



## Cumulative risk and AIDS-orphanhood: Interactions of stigma, bullying and poverty on child mental health in South Africa

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### ABSTRACT

Research shows that AIDS-orphaned children are more likely to experience clinical-range psychological problems. Little is known about possible interactions between factors mediating these high distress levels. We assessed how food insecurity, bullying, and AIDS-related stigma interacted with each other and with likelihood of experiencing clinical-range disorder. In South Africa, 1025 adolescents completed standardised measures of depression, anxiety and post-traumatic stress. 52 potential mediators were measured, including AIDS-orphanhood status. Logistic regressions and hierarchical log-linear modelling were used to identify interactions among significant risk factors. Food insecurity, stigma and bullying all independently increased likelihood of disorder. Poverty and stigma were found to interact strongly, and with both present, likelihood of disorder rose from 19% to 83%. Similarly, bullying interacted with AIDS-orphanhood status, and with both present, likelihood of disorder rose from 12% to 76%. Approaches to alleviating psychological distress amongst AIDS-affected children must address cumulative risk effects.

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### Introduction

Fifteen million children worldwide were orphans due to HIV/AIDS in 2007, with 1.4 million in South Africa (UNAIDS, 2008). This paper is based on primary analysis of a large controlled survey-based study of mental health amongst AIDS-orphaned children (maternal, paternal or double orphans; UNAIDS, 2004). Prior analyses show AIDS-orphans to have increased likelihood of clinical-range scores for internalising problems such as depression and post-traumatic stress, compared to other-orphans, non-orphans and norms from developed countries (Cluver, Gardner, & Operario, 2007). A recent review supports findings of heightened psychological distress amongst AIDS-orphaned and AIDS-affected children (Cluver & Gardner, 2007a). Other studies have found AIDS-orphans to experience high rates of depression (Bhargava, 2005), PTSD and anxiety (Pelton & Forehand, 2005).

If appropriate services for AIDS-affected children are to be developed, we need reliable evidence concerning factors which mediate risks of clinical-level disorder. Experience of AIDS-related stigma is reported by AIDS-orphans and AIDS-affected children (Strode & Barrett Grant, 2001; Thurman et al., 2006), and is associated with increased psychological problems amongst orphans

(Cluver, Gardner, & Operario, 2008). Community studies suggest that bullying is highly associated with mental health problems (Hay, Payne, & Chadwick, 2004), particularly for other groups of stigmatized children such as refugees (Almqvist & Broberg, 1999). Extreme or subsistence poverty, measured by food insecurity, was associated with increased psychological distress amongst AIDS-orphans in Tanzania, Ethiopia and Rwanda (Bhargava, 2005; Chatterji et al., 2005; Makame, Ani, & McGregor, 2002). Research in the developed world suggests that poverty largely affects child mental health through its impact on other risk factors (Rutter, Giller, & Hagell, 1998), and that the highest risks for child psychopathology arise from cumulative combinations of stressful or negative experiences (Fergusson & Lynskey, 1996). In Rwanda, a study of youth orphaned by genocide, HIV/AIDS and other causes found interactions among social marginalisation, alcohol use and depression scores (Boris et al., 2008). However, few studies to date have examined interactions of AIDS-orphanhood in particular with risk factors and child mental health. To our knowledge this is the first known study to explore cumulative or interactive effects in relation to child mental health in the developing world.

### Method

The study measured 52 potential mediating factors, derived from a) systematic review of quantitative research with AIDS-orphaned children (largely in SubSaharan Africa and the US), b)

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review of wider research with AIDS-orphaned, AIDS-affected and other vulnerable children, and c) qualitative research with 120 orphans and caregivers (Cluver & Gardner, 2007b). These factors were quantitatively tested for associations with mental health, controlling for socio-demographic factors. In recent work we have demonstrated how factors relating to poverty, stigma and quality of care, when taken separately, relate significantly with internalising disorders (Cluver et al., 2008).

However, this left two closely related concerns. Firstly, it was important to check whether the apparent separate relationships between mental health and the main predictive variables (i.e. stigma, extreme poverty, and AIDS-orphanhood status) were affected – whether weakened or strengthened – by relationships among them, i.e. whether interactions were present. Secondly, evidence from studies of other vulnerable children (e.g. Rutter et al., 1998) suggests that key predictive factors may produce a cumulative effect on mental health.

We opted to undertake a log-linear analysis (1979) (Upton, 1978) of these 52 variables so as to comprehensively establish the relationships amongst them. This allowed us to identify cumulative effects and interactions between risk factors being considered on child mental health.

### Participants

1025 children and adolescents were interviewed: 425 AIDS-orphaned, 241 orphaned by non-AIDS causes and 278 non-orphaned. (A further 81 were excluded as cause of orphanhood could not be confirmed.) As noted earlier, the study used the UN definition of orphanhood as loss of one or both parents (UNAIDS, 2004), and the World Health Organization (2003) definition of adolescence as 10–19 years. In 2005 and 2006, participants were recruited from 9 schools, 18 community organisations, and door-to-door sampling. The community organisations included 6 shelters and 2 feeding schemes for streetchildren, as well as organisations providing occasional food parcels for child-headed households, free community sports schemes, and church and community-led feeding schemes for vulnerable children. By these means access was obtained to highly vulnerable children who might have been excluded by school or door-to-door sampling within townships. Where orphans were recruited from schools and organizations that serve both orphans and non-orphans, a randomly chosen sample of non-orphans in the same grade and class was selected. Where projects were orphan-specific, orphans were matched to controls in the same community, selected through random door-to-door sampling and matched by gender and age. AIDS-orphaned streetchildren were matched to other-orphaned and non-orphaned streetchildren from the same shelter or feeding scheme. In order to exclude acute bereavement reactions, children orphaned in the previous 6 months were not interviewed.

Participants lived in deprived, Xhosa-speaking urban neighbourhoods of Cape Town, in areas formerly designated for Black Africans under apartheid. These areas are characterised by high levels of poverty, AIDS-related stigma and violent crime.

Although the generalisability of the present study is limited because of the non-probabilistic sample, its representativeness (Galtung, 1973) was improved compared to school-based surveys of adolescents by the additional purposive sampling of excluded populations: streetchildren ( $n=60$ ), child-headed and youth-headed households ( $n=49$ ), and non-school attendees ( $n=35$ ). It is noted that there is no reliable data on numbers or proportions of each of these groups within the child population or the orphan population. It was therefore impossible to determine whether we had appropriate proportions within our sample. However, there is strong anecdotal and qualitative evidence of orphanhood

contributing to children living on the streets, in child-and-youth-headed households, and not attending school. In light of this, our purposive sampling aimed to ensure sufficient numbers within each of these groups for inclusion in regressions.

Death certificates are unreliable sources regarding HIV/AIDS in South Africa, and clinical data is rarely available. Cause of parental death was determined using the 'verbal autopsy' method, validated in a previous study of adult mortality in South Africa (Hosegood, Vanneste, & Timaeus, 2004), as well as in other African countries. In a South African validation study, sensitivity of the verbal autopsy method for adult communicable diseases was found to be 89%, specificity was 93% and positive predictive value 76% (Kahn, Tollman, Garenne, & Gear, 2000). Determination of AIDS-related parental death (yielding 'AIDS-orphans') required identification of three or more AIDS-defining illnesses; i.e. Kaposi's sarcoma, HIV-wasting syndrome or oral candidiasis (World Health Organization, 2005). Where possible, child report was corroborated by teachers, social workers and surviving parents. Where diagnoses were in doubt, symptoms were reviewed by two independent medical practitioners. Non-AIDS causes of parental deaths (yielding 'other-orphans') included homicide (28%), road accidents (24%) and suicide (3%). AIDS-unrelated illnesses such as diabetes and hypertension were coded as non-AIDS deaths only where there were no other potentially AIDS-related symptoms. The 81 cases in which cause of death was unclear were excluded from all analyses. These included deaths attributed to 'bewitchment' and deaths from tuberculosis which lacked other AIDS-defining symptoms.

### Procedures

Ethical protocols were approved by The University of Oxford, the University of Cape Town and the Western Cape Province Education Department. Participation was voluntary, and informed consent was obtained from adolescents and caregivers. 34 children did not participate due to recent bereavement (27), disclosure of HIV+ status (5) or lack of consent (2). With interviewers, children completed anonymous self-report questionnaires lasting 40–60 min. The extent of interviewer assistance was adjusted according to the level of child literacy. All interviewers were local, Xhosa-speaking social workers, psychologists or community health workers, trained in working with AIDS-affected children. Interviewers were blinded to orphan status until the end of the interview, and standardised, closed-question questionnaires were read aloud in order to reduce likelihood of interviewer bias.

Participants received refreshments and certificates, and organizations received staff training in child protection and mental health. Confidentiality was maintained, except where children were at risk of significant harm or requested assistance.

### Measures

Psychological distress was measured using standardised scales: the Child Depression Inventory (Kovacs, 1992), the Children's Manifest Anxiety Scale-Revised (R-CMAS) (Reynolds & Richmond, 1978) and the Child PTSD Checklist (Amaya-Jackson, Newman, & Lipschitz, 2000). All have been shown to be reliable, and have been used previously with Xhosa-speaking, vulnerable children in Cape Town. Further information on psychometric properties is reported in Cluver et al. (2007). Questionnaires were back-translated and piloted for acceptability.

For depression (Kovacs, 1992) and anxiety scales (Stallard, Velleman, Langsford, & Baldwin, 2001), clinical cut-offs were determined using DSM-IV criteria and standardized clinical cut-offs. For post-traumatic stress, we used a clinical cut-off according to DSM-IV symptom clusters. Children were counted as above the clinical

cut-off if they reported at least 1 re-experiencing, 3 avoidance or numbing and 2 hyperarousal symptoms, with a conservative symptom-report threshold of 'most of the time' (Erwin, Newman, McMackin, Morrissey, & Kaloupek, 2000). Then 'presence of disorder' was defined as children experiencing clinical-level scores for one or more of depression, anxiety and post-traumatic stress. It is important to note that no clinical cut-offs have been validated in South Africa (or in Africa), and thus cut-offs standardised on developed world populations are used with caution.

Bullying was measured with the 9-item, standardised 'Social and Health Assessment Peer Victimization Scale' (Ruchkin, Schwab-Stone, & Vermeiren, 2004), used in research with vulnerable children in Cape Town (Ward, Martin, Theron, & Distiller, 2007). This scale is adapted from the Multidimensional Peer Victimization Scale, and showed  $\alpha = .82$  in a US validation study (Mynard & Joseph, 2000). Items included being called names, being hit or threatened and having possessions broken, and were scored according to frequency in the past year. Scale values were divided between above-median ('more bullied';  $>12/36$ ) and below-median ('less bullied';  $<12/36$ ).

No standardized instruments currently exist to measure AIDS-related stigma amongst non-infected orphans. A brief 4-item stigma scale was devised, based on items from the Berger Stigma Scale for HIV+ Youth-Revised (Wright, Naar-King, Lam, Templin, & Frey, 2007). This was adapted using a) reports from qualitative interviews (Cluver & Gardner, 2007b), b) literature review and c) consultation with local academics currently researching stigma (Deacon, 2006; Maughan Brown, 2006), and pre-piloted to ensure relevance for non-infected South African orphans (see Appendix 2). Participants reported frequency of experiencing teasing, being treated badly and being gossiped about because of the illness of a family member (never/sometimes/very often). Scale reliability was good, with  $\alpha$  of .83 for stigmatizing events, and  $\alpha = .88$  when including extent of distress. Scale values were computed for each participant, with a total possible score of 8. 'Stigma' was defined as endorsement of one or more experience of stigma. In study areas of 22–36% HIV-prevalence, many children would have had HIV-infected family, and thus AIDS-related stigma was increased among, but not restricted to, AIDS-orphaned children.

Food insecurity was measured using self-report of 0–7 days without food in the past week, following studies with AIDS-orphaned children in Tanzania (Makame et al., 2002) and Mozambique (Manuel, 2002). Where children reported lack of food one or more days, scores were coded as 'food insecure'. Quality of care was measured by five variables: frequency of praise for the child, extent of caregiver monitoring of child, frequency of caregiver-child activities such as helping with homework, child's sense of belonging in the home, and sharing of resources between children in the home. Each factor was coded according to acceptable/unacceptable levels, and quality of care was coded as good where levels were acceptable on all five variables.

### Statistical analysis

Analyses followed the following general procedures. Our recruitment strategy had utilised over-sampling of AIDS-orphaned and other-orphaned children. In outline, we weighted the dataset to match the relative proportions of these groups occurring within the South African population – for which relevant estimates were available – towards obtaining a more representative sample. We then had to assume that the weighted sample would be broadly representative of Xhosa-speaking urban children across other risk factors.

More specifically, there are no national or provincial datasets which directly measure numbers of AIDS-orphaned, other-

orphaned and non-orphaned children (both maternally and paternally orphaned) within the child population. We therefore used data from the General Household Survey, a bi-annual nationally representative survey, conducted in the same year as data collection for this study (Statistics SA, 2006) to determine that 24% of all children within the 10–19 age group are orphaned (by any cause) within the general population. In order to identify proportions of those orphaned children whose parents had died of AIDS, we used UNAIDS models (UNAIDS, 2006), which estimated that, in 2005, 50% of all orphaned children aged 0–17 were AIDS-orphaned (detailed description of methodology used to produce UNAIDS estimates can be found at <http://www.epidem.org>). On the basis of these estimates, we weighted the dataset from the present sample.

The weighted sample was used for all analyses except for hierarchical log-linear modelling: as recommended (Hendrikx, 2002), this used the unweighted data set. For a full description of the modelling selection procedures, and of checks used to confirm robustness of log-linear models using the unweighted dataset, please see Appendix 1.

Potential risk and protective factors were entered into multivariate logistic regressions alongside orphanhood status, age and gender, and with the dependent variable of any internalising disorder (i.e., clinical-level score on one or more of depression, anxiety or PTSD). Backwards-elimination selected eight variables with associations  $p < .01$ . Three variables were excluded, either due to small group size (streetchildren  $n = 60$ ) or to limited direct policy relevance (community closeness, coping mechanisms such as 'I go for a walk'). The remaining five variables were coded dichotomously for entry into log-linear analyses; food security (F), stigma (S), orphanhood status (V), quality of care (Q) and bullying (B).

The three interactive effects between the psychological outcome of internalising disorder ('I') and risk factors – food insecurity, stigma and internalizing disorder ( $F \times S \times I$ ); orphanhood status, bullying and internalising disorder ( $V \times B \times I$ ); and quality of care and internalising disorder ( $Q \times I$ ) – were then tabulated using the weighted data, and examined in detail (Tables 1 and 2). Other associations are noted more briefly.

Data was analysed using SPSS (Version 14.0). All tests were two-tailed and significance was set at  $p < .01$  level for regressions, but rather more stringently at  $p < .005$  level for the log-linear modelling, to attempt to compensate for the appreciable number of comparisons made.

## Results

Using the weighted sample, around one third (301 of 973) of children reported having insufficient food at home for one or more days per week. Around one fifth (220) of children reported

**Table 1**

Interaction among food insecurity, AIDS-related stigma and risk of disorder ( $F \times S \times I$ ).

	Food secure		Food insecure		Total	
	No stigma (%)	Stigma (%)	No stigma (%)	Stigma (%)	No stigma (%)	Stigma (%)
No disorder (%)	81.2	46.7	66.5	16.8	77.6	31.4
Disorder (%)	18.8	53.3	33.5	83.2	22.4	68.6
Total	100.0	100.0	100.0	100.0		
N	565	107	188	113	753	220

Note: 'disorder' defined as presence of clinical-level score on one or more of: Child Depression Inventory, Revised Children's Manifest Anxiety Scale and Child PTSD Checklist.

Note: for the three-variable table of food secure,  $\chi^2 = 56.82$ ,  $df = 1$ ,  $p < .001$ , for food insecure,  $\chi^2 = 115.99$ ,  $df = 1$ ,  $p < .001$ .

**Table 2**Interaction between AIDS-orphanhood, bullying, and risk of disorder ( $V \times B \times I$ ).

	More bullied		Less bullied		Total	
	With disorder (%)	Without disorder (%)	With disorder (%)	Without disorder (%)	With disorder (%)	Without disorder (%)
AIDS-orphans	76.1	23.9	38.3	61.7	54.6	45.4
Other orphans	46.7	53.3	27.0	73.0	34.5	65.5
Non-orphans	50.8	49.2	11.9	88.1	30.0	70.0
Total %	53.2	46.8	17.2	82.8		
N (weighted)	218	192	82	477	300	669

Note: 'disorder' defined as presence of clinical-level score on one or more of: Child Depression Inventory, Revised Children's Manifest Anxiety Scale and Child PTSD Checklist. Note: for the three-variable table of AIDS-orphanhood,  $\chi^2 = 53.55$ ,  $df = 1$ ,  $p < .001$ , for other-orphanhood,  $\chi^2 = 9.30$ ,  $df = 1$ ,  $p < .002$ , for non-orphanhood  $\chi^2 = 46.04$ ,  $df = 1$ ,  $p < .001$ .

experience of AIDS-related stigma. There was no difference in proportions of AIDS-orphaned, other-orphaned and non-orphaned children who were above the median score for being bullied. Overall rates of clinical-level psychological disorder were 9.7% for depression, 9.8% for anxiety and 27% for PTSD, broadly according with estimates for children in South Africa (Kleintjies et al., 2006), and for proportions found in low income areas in the Western Cape (Seedat, van Nood, Vythilingum, Stein, & Kaminer, 2000). 31% of children showed one or more internalising disorder.

The log-linear analysis identified a number of two-way effects. Amongst these, the only factor associated with likelihood of psychological disorder was quality of care, indicated by the term  $Q \times I$ . About half (46%) of children reporting poor care showed clinical-range scores in at least one disorder, compared to only one quarter (24%) of children reporting good care ( $p < .001$ ,  $\chi^2 = 53.0$ ).

We briefly note the other significant two-way effects. Orphanhood by any cause was associated with increased likelihood of food insecurity (association orphanhood  $\times$  food insecurity ( $V \times F$ ) – 50% of AIDS-orphans and 47% of other-orphans, compared to 26% of non-orphans,  $p < .001$ ,  $\chi^2 = 39.2$ ). AIDS-orphans were more likely to report experience of stigma (association orphanhood  $\times$  stigma ( $V \times S$ ) – 55% of AIDS-orphans compared to 27% of other-orphans and 17% of non-orphans,  $p < .001$ ,  $\chi^2 = 83.2$ ). Stigma and bullying were also associated, as one would expect (association stigma  $\times$  bullying ( $S \times B$ ) – 70% of stigmatised children reported being bullied, compared to 41% of non-stigmatised children,  $p < .001$ ,  $\chi^2 = 61.1$ ). A surprise was that orphaned children reported better quality of care than non-orphans (association orphanhood  $\times$  quality of care ( $V \times Q$ ) – good care was reported by 67% of AIDS-orphans and 73% of other-orphans, compared to 60% of non-orphans).

Two three-way interaction effects related to likelihood of psychological disorder. The first three-way interaction, between food insecurity and stigma in relation to disorder ( $F \times S \times I$ ), is displayed in Table 1 and Fig. 1. The second three-way interaction, AIDS-orphanhood status and bullying in relation to disorder ( $V \times B \times I$ ), is displayed in Table 2 and Fig. 2.

Regarding the first effect (food insecurity  $\times$  stigma  $\times$  disorder –  $F \times S \times I$ ), the two right-most columns of Table 1 show the simple association between stigma and disorder, before food insecurity is brought into consideration: disorder is present among only 22% of those who are not stigmatised, but rises to 69% among those who are stigmatised. Fig. 1 then illustrates the interaction effect, when food security is introduced. The graph shows that, amongst all children, the group showing the lowest proportion of disorder were those who were not stigmatised and who had no days without food in the past week (18.8% with disorder). The group showing the highest proportion of disorder were those who were both stigmatised and experienced food insecurity (83.2% with disorder). Each of these factors independently is associated with a lesser increase in proportion of clinical disorders. Food insecurity itself (in the absence of stigma) increased the proportion to 33.5%. Stigma itself (in the absence of food insecurity) increased the proportion to 53.3%.

The other three-way interaction (orphanhood  $\times$  bullying  $\times$  disorder –  $V \times B \times I$ ) shows how the association between disorder and bullying varies significantly for the different categories of orphanhood (Table 2 and Fig. 2). For non-orphans there is a low level of disorder (12%) with no or low levels of bullying, but this is heightened four-fold for high levels of bullying (51%). For other-orphans, the level of disorder is higher (27%) with no or low levels

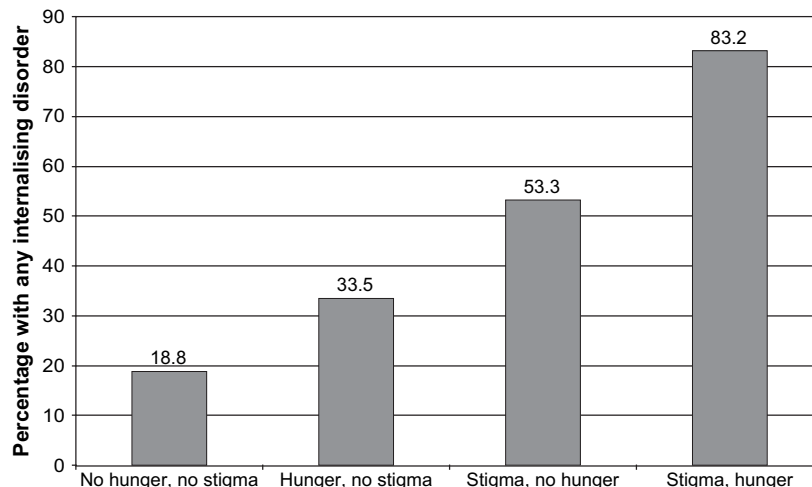


Fig. 1. Interaction  $F \times S \times I$  among food insecurity, AIDS-related stigma and risk of disorder.



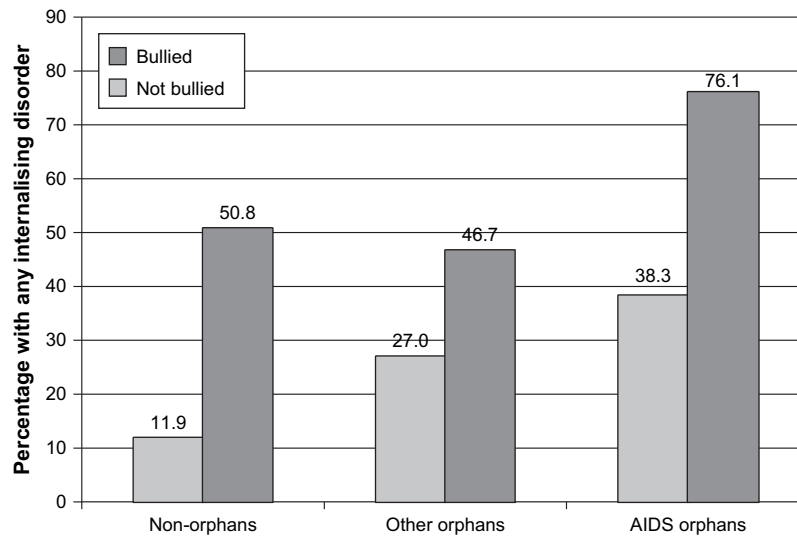


Fig. 2. Interaction  $V \times B \times I$  between AIDS-orphanhood, bullying, and risk of disorder.

of bullying, and this nearly doubles (47%) for high levels of bullying. Among AIDS-orphans, the proportion with disorder is even higher with no or low levels of bullying (38%), yet again it nearly doubles for high levels of bullying, to a very high level (76%).

## Discussion

This study took place in a deprived, violent urban Southern African setting. It demonstrates the strong interactive effects among poverty (indicated by food insecurity), AIDS-related stigma, and bullying as predictors, and mental health of children as the dependent variable. In particular, the combined interactive effect of two environmental factors – food insecurity and stigma – increased proportions of children with internalising disorders from 19% to 83%. Additionally, bullying was associated with substantial rises in mental health problems for all children that varied across categories of orphanhood. For example, among AIDS-orphans – whose initial rates of disorder were high (38%) in any case – being bullied in addition manifested in high disorder rates of 76%.

Causal directions cannot be inferred from these associations. But these findings do indicate some of the risk factors which are part of the experience of AIDS-orphanhood. Further, this study finds that these risk factors interact to produce a cumulative negative effect on child mental health. AIDS-related stigma, bullying and poverty are linking together to intensify the vulnerability of AIDS-orphaned and AIDS-affected children.

This finding expands upon previous research amongst orphaned children in sub-Saharan Africa. In Rwanda and Mozambique, orphaned youth reported high levels of depression and social isolation (Boris, Thurman, Snider, Spencer, & Brown, 2006; Manuel, 2002). In Zimbabwe, higher stress amongst orphans was associated with lower levels of social support, and authors noted multiple stressors on vulnerable youth (Gilborn et al., 2006). In Ethiopia, deficiencies of household income, distribution of food and emotional support were predictors of mental health problems amongst orphans (Bhargava, 2005). It would be valuable to examine whether there are interactive effects among these and other potential risk factors which were not addressed in the present study, such as forced sex, transactional sex and corporal punishment.

Evidence of cumulative interactive effects suggests that interventions addressing one risk factor, such as food insecurity, may

potentially both improve mental health outcomes, and reduce the impact or incidence of another, linked risk factor. Conversely, services aimed at reducing the prevalence of psychological distress may need to focus on a number of different environmental risks, such as school-based anti-bullying strategies, nutrition schemes, and stigma-reduction.

Some of these interventions may be easier said than done. Regarding just one of our three factors, AIDS-related stigma, one finds that there are no known studies evaluating effects of stigma reduction strategies on AIDS-orphans in particular. However, reviews of strategies aiming to reduce stigma towards HIV-infected people suggest positive results of legal protection and provision of anti-retroviral drugs in reducing public fears of HIV (Klein, Karchner, & O'Connell, 2002). A review of 21 studies notes the paucity of quality research on stigma reduction (especially in the developing world), but finds impacts of community interventions including provision of information around HIV, counselling, group desensitisation towards HIV, and contact with HIV+ people (Brown, Macintyre, & Trujillo, 2003).

However, there is stronger evidence of positive impacts of interventions on child nutrition. Existing policies in South Africa, such as the unconditional transfer child support grant, have been shown to be associated with improved height-for-age z scores and reduced hunger amongst children (Aguero, Carter, & Woolard, 2007). Evidence of effectiveness of anti-bullying programmes is more mixed, but some studies show significant outcomes on self-reported victimisation in schools (Smith, Schneider, Smith, & Ananiadou, 2004).

Within South Africa, a number of programmes seeking to address the factors highlighted in this study are currently underway. Programmes aiming to reduce child hunger include Department of Social Development social welfare grants, such as the child support grant, foster care grant and old-age pension. Recent data shows that these have wide reach (supported by initiatives such as mobile grant outreach days), but for some orphaned children there remain difficulties in accessing grants, i.e. those who lack birth certificates, those who have migrated without ID documents, or those whose parental death certificates are unavailable. More specifically targeted programmes include food parcel and food gardening schemes for orphaned children. Other programmes, such as school feeding schemes and school food gardens, are supported by the Department of Education.

Public information messages such as the Khomanani programme, of the Department of Health emphasise the need to treat HIV+ people and their families without discrimination, as does the National Strategic Plan 2007–2011.

Regarding bullying, Department of Education programmes include the Safe Schools Project within high-risk crime areas, largely focused on reducing severe violence, such as rape, murder, drug dealing and gang activity. National Lifeskills education in schools also aims to promote respect and interpersonal communication between peers, but evaluations of their impact are not known. The South African government also works closely with national NGOs such as Soul City, whose 'SoulBuddyz' programme aims to reduce bullying and stigma.

The findings of this study have been presented to the South African Minister of Social Development, and to senior officials at the national departments of Social Development, Health, and Education. Additionally, key findings of this paper are part of the background information for South Africa's 2009–2012 National Action Plan for Orphans and other Children made vulnerable by HIV and AIDS.

The findings of the present study also add to our theoretical understanding of the impacts of interacting or cumulative effects of factors on child mental health. Regarding evidence on child psychopathology, it has been remarked that the effects of a single stressful experience 'if occurring in isolation from other adversities, were quite small' (Rutter, 2000); whereas more extreme risks may result from cumulative stressful experiences, such as the multiple negative circumstances associated with parental bereavement in poor, high-stigma environments (Sameroff, Seifer, & Bartko, 1997). This study finds evidence very much to this effect in an analogous context, i.e. that risk factors do interact with each other and, as a result, have cumulative effects which are greater than the effects of single factors.

The findings of this study may also contribute to the ongoing debate whether interventions should target orphans or AIDS-orphans within the wider group of vulnerable children. Policy and programming increasingly recognise risks associated with targeting orphans, such as isolation and re-stigmatisation for children. The findings of this study suggest that AIDS-orphanhood and the experience of AIDS-related stigma *interact with* factors of more general child vulnerability, such as quality of care, bullying and economic vulnerability, to impact on child mental health. It may be especially important to ensure that interventions that target more general risk mechanisms are reaching AIDS-affected children, even if specific targeting of interventions towards AIDS-affected children is impossible.

#### *Methodological limitations and strengths*

This study has a number of methodological limitations. Firstly, although standardised psychological instruments have been used with this population, such scales have not yet been directly validated in South Africa. There have also been no representative surveys of child or adolescent mental health in South Africa with which to compare the rates suggested in this study. However, the proportions of disorder that were evidenced in the study, using the overall weighted sample, did reflect recent estimated rates of disorder (based on literature review) amongst children and adolescents in the Western Cape province, South Africa (Kleintjies et al., 2006).

Secondly, any survey of stigma or bullying risks potential method overlap. Children with internalising disorders may have felt more isolated and threatened, and thus reported higher levels of stigma or bullying than other children. However, experience of stigma and bullying can only be measured by self-report, and

perceived stigma and bullying are inherently partially subjective. Bullying was measured by a standardised, validated questionnaire, and both bullying and stigma scales showed good reliability. In order to limit method overlap, stigma items focused as much as possible on actual specific acts of harassment (such as being teased) reflecting the stigma of AIDS.

The stigma inventory used was devised for this study, and was based on scales for HIV+ youth, adapted using qualitative data. It was also essential to be able to ask children about experience of stigma associated with parental HIV, without assuming that children were aware of, or able to acknowledge, parental HIV-status. For this reason, the scale referred to 'illness' and 'death', which was identified in qualitative work and in piloting to be understood to mean AIDS-related in the context of gossip and teasing. The scale also asked about specific, tangible experiences of stigma, rather than more intangible internalized stigma. In light of the findings of this study, which shows high levels of experienced stigma for non-infected orphans, it is important that a more detailed scale is developed and validated.

While there may be some conceptual overlap between experiences of AIDS-related stigma and bullying for children, it would appear that the relationship is substantially empirical, in the way suggested by the interactions between the two constructs. Firstly, there is literature suggesting that bullies often focus on familial sickness or disability as a means of attacking victims (Hay et al., 2004). Secondly, analysis of group differences showed that AIDS-orphaned children reported very much higher levels of stigma than other groups ( $p < .001$ ), but similar levels of bullying (ns). Finally, qualitative exploration suggested that bullying was strongly related to familial poverty (i.e. children who were visibly poor were bullied), whilst stigma was strongly related to parental HIV-status (both regarding parental death and illness of a surviving parent). Given the clear negative impacts on children of both stigma and bullying, it is important that future research assesses the relationships between these experiences for AIDS-affected children.

The nature of the sample also precluded the use of alternative (i.e. caregiver or teacher) informants for mental health outcomes. 6% of AIDS-orphaned adolescents did not attend school, and most of the streetchildren were not enrolled. The use of caregiver report would have introduced systematic bias of poorer reporting for children who did not have primary caregivers – i.e. were living on the streets or in child-headed households, and for children with very unwell or distressed caregivers.

Finally, causal explanations do not follow from empirical associations; for instance, this study cannot tell us the direction of the relationship between being bullied and having an internalising disorder, or between AIDS-orphanhood and proneness to food insecurity (although there is strong evidence that familial AIDS-illness and death lead directly to increased household poverty). For causal hypotheses we rely on strong evidence from wider literature (for example that familial AIDS-illness is a strong causal factor for AIDS-related stigma), or evidence from other studies of child psychopathology that one variable is generally antecedent to another (for example that bullying is a causal factor in victims' development of internalising disorders). It is desirable that future, longitudinal studies of AIDS-orphanhood incorporate reliable measures of mental health in order to help determine causal factors in this group. However, the associations do allow us to reflect upon the potential effects and possible benefits of programmes addressing stigma, bullying and food insecurity.

There are some strengths of this study design that can be noted. To our knowledge, this is the largest study to date in the world to explore risk and protective factors for psychological outcomes amongst AIDS-orphans, other-orphans and non-orphans. The study uses well-validated standardised scales with good psychometric

properties. Finally, the study adds to our understanding of interactions between factors affecting the mental health of AIDS-affected children.

## Conclusions

As evidenced from a study of an appreciable sample of African children in South Africa using well-validated instruments, poverty, stigma and bullying have striking interactive effects in heightening likelihood of child psychological disorder in the context of AIDS. Planned interventions to alleviate these risk factors need to take this cumulative effect into account.

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## Appendix 1. Statistical techniques

We had two related concerns to determine in this analysis. The first was whether environmental factors (such as stigma, poverty) were interacting with each other to produce differential effects on children's mental health. The second concern was whether factors were interacting to produce a cumulative effect on mental health outcomes. A convenient mode of analysis allowing us to address both the related concerns, for modest subsets of variables, is log-linear analysis. While regression analysis does of course admit the introduction of interaction effects, it tends to be a piecemeal endeavour to test which of the many permutations of interaction effects might be present in a set of several variables. But, as Blalock (1979) warns, not only should one "always investigate the possibility of interactions or non-additive relationships" (p. 547), but this "should not be a 'hit or miss' matter of looking for only a select subset of the possible interactions while neglecting the rest". By contrast, log-linear analysis allows one comprehensively to establish the prevailing simultaneous relationships amongst a given set of variables. In particular, it establishes what interaction effects may be significant. And since an interaction indicates which variables with separate impact have a greater (or diminished) impact when combined, by its nature it addresses our second concern, to identify the cumulative effect of the risk factors being considered on child mental health.

There are trade-offs in the choice of technique. Log-linear analysis relies on the variables being categorical or, more rarely, ordinal (Upton, 1978). Interval variables therefore have to be categorised, with a resulting loss of power. Indeed, the more categories are retained in the variables in the analysis, the more laborious it is to interpret the multi-way tables in which we are interested. In particular, it is appreciably more convenient to interpret tables with a dichotomous dependent variable. However, in this instance these limitations were outweighed by the gains in addressing our two-fold concerns, of interactions among factors and cumulative impact.

Hierarchical log-linear modelling was conducted using the unweighted data set. The automatic backwards selection provided by SPSS yielded the following hierarchy of models:

1:  $\{Q \times I, F \times S \times I, V \times B \times I, S \times B \times I, S \times F \times Q, V \times Q, V \times S, V \times F, B \times Q\}$  Fit:  $p < .40, \chi^2 = 66.29, df = 64$

2:  $\{Q \times I, F \times S \times I, V \times B \times I, S \times B, S \times F \times Q, V \times Q, V \times S, V \times F, B \times Q\}$  Fit:  $p < .27, \chi^2 = 71.70, df = 65$

3:  $\{Q \times I, F \times S \times I, V \times I, B \times I, V \times B, S \times B, S \times F \times Q, V \times Q, V \times S, V \times F, B \times Q\}$  Fit:  $p < .11, \chi^2 = 81.18, df = 67$

For convenient comparison the terms involving the dependent variable I have been gathered at the left. Model 2 was selected for three reasons familiar in log-linear modelling (Upton, 1978): the overall fit was sound but still relatively economical for a multi-way model; the removal of any term involving the dependent variable caused a deterioration in chi-square that was significant at  $p < .05$ ; and the terms involving the chosen dependent variable I, 'presence of internalising disorder', were substantively revealing.

For instance, Model 3 shows the effect of removing the three-way interaction  $V \times B \times I$  from Model 2, in favour of its composite two-way associations  $V \times I, B \times I$ , and  $V \times B$ . The deterioration in  $\chi^2$  for the change in df of 2 is significant for  $p < .009$ . Dropping the  $F \times S \times I$  interaction from Model 2, or the  $Q \times I$  term, produced even more significant deteriorations of fit.

Additionally, a check was made for the possible impact of having modelled on unweighted data from a sample that was disproportionately stratified – in this instance, with respect to AIDS-orphanhood status (V). In such a situation, Hendrikx (2002) recommends "a model in which interactions are included between all independent variables and the stratifying variable(s), together with the main effects of the stratifying variable(s)". This was effectively achieved by replacing Model 2 with, as a baseline, the model

Model 4:  $\{Q \times I, F \times S \times I, V \times B \times I, S \times B \times F \times Q \times V\}$  Fit:  $p < .643, \chi^2 = 34.27, df = 38$

When the three terms involving I were dropped in turn from Model 4, the deterioration of fit was significant at  $p < .00001$ ,  $p < .0001$  and  $p < .029$  respectively. Model 2 was therefore retained for detailed consideration.

The three effects between the psychological outcome I and risk factors –  $F \times S \times I, V \times B \times I$ , and  $Q \times I$  – were then tabulated using the weighted data, and examined in detail (Tables 1 and 2). Other associations are noted more briefly.

## Appendix 2. Brief stigma inventory

Buntu and Lindiwe's mother was ill for some time before she died. Their father is unwell at the moment. Some people have been unkind to them because of this.

Have you ever been teased or treated badly because of people in your family being unwell?

**I have been teased:** not at all/sometimes/often

**I have been treated badly:** not at all/sometimes/often

**People gossiped behind my back about it:** not at all/sometimes/often

**Did all this upset you?** not at all/somewhat/very much

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