Pathways to poor educational outcomes for HIV/AIDS-affected youth in South Africa

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Abstract

A recent systematic review of studies in the developing world (Guo, Li, & Sherr, 2012) has critically examined linkages from familial HIV/AIDS and associated factors such as poverty and child mental health to negative child educational outcomes. In line with several recommendations in the review, the current study modelled relationships between familial HIV/AIDS, poverty, child internalising problems, gender, and four educational outcomes: non-enrolment at school, non-attendance, deficits in grade progression, and concentration problems. Path analyses reveal no direct associations between familial HIV/AIDS and any of the educational outcomes. Instead, HIV/AIDS-orphanhood or caregiver HIV/AIDS-sickness impacted indirectly on educational outcomes via the poverty and internalising problems that they occasioned. This has implications for evidence-based policy inferences. For instance, by addressing such intervening variables generally, rather than by seeking to target families affected by HIV/AIDS, interventions could avoid exacerbating stigmatisation, while having a more direct and stronger impact on children's educational outcomes. This analytic approach also suggests that future research should seek to identify causal paths; and may include other intervening variables related to poverty (such as child housework and caring responsibilities) or to child mental health (such as stigma and abuse), that are linked to both familial HIV/AIDS and educational outcomes.

Keywords: HIV/AIDS, children, education, schooling, poverty, mental health, psychosocial factors

A growing body of literature links familial HIV/AIDS in the developing world with poor educational outcomes for children. An invaluable review of twenty-three papers in this area, dealing mainly with evidence from African countries, was recently conducted by Guo, Li, and Sherr (2012; see also Li and Guo, 2012). A key debate in this literature concerns the relative contribution of poverty and familial HIV/AIDS to children's educational outcomes. There is substantial evidence about the poverty link in developing countries (van der Berg, 2005); however, research linking familial HIV/AIDS with educational outcomes is less clear. On the one hand, an international meta-analysis found that household wealth was a more consistent marker of school attendance then orphanhood or co-residence with chronically- or HIV/AIDS-sick caregivers (Akwara et al., 2010). An earlier one suggested that the enrolment gap separating AIDS- and other-orphaned from non-orphaned children is much smaller than that between poorer and richer children (Ainsworth & Filmer, 2002). By contrast, several national studies reviewed by Guo et al. (2012) have reported levels of school enrolment or poorer attendance that are reduced (compared to the respective control groups) amongst HIV/AIDS-orphaned children (Case & Ardington, 2006; Evans & Miguel, 2007; Nyambedha & Aagaard-Hansen, 2010; Yang et al., 2006); and children with HIV/AIDS-sick parents or caregivers (Ainsworth, Beegle, & Koda, 2005; Cluver, Operario, Lane, & Kganakga, 2011; Evans & Miguel, 2007; Yamano & Jayne, 2005). Enrolment may be sustained despite poor attendance (Sharma, 2006) or grade progression (Bicego, Rutstein, & Johnson, 2003).

The link between familial HIV/AIDS and poor educational outcomes may be exacerbated by poverty (Kasirye & Hisali, 2010; Yamano & Jayne, 2005), or mitigated by welfare assistance (Nyamukapa & Gregson, 2005) and schooling that is free (Yamano, 2007) or assisted (Birdthistle et al., 2009). These findings suggest that focusing on the relative

contributions of familial HIV/AIDS and poverty with regard to educational outcomes is problematic. Rather, it seems likely that the impact of familial HIV/AIDS on educational outcomes occurs via the family poverty it engenders. One aim of the current study was to test this hypothesis empirically.

A somewhat analogous debate concerns the impact of child gender on educational outcomes. The meta-analysis by Ainsworth and Filmer (2002) reported that orphaned girls are not disproportionately affected in terms of enrolment. However, in comparison with orphaned boys, orphaned girls in Tanzania do miss more school hours (Ainsworth et al., 2005), whereas this difference is not significant among for non-orphans; and in Burkina Faso orphaned girls were less likely to enrol in school following parental death (Kobiané, Calvès, & Marcoux, 2005). Such effects were found, in Zimbabwe, to be mitigated by external resources (Nyamukapa & Gregson, 2005). Based on these findings child gender was explicitly included in all analyses.

Additionally, in their review Guo et al. (2012) have identified several limitations within this research area. First, they suggest that parental/caregiver HIV/AIDS-sickness should, due to its financial and caring demands, be studied alongside HIV/AIDS-orphanhood (Richter, Foster, & Sherr, 2007). Second, educational outcomes need to be differentiated. Enrolment and school attendance are analysed more frequently than other important educational outcomes such as concentration problems in class (Cluver et al., 2012) or grade progression (Bicego et al., 2003). Finally, few of the studies reviewed attended to psycho-social wellbeing: (Sengendo & Nambi, 1997; Yang et al., 2006; Zhao et al., 2009), and these did not examine psychological wellbeing as a predictor of educational outcomes. Yet research has established clear links from HIV/AIDS-orphanhood and caregiver HIV/AIDS sickness to internalising problems (depression, anxiety, and posttraumatic stress disorder) in both cross-sectional (Cluver, Gardner, & Operario, 2007) and longitudinal studies (Cluver,

Orkin, Gardner & Boyes, 2012). Moreover, there is evidence in developing countries that internalising problems are linked to poor educational outcomes (Walker et al., 2007). It thus seems plausible that familial HIV/AIDS may impact children's educational outcomes through mental health problems. This hypothesis was also tested in the current study.

In summary, the research literature suggests that various child educational outcomes may be affected by factors at several levels: societal (e.g. poverty), familial (e.g. HIV/AIDS-related illness or death of a parent or primary caregiver), and individual (e.g. child gender and mental health). However, the challenge is simultaneously to model relationships among these variables, and in particular to test empirically the hypotheses that relationships between familial HIV/AIDS and education might operate *through* poverty and child mental health. The path analysis framework used in the current study is suitable for this purpose. At the same time we explicitly address several of the limitations identified by Guo et al. (2012), by: 1) including both HIV/AIDS-orphanhood and caregiver HIV/AIDS-sickness as separate predictors in the models; 2) differentiating educational outcomes in four ways (non-enrolment, non-attendance, deficits in grade progression, and concentration problems); 3) including child internalising problems; and 4) testing for gender effects.

Method

Study population and procedures

In 2005, 1025 black African Xhosa-speaking children and adolescents were interviewed in a study examining psychological distress in children from poor communities of Cape Town (Cluver et al., 2007). The study area covered deprived peri-urban settlements characterised by high population density, unemployment, property crime, rape, and violent crime (South African Police Services, 2009). Four years later, 723 youth aged between 11 and 25 years,

49.7% of them female, were followed up (71% retention rate). The current analysis uses the latter dataset (drawing on the former only for grade progression).

Ethical approval was obtained from the Universities of Oxford and Cape Town and the Western Cape Education Department; and informed consent was obtained from both children and their caregivers. Given low literacy rates (Mulis, Martin, Kennedy, & Foy, 2007) questionnaires were administered verbally by interviewers, who were all local Xhosa-speaking community health or social workers, trained in working with children from deprived communities and administering standardised questionnaires. Confidentiality was maintained unless children were at risk of harm or requested assistance. Participation took 40-60 minutes and no incentives for participation were provided except refreshments and certificates.

Measures

Orphan status and caregiver sickness status: The UN definition of orphanhood was used: the loss of one or both parents among children up to the age of 18 years (UNAIDS, 2004). Death certificates are unreliable sources regarding HIV/AIDS deaths in South Africa and clinical data is rarely available. Therefore, cause of parental death was determined using a Verbal Autopsy method (Lopman et al., 2006) based on youth responses, validated in South Africa (Kahn, Tollman, Garenne, & Gear, 2000). In the current study, determination of HIV/AIDS-related parental death required a conservative threshold of three or more HIV/AIDS-defining symptoms (e.g. Kaposi's sarcoma or shingles). A similar symptom checklist procedure was used to determine caregiver HIV/AIDS-sickness. Again, 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.

Educational outcomes: Four educational outcomes were measured: school non-enrolment (vs. enrolment), school non-attendance (how many days missed in the last week),

deficiencies in grade progression (number of grades actually passed over four years in comparison to the four grades expected), and concentration problems. Concentration problems were measured with a scaled item asking "Is it hard for you to pay attention – like listening to your teacher, or doing your work – because you can't concentrate well?" (*Not at all/Some/Most/All of the time*). All educational information was based on youth report, since school data is of variable reliability and many respondents had changed caregivers.

Poverty: Food insecurity was used as a poverty indicator, following the UN definition, i.e. constant and adequate nutrition (UNESCO, 1996). It was measured by days in the past week (0-7) without sufficient food (Makame, Ani, & Grantham-McGregor, 2002). However, recognising the poor overall food security in the research area, a threshold was set (Cousins, 2004): youth who reported not having sufficient food for two or more days in the previous week were classified as food insecure.

Internalising problems: Depression symptoms were measured with the Children's Depression Inventory – short form (Kovacs, 1992). This 10-item scale has been used previously in South Africa (Cluver et al., 2007), has good psychometric properties (α=.71-.94; Saylor, Finch, & Spirito, 1984), and is highly correlated with the full version of the inventory (r=.89; Kovacs, 1992). Anxiety symptoms were measured using an abbreviated version of the widely-used Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1978). The full scale has been validated for use in South Africa (Boyes & Cluver, in press). The 14 highest loading items from a factor analysis of the 2005 data were administered in 2009 (α=.82). PTSD symptoms were measured with the Child PTSD Checklist (α= .93). This 28-item scale is derived from the DSM-IV criteria (American Psychiatric Association, 2000), is responded to on a four-point scale (*Not at all/Some/Most/All of the time*), and has been extensively used in Cape Town (Seedat, Nyamai, Njenja, Vythilingum, & Stein, 2004; Suliman et al., 2009). The cehecklist has

recently been validated in South Africa (Boyes, Cluver, & Gardner, 2012). A composite internalising-problems score was calculated by summing depression, anxiety, and PTSD scores (after standardising scores to ensure equivalent contribution to the composite total).

Statistical Analyses

Analyses summarising sample characteristics, poverty, internalising problems, and educational outcomes (in relation to orphan status and caregiver sickness status) were conducted using SPSS 19. A series of path analyses tested hypothesized relationships between HIV/AIDS-orphanhood, caregiver HIV/AIDS sickness, poverty, internalising problems, and educational outcomes. School non-enrolment was modelled separately using the full dataset. School non-attendance, deficiencies in grade progression, and concentration problems were modelled simultaneously with the sample limited to those currently enrolled in school. Path analyses were conducted using maximum likelihood estimation, and Bayesian estimation for the enrolment dichotomy (Byrne, 2010), in AMOS 19. Standardised regression weights (β) and associated *p* values were calculated for all potential paths in both full models. Non-significant paths were then dropped and the resulting models re-analysed. Goodness of fit of the final models (Figure 1 and Figure 2) was assessed using model chi square (χ^2) and χ^2/degrees of freedom (χ^2/df), RMSEA, and CFI. A non-significant value of χ^2 indicates good model fit; however, χ^2/df is less sensitive to sample size. The maximum acceptable value of χ^2/df is three. For RMSEA a value of .05, and for CFI a value of .95, indicates good fit (Blunch, 2008).

Results

The sample consisted of 723 youth of 11-25 years (*M*=16.90, *SD*=2.50). Verbal autopsy

scores were used to classify youth as HIV/AIDS-orphaned (*n*=269) and to determine whether

youth were living with an HIV/AIDS-sick caregiver (*n*=103). Compared to respondents in the

analysis sample, respondents lost were more likely to be male [$\chi 2(1)=4.18, p=.042$] and older

[$F(1, 1022)=17.81, p < .001$; partial $\eta 2=.02$], and with higher scores for depression [$F(1,$

$1022)=26.52, p < .001$; partial $\eta 2=.03$] and anxiety [$F(1, 1016)=7.20, p=.013$; partial $\eta 2=.01$].

Sample characteristics, poverty, internalising problems, and educational outcomes by both

orphan status and caregiver sickness status are summarised in Table 1.

(**Table 1 about here**)

Enrolment

The final path model examining the dichotomous outcome of school non-enrolment is

illustrated in Figure 1. Fit indices indicated excellent fit for the model ($\chi^2(9)=12.35$, *p*=.194;

$\chi^2/df=1.37$; CFI=.990; RMSEA=.023) and it accounted for 5% of the variance in non-

enrolment. Neither caregiver HIV/AIDS-sickness nor HIV/AIDS-orphanhood was directly

associated with non-enrolment. However, caregiver HIV/AIDS-sickness was indirectly

associated with non-enrolment via internalising problems, as well as through a combination

of both poverty and internalising problems (total indirect effect: $\beta=.04$). Additionally,

HIV/AIDS-orphanhood was indirectly associated with school non-enrolment via a

combination of poverty and internalising problems (total indirect effect: $\beta=.02$).

(**Figure 1 about here**)

Attendance

The final path model examining school non-attendance, concentration problems, and deficits

in grade progression is illustrated in Figure 2. Fit statistics indicated excellent fit

($\chi^2(17)$=21.18, p=.218; χ^2/df=1.25; CFI=.988; RMSEA=.021) and the model accounted for 4% of the variance in non-attendance, 25% in concentration problems, and 2% in grade progression deficits. Again, there were no direct links between caregiver HIV/AIDS-sickness or HIV/AIDS-orphanhood and any educational outcomes. However, caregiver HIV/AIDS-sickness was indirectly associated with non-attendance through both poverty and internalising problems, as well as through a combination of both of these variables (total indirect effect: β=.03). HIV/AIDS orphanhood was indirectly associated with non-attendance via poverty and a combination of both poverty and internalising problems (total indirect effect: β=.06).

Concentration problems

Caregiver HIV/AIDS-sickness was also indirectly associated with concentration problems via internalising problems and a combination of both poverty and internalising problems (total indirect effect: β=.07). HIV/AIDS-orphanhood was indirectly associated with concentration problems through a combination of both poverty and internalising problems (total indirect effect: β=.04).

Grade progression

As with the other three educational outcomes above, there were no direct links from poverty or internalising problems to deficits in grade progression. Indeed, the path from having an HIV/AIDS-sick caregiver to grade progression proceeded via not only a combination of poverty and internalising problems but also concentration problems (total indirect effect: β=.01). Similarly, HIV/AIDS-orphanhood was indirectly associated with deficits in grade progression via a combination of poverty and internalising problems and thence concentration problems (total indirect effect: β=.01).

Gender

Gender was directly associated only with concentration problems (boys reported more difficulties) and grade progression (boys progressed more poorly). Gender also had an indirect effect on poor grade progression via concentration problems (total indirect effect: β=.02). Gender was not associated with enrolment or any other variables in the model.

(Figure 2 about here)

Discussion

The aim of the current study was to model relationships among familial HIV/AIDS, poverty, child internalising problems, gender, and four educational outcomes: non-enrolment at school, non-attendance, deficits in grade progression, and concentration problems. It was hypothesized that the impact of familial HIV/AIDS on educational outcomes would operate, at least partially, via poverty and child internalising problems.

Notably, path analyses revealed no direct associations between either HIV/AIDS-orphanhood or caregiver HIV/AIDS-sickness and any of the educational outcomes. Instead, HIV/AIDS-orphanhood and caregiver HIV/AIDS-sickness impacted indirectly on educational outcomes via both poverty and internalising problems. The path models for both non-enrolment and concentration problems were identical (Figure 1 and Figure 2). Caregiver HIV/AIDS-sickness was related to these two outcomes via internalising disorder; and was joined by HIV/AIDS-orphanhood in bearing on these outcomes more indirectly, via poverty and thence via internalising disorder. Moreover, the pathways were closely similar for the third outcome of non-attendance, with the exception of an additional link between poverty and non-attendance. Relationships between familial HIV/AIDS and the fourth outcome, deficits in grade progression, operated via not only poverty and internalising problems but

also concentration problems (Figure 2). Gender was associated directly only with boys' reporting more concentration problems and deficits in grade progression, and indirectly via concentration problems to the deficits in grade progression.

Taken together, these findings support our hypotheses that the impact of familial HIV/AIDS on educational outcomes occurs via the family poverty and child mental health problems it occasions. One may conjecture that familial HIV/AIDS will manifest effects, as in this study, not directly, but rather indirectly via intervening variables that intimate the pathways and mechanisms involved. This conjecture may encourage further investigations using path analysis, or re-analyses of existing data. In this regard, we note that our findings quantify not only the effects but also feasible pathways involved in several qualitative studies of the poverty and psycho-social consequences of familial HIV/AIDS and their effects on education in developing countries: for example Sengendo and Nambi (1997) in Uganda, Tu et al. (2009) and Zhao et al. (2009) in China, and Cluver et al. (2012) in South Africa.

By distinguishing relevant pathways – from differentiated familial AIDS impacts, via applicable individual or societal intervening variables, to a broad range of educational outcomes – this study contributes to resolving some of the existing confusion in the area, and laying a firmer foundation for evidence-based policy inferences.

One implication of the analysis for policy and programming is that, in improving educational outcomes for children in HIV/AIDS-affected families, a more direct and stronger impact may be achieved by targeting the poverty-related and psycho-social consequences of HIV/AIDS rather than by targeting HIV/AIDS-affected families. This would also lessen the risk of increasing stigmatization. Regarding poverty, research has demonstrated improvements in child educational outcomes as a result of school feeding schemes , social grants, and other poverty-alleviation measures (Kristjansson et al., 2007). Regarding the psycho-social consequences, for instance addressing internalising problems to improve

classroom concentration, the literature is more limited, though there are indications of the

benefits of support groups (Kumakech, Cantor-Graae, & Maling, 2009), and indeed of

measures to diminish poverty (Cluver & Orkin, 2009).

These implications for intervention would also apply to "young carers" (Becker

2000). Children in AIDS-impacted families are an egregious example (Cluver et al., 2012), in

having to assume caring responsibilities that are more extensive and intimate than the

household work young people do in Africa (Robson, Ansell, Huber, Gould, & Van Blerk,

2006), because the poverty resulting from AIDS-sickness or orphanhood restricts access to

adequate healthcare (Becker 2007).

A number of limitations of the current study should be noted. First, with the exception

of the calculation of deficits in grade progression, the present analyses are cross-sectional.

Therefore, the causal directions indicated in the path models are theoretical (Davis, 1985;

Iacobucci, 2008) and should be tested using longitudinal data (This was not attempted in the

present study because the effects would likely be attenuated by the extensive duration

between the waves). Second, concentration problems and school attendance were measured

with single self-reported items. Future research could extend these measures, possibly

complemented with teacher reports. Similarly, the single-item food insecurity variable,

adopted to differentiate degrees of poverty, could be refined. Third, although child age is

important in exploring educational outcomes, we found that its inclusion did not change the

significant pathways, nor their relative strengths; so in these models it was omitted for

simplicity. However, the effect of age and possible interactions need further research. Fourth,

for these initial explorations a three-part composite variable of internalising symptoms was

constructed. This could be disaggregated and modelled separately, since depression, anxiety,

and PTSD symptoms may be differentially associated with educational outcomes. Fifth, the

sample size is modest. If a larger sample were available, familial effects could be

disaggregated – for potential differences associated with maternal, paternal, or double orphanhood (Guo et al., 2012). Moreover, the sample was purposive, and the findings are therefore not immediately generalisable. Although the profile of respondents is not unrepresentative in the chosen areas on characteristics such as gender and age, the findings would need to be tested in probabilistic samples. Sixth, because the key pathways are indirect the effects are relatively weak; and although the fit of the models was excellent, the variance accounted for in educational outcomes was modest. This may be due partly to the measures used (e.g. school non-attendance in the past week only provides a snapshot of school attendance). But it also suggests that additional variables, which can be theoretically linked to familial HIV/AIDS and educational outcomes, should be included in models if the samples are of adequate size: e.g. children's housework or caring responsibilities related to poverty, and abuse or stigma related to internalising difficulties, are both associated with familial HIV/AIDS and may in turn be associated with educational difficulties. Finally, in undertaking quite an intricate a path analysis we have elected to bypass interaction effects. Tackling these limitations will provide a substantial agenda for future research.

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Table 1. Sample characteristics, poverty, internalising problems, and educational outcomes as a function of both orphan status and caregiver sickness status

	HIV/AIDS-orphaned	Not HIV/AIDS-orphaned	*p* value	HIV/AIDS-sick caregiver	Caregiver not HIV/AIDS-sick	*p* value
Age (*M, SD*)	17.17 (2.75)	16.74 (2.33	**.023**	17.04 (2.54)	16.87 (2.49)	.525
Female	48%	53%	.222	59%	48%	**.041**
Poverty (*M, SD*)	2.77 (2.47)	1.45 (2.11)	**< .001**	3.13 (2.45)	1.72 (2.45)	**< .001**
Internalising Problems (*M, SD*)	5.22 (.93)	4.88 (.76)	**< .001**	5.31 (.88)	4.93 (.82)	**< .001**
Not enrolled at school	21%	18%	.342	25%	18%	.081
School non-attendance (*M. SD*)	.38 (.95)	.21 (.60)	**.007**	.37 (.78)	.25 (.74)	.213
Concentration problems (*M, SD*)	.72 (.88)	.56 (.81)	**.014**	.92 (.99)	.56 (.80)	**< .001**
Deficiencies in grade progression (*M, SD*)	1.27 (.67)	1.25 (.68)	.669	1.23 (.60)	1.26 (.69)	.620

Note: p values associated with one-way ANOVAs or chi-square test (significant *p* values are bolded)

Figure 1. Path model with school non-enrolment as the outcome variable
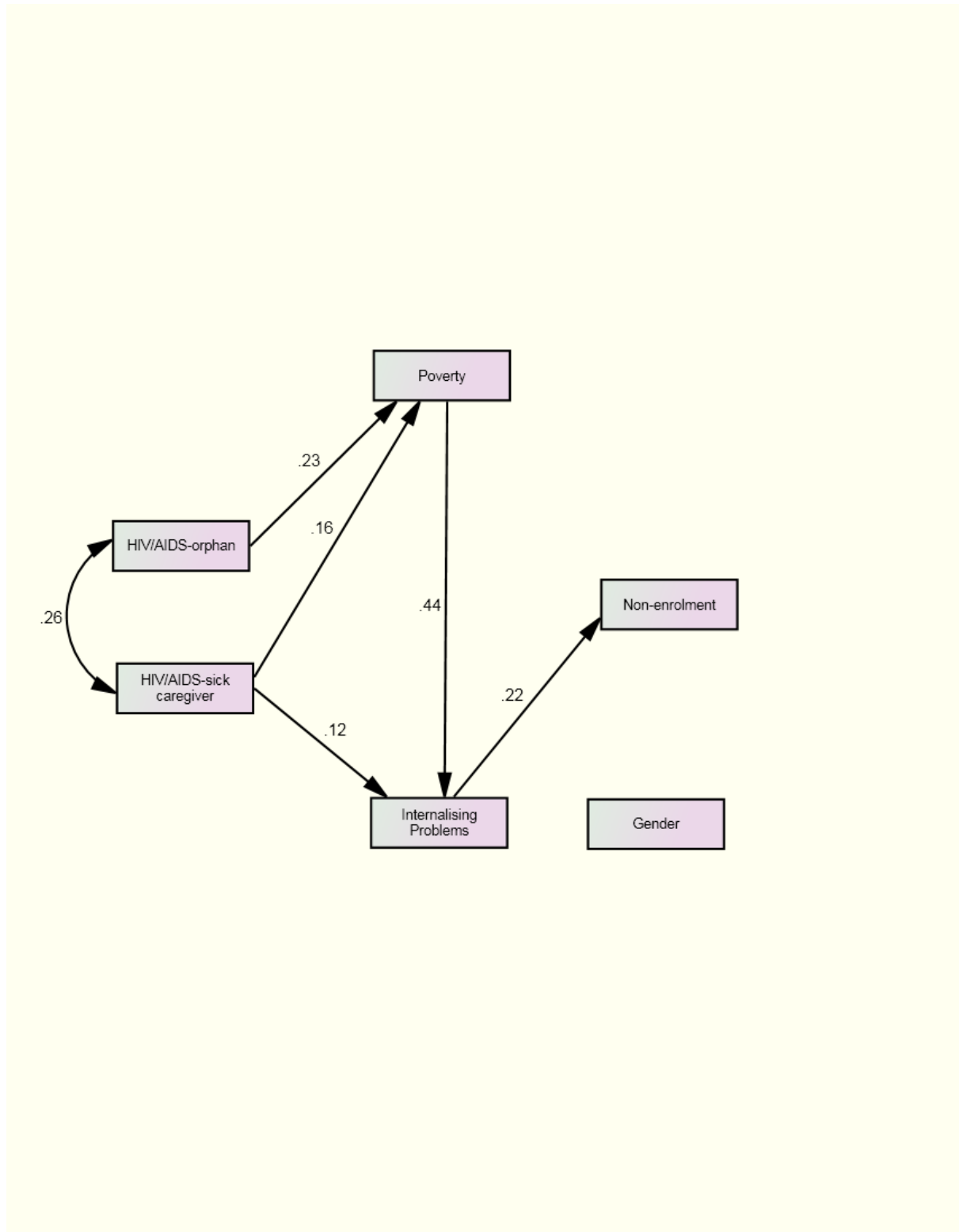
Figure 2. Path model with school non-attendance, concentration problems, and deficits in

grade progression as the outcome variables