Relationships Between Familial HIV/AIDS and Symptoms of Anxiety and Depression: The

Mediating Effect of Bullying Victimization in a Prospective Sample of South African

Children and Adolescents

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Abstract

South African children and adolescents living in HIV/AIDS-affected families are at elevated risk of both symptoms of anxiety and depressive symptoms. Poverty and HIV/AIDS-related stigma are additional risk factors for these negative mental health outcomes. Community level factors, such as poverty and stigma, are difficult to change in the short term and identifying additional potentially malleable mechanisms linking familial HIV/AIDS with mental health is important from an intervention perspective. HIV/AIDS-affected children are also at increased risk of bullying victimization. This longitudinal study aimed to determine whether prospective relationships between familial HIV/AIDS and both anxiety symptoms and depressive symptoms operate indirectly via bullying victimization. Adolescents ($M =$ 13.45 years, 56.67% female, $n = 3515$) from high HIV-prevalent (> 30%) communities in South Africa were interviewed and followed-up one year later ($n = 3401$, 96.70% retention). Census enumeration areas were randomly selected from urban and rural sites in two provinces, and door-to-door sampling included all households with a resident child/adolescent. Familial HIV/AIDS at baseline assessment was not directly associated with mental health outcomes one year later. However, significant indirect effects operating via bullying victimization were obtained for both anxiety and depression scores. Importantly, these effects were independent of poverty, HIV/AIDS-related stigma, and baseline mental health, which highlight bullying victimization as a potential target for future intervention efforts. The implementation and rigorous evaluation of bullying prevention programs in South African communities may improve mental health outcomes for HIV/AIDS-affected children and adolescents and this should be a focus of future research and intervention.

Introduction

UNICEF estimates that worldwide by 2020 approximately 40 million children will have lost one or both parents to HIV/AIDS (UNICEF, 2013). Approximately 80% of the worlds' HIV/AIDS-orphaned children and adolescents live in sub-Saharan Africa, with 2.5 million HIV/AIDS-orphaned children living in South Africa alone (UNICEF, 2013). A substantial body of literature from the developed world (Forehand et al., 2002; Rotheram-Borus, Stein, & Lin, 2001), sub-Saharan Africa (Bhargava, 2005; Cluver, Gardner, & Operario, 2007; Cluver, Orkin, Boyes, Gardner, & Nikelo, 2012; Cluver, Orkin, Gardner, & Boyes, 2012; Makame, Ani, & McGregor, 2002; Nyamukapa et al., 2008), and China (Fang et al., 2009) has linked familial HIV/AIDS with poor mental health outcomes for children and adolescents. In South Africa, both cross-sectional and prospective research has demonstrated that children and adolescents orphaned by HIV/AIDS or living with an HIV/AIDS-sick caregiver are at elevated risk of experiencing both symptoms of anxiety and depressive symptoms (Cluver et al., 2007; Cluver, Orkin, Boyes, et al., 2012; Cluver, Orkin, Gardner, et al., 2012). Understanding mechanisms linking familial HIV/AIDS with poorer mental health is crucial from the perspective of both intervention design and programmatic planning.

Child and Adolescent Mental Health: Socio-Ecological Models of Development

Socio-ecological models of child and adolescent development (e.g., Bronfrenbrenner, 1979) posit a number cumulative and counterbalancing effects of risk and protective factors across a number of levels; e.g., individual, family and society (Luthar, Cicchetti, & Becker, 2000; Rutter, 2006). Children and adolescents in South Africa face a number of risks to their social and emotional development, including extreme poverty (Cluver, Gardner, & Operario, 2009),

high levels of abuse (Richter & Dawes, 2008), the impact of the HIV/AIDS epidemic (Cluver, Orkin, Boyes, et al., 2012), as well as high levels of interpersonal and community violence (Burton, 2008). Importantly, these risks are amplified in families affected by HIV/AIDS (Cluver et al., 2013). Recent research has demonstrated that there is no *direct* link between familial HIV/AIDS and child and adolescent mental health, instead household familial HIV/AIDS is *indirectly* associated with mental health through intervening variables, including poverty (Cluver et al., 2013; Makame et al., 2002; Ssewamala, Han, & Neilands, 2009), experiences of HIV/AIDS-related stigma, and prior mental health (Boyes & Cluver, 2013b; Chi, Li, Zhao, & Zhao, in press; Cluver et al., 2013). Therefore, poverty and HIV/AIDS-related stigma are important areas of intervention if mental health outcomes for HIV/AIDS-affected children and adolescents are to be improved.

However, while progress on poverty alleviation has been made, Statistics South Africa (2014) estimates that approximately 23 million people (45.50% of the population) still live in poverty. Additionally, reducing HIV/AIDS-related stigma at a community level is complex and difficult (Cluver, Gardner, & Operario, 2008). Literature reviews have highlighted a dearth of high quality research on community level stigma reduction (Klein, Karcher, & O'Connell, 2002; Stangl, Lloyd, Brady, Holland, & Baral, 2013). One major reason for this is that intervention studies tend to focus on a single socio-ecological level (the individual level) and do not address community level attitudes and social norms that impact on an individual's attitudes and behavior (Stangl et al., 2013). Given the difficulty of intervening on poverty and HIV/AIDS-related stigma at a community level, identifying additional (and potentially more proximal) targets for intervention is also important.

Peer groups become increasingly important across the primary and secondary school years (Owens, Shute, & Slee, 2000; Stauffacher & DeHart, 2006) and social identity theory (Tajfel & Turner, 1986) posits that that attitudes and behaviors toward "in group" and "out

group" members arise from a motivation to be associated with the "in group". Therefore, members of an "out group" are more likely to be discriminated against, which in childhood and adolescence may manifest in bullying behaviors (Burns, Maycock, Cross, & Brown, 2008; Gini, 2006). As HIV/AIDS-affected children are at perceived more negatively by their peers (Ishikawa, Pridmore, Carr-Hill, & Chaimuangdee, 2011) and are elevated risk of being victims of bullying (Cluver, Bowes, & Gardner, 2010; Ishikawa, Pridmore, Carr-Hill, & Chaimuangdee, 2010), the current study focuses on bullying victimization as a potential intervention target.

Bullying Victimization and Mental Health

Bullying can be defined as repeated acts of aggressive behavior intended to cause harm, and it is usually characterised by an imbalance in power between the perpetrator and the victim (Olweus, 1993; Rigby, 2002). Bullying victimization in South Africa is widespread, with data from a nationally representative sample of high school students putting prevalence rates at 41% (Reddy et al., 2003), although prevalence rates as high as 61% have also been reported (Townsend, Flisher, Chikobvu, Lombard, & King, 2008). In both the developed world and South Africa, experiences of bullying victimization peak in early adolescence, a period during which children spend increasing amounts of time with their peers (Ghoul, Niwa, & Boxer, 2013; Larson & Richards, 1991) and increasingly value peer relationships and approval (Eccles et al., 1993). After this period, experiences of bullying victimization reduce steadily with age (Flisher et al., 2006; Nansel et al., 2001; Olweus, 1993; Rigby, 2002). Additionally, adolescence is also a risk period for the development of mental health problems, including anxiety and depression (Essau, Conradt, & Petermann, 2000; Newman et al., 1996). Taken together, these factors suggest that a sample incorporating late childhood

and adolescence is optimal for examining potential relationships between familial HIV/AIDS, bullying victimization and mental health.

In the developed world, the accumulation of research evidence offers strong support for a relationship between bullying victimization and poor mental health outcomes for children and adolescents. This evidence comes from both cross-sectional and prospective studies demonstrating a dose-response relationship between bullying victimization and mental health in different samples and using differing measures (Arseneault, Bowes, & Shakoor, 2010; Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006). More specifically, two cross-sectional South African studies have demonstrated relationships between bullying victimization, symptoms of anxiety, and depressive symptoms in community samples of children and adolescents (Cluver et al., 2010; Shields, Nadasen, & Pierce, 2009) and a recent prospective South African study has demonstrated that bullying victimization is predictive of internalising symptoms (including anxiety symptoms and depressive symptoms) measured one year later, even after adjusting for poverty (Boyes, Cluver, Bowes, Ward, & Badcock, 2014). Furthermore, in a large sample of South African children and adolescents, Cluver et al. (2010) reported that caregiver HIV/AIDS-sickness and HIV/AIDS-related stigma are risk factors for bullying victimization.

Given that bullying victimization is associated with both symptoms of anxiety and depressive symptoms, and that familial HIV/AIDS is associated with both bullying victimization and mental health outcomes, it is at least plausible to hypothesise that bullying victimization may mediate relationships between familial HIV/AIDS and mental health outcomes. However, to date no studies have examined whether relationships between familial HIV/AIDS and both symptoms of anxiety and depressive symptoms may operate indirectly via experiences of bullying victimization. Importantly, from an intervention perspective, a recent systematic review (Vreeman & Carroll, 2007) and meta-analysis (Ttofi & Farrington,

2011) of anti-bullying interventions in the developed world both concluded that anti-bullying programs are effective in reducing bullying and victimization, and there is evidence that reductions in bullying are in turn associated with improved mental health (Williford et al., 2012).

Present Study

The current study examined prospective relationships between familial HIV/AIDS, bullying victimization, and mental health in a large community sample of South African children and adolescents. The specific aims of the present study were to determine whether familial HIV/AIDS is prospectively associated with both symptoms of anxiety and depressive symptoms in South African children and adolescents, and whether these relationships operate indirectly via bullying victimization (after adjusting for poverty and independently of previously established indirect effects operating through HIV/AIDS-related stigma and baseline mental health). It was hypothesized that familial HIV/AIDS at baseline assessment would be associated with higher anxiety and depression scores one year later. In accordance with previous research it was hypothesized that, after adjusting for poverty, these prospective relationships between familial HIV/AIDS and anxiety and depression scores would be multiply mediated by baseline HIV/AIDS-related stigma and mental health. However, an *additional* independent indirect effect operating via baseline bullying victimization was also specifically hypothesized.

Method

Participants

The overall goals of the broader project were to examine the psychosocial impacts of HIV/AIDS on South African families (Cluver et al., 2013). Children and adolescents ($n = 3515$) from rural and urban sites in two South African provinces (the Western Cape and Mpumalanga) took part in a community-based survey. Two provinces were chosen to ensure that a range of different language groups were represented in the sample. Participants in the Western Cape spoke Xhosa and participants in Mpumalanga spoke Sotho or Shangaan. Children and adolescents were recruited using random sampling of census enumeration areas in four health districts with over 30% antenatal HIV-prevalence. In randomly selected enumeration areas, households were sampled consecutively (door-to-door) and one child or adolescent per household (aged between 10 and 17 years, randomly selected if there were multiple children or adolescents in the household) participated in the study. Adolescents were followed up after one year (96.70% retention rate, $n = 3401$, a loss to follow-up of 114 adolescents). Ages ranged between 10 and 17 years at baseline ($M = 13.45$, $SD = 2.15$) and 56.67% of the children and adolescents were female. At baseline assessment 38.75% of children and adolescents ($n = 1318$) were affected by familial HIV/AIDS (see measures section for information on how this was determined). Sample characteristics are summarised in Table 1.

Insert Table 1 approximately here

Procedures

As reported previously (Cluver et al., 2013), ethical approval for the study was obtained from the Universities of Oxford, Cape Town, and KwaZulu-Natal, as well as the Provincial Health and Education Departments of the Western Cape, Mpumalanga, and KwaZulu-Natal. Prior to participation voluntary informed consent was provided by participants and their caregivers. All measures were translated (and translations checked by back-translation) into local languages, and adolescents participated in the language of their choice. Measures were administered verbally at both assessment points by research assistants. All assistants were trained and had previous experience working with vulnerable children. The questionnaire booklet was designed in the style of a teen magazine and included pictures of popular music and television stars. In total, participation took approximately 60 minutes at both baseline and follow-up assessment points. No incentive for participation was provided. Confidentiality was maintained unless participants requested assistance or were at significant risk of harm, in which case referrals to appropriate services were made.

Measures

Familial HIV/AIDS

Participants were classified as HIV/AIDS-affected if they were HIV/AIDS orphaned or living with a caregiver who was HIV/AIDS-sick. Death certificates are unreliable sources regarding HIV/AIDS deaths in South Africa and clinical data is rarely available. Cause of parental death was therefore determined using a youth report version of the Verbal Autopsy (Lopman et al., 2006), which has been validated in South Africa (Kahn, Tollman, Garenne, & Gear, 2000). Determination of HIV/AIDS-related parental death required a conservative threshold

of three or more HIV/AIDS-defining illnesses (e.g., Kaposi's sarcoma or shingles) to be identified by the youth. The UN definition of orphanhood was used, i.e. the loss of one or both parents among children up to the age of 18 years (UNAIDS, 2008). Therefore, children did not need to have lost both parents to HIV/AIDS to be categorised as HIV/AIDS-orphaned.

For determining caregiver illness, self-reported current HIV-status is also unreliable. High levels of stigma in South Africa result in low HIV-testing (8% in the past year; Peltzer, Matseke, Mzolo, & Majaja, 2009), and many people and their families are unaware of their HIV-status. Consequently, caregiver HIV/AIDS-sickness was determined by adolescent report using a symptom checklist directly adapted from the Verbal Autopsy. A conservative threshold of three or more HIV/AIDS-defining symptoms was required in order for the caregiver to be categorised as HIV/AIDS-sick. This information was used to classify youth as being affected by familial HIV/AIDS (either HIV/AIDS-orphaned or living with an HIV/AIDS-sick caregiver) or unaffected by familial HIV/AIDS (neither HIV/AIDS-orphaned nor living with an HIV/AIDS-sick caregiver). This methodology has been used previously with South African adolescents (Cluver, Orkin, Boyes, et al., 2012; Cluver et al., 2013).

Anxiety symptoms

Symptoms of anxiety were measured at baseline and follow-up assessments using an abbreviated version of the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). Only the 14 highest loading items, identified through factor analysis in a previous study (Cluver, Orkin, Gardner, et al., 2012) were administered. Example items include "I worry a lot of the time" and "I am nervous" and are responded to on a *no/yes* scale. Total anxiety scores were calculated by summing all items. The RCMAS has been validated for use with South African samples (Boyes & Cluver, 2013a) and the abbreviated version

demonstrated excellent reliability in the current sample (Baseline: $\alpha = .81$; Follow-up: $\alpha = .81$).

Depressive symptoms

Depressive symptoms were measured at baseline and follow-up assessments with the 10-item Children's Depression Inventory – Short Form (CDI-SF; Kovacs, 1992). The inventory contains a range of symptoms and participants are asked to choose one statement that best reflects their feelings in the past two weeks. The short form is well validated and highly correlated with the full 27-item version (Kovacs, 1992) and has been used previously in South Africa samples (Cluver et al., 2007). Total depression scores were calculated by summing all items. The inventory demonstrated adequate reliability in the current sample (Baseline: $\alpha = .73$; Follow-up: $\alpha = .74$).

Bullying victimization

Bullying victimization was measured at both baseline and follow-up assessment with the nine-item Social and Health Assessment Peer Victimization Scale (Ruchkin, Schwab-Stone, & Vermeiren, 2004). This scale has been adapted from the Multidimensional Peer Victimization Scale, which showed excellent reliability ($\alpha = .82$) in a US sample (Mynard & Joseph, 2000). Example items include "being called names" and "being hit or threatened", and are responded according to frequency in the past year (*0: Never, 1: Once, 2: Two to three times 3: Four or more times*). However, as the definition of bullying victimization emphasizes the *repeated* nature of exposure to aggressive experiences (Olweus, 1993; Rigby, 2002), only participants who experienced two or more incidents in the past year for each item were classified as being bullied for that item. Responses were therefore coded *0: Never or once, 1: Two to three times, 3: Four or more times*. This adapted response scale has been

used previously with this age group in South Africa (Boyes et al., 2014) and demonstrated adequate reliability in the current sample (Baseline: $\alpha = .76$; Follow-up: $\alpha = .68$).

Additionally, in order to examine potential effect of exposure to multiple types of bullying victimization two categorical variables were created: 1) a three category variable of increasing exposure (*0: No bullying victimization, 2: One to three types of bullying victimization, 3: Four or more types of bullying victimization*), and 2) based on previous studies from South Africa (Boyes et al., 2014; Cluver et al., 2010), bullying victimization was also dichotomised according to whether children and adolescents had experienced four or more types of bullying victimization in the past year (*0: Less than four types of bullying victimization, 1: Four or more types of bullying victimization*).

HIV/AIDS-related stigma

HIV/AIDS-related stigma was measured at baseline and follow-up assessments using the brief 10-item Stigma-by-Association scale, which has been recently validated for use in South Africa (Boyes, Mason, & Cluver, 2013). Example items include being teased and being rejected and are responded to on a three-point frequency scale (*0: Not at all, 1: Sometimes, 2: All the time*). Total HIV/AIDS-related stigma scores are calculated by summing all items. Internal consistency in the current sample was excellent at both assessment points (Baseline: $\alpha = .87$; Follow-up: $\alpha = .86$).

Sociodemographic characteristics

Household poverty was measured at baseline assessment using an index of access to the eight highest socially-perceived necessities for children and adolescents in South Africa. These were identified through focus groups (Barnes & Wright, 2012), followed by corroboration by over 80% of those sampled in the nationally representative South African Social Attitudes

Survey (Pillay, Roberts, & Rule, 2006). Items included: three meals per day, a visit to the doctor when needed, medicines when needed, enough clothes to remain warm and dry, soap to wash every day, money for school fees, school uniform, and more than one pair of shoes. Items were reverse-scored (*0: Has access to the necessity; 1: Does not have access to the necessity*) and summed to give a total poverty score (total number of necessities lacking).

Additional socio-demographic variables included age and sex of the children and adolescents, province, and whether the participant lived in an urban or rural location, all measured at baseline assessment.

Results

Analytic Plan

Analyses were conducted in four stages in SPSS 22 and Mplus 6. First, we checked for any differences in sociodemographic characteristics, mental health scores, and experiences of bullying victimization between participants lost and retained at follow-up. Second, anxiety symptoms, depressive symptoms, bullying victimization, poverty, and HIV/AIDS-related stigma were examined at both baseline and follow-up assessments, and presented disaggregated by whether households were HIV/AIDS-affected and experiences of bullying victimization. Third, partial correlational analyses (controlling for poverty, child age and sex, province, and urban versus rural location) summarised strengths of relationships between anxiety symptoms and depressive symptoms (measured at baseline and follow-up) and being HIV/AIDS-affected, bullying victimization, and HIV-AIDS-related stigma (all measured at baseline). Finally, in order to determine whether prospective relationships between being HIV/AIDS-affected and both symptoms of anxiety and depressive symptoms operated indirectly via baseline bullying victimization, HIV/AIDS-related stigma, and baseline mental

health (after adjusting for poverty and other sociodemographic variables), tests of multiple mediation were conducted in Mplus 6. All indirect effects (and bias corrected 95% confidence intervals) were estimated based on 5000 bootstrapped re-sampling draws. With the exception analyses comparing youth lost and retained at follow-up, the current analyses were limited to the 3401 youth assessed at both data collection points.

Children Lost and Retained at Follow-Up

Youth lost to follow-up did not differ with regard to being HIV/AIDS-affected [$\chi^2(1) = .23$, $p = .629$], sex [$\chi^2(1) = .07$, $p = .789$], baseline bullying victimization [$F(1, 3514) = 1.40$, $p = .237$, Cohen's $D = 0.10$], or anxiety [$F(1, 3512) = 2.25$, $p = .134$, Cohen's $D = 0.14$]. However, participants lost to follow-up were missing more basic necessities [$F(1, 3514) = 21.55$, $p < .001$, Cohen's $D = 0.36$], older [$F(1, 3512) = 6.44$, $p = .011$, Cohen's $D = 0.24$], and had higher depression scores at baseline assessment [$F(1, 3512) = 8.98$, $p = .003$, Cohen's $D = 0.26$]. Although a follow-up rate of 96.70% after one year is extremely high, some of the most vulnerable participants were unable to be traced and results should be interpreted with this in mind. The sample was limited to youth assessed at both time points for all further analyses.

Mental Health, Bullying Victimization, Poverty, Stigma, and Familial HIV/AIDS

At both assessment points, children and adolescents affected by familial HIV/AIDS reported significantly higher anxiety and depression scores than children whose families were unaffected by HIV/AIDS. Additionally, HIV/AIDS-affected youth reported significantly more poverty and HIV/AIDS-related stigma than children and adolescents not affected by

HIV/AIDS, at both assessment points (Table 2). With regard to bullying victimization, children and adolescents affected by familial HIV/AIDS obtained significantly higher total bullying victimization scores. Specifically, these children and adolescents were significantly less likely to have never been bullied at baseline assessment and significantly more likely to have experienced four or more types of bullying victimization at both baseline and follow-up assessments [Baseline: $\chi^2(2) = 25.78$, $p < .001$; Follow-up: $\chi^2(2) = 9.68$, $p = .008$]. This pattern of results is illustrated in Figure 1. Given that HIV/AIDS-affected children were specifically more likely to experience four or more types of bullying victimization, all further analyses were conducted using this multiple bullying victimization dichotomy.

Insert Table 2 and Figure 1 approximately here

Mean scores on the anxiety, depression, poverty, and HIV/AIDS-related stigma measures for both assessment periods are summarised in Table 3, disaggregated by familial HIV/AIDS and multiple bullying victimization experiences at baseline assessment. Amongst children and adolescents affected by HIV/AIDS, those who experienced multiple bullying victimization reported significantly higher scores on the anxiety, depression, poverty and HIV/AIDS-related stigma measures at baseline assessment. At follow-up assessment, children and adolescents who experienced multiple bullying victimization reported significantly higher anxiety scores and HIV/AIDS-related stigma scores.

Amongst children and adolescents not affected by familial HIV/AIDS, those who experienced multiple bullying victimization reported significantly higher scores on the anxiety, depression, poverty, and stigma measures at baseline assessment. At follow-up assessment, children and adolescents who had experienced multiple bullying victimization

reported significantly higher anxiety scores, but differences on all other variables were non-significant.

Insert Table 3 approximately here

Partial Correlations between Anxiety Symptoms, Depressive Symptoms, Familial HIV/AIDS, Multiple Bullying Victimization, and HIV/AIDS-Related Stigma

Partial correlations (adjusting for poverty, child age and sex, province, and urban versus rural location) between anxiety symptoms and depressive symptoms (measured at both baseline and follow-up assessments) and being HIV/AIDS-affected, multiple bullying victimization, and HIV/AIDS-related stigma (measured at baseline assessment) are summarised in Table 4. After adjusting for poverty and other sociodemographic variables, baseline familial HIV/AIDS was significantly correlated with anxiety scores and depressions scores measured at follow-up assessment. Additionally, familial HIV/AIDS was also correlated with all hypothesized mediators (bullying victimization, HIV/AIDS-related stigma, and baseline mental health), permitting a test of the final hypothesis regarding multiple mediation: i.e. that after adjusting for poverty, the prospective relationship between familial HIV/AIDS and child and adolescent mental health operates indirectly via experiences of bullying victimization, HIV/AIDS-related stigma, and baseline mental health.

Insert Table 4 approximately here

Multiple Mediation Tests of the Prospective Relationships between Familial HIV/AIDS and Symptoms of Anxiety and Depression

Tests of multiple mediation were conducted in Mplus 6. As multiple bullying victimization was a dichotomous variable, coefficients were calculated using robust weighted least squares estimation (WLSMV), which is recommended when analyses include categorical variables (Muthen, du Toit, & Spisic, 1997). Hayes (2013) argues that unstandardized coefficients are the preferred metric in causal modelling, and following this recommendation unstandardized coefficients are reported for all models. Multiple mediation models for anxiety and depression scores are illustrated in Figure 2.

Familial HIV/AIDS was not directly associated with prospective anxiety scores; however, the total indirect effect was significant (B = .342, 95% CI = .235 to .458). Specific significant indirect effects operating via multiple bullying victimization (B = .074, 95% CI = .027 to .140), HIV/AIDS-related stigma (B = .060, 95% CI = .014 to .114), and baseline anxiety scores (B = .209, 95% CI = .150 to .273) were obtained. The final model accounted for 10 percent of the variance in anxiety scores. Similarly, familial HIV/AIDS was not directly associated with prospective depression scores; however, the total indirect effect was significant (B = .126, 95% CI = .069 to .196). Again, specific significant indirect effects operating via multiple bullying victimization (B = .019, 95% CI = .003 to .048), HIV/AIDS-related stigma (B = .050, 95% CI = .014 to .091), and baseline depression scores (B = .057, 95% CI = .032 to .089) were obtained. The final model accounted for 19 percent of the variance in depression scores.

Insert Figure 2 approximately here

Discussion

South African children and adolescents living in HIV/AIDS-affected families are at increased risk of symptoms of anxiety and depressive symptoms (Cluver, Orkin, Boyes, et al., 2012; Cluver, Orkin, Gardner, et al., 2012). Poverty (Cluver et al., 2013; Ssewamala et al., 2009) and HIV/AIDS-related stigma (Boyes & Cluver, 2013b) are additional risk factors for these negative mental health outcomes. However, community level factors, such as poverty and HIV/AIDS-related stigma are difficult to change in the short-term and therefore identifying additional potentially malleable mechanisms linking familial HIV/AIDS with mental health is important from an intervention perspective. Given that bullying victimization is associated with negative mental health outcomes in both the developed world (Fekkes et al., 2006) and South Africa (Boyes et al., 2014), and that familial HIV/AIDS is associated with both bullying victimisation (Cluver et al., 2010) and poorer mental health, this raises the possibility that bullying victimization may mediate the relationship between familial HIV/AIDS and mental health. The current study therefore aimed to determine whether prospective relationships between familial HIV/AIDS and child and adolescent mental health operate indirectly via experiences of bullying victimization. Importantly, it also aimed to determine whether these indirect effects are independent of poverty and previously established indirect effects operating via HIV/AIDS-related stigma (Boyes & Cluver, 2013b), and also independently of baseline mental health.

Familial HIV/AIDS, Bullying Victimization, and Mental Health

Consistent with previous research, familial HIV/AIDS was associated with symptoms of anxiety and depressive symptoms both cross-sectionally and longitudinally. At baseline

assessment, children and adolescents living in HIV/AIDS-affected families had significantly higher anxiety scores and depression scores than youths not affected by HIV/AIDS. Additionally, these differences were maintained at follow-up assessment one year later, suggesting that familial HIV/AIDS is prospectively predictive of later mental health outcomes. These findings are consistent with previous studies from South Africa (Cluver, Orkin, Boyes, et al., 2012; Cluver, Orkin, Gardner, et al., 2012) and emphasize the importance of intervening to promote improved mental health amongst HIV/AIDS-affected youth.

In the current analyses, familial HIV/AIDS was also associated with exposure to bullying victimization, HIV/AIDS-related stigma, and poverty and these differences were also maintained over time. With regard to bullying victimization, specifically, children affected by HIV/AIDS were less likely to have never been bullied and were more likely to have experienced multiple types of bullying victimization. The findings regarding prospective links between familial HIV/AIDS and bullying victimization extend previous cross-sectional research using a smaller sample from a single South African province (Cluver et al., 2010) and demonstrate that children and adolescents affected by HIV/AIDS remain at risk of experiencing multiple bullying victimization over time, even though overall rates of bullying victimization decrease across adolescence (Nansel et al., 2001; Olweus, 1993; Rigby, 2002). Given that adolescence is a risk period for the development of mental health problems (Newman et al., 1996), this sustained victimization of HIV/AIDS-affected youth, in the context of a more general reduction across adolescence, is particularly concerning and further research examining risk and protective factors associated with sustained bullying victimization is warranted.

Additionally, HIV/AIDS-affected youth who experienced multiple types of bullying victimization reported elevated symptoms of anxiety and depressive symptoms in comparison

with HIV/AIDS-affected youth who did not experience multiple types of bullying victimization. With the exception of depressive symptoms, these differences were maintained at follow-up assessment. A similar pattern of findings was obtained for children and adolescents not affected by HIV/AIDS; however, in this group longitudinal effects were limited to symptoms of anxiety. These findings are consistent with previous research demonstrating that bullying victimization is more generally associated with prospective mental health outcomes in both the developed world (Arseneault et al., 2010; Fekkes et al., 2006) and South Africa (Boyes et al., 2014).

However, although familial HIV/AIDS was prospectively associated with both symptoms of anxiety and depressive symptoms in the current sample, multiple mediation tests revealed that familial HIV/AIDS was not *directly* associated with either anxiety or depression scores. Instead, the effect of familial HIV/AIDS on prospective mental health outcomes operated entirely *indirectly*. As expected and consistent with previous research (Boyes & Cluver, 2013b; Cluver et al., 2013), after adjusting for poverty, HIV/AIDS-related stigma and baseline mental health were significant mediators of the prospective relationships between baseline familial HIV/AIDS and both symptoms of anxiety and depressive symptoms. However, bullying victimization was an *additional* significant mediator of the relationships between familial HIV/AIDS and both anxiety symptoms and depressive symptoms. Importantly, this was independently of poverty and the indirect effects of HIV/AIDS-related stigma and baseline mental health.

Implications for Intervention

In the context of the HIV-epidemic in South Africa, community-level poverty, caregiver sickness and death, and community level HIV/AIDS-related stigma are unfortunately not

uncommon, and are clearly associated with negative mental health outcomes for children and adolescents. Socio-ecological models (e.g., Bronfrenbrenner, 1979) that posit interactions between potential risk and protective factors provide a useful framework to guide research in this area, as the impacts of exposure to any given risk factor may be offset by mitigating other risk factors or by exposure to protective factors. However, these models are generic in that they do not indicate specific constructs to be measured. The current findings extend the South African literature by elucidating that, over and above the effects of previously identified risk factors (i.e. poverty, HIV/AIDS-related stigma, and prior mental health), bullying victimization is an independent mediator of the relationship between familial HIV/AIDS and child and adolescent mental health.

Given that both poverty and HIV/AIDS-related stigma in South Africa occur at the structural or community level and are difficult to change in the short-term, identifying more proximal and potentially modifiable risk factors (such as bullying victimization) that might account for relationships between familial HIV/AIDS and child and adolescent mental health is important. The mediational effect of bullying victimization on the relationship between familial HIV/AIDS and child and adolescent mental health suggests that reducing bullying victimization could be a potential target for intervention and programming.

A recent systematic review (Vreeman & Carroll, 2007) and meta-analysis (Ttofi & Farrington, 2011) of anti-bullying interventions in the developed world both concluded that anti-bullying programs are effective in reducing bullying and victimization (with average reductions of 17-23%, Ttofi & Farrington, 2011), although the chances of success are greater when interventions incorporate a whole-school approach involving multiple disciplines and the whole school community (Vreeman & Carroll, 2007). Additionally, a recent trial from Finland has demonstrated that an anti-bullying intervention was successful in reducing bullying behaviors and that this in turn was associated with improvements in mental health

among children (Williford et al., 2012). While poverty and stigma reduction clearly both remain important priorities, bullying prevention programs (developed or adapted for South African contexts[1]) should be trialled and rigorously evaluated in high HIV-prevalent areas.

Furthermore, promoting improved mental health of HIV/AIDS-affected youth in South Africa through targeting bullying victimization has two additional advantages: *i)* using a whole school approach means that HIV/AIDS-affected children and adolescents are not directly targeted, reducing the chances of them being identified and exposed to even more HIV/AIDS-related stigma, and *ii)* bullying victimization is more broadly associated with child and adolescent mental health in South Africa (Boyes et al., 2014). Therefore, bullying prevention efforts are likely to promote improvements in mental health for South African youth in general, while also specifically benefitting vulnerable groups, such as children and adolescents affected by familial HIV/AIDS.

However, it should be noted that while recent meta-analyses and reviews of school-based programs to reduce bullying appear promising (e.g., Ttofi & Farrington, 2011), there is still substantial uncertainty over exactly what components of interventions are successful and for whom (Smith, Salmivalli, & Cowie, 2012). This has prompted calls for more systematic research on group differences (e.g., age) in anti-bullying program effectiveness, as well as further study of the effectiveness of various program components (e.g., disciplinary, peer mentoring, peer mediation, promoting bystander intervention, including parent meetings; Smith et al., 2012).

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[1] Caution is needed when transferring interventions designed and tested in the developed world into a developing world context, and efforts should be made to ensure their cultural acceptability and applicability.

Limitations

As with all research, this study had a number of methodological limitations. First, measuring bullying victimization (as well as symptoms of anxiety and depressive symptoms) reliably in children and adolescents is difficult. This is due to social desirability problems and limitations in children's ability to report subjective internal states (Michael & Merrell, 1998; Salmivalli & Peets, 2009). These problems may have been increased by the use of interviewers, however, this is also a strength of the study (with regard to minimising missing data and aiding children's understanding of questionnaire items in the context of low literacy; Mulis, Martin, Kennedy, & Foy, 2007). Second, designs relying exclusively on self-report are at risk of method overlap bias. Specifically, youth exhibiting symptoms of anxiety or depressive symptoms may feel more isolated and threatened, therefore perceiving higher levels of victimization. Using longitudinal data reduces this problem, as prior mental health scores are controlled for when predicting prospective mental health outcomes; however, future research should attempt to include teacher and/or peer nominations of bullying victimization together with youth self-reports. Third, although the retention rate was high, some of the most vulnerable children and adolescents were among those unable to be traced. All results should be interpreted with this in mind. Fourth, the measure of bullying victimization did not capture why children believed they were being bullied. There are likely to be many reasons for why children are bullied and we are unable to conclude whether the bullying victimization experienced by HIV/AIDS-affected youth is specifically related to HIV/AIDS. However, what is emerging is that HIV/AIDS-affected children are at increased risk of bullying victimization in general, and that this victimization mediates relationships between familial HIV/AIDS and both symptoms of anxiety and depressive symptoms. We believe that this is an important finding that has implications for intervention research and

programming. Finally, participants were sampled from high HIV-prevalence sites. These are low income areas where the population is predominantly black African. Findings are therefore not necessarily generalizable to high income areas and other population groups in South Africa.

Conclusion

The current study offers the first evidence that prospective negative relationships between familial HIV/AIDS and child and adolescent mental health operate indirectly via experiences of bullying victimization. Moreover, this effect is independent of poverty, HIV/AIDS-related stigma, and baseline mental health (all of which are also prospectively predictive of child and adolescent mental health in South Africa). While poverty reduction and community-level stigma reduction remain important priorities in South Africa, intervening at the community level is difficult in the short term. Therefore, identifying additional potentially modifiable risk factors is essential for the promotion of improved mental health amongst HIV/AIDS-affected South African youth. The current findings highlight bullying victimization as a potential target for future intervention efforts. Research from the developed world has established the effectiveness of school-based bullying prevention programs in reducing both bullying behavior and bullying victimization, particularly programs incorporating a whole school approach. Importantly, using a whole school approach means that HIV/AIDS-affected children and adolescents would not be directly targeted, reducing the chances of further stigmatisation, and also promoting improved mental health in South African students more generally. The current findings suggest that the development, implementation, and rigorous evaluation of bullying prevention programs in South African communities may improve mental health outcomes for HIV/AIDS-affected children and adolescents and should be a focus for future intervention research.

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Table 1. Sample characteristics at baseline assessment, disaggregated by familial HIV/AIDS

	Familial HIV/AIDS (*n* = 1318)	No familial HIV/AIDS (*n* = 2083)	Cohen's *D*
Sex (female), *n* (%)	793 (60.17%)	1133 (54.39%)**	--
Age, *M* (*SD*)	13.58 (2.10)	13.33 (2.17)**	.12
Mpumalanga, *n* (%)	677 (51.37%)	971 (46.62%)*	--
Western Cape, *n* (%)	641 (48.63%)	1112 (53.38%)*	--
Live in urban area, *n* (%)	621 (47.12%)	1099 (52.76%)**	--
Live in rural area, *n* (%)	697 (52.88%)	984 (47.24%)**	--

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Significance levels are associated with χ^2 or one-way ANOVA (Age and Poverty). -- not applicable due to χ^2.

Table 2. Anxiety, depression, bullying victimization, poverty, and HIV/AIDS-related stigma disaggregated ted by being HIV/AIDS-affected

	Familial HIV/AIDS (*n* = 1318)	No familial HIV/AIDS (*n* = 2083)	Cohen's *D*
Baseline Assessment			
Anxiety Score, *M (SD)*	5.32 (3.50)	4.05 (3.32)***	.37
Depression, *M (SD)*	2.22 (2.76)	1.49 (2.20)***	.29
Bullying Victimization, *M (SD)*	2.21 (2.93)	1.77 (2.65)***	.16
Poverty, *M (SD)*	3.05 (2.35)	2.45 (2.26)***	.26
HIV/AIDS-related stigma, *M (SD)*	2.09 (3.26)	.86 (2.04)***	.45
Follow-up Assessment			
Anxiety, *M (SD)*	3.99 (3.44)	3.40 (3.07)***	.18
Depression, *M (SD)*	1.52 (2.30)	1.28 (2.11)**	.11
Bullying victimization, *M (SD)*	1.46 (2.27)	1.20 (1.95)***	.12
Poverty, *M (SD)*	2.99 (2.40)	2.61 (2.31)***	.16
HIV/AIDS-related stigma, *M (SD)*	1.15 (2.38)	.60 (1.72)***	.26

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Significance levels are associated with one-way ANOVA.

Table 3. Anxiety, depression, poverty, and HIV/AIDS-related stigma disaggregated by household HIV/AIDS-sickness and multiple bullying victimization experiences

	Familial HIV/AIDS No Multiple Bullying Victimization (*n* = 1105)	Multiple Bullying Victimization (*n* = 213)	Cohen's *D*	No familial HIV/AIDS No Multiple Bullying Victimization (*n* = 1847)	Multiple Bullying Victimization (*n* = 236)	Cohen's *D*
Baseline Assessment						
Anxiety, *M* (*SD*)	4.92 (3.37)	7.36 (3.46)***	.71	3.76 (3.18)	6.37 (3.47)***	.78
Depression, *M* (*SD*)	2.01 (2.61)	3.35 (3.24)***	.46	1.35 (2.06)	2.57 (2.90)***	.49
Poverty, *M* (*SD*)	2.95 (2.34)	3.59 (2.32)***	.27	2.41 (2.25)	2.77 (2.36)*	.16
HIV/AIDS-related stigma, *M* (*SD*)	1.82 (2.87)	3.50 (4.57)***	.44	.79 (1.91)	1.44 (2.85)***	.27
Follow-up Assessment						
Anxiety, *M* (*SD*)	3.83 (3.37)	4.79 (3.70)***	.27	3.29 (3.02)	4.22 (3.37)***	.29
Depression, *M* (*SD*)	1.49 (2.24)	1.69 (2.57)	.08	1.25 (2.08)	1.49 (2.29)	.11
Poverty, *M* (*SD*)	2.90 (2.41)	3.46 (2.30)**	.24	2.60 (2.28)	2.79 (2.56)	.08
HIV/AIDS-related stigma, *M* (*SD*)	1.04 (2.19)	1.75 (3.09)***	.27	.60 (1.74)	.56 (1.56)	.02

Note: * *p* < .05, ** *p* < .01, *** *p* < .001. Significance levels are associated with one-way ANOVA or χ^2.

Table 4. Partial correlations between symptoms of anxiety and depression, familial HIV/AIDS, multiple bullying victimization, and HIV/AIDS-related stigma

	Familial HIV/AIDS	Anxiety T1	Anxiety T2	Depression T1	Depression T2	Multiple Bullying Victimization T1	HIV/AIDS-related Stigma T1
Familial HIV/AIDS	--						
Anxiety T1	.15***	--					
Anxiety T2	.07***	.22***	--				
Depression T1	.12***	.46***	.12***	--			
Depression T2	.06***	.12***	.42***	.12***	--		
Multiple Bullying Victimization T1	.05**	.25***	.10***	.18***	.04*	--	
HIV/AIDS-related Stigma T1	.20***	.23***	.06**	.26***	.07***	.15***	--

Note: Partial correlations adjusting for poverty, child age and sex, urban versus rural location, and province. T1 indicates variable measured at baseline assessment. T2 indicates variable measured at follow-up assessment. $*\ p < .05$, $**\ p < .01$, $***\ p < .001$.

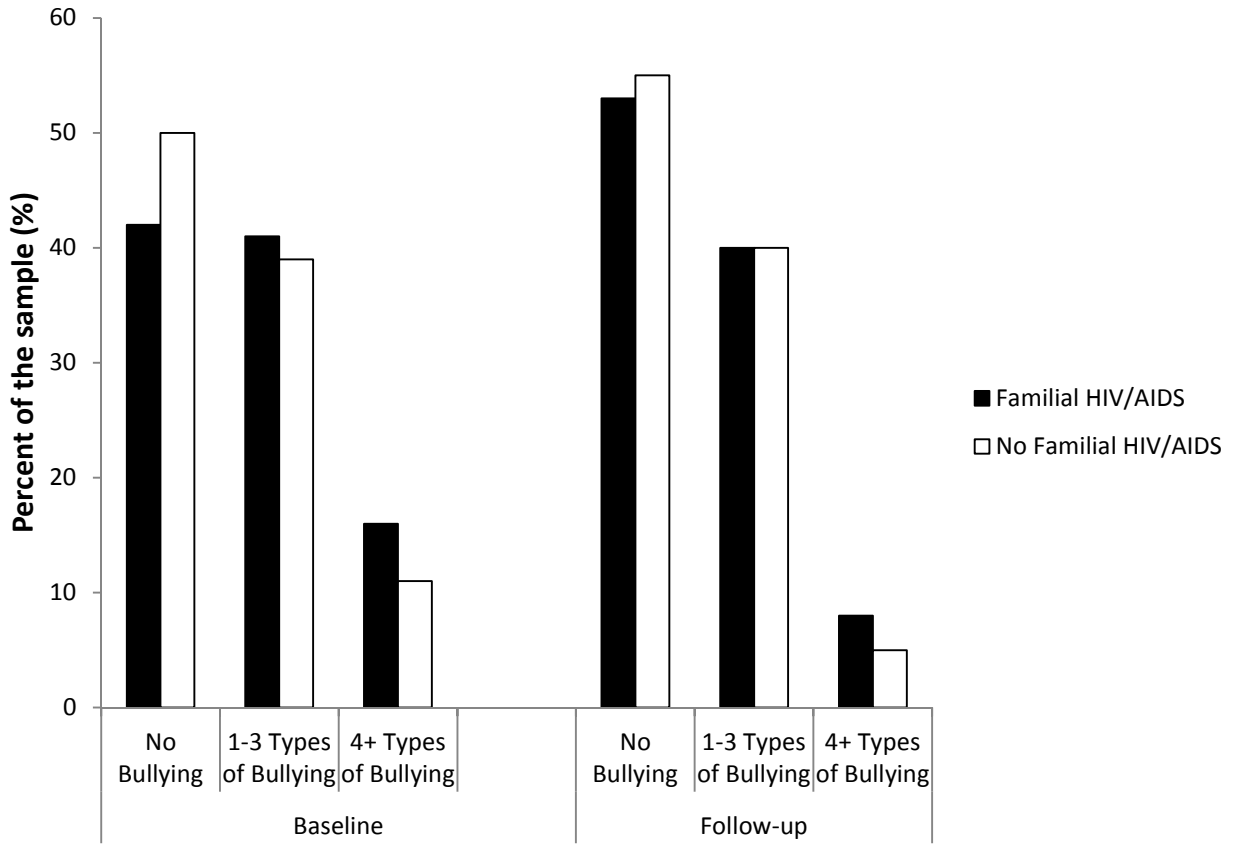*Figure 1.* Expereinces of bullying victimization disaggregated by familial HIV/AIDS

Figure 2. Multiple mediation models for symptoms of anxiety and depression
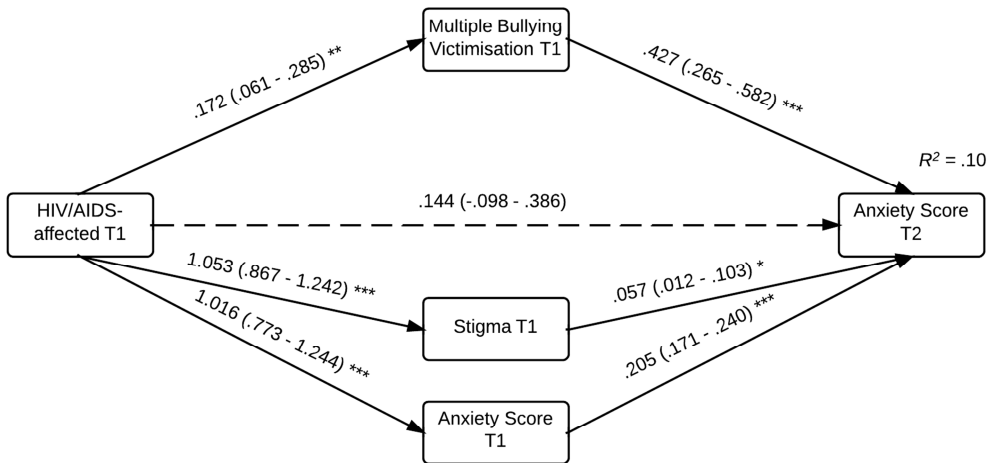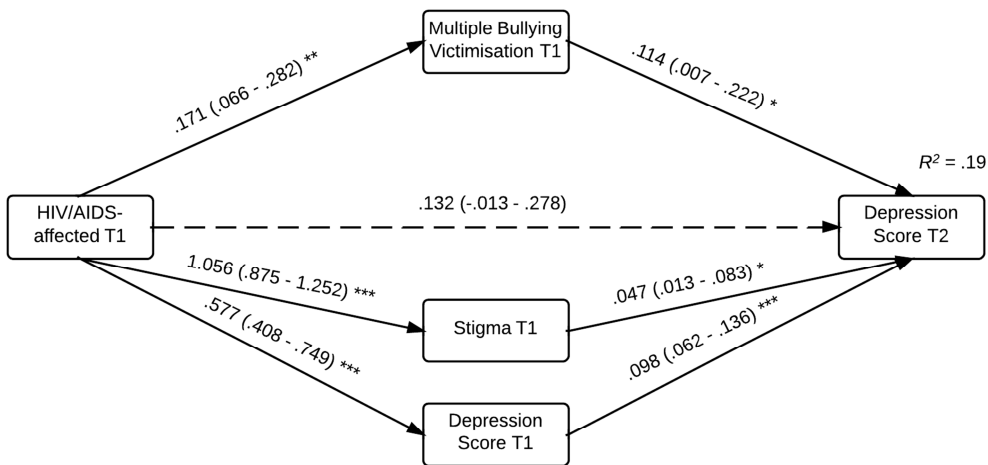
Figure 2a: Anxiety Symptoms

Figure 2b: Depression Symptoms

Note: Unstandardized coeffcients are reported. * $p < .05$, ** $p < .01$, *** $p < .001$. Dashed lines represent non-significant paths. T1 indicates variable measured at baseline assessment. T2 indicates variable measured at follow-up assessment. Models adjust for poverty, child age and sex, urban versus rural location, and province.