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Article title: How can we learn about community socio-economic status and poverty in a developing country urban environment? An example from Johannesburg-Soweto, South Africa

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ABSTRACT

Few tested tools exist to assess poverty and socio-economic status (SES) at the community level, particularly in the urban environments of developing countries. Furthermore, there is no real sense of what the community concept actually means. Consequently, this paper will describe how findings from formative qualitative research were used to develop a quantitative tool to assess community SES in Soweto and Johannesburg in terms of how the tool was administered, the terminology used, and topics covered. This paper also discusses the level of aggregation respondents identified as defining a local community using an innovative drawing/mapping exercise. Focus groups (n=11) were conducted with 15-year-old adolescents and their caregivers from the 1990 Johannesburg-Soweto Birth-to-Twenty (Bt20) cohort and key informant in-depth interviews (n=17) with prominent members working in the Bt20 communities. This research recognises the importance of involving local people in the design of data collection tools measuring poverty and human well-being.

Keywords: Community; socio-economic status; South Africa; qualitative; questionnaire design

INTRODUCTION

Background

Poverty and socio-economic status (SES) are known to be associated with health outcomes and the potential for social or economic interventions to impact on these makes health inequality research a priority area. Such research is particularly timely given that the half-way point has now been reached to achieve the Millennium Development Goals (MDGs). Indeed, sub-Saharan Africa is not on target to halve the people in poverty by 2015 and has the highest poverty gap ratio indicating that the African poor *"are the most economically disadvantaged in the world"* (United Nations, 2007, p, 7).

Research in the 1980s and 1990s revealed diversity in the extent and depth of poverty within urban areas in developing countries, often showing poverty to be at its worst in deprived city slums (Harpham et al., 1988). A particular concern in urban developing country environments is to understand the role of contextual effects (community effects) versus compositional effects (individual/household effects) in shaping health and well-being (Pickett and Pearl, 2001; Macintyre et al., 2002; Riva et al., 2007).

Community effects on health

The impacts of contextual/community SES effects on health are recognised, especially since multilevel modelling techniques have facilitated the identification of community effects controlling for

individual/household level SES (e.g. Diez-Roux, 1998; Duncan et al., 1998). Households with similar SES profiles can have different health outcomes when living in contrasting areas (Macintyre and Ellaway, 2000) meaning that community features have the potential to modify individual level influences on health. Understanding the relative contribution of household and community SES to health is important for policy makers in order to design and target public health interventions.

In their review of 25 studies, although modest, Pickett and Pearl (2001) found that contextual effects existed in all studies except two. They identified ways in which neighbourhoods influence health such as through health care availability and accessibility, infrastructure, attitudes towards health as well as through social support mechanisms (p, 111), illustrating the potential multidimensionality of the importance of community SES for health. A more recent review of the literature on area level effects on health by Riva et al. (2007) reconfirmed the importance of area effects, showing them to be consistently significantly associated with health over and above individual level effects.

Assessing community SES

Few tested tools exist to assess SES at the community level, particularly in developing country urban settings. The Demographic and Health Survey (DHS) and Living Standards and Measurement Study (LSMS) are two widely used nationally representative surveys in developing countries. The DHS carry out Service Provision Assessments which

survey health and family planning services, obtaining data on access and availability as well as quality of care (Macro DHS, 2007). The LSMS collects community data on location and quality of health care services, education and infrastructure but tends to only be used in rural areas where communities are easier to define (Grosh and Glewwe, 1995, p, 5).

Because few tested tools exist and because of the limitations of those that *do* exist, many studies use aggregated individual/household level variables such as the percentage of people unemployed to assess community SES (Macintyre et al., 2002). However, the use of aggregated individual/household level data may result in problems of 'ecological fallacy' which *"involves inferring individual level relationships from relationships observed at the aggregate level"* (Macintyre et al., 2002, p, 125-126). In their review of studies linking area effects to health outcomes, Pickett and Pearl (2001) suggest that the non-use of integral data may be explained by the accessibility of census data, finding that only two out of the 25 studies reviewed included integral variables, that is, variables measured at the community level. Riva et al. (2007) also found that more recent studies of area effects on health have continued to primarily use census SES data. The lack of adequate tools for assessing integral measures of community SES within urban developing country contexts may go someway to explaining the continued reliance on census measured aggregated individual/household SES measures to depict community SES. Understanding and being able to measure integral

measures of community SES is vital to assessing poverty and monitoring progress towards the MDGs.

The concept of community

As well as a need to collect integral community SES data, there is a need to recognise what community members themselves understand by the concept of community. In the literature, studies have focussed on convenient administrative boundaries to define communities (see Pickett and Pearl, 2001 for a review). Indeed, Pickett and Pearl (2001) found that 23 out of the 25 studies reviewed used geographical boundaries but discussed that such convenient administrative boundaries may not be appropriate *"if they do not correspond to the actual geographical distribution of the causal factors linking social environment to health"* (p, 112). Riva et al. (2007) in their more recent review also found that administrative and statistical areas continued to be most commonly used.

The study context

The South African context is ideal for examining community SES due to the disparities in community development and the transient nature of most townships under apartheid. However, since the first democratic elections in 1994, the South African government has been striving to address poverty and inequality (May, 2000). South Africa is now a country in economic, health, and nutritional transition (Benade et al., 1996), meaning that findings in this urban setting could be applicable to urban areas in other countries experiencing transition, particularly in the

African region.

This research uses a sub-sample from the 1990 Johannesburg-Soweto born Birth-to-Twenty (Bt20) cohort to develop a tool for assessing community SES. Bt20 is the largest and longest running cohort study of child health and development in Africa (Richter et al., 1995) and its longitudinal design brings a unique opportunity to analyse the changing role of SES on health in childhood and adolescence, noted as important by Riva et al. (2007). However, a limitation of the Bt20 study is that up until 2005 only household measures of SES had been collected and no community level SES data were available.

This was especially important because the cohort had grown into adolescents and adolescence marks the onset of increasing independence from the family and of more time being spent in the community (Allison et al., 1999). Therefore as the Bt20 cohort were reaching a critical milestone in their development, the community and school socio-economic environment in which they were living was likely to be becoming increasingly important for lifestyle risk factors.

Aim of paper

This paper will describe how formative qualitative research helped to establish lay knowledge and perceptions of the importance of community/school SES for health to inform the development of a questionnaire to assess community/school SES in the Johannesburg-

Soweto context. In particular, it will explain how the findings informed the questionnaire design relating to the terminology used, topics covered, and administration. The design is compared and contrasted to the LSMS community SES tool, which has commonly been used in developing countries.

DATA AND METHODS

Data

The Bt20 birth cohort study enrolled all singleton children born in Johannesburg-Soweto during a seven week period in 1990 and who remained resident for six months (Richter et al., 2007). A description of the cohort profile can be found in Richter et al. (2007) which outlines the sample, sample attrition, and the study's research themes. Ethical approval for this study was granted by the ethics committees of the University of the Witwatersrand, South Africa, and Loughborough University, UK.

Methods

Eleven focus group discussions (FGDs) averaging seven participants were conducted with 15-year-old adolescents and caregivers from a sub-sample of African Blacks (African decent) and African Whites (European decent) of the Bt20 cohort to establish their perception of the importance of their social and economic surroundings. The FGDs were stratified by population group, community SES, adolescents and caregivers, and by sex of the adolescents to ensure they were as homogenous as possible

to create a *"permissive, non-threatening environment"* for discussion (Krueger, 1988, p, 18). To select the sample, the research team had to rate the SES of the communities, classifying African Blacks living in communities mostly made up of shacks and small four roomed housing as living in low SES communities, African Blacks living in richer areas of Soweto and living in suburbs as living in mid SES communities, and African Whites as living in high SES communities.

Seventeen in-depth interviews (IDIs) were conducted with key informants stratified by the type of key informant and the SES of the communities in which they worked. Key informants included community leaders such as councillors, health care workers, school and religious leaders as well as estate agents since property prices were hypothesised to play an important role in determining the SES of communities. Key informants were involved because it was thought more likely that they would consider social and economic issues that affected the wider community in contrast to the adolescents and caregivers whose perceptions were more likely to be driven by their immediate social and physical environment (Raphael et al., 2001).

The participants conducted a mapping exercise where the adolescents and key informants drew what they considered to be the community where they lived/worked and spent most of their time. The caregivers marked the areas where they spent most of their time on a map provided

rather than drawing a picture. This approach provided participant definitions of the concept of community.

Although the question routes for the FGDs/IDIs varied slightly, there were five key sections. The first section asked questions to ascertain a definition for community; the second section established a general definition of SES; the third section examined SES at the community level; school SES was addressed in the penultimate section; and the implications of SES especially in relation to health were discussed in the last section. School SES was examined because a large part of an adolescent's community is focused in the school and, in this setting, high schools can be located outside of the community in which the household is positioned. The question route for the estate agents varied somewhat from that described above as it addressed issues such as what made a place desirable/undesirable to live and whether the property or the area was more important for determining property prices.

The FGDs and IDIs were conducted in the languages that the participants used during the sessions and recordings were transcribed verbatim and translated into English. An interpretive descriptive approach to analysis was used. The codebook was developed by a team of South African and UK researchers by extracting concepts from each line of the transcripts and grouping them into codes. The analysis used 'constant comparison' of the data by asking questions about the data and making comparisons between codes, leading to an emergent set of themes. Double coding

was used to validate the coding system, discussing any discrepancies, and revising the code book accordingly.

RESULTS

Defining the community

The drawing exercise produced some diverse perceptions of community and Figure I presents some examples of drawings by the adolescents. Although the participants were all given the same instructions for the drawing exercise, a range of boundaries for community were defined in the pictures from a single house through to communities covering several kilometres. Furthermore, some drawings included social networks (e.g. friends and relatives' houses), physical aspects (e.g. river), facilities (e.g. park, sports ground, church, and shops), services (e.g. schools), infrastructure (e.g. road and bus networks) and identified clear problems that had potential health implications of the area where they lived (e.g. dump place).

[Figure I about here]

After conducting the drawing/mapping exercise, when asked to describe the area where they lived and spent most of their time, some people described the facilities in their community e.g. shops and shopping centres, and sports and social facilities. However, most people described the problems in their communities e.g. crime, drugs, unemployment and repossession of houses, and alcohol abuse/drinking establishments.

Nevertheless, most people liked where they were living, despite these problems. Moreover, there were positive aspects to some of the problems, such as crime bringing people together, that were described as enhancing community spirit:

> *"In a way crime is bringing us together, you know?...Or the prevention of crime. We subscribe to the and pay for the community vehicle which drives around and er the children love to, to chat to the, the er police in the in the vehicle and we're greeting each other and looking after each other, those with the same sort of signs on their their gates, it's, er, it's quite nice but it has been, erm, in the past, very separate, very private"* (African White male caregiver).

> *"In Protea North our main problem is burglary especially winter time. So we decided to have eehh committee that meets every Wednesday and then the men and boys that have finished their tertiary studies and maybe they are not working, they volunteer to patrol every night especially winter time "* (African Black female caregiver living in mid SES community).

Most people called their communities by name, that is, by the suburb name e.g. Zola, Northcliff etc. The term 'location' was used to describe a community but seemed to be associated with the areas in Soweto where African Blacks lived whereas the term 'suburb' predominantly referred to the suburbs where African Whites mainly resided:

> *"People call will prefer to call it a suburb because it's like bond houses and all that stuff but I prefer to call a location because it's in the location"* (African Black adolescent girl living in mid SES community).

Furthermore, 'mini-suburb' was used to refer to suburb-like districts in Soweto that were made up of similar housing to that found in the suburbs, that is, houses that require a bank loan to buy (bond housing). Other terminology that was used included 'area', 'place', 'township', and more

colloquial terms such as ‘ghetto’. Although some people referred to their ‘community’, the term ‘neighbourhood’ seemed a much more generic expression that everyone understood.

Individual/household SES

Four dominant dimensions of SES were identified by participants. First, material wealth was seen as important in the form of the possessions that people had such as cars, houses, clothing, and money. While most identified with this most obvious dimension of SES, there were others who challenged this as the isolated important dimension of SES. For example, social wealth was seen as important in relation to the quality of life or happiness that people had:

> *“For me, poverty’s got nothing to do with the, the walls and the cars and the, the material things. Poverty is quality of life. And… quality of life, I mean I hear people who can’t go out at night. There’s so much happens in our world at night that, that I think there are people in this room that, which truly experience poverty. That’s my opinion. We deprive ourselves of real life. And that makes us poor. I deal with children who enjoy one meal a day. I say that, enjoy, because that’s what they want. These are the happiest people on earth. They don’t have bicycles and cell phones and that sort of thing, they’re wealthy, in here. And for me, that’s real wealth. Is quality of life and happiness. Immaterial of what we have. If he gets a cold, gets a cough, put on a jersey, we’re happy. And poverty measured in that more than the material things that we’ve got”* (African White male caregiver).

Religious leaders identified a third dimension to wealth which was spiritual wealth. Finally, education was seen as wealth:

> *“Education in itself is wealth, yes it’s wealth on it’s own, as it is”* (African Black male caregiver living in mid SES community).

> *"I would say no education is like poverty, because if you don't have education, these people don't get jobs, and to help them to have food on the table every day"* (African White female caregiver).

Furthermore, when ranking the importance of the factors used to describe how poor/wealthy someone was, it appeared that the interrelationship between the different aspects of SES was complex and interrelated:

> *"So it's really difficult to rank them because if you if you have a job you need an education but you need money for an education and to get money you need a job so it kind of goes in a circle"* (African White adolescent girl).

Community SES

Similar to individual/household SES, participants identified several dimensions to community SES. First, the services in communities were mentioned such as education and health care services as well as emergency services and the postal service. Facilities were also discussed such as shops and shopping centres, as well as sports and social facilities. Infrastructure was seen as a dimension of community SES in terms of the transport networks, lighting, electricity, water, and sanitation. Social aspects of the community were also discussed such as community spirit and peer pressure. The importance of the church was also identified.

As hypothesised, property seemed to play an important role in determining the SES of a community. Alongside property prices, the type of housing was also identified as being important e.g. single or double storey housing (double storey properties were a sign of higher status) and

government provided housing or bond housing. Space around properties was also considered important.

Although property was an important dimension of community SES, another common theme to come out of the qualitative research was the fear of crime and the need for security:

> *"If it happens it happens. Everybody's been hijacked and had their car stolen and had their house broken into. Everybody knows somebody who's been raped and attacked and held hostage in their house, I mean, that that is the choice that we make living in South Africa"* (African White female caregiver).

> *"Uhh where I live, it is not safe there. The police sometimes patrol and they catch a few people at night but, still there is crime happening they break into our houses. People get injured in the streets and also the mob justice that we have here, the community members are hitting people, so it is not that safe"* (African Black adolescent male living in mid SES community).

The different types and causes of crime were discussed but also the measures taken to ensure safety and security such as dogs, weapons, high walls and fences, and belonging to security companies:

> *"We have an electric, an electrified fence within the confines of the, the property, the house is about 135 years old or something, we have huge dogs, sort of 70 kilo dogs that stand and go Woof! Woof! Woof! And everybody says will you please put your dog away before I come in? And so that's one deterrent. We do have a security company, electric fences there, we, we don't venture out a lot. We've got around a kilometre of fencing, and we, there's about 8, about 6 pieces of grassland, and the kids, the kids… we, we don't venture out"* (African White female caregiver).

> *"My community it's safe I mean at night we do we have have cops patrolling around and some boys I mean those like they do collect money every like they do like collect money at our houses like R10 on Fridays for like*

> *patrolling around the area, so I think it's safe. People do go at night"* (African Black adolescent female living in mid SES community).

School SES

The penultimate section of the qualitative question route addressed school SES and education was found universally important:

> *"We have already said that when you are wealthy you have money you have you have nice things, and now if you have education it means you will be able to get a good job and be able to buy those things and be wealthy as well and be able to stay in nice places"* (African Black adolescent boy living in mid SES community).

Aspects that were identified as making a good school were factors such as good teachers and management, disciplined learners, good facilities and resources, parental involvement, extra-curricular activities, and community friendly schools, that is, allowing their facilities to be used. Problems identified to exist in schools included drugs, smoking, alcohol consumption, skipping class, overcrowding and not enough schools, lack of resources, lack of good teachers, and lack of safety.

Implications of SES for health

The final section of the question route addressing the implications of poverty found that the majority of participants thought that there were health risks of being poor. They believed that this relationship worked through factors such as access and quality of health care, increased susceptibility to infection, poor sanitation, pollution, and malnutrition:

> "*Rich people live in cleaner environments and have money to go to the doctor when they're sick instead of going to the local clinic where the nurses sit and chat at the corners, they go to private clinics where they immediately get attention"* (African Black female caregiver living in low SES community).
>
> *"Health risks is to get sick, like these toilets cause the children to get sick a lot and also people pick up food from the dumping sites, food from the dumping site and then they make them sick and also not have proper clothing wham it is cold then they get cold"* (African Black female caregiver living in low SES community).

The area of residence was thought important as it influenced accessibility of health care and education as well as future aspirations. Furthermore, the participants thought that the effects of poverty could be reduced through government policies such as job creation, education and empowerment, as well as through charity and self-help.

> *" I don't have a solution to what needs to be done and maybe when we look at, at skilling, skilling people and giving them some, erm, some, something to live for in their lives, um, maybe that's, maybe that's the answer"* (African White female caregiver).
>
> *"If government could create jobs and look after its people and stop misusing the tax money and do the right thing"* (African Black female caregiver living in low SES community).

DISCUSSION

The formative qualitative research informed the development of a questionnaire to assess community SES in urban Johannesburg-Soweto (a copy of the questionnaire is available from the authors). It proved important to involve community members in the understanding of the local SES environment as the questionnaire developed was very different to what would have been designed without the insight from community

members. For example, Table I summarises how the study questionnaire compares to the South African LSMS community questionnaire in terms of the terminology used, the topics covered, and how it was administered. The South African LSMS was used for comparison as it was administered in the South African context, and utilised a community questionnaire.

[Table I about here]

Terminology

The principal issue was to determine an appropriate definition and terminology to use for community. The LSMS collected community data from each cluster of their sample which were based on Census Enumerator Subdistricts (SALDRU, 1994), a convenient sampling unit. The use of this kind of administrative unit has been warned against by other researchers (e.g. Pickett and Pearl, 2001) because it does not necessarily correspond to the area of influence over individuals' lives.

Indeed, the innovative drawing/mapping exercise used in this study revealed no firm consensus on what was meant by community to the participants. This presents a challenge to the design of quantitative tools aimed at assessing community because of the individual variability in the meaning of the concept of community. In order to allow comparisons based on the collection of large scale quantitative survey data, it is important that participants are considering the same definition of the concept of community. Therefore the definition used was the area where

the respondents could potentially walk to in about 20 minutes from their house, that is, approximately 2 kilometres in any direction from their house which was a definition based on consultation with the research team using their contextual knowledge of Johannesburg-Soweto. Indeed, Riva et al. (2007, p, 857) consider such definitions using a radius around a location as *"particularly innovative".*

Furthermore, it was found that the common administrative unit in South Africa ('the suburb') was inappropriate to use since it had African White connotations and concurs with Pickett and Pearl's (2001) caveat of using convenient administrative units. Moreover, findings from the qualitative research suggested that 'neighbourhood' was the most appropriate terminology to use in the questionnaire since it was universally understood in contrast to the 'community' terminology used in the LSMS (SALDRU, 1993).

Topics

As well as determining the terminology used in the design of the questionnaire, the qualitative findings also informed the topics to be addressed. The qualitative findings suggested that local people perceived both economic and social support factors as equally important in understanding the role of community SES for adolescent health in this context. Services, facilities, infrastructure, and social aspects were also important dimensions of community SES identified by participants. Therefore, the community questionnaire contained approximately 50

mostly closed answer questions, split into three sections on economic aspects, social aspects, and questions about schools including both facilities and problems.

In contrast, the LSMS community questionnaire focussed on economic aspects which is common in quantitative surveys, rather than social aspects which are often ignored but which were identified by the qualitative responses to be an important part of participants' definitions of community SES. For example, issues of crime and security were not addressed specifically in the LSMS community questionnaire but were dominant themes across the discussions. Furthermore, although the LSMS community questionnaire asked about the major religions practiced in the community, it did not collect data on religious networks and support, and religion was identified as a dimension of SES. Moreover, although both questionnaires considered the type and facilities of schools as well as the problems in schools, the LSMS did not include specific questions on safety and after school and community activities which were raised during the qualitative work as being important.

Administering

The study questionnaire was designed to be administered to 16-year-old adolescents in a sub-sample of the Bt20 cohort compared to the LSMS questionnaire which was administered to respected members in the community (SALDRU, 1994), and as a consequence, could be considered biased if they had conflicts of interest or if they did not live in

the community themselves. For consistency, it was thought better to sample the adolescents for whom the health data were available, that is, including our participants' own views of their community SES. Furthermore, finding community leaders to represent all urban communities is a challenge and may be easier to identify in rural communities. Indeed, our experiences from the qualitative work showed us how hard it was to identify community leaders. The questionnaire was administered to the adolescents as opposed to their caregivers to allow for longitudinal consistency since the adolescents would be followed-up again in year 18 when they could be living independently.

However, there are limitations of using adolescents over community leaders since two adolescents could perceive the same community differently. Also, adolescents would not be able to deal with some questions. For example, some issues considered in the LSMS community questionnaire were too challenging to ask adolescents such as commodity prices and details about health services but may be followed-up in the next round of the survey when the adolescents are aged 18 years and may have more knowledge and experience of these issues. An interviewer administered questionnaire was chosen for the study in the hope to obtain more complete and reliable data as it was thought that using a self-complete questionnaire would lead to misunderstandings and item non-response.

Limitations

Because this study aimed to design a tool for use in the Bt20 study, it used participants from the cohort to collect qualitative information. These participants represent a cohort of children born in 1990 and who stayed resident in Johannesburg-Soweto. Therefore information from recent migrants and less stable urban residents was not collected meaning that the poorest of the poor were not considered. Consequently, studies working with this most vulnerable group might need to consider additional input from these individuals before assessing community SES in an urban African setting. Furthermore, although qualitative research does not aim to be representative, there was selective non-attendance amongst the mid SES groups for the FGDs which could mean that their views were underrepresented.

It is important to note the difficulty of developing a tool to measure community SES. It was a resource intensive and costly process as well as time consuming. Many staff were needed to organise and conduct the formative qualitative research, and collecting the data, analysing it, and producing the questionnaire took approximately one year. In an ever changing socio-political environment, this delay could also potentially be a limitation. For many studies the funds would simply not be available for this level of in-depth data collection. This perhaps goes some way to explaining the lack of improvement in studies using non-census/official statistics to describe communities between the review carried out by

Pickett and Pearl (2001) and the more recent study published by Riva et al. (2007).

Finally, although the development of the quantitative survey to collect data on community SES was informed by the qualitative research, as well as the literature, it is yet to be tested in other settings. It is not yet known how applicable it will be in other urban areas in South Africa, nor in other developing country settings. Future work also plans to compare the data that are being collected with the questionnaire with those collected in the census at the suburb level to identify any differences between the two sources. However, once validation is carried out successfully, the tool may be of practical use to governments and survey organisations such as the DHS and LSMS.

CONCLUSION

Findings suggest that both economic and social support factors are equally important in understanding the role of community SES for adolescent health in this South African urban context. This paper also recognises that it is important to involve local people in the design of data collection tools to measure poverty and human welfare. Using this approach means that community members contribute to our understanding of poverty and the local SES environment, thus avoiding the risk of missing important concepts that are unknown to the researchers (Raphael et al., 2001). The tool will be useful to the Bt20 study in disentangling the role of household and community SES in

predicting health and well-being. The questionnaire developed could also have wider applications in South Africa to monitor participants' perceptions of the impact of government poverty alleviation policies as well as in other settings to assess and monitor community SES and poverty so resources and policies can be appropriately targeted and the MDGs met.

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REFERENCES

Allison, K., Burton, L., Marshall, S., Perez-Febles, A., Yarrington, J., Kirsh, L. N. Merriwether-DeVries, C., 1999. Life Experiences Among Urban Adolescents: Examining the Role of Context. Child Development, 70 (4), 1017-1029.

Benade, A. J. S., Oelofse, A. Faber, M., 1996. Body Composition in Different Ethnic Groups in South Africa. Asia Pacific Journal of Clinical Nutrition, 5 (4), 226-228.

Diez-Roux, A., 1998. Bringing Context Back into Epidemiology: Variables and Fallacies in Multi-Level Analysis. American Journal of Public Health, 88 (2), 216-222.

Duncan, C., Jones, K. Moon, G., 1998. Context, Composition and Heterogeneity: Using Multilevel Models in Health Research. Social Science and Medicine, 46 (1), 97-117.

Grosh, M. E. Glewwe, P., 1995. A Guide to Living Standards Measurement Study Surveys and Their Data Sets. Living Standards Measurement Study Working Paper No. 120, [http://www.worldbank.org/html/prdph/lsms/guide/guide.pdf].

Harpham, T., Lusty, T. Vaughan, P., 1988. Community Health and the Urban Poor. Oxford University Press, Oxford.

Krueger, R. A., 1988. Focus Groups: A Practical Guide for Applied Research. Sage, London.

Macintyre, S. Ellaway, A., 2000. Biological Approaches: Rediscovering the Role of the Physical and Social Environment. In Berkman, L. Kawachi, I. (Eds) Social Epidemiology. Oxford University Press, New York, 174-190.

Macintyre, S., Ellaway, A. Cummins, S., 2002. Place Effects on Health: How Can We Conceptualise, Operationalise and Measure Them? Social Science and Medicine, 55 (1), 125-139.

Macro DHS, 2007. Demographic and Health Surveys Service Provision Assessments. Available from: http://www.measuredhs.com/aboutsurveys/spa.cfm [Accessed 6 September 2007].

Pickett, K. E. Pearl, M., 2001. Multilevel Analyses of Neighbourhood Socioeconomic Context and Health Outcomes: A Critical Review. Journal of Epidemiology and Community Health, 55 (2), 111-122.

Raphael, D., Renwick, R., Brown, I., Steinmetz, B., Sehdev, H. Phillips, S., 2001. Making the Links Between Community Structure and Individual Well-Being. Health and Place, 7 (3), 179-196.

Richter, L., Yach, D., Cameron, N., Griesel, R. de Wet, T., 1995. Enrolment into Birth to Ten: Population and Sample Characteristics. Paediatric and Perinatal Epidemiology, 9 (1), 109-120.

Richter, L., Norris, S., Pettifor, J., Yach, D. Cameron, N., 2007. Mandela's Children: The 1990 Birth to Twenty Study in South Africa. International Journal of Epidemiology, 36 (3), electronic pages 1-8.

Riva, M., Gauvin, L. Barnett, T. A., 2007. Toward the Next Generation of Research into Small Area Effects on Health: a Synthesis of Multilevel Investigations Published Since July 1998. Journal of Epidemiology and Community Health, 61 (10), 853-861.

SALDRU, 1993. Community Questionnaire. Southern Africa Labour and Development Research Unit. Project for Statistics on Living Standards and Development. Available from: http://www.worldbank.org/html/prdph/lsms/country/za94/docs/za94com.pdf [Accessed 25 April 2007].

SALDRU, 1994. Overview of the South Africa Integrated Household Survey. Available from:

http://www.worldbank.org/html/prdph/lsms/country/za94/docs/za94ovr.txt [Accessed 25 April 2007].

United Nations, 2007. The Millennium Development Goals Report 2007. United Nations, New York. [http://www.un.org/millenniumgoals/pdf/mdg2007.pdf].

Table I: Comparison of South African Living Standards and Measurement Study (LSMS) community and study questionnaires

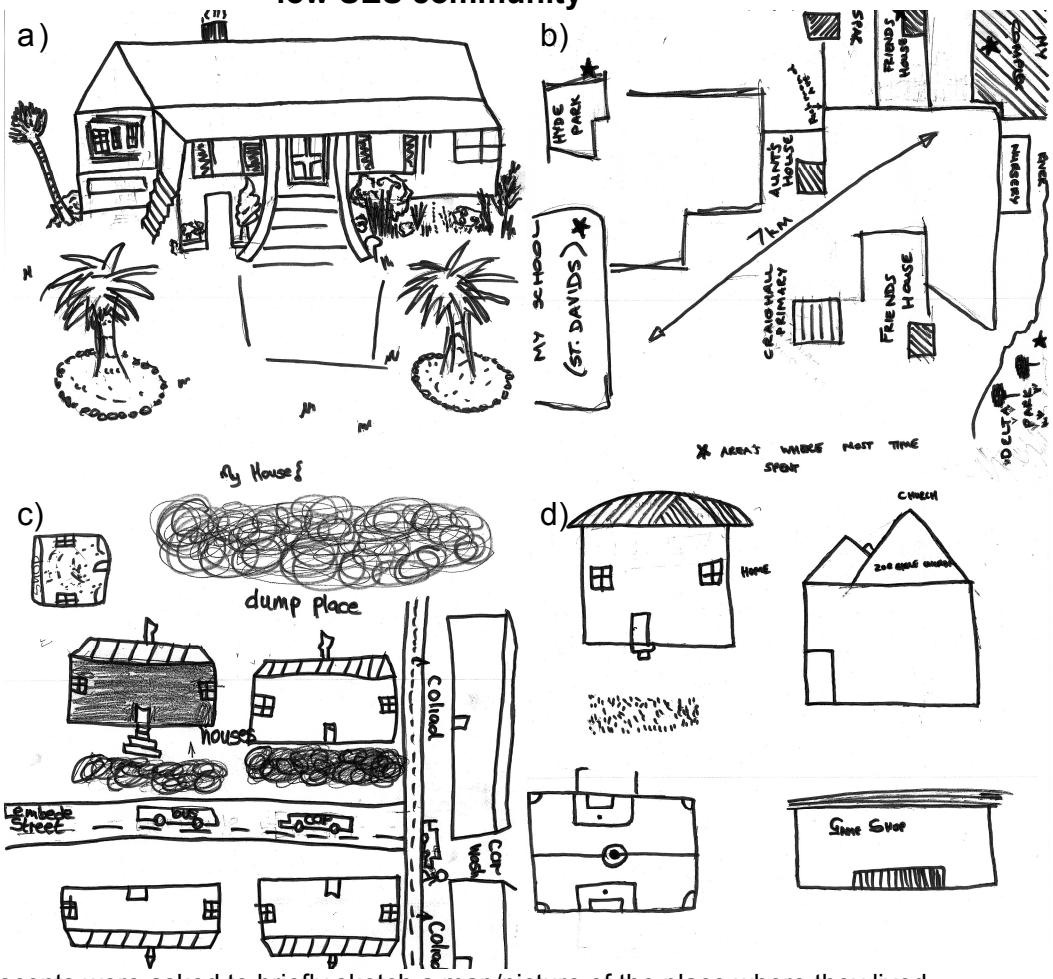
	South African LSMS (1993) community questionnaire	Study questionnaire (2006)
Community definition	Census defined sample cluster	Area approximately 20 minutes walk from the house/2 kilometres in any direction
Community terminology	Community	Neighbourhood
Topics covered in questionnaire	***Section 1: Demographic information***	
	Urban/peri-urban/rural	Only administered in urban area
	Principal population groups	Asked in section B
	Major religions practiced	
	Migration pattern	
	Homelessness	Asked in section A
	Section 2: Economy & infrastructure	***Section A: Economic aspects***
	Major economic activities	Neighbourhood wealth
	Type and pass-ability of roads	Inequalities in wealth
		Type, condition & spacing of housing
		Fences/walls around properties
	Services (restaurant, drinking bar, post office, public telephones, bank, markets)	Time to & if enough facilities (schools, health facilities, police station, shopping malls, food outlets, bars, cinema, recreational centres, church, library, sports facilities, parks, petrol station, transport networks etc)
	Public transport	Infrastructure/services (postal service, street lighting, water supply)
		Type & condition of roads
		Problems in neighbourhoods (teen pregnancies, traffic congestion, road safety, sewerage, illegal dumping, pollution, overcrowding, people born outside South Africa, homelessness, repossession, unemployment, prostitution, alcohol abuse, drugs, gangsters, drinking establishments)
		Section B: Social aspects
		Safety
		Crime
		Security measures
		Activities for young people
		Time spent with friends
		Peer pressure
		Principal population group
		Noise & liveliness
		Community spirit & support
		Feelings about neighbourhood
		Religious networks & support provided

Table I continued:

	South African LSMS (1993) community questionnaire	Study questionnaire (2006)
	Section 3: Education	***Section C: Schools/education***
	Accessibility	Attendance & where
	Type of school	Type of school
	Number of students/teachers	Number of learners per class
	Facilities	Facilities
	Literacy programmes	After school activities Community activities Safety
	Schooling problems	Problems in schools (poor academic standards, lack of resources, lack of discipline, overcrowding, poor teachers, bullying, skipping class, smoking, alcohol consumption, drugs, weapons, violence, teen pregnancy, rape, sexual relationships between learners & teachers)
	Section 4: Health	
	Personnel Facilities Health problems Problems with health services Where most women give birth Immunisation campaigns	Asked in section A
	Section 5: Agriculture Agricultural extensions Co-operatives Machinery Chemicals Rainfall Land trade	Not relevant as urban population
	Section 6: Recreational facilities Number, accessibility & distance to cinema, discotheque, nightclub, sports ground, tennis court, swimming pool, parks	Asked in section A
	Section 7: Shops & commodity prices Shopping centres/malls Where most households do shopping Prices for food/non-food items from formal & informal source	Asked in section A
Sample	Nationally representative	Sub-sample of Birth-to-Twenty adolescents born & still residing in urban Johannesburg-Soweto
Respondents	Respected members of the community e.g. head teachers	16-year-old adolescents

(SOURCE: SALDRU, 1993, 1994)

Figure I: Examples of drawings by adolescents of their community a) by an African White adolescent girl b) by an African White adolescent boy c) by an African Black adolescent boy living in mid SES community d) by an African Black adolescent boy living in low SES community



Adolescents were asked to briefly sketch a map/picture of the place where they lived and the areas where they spent most of their time with their family and friends.