this type. Given the very high rates of urbanisation and migration underway in so many developing countries, it is imperative that family demographers make more use of available geo-spatial measures and analytical techniques to understand the family processes involved, and their impact on individual and family well-being.

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Note

1 The KST questionnaire was administered on tablet computers using Open Data Kit (ODK) software that enabled interface with Google Maps to record GPS coordinates.

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References

Aboderin I 2004 Decline in material family support for older people in urban Ghana, Africa: understanding processes and causes of change *The Journal of Gerontology Series B: Psychological Sciences and Social Sciences* 59 S128–37

Adepoju A 2008 *Migration in sub-Saharan Africa* Nordiska Afrikainstitutet, Uppsala

African Population and Health Research Center (APHRC) 2014 *Population and health dynamics in Nairobi's informal settlements: report of the Nairobi Cross-sectional* Slums Survey APHRC, Nairobi

Alber E and Bochow A 2011 Changes in African families: a review of anthropological and sociological approaches toward family and kinship in Africa in **Gonzales A, Oloo F and DeRose L** eds *Frontiers of globalization: kinship and family structures in Africa* Africa World Press, Trenton NJ 1–30

Aldous J 1962 Urbanization, the extended family, and kinship ties in West Africa *Social Forces* 41 6–12

Ankrah M E 1993 The impact of HIV/AIDS on the family and other significant relationships: the African clan revisited *AIDS Care* 5 5–22

Apt N 2001 Rapid urbanization and living arrangements of older persons in Africa *Population Bulletin of the United Nations* 42/43 288–310

Becker G S 1991 *A treatise on the family* Harvard University Press, Cambridge MA

Cassidy L and Barnes G D 2012 Understanding household connectivity and resilience in marginal rural communities through social network analysis in the village of Habu, Botswana *Ecology and Society* 17

Clark S, Madhavan S, Cotton C, Beguy D and Kabiru C 2017 Who helps single mothers in Nairobi?: the role of kin support *Journal of Marriage and Family* 79 1186–204

Cliggett L 2005 *Grains from grass: aging, gender, and famine in rural Africa* Cornell University Press, Ithaca NY

Collinson M, Tollman S M, Kahn K and Clark S 2006 Highly prevalent circular migration: households, mobility and economic status in rural South Africa in **Tienda M, Findley S, Tollman S and Preston-Whyte E** eds *Africa on the move: African migration and urbanisation in comparative perspective* University of Witwatersrand, Johannesburg 194–216

Cooper C H, Fone D L and Chiaradia A J 2014 Measuring the impact of spatial network layout on community social cohesion: a cross-sectional study *International Journal of Health Geographics* 13 1

Eloundou-Enyegue P M and Stokes S C 2002 Will economic crises in Africa weaken rural-urban ties? Insights from child fosterage trends in Cameroon *Rural Sociology* 67 278–98

Faust K, Entwisle B, Rindfuss R, Walsh S J and Sawangdee Y 2000 Spatial arrangement of social and economic networks among villages in Nang Rong District, Thailand *Social Networks* 21 311–37

Ferguson J 1999 *Expectations of modernity: myths and meaning of urban life on the Zambian Copperbelt* University of California Press, Berkeley CA

Fischer C S 1982 The dispersion of kinship ties in modern society: contemporary data and historical speculation *Journal of Family History* 7 353–75

Geschiere P 2009 *The perils of belonging: autochthony, citizenship, and exclusion in Africa and Europe* University of Chicago Press, Chicago IL

Grant M J and Hallman K K 2008 Pregnancy-related school dropout and prior school performance in KwaZulu-Natal, South Africa *Studies in Family Planning* 39 369–82

Hughes N and Lonie S 2007 M-PESA: mobile money for the 'unbanked' turning cellphones into 24-hour tellers in Kenya *Innovations* 2 63–81

Isiugo-Abanihe U C 1985 Child fosterage in West Africa *Population and Development Review* 11 53–73

Kumar N 2007 Spatial sampling design for a demographic and health survey *Population Research and Policy Review* 26 581–99

Lam D, Ardington C, Branson N, Case A, Leibbrandt M, Menendez A, Seekings J and Sparks M 2008 *The Cape Area Panel Study: a very short introduction to the integrated waves 1-2-3-4 data* The University of Cape Town, Cape Town

Lloyd C B and Blanc A K 1996 Children's schooling in sub-Saharan Africa: the role of fathers, mothers, and others *Population and Development Review* 265–98

Kakonde P 2009 *Transnational family ties, remittances motives and social death among congolese migrants: a socio-anthropological analysis* Unpublished Thesis University of Witwatersrand, Johannesburg

Kankonde P B 2010 Transnational family ties, remittance motives, and social death among Congolese migrants: a socio-anthropological analysis *Journal of Comparative Family Studies* 41 225–43

Madhavan S, Clark S, Beguy D, Kabiru C W and Gross M 2017 Moving beyond the household: innovations in data collection on kinship *Population Studies* 71 117–32

Madhavan S, Harrison A and Sennott C 2013 The management of nonmarital fertility in two South African communities *Journal of Culture, Health and Sexuality* 15 614–28

Madhavan S, Mee P and Collinson M 2014 Kinship in practice: spatial distribution of children's kin and care networks *Journal of Southern African Studies* 40 401–18

Madhavan S, Schatz E, Clark S and Collinson M 2012 Children's mobility, maternal status and household composition in rural South Africa *Demography* 49 699–718

Marteleto L, Cavanagh S, Prickett K and Clark S 2016 Instability in parent–child co-residence and adolescent development in urban South Africa *Studies in Family Planning* 47 19–38

Mberu B U, Ezeh A C, Chepngeno-Langat G, Kimani J, Oti S and Beguy D 2012 Family ties and urban–rural linkages among older migrants in Nairobi informal settlements *Population, Space and Place* 19 275–93

Mouw T 2002 Are black workers missing the connection? The effect of spatial distance and employee referrals on interfirm racial segregation *Demography* 39 507–28.

Murray M J and Myers G A 2006 *Cities in contemporary Africa* Palgrave Macmillan, New York NY

Nauck B and Becker O A 2013 Institutional regulations and the kinship solidarity of women – results from 13 areas in Asia, Africa, Europe, and North America *European Sociological Review* 29 580–92

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Oppong C 2006 Familial roles and social transformations older men and women in sub-Saharan Africa *Research on Aging* 28 654–68

Parks V 2004 Access to work: the effects of spatial and social accessibility on unemployment for native-born black and immigrant women in Los Angeles *Economic Geography* 80 141–72

Pezzin L E, Polla R A and Schone B S 2007 Efficiency in family bargaining: living arrangements and caregiving decisions of adult children and disabled elderly parents *CESifo Economic Studies* 53 69–96

Posel D 2004 Have migration patterns in post-apartheid South Africa changed? *Journal of Interdisciplinary Economics* 15 277–92

Potts D 2012 Whatever happened to Africa's rapid urbanisation? *Africa Research Institute* Counterpoints Series Monograph

Rosero-Bixby L 2004 Spatial access to health care in Costa Rica and its equity: a GIS-based study *Social Science and Medicine* 58 1271–84

Setel P W 1999 *A plague of paradoxes: AIDS, culture, and demography in northern Tanzania* University of Chicago Press, Chicago IL

Shelton N and Grundy E 2000 Proximity of adult children to their parents in Great Britain *International Journal of Population Geography* 6 181–95

Simone A 2009 *City life from Jakarta to Dakar: movements at the crossroads* Routledge, New York NY

Singh G 2007 Paradoxical payoffs: migrant women, informal sector work, and HIV/AIDS in South Africa *New Solutions: A Journal of Environmental and Occupational Health Policy* 17 71–82

Smith D J 2011 Rural-to-urban migration, kinship networks, and fertility among the Igbo in Nigeria *African Population Studies* 25 320–36

Spiegel A, Watson V and Wilkinson P 1996 Domestic diversity and fluidity among some African households in Greater Cape Town *Social Dynamics* 22 7–30

Stark O and Bloom D E 1985 The new economics of labour migration *The American Economic Review* 75 173–8

UN Habitat 2014 *State of the world's cities report* United Nations, New York NY

Ureta S 2008 Mobilising poverty? Mobile phone use and everyday spatial mobility among low-income families in Santiago, Chile *The Information Society* 24 83–92

Viry G 2012 Residential mobility and the spatial dispersion of personal networks: effects on social support *Social networks* 34 59–72

Wang F and Luo W 2005 Assessing spatial and non-spatial factors for healthcare access: towards an integrated approach to defining health professional shortage areas *Health and Place* 11 131–46

Weinreb A A 2002 Lateral and vertical intergenerational exchange in rural Malawi *Journal of Cross-Cultural Gerontology* 17 101–38.

Wellman B 1990 The place of kinfolk in personal community networks *Marriage and Family Review* 15 195–228

Williams A L and Merten M J 2011 iFamily: Internet and social media technology in the family context *Family and Consumer Sciences Research Journal* 40 150–70

Wirth L 1938 Urbanism as a way of life *American Journal of Sociology* 44 1–24

Wyche S P, Smyth T N, Chetty M, Aoki P M and Grinter R E 2010 Deliberate interactions: characterizing technology use in Nairobi, Kenya in *Proceedings of the SIGCHI conference on human factors in computing systems* Association of Computing Machinery, Atlanta, GA 2593–602

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