Family Contexts and Schooling Disruption among Orphans in Post-Genocide Rwanda

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Abstract This study examines the relationship between orphan status and schooling disruption in post-genocide Rwanda. The results indicate that while non-orphans have more favorable schooling outcomes in two-parent than in single-parent families, the reverse is true among Rwandan orphans. In single-mother households, paternal orphans, i.e. orphans with only a living mother, have better outcomes than their orphan *and* non-orphan counterparts. In contrast, paternal orphans have worse outcomes than other children in two-parent households, especially in households headed by males. Maternal orphans are more likely to experience schooling disruptions than non-orphans regardless of family structure. The maternal-orphan disadvantage is nevertheless greater in female-headed than in male-headed households. As expected, non-related orphans are more disadvantaged than orphans related to their household heads. However, non-related orphans have a greater disadvantage in two-parent than in single-parent households. The results also suggest that within households, the provision of childcare to children below schooling age is an impediment to orphan's schooling. These impediments are, however, greater for double-orphans than paternal or maternal orphans.

Keywords Children · Families · Orphans · Schooling · Genocide · HIV/AIDS

Introduction

Catastrophic events such as civil conflicts, epidemics, and other humanitarian emergencies have engendered significant scholarly interest in recent demographic studies (Verwimp and Bavel 2005; Brunborg and Urdal 2005; Brunborg and Tabeau

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2005; Agadjanian and Prata 2002). Part of this interest is driven by the need to understand how demographic shocks affect subsequent social adjustment processes. Accordingly, a number of studies now catalogue the specific impacts of wars, epidemics, and other emergencies on fertility, mortality, and migration processes (Verpoorten 2005; Khat et al. 1997; Eloundou-Enyegue et al. 2000; Schmeidl 1997). Studies on how the outcomes of children are affected by these events also point to a range of deleterious consequences of these crises for the welfare of children (de Walque 2005; Hazem et al. 2004; Murray et al. 2002; Goldstein et al. 1997). In African societies, for example, the socio-demographic outcomes of children have been found to be negatively affected by the HIV/AIDS epidemic (e.g. Young and Ansell 2003; Foster and Williamson 2000); wars (Albertyn et al. 2003; Veale and Dona 2003); as well as famines (Jaspars and Young 1995). More recently, research on African children affected by these events has drawn attention to their effects on orphan status, and in turn, the effects of orphan status on schooling (e.g. Case et al. 2004; Ainsworth et al. 2005).

Despite increased research on the negative consequences of orphan status in African societies, lingering questions remain about the specific ways in which the welfare of orphans is affected by other demographic processes. Thus, although the association between orphans status and children's living arrangements is now well established (Foster 2000; Monasch and Boerma 2004), previous research gives limited attention to the mediating impacts of family structure on the dynamics of orphans' schooling. Consequently, the logical nexus that exists between the impacts of humanitarian crisis on both orphan status and family formation processes has not been fully examined. Wars and HIV/AIDS, for example, can increase parental mortality which can affect both orphan status and whether or not orphans live in single-parent or two-parent families. These differences in family structure, especially for single-parent orphans, will generally depend on whether an orphan's surviving parent chooses to re-marry. As maintained by some scholars, a significant number of HIV/AIDS widows and widowers in some societies choose to remarry and have children in their new relationships (Ntozi et al. 1999; Ntozi 1997). Since differences in family structure are known to have significant implications for the welfare of children (e.g. McLanahan and Sandefur 1994; Nord 1998) the extent to which family structure influences the association between orphan status and schooling needs to be further clarified.

This study, therefore, uses data from the 2002 Rwandan census to investigate the relationship between family structure and schooling disruption among orphans and non-orphans. In general, the study attempts to achieve three specific objectives. First, it examines the association between orphan status and discontinuities in schooling progress, with specific reference to the current non-enrollment status of children previously enrolled in school. In this process, explicit attention is given to the association between maternal, paternal, and double orphan status and schooling disruption among young children. As its second objective, the study locates the dynamics of schooling disruption within the context of the social influences of single-parent and two-parent families. In addition, the study identifies the extent to which orphans' schooling progress is associated with such factors as the sex of their household head and whether or not they are the biological children of their

household head. The final objective of the study involves examining the relationship between household wealth and schooling disruption among orphans and non-orphans in different family contexts. The study, therefore, investigates whether household wealth has a differential association with schooling among paternal, maternal, and double-orphans in single and two-parent families.

Genocide, HIV/AIDS, and Orphan Status in Rwanda

Most studies seem to agree that at least 500,000 people were killed in Rwanda during the 3 month period of the genocide in 1994 (Newbury 1998; Verpoorten 2005). This, according to some scholars (e.g. Kuperman 2000), was one of the most rapid rates of ethnic cleansing in modern history. Estimates of the impacts of the genocide also suggest that genocide-related deaths accounted for a 10% decrease in Rwanda's pre-genocide population (Hintjens 1999; Verwimp 2004). As expected, the demographic impacts of the genocide were not limited to its impact of Rwanda's population size. Previous studies also highlight its deleterious effect on other demographic indicators (Jayaraman et al. 2007; Verwimp and Bavel 2005), and describe disparities in these effects across specific regions of the country (Verwimp 2001; Verwimp 2003).

Not surprisingly, Rwanda now has one of the world's highest rates of orphanhood (Ainsworth and Filmer 2006). Nevertheless, although orphan status in contemporary Rwanda is directly associated with the extreme mortality conditions of the genocide, the impacts of other factors such as HIV/AIDS on increasing its orphan population cannot be discounted (UNICEF 2006). Post-genocide research on children in Rwanda, however, gives more attention to the effects of the conflict on the outcomes of children. As a result, a number of studies now reveal the impacts of the conflict on children's health and nutritional outcomes (e.g. Geltman and Stover 1997; Akresh et al. 2007); their psychosocial outcomes (Schaal and Elbert 2006); while others focus on the social outcomes of children in Rwandan forced-migrant populations (e.g. Bird 2003).

Broadly speaking, orphan status is generally associated with less favorable socioeconomic indicators among children in Rwanda. Veale and Dona (2003), for example, indicate that orphan status is a predictor of a higher likelihood of homelessness among Rwandan children in the years following the genocide. Siaens et al. (2003) maintain that Rwandan orphans are more likely to be poor and malnourished, but less likely to be enrolled in schools than non-orphans.¹ De Walque (2005) also reports a similar schooling disadvantage among orphans. In Akresh and De Walque's (2008) study, educational attainment in the post-genocide years is shown to be lower among both orphans and non-orphans than in the pre-genocide years, although the relative disadvantage of orphans was consistent across time. As with the broader literature on orphans, however, the question of whether the apparent schooling disadvantage of Rwanda's orphans is consistent across family structure, as well as the broader influences of family contexts on children's outcomes, have not been systematically identified in previous studies.

¹ This study, however, uses proxy indicators of orphan status that are based on the absence of both parents.

Contextual Issues

A major determinant of the schooling outcomes of orphans is their degree of relatedness with their household heads. Accordingly, previous research consistently reports that orphans have better schooling outcomes when they live with relatives than with non-relatives (Case et al. 2004; Kobiané et al. 2005). Attempts to account for the positive effects associated with living with relatives have generally been based on evolutionary perspectives on altruism. Thus, a number of scholars now discuss the importance of these relationships within context of Hamilton's rule that hypothesizes that altruistic behavior will be associated with degrees of relatedness between individuals (e.g. Sear et al. 2002; Case et al. 2004). Schooling differentials that are conditional on orphan status are, therefore, seen to be a product of parents' decisions to invest more resources in the welfare of their biological children (i.e. non-orphans) compared to their investments in non-biological children (i.e. orphans). In fact, a growing body of evidence consistent with these differential parental investments in children is now found in several studies (e.g. Anderson et al. 1999; Case et al. 2001). Within this evolutionary framework, therefore, the schooling disadvantage of orphans is considered to be a direct result of lower parental investments in their schooling compared to parental investments into the schooling of non-orphans.

Despite the intuitive appeal of altruistic explanations, our understanding of the familial influences that account for the orphan schooling disadvantage is far from complete. Given what we know of the mediating impacts of family structure on children's schooling, part of the orphan disadvantage is likely to be explained by differences in family-structure. Non-orphans, for example, are by definition children with two living parents. Thus, their schooling *advantage* may not only be explained by greater altruistic investments from their parents, but also by their greater expected likelihood of living in two-parent relative to single-parent families. Living in single-parent families, for example, is negatively associated with parent-teacher contact and parental involvement in schools, both of which have a negative impact on children's schooling performance (Kohl et al. 2000). Single-parent families are also associated with a lower quality of parenting and a higher exposure to psychological stress compared to two-parent families (Amato 2005). Other effects of family structure on children's schooling are economic. For example, children in single-parent families are more likely to live in worse socioeconomic circumstances which can in turn explain their lower levels of educational attainment compared to children in two-parent families (e.g. Downey 1994; Manning and Lamb 2004; Deleire and Kalil 2002).

Notwithstanding the positive association between living in two-parent families and children's schooling outcomes, the ways in which family structure affects the schooling outcomes of orphans has not been systematically addressed. As a result, there is also limited evidence regarding whether or not orphans derive the same benefits from two-parent families that have been found in previous studies. At the same time, orphans in two-parent families are likely to be the step-children or foster-children of at least one parent. As noted by Manning and Lamb (2004), step and foster children in two-parent-families generally have worse schooling outcomes

compared to their counterparts who are biological children. Analogous disadvantages have thus been found among orphans living with step parents in some African countries. Specifically, Nyamukapa and Gregson (2004) report that part of the schooling disadvantage of maternal orphans in Zimbabwe can be explained by the limited support they receive from step-mothers.

Related to the effect of family structure are the effects of the number of parents deceased and the sex of the deceased parent. Among single-parent orphans, maternal orphans have been shown to have less favorable schooling outcomes than paternal orphans (Evans and Miguel 2007). Since paternal orphans have a surviving mother, while maternal orphans do not, these findings broadly imply that maternal influences on school enrollment among orphans are more important than paternal influences. Among paternal orphans, surviving mothers have also been found to take on an even greater role in the education of their children after the death of the father. In contrast, other studies suggest that the maternal effect on the schooling of paternal orphans may be undermined by the greater income loss associated with the death of a father (Gertler et al. 2004). In families with maternal orphans, maternal deaths are likely to have a negative effect on schooling since children are likely to be used as substitutes for female household labor previously provided by their mothers. Not surprisingly, the impacts of parental deaths are even more dramatic among children with two-dead parents (i.e. double orphans). Accordingly, a number of studies now show that the schooling outcomes of double-orphans are less favorable relative to those of their other orphan and non-orphan counterparts (e.g. Monasch and Boerma 2004).

An equally important determinant of children's schooling outcomes is household wealth. Conceptually, however, the direction of the wealth effect on orphans' schooling appears to be unclear. Some studies associate the impacts of wealth to the loss of parental income that comes with parental deaths (Beegle et al. 2006). According to this perspective, the loss of income associated with parental deaths may be associated with children's increasing tendency to work outside the home to meet current consumption needs (Sharma 2006). On the contrary, other studies suggest that as a result of economic hardships, the likelihood of fostering an orphan is in fact positively associated with household wealth. This relationship is clearly intuitive. At the same time, it is still not clear whether living in wealthier households will decrease disparities in parental investments in children. In African countries, some scholars also argue that the economic impacts on the outcomes of orphans are moderated by the strength of kinship networks and the financial contributions of extended family members (Kobiané et al. 2005). In contrast, other studies also argue that kinship resources have very limited impacts when orphanhood rates are high (Ntozi et al. 1999; Foster 2000; Nyambedha et al. 2003).

Children's schooling outcomes are also negatively affected by the number of children in the early childhood ages living within their families (Lloyd and Gage-Brandon 1992; Glick and Sahn 2000). Explanations for this effect are generally economic and are reflected in resource dilution theories that maintain that larger sibship sizes decrease the amount of resources available for human capital investment (Steelman et al. 2002). Non-human capital investment explanations have also been given in other studies (e.g. Patrinos and Psacharopoulos 1997) that

suggest that school-age children will mainly work to care for their younger siblings as the number of younger siblings in their household increases.

Hypotheses

Based on the conceptual relationships found in previous studies this study examines two main hypotheses on the impacts of family contexts on orphan disparities in schooling disruption. First, the schooling disadvantage of orphans is hypothesized to be conditional on differences in family structure. Thus, differences in altruistic investments between single-parent orphans (i.e. maternal and paternal orphans) and non-orphans are expected to be conceptually smaller in single-parent than in two-parent families. This is because *non-orphans* are expected to receive more altruistic investments in two-parent families (i.e. from two-parents) than in single-parent families (i.e. from one parent). Consequently, disparities between single-parent orphans and non-orphans are hypothesized to be smaller in the single than in two-parent families. Similarly, although double-orphans have no living parent they are also expected to have a smaller schooling disadvantage relative to non-orphans in single-parent than in two-parent families. Secondly, since single-parent orphans are intuitively more likely to have step-parents or foster-parents in two-parent than in single-parent families, the study also hypothesizes that the disadvantage of single-parent orphans in two-parent families will be driven by whether or not they are the biological children of their household heads.

Data and Methods

The data used in the empirical analysis are taken from a 10% sample of the 2002 Rwandan census. These data are currently available in the Integrated Public Use Microdata-International database of the Minnesota Population Center (Minnesota Population Center 2007). One clear advantage associated with these data is that they contain a larger number of observations compared to other surveys conducted in Rwanda in the years following the genocide. In addition, they contain information on a variety of demographic, educational, and household characteristics. Information on current school attendance is based on indicators identifying respondents age 6 and above who indicated that they were students during inquiries about their primary economic activity. Furthermore, for all respondents aged 25 or younger, the 2002 census provides information on whether or not their parents were alive. This information is used to distinguish between three types of orphans—double orphans, who have two dead parents; maternal orphans, who have a living father but a dead mother; and paternal orphans, who are defined as children with a dead father but a living mother. Following previous studies, non-orphans are defined as children who have two living parents. Children with missing information on the mortality status of their parents, i.e. about 3.5% of the sample, are excluded from the analysis. Since the study focuses on young children most likely to have been orphaned during the genocide in 1994, the final sample is restricted to children between the ages of 8 and

13. Members of this cohort were generally between ages the ages of 0 and 5 during the 1994 genocide. This restriction is important because including children born after 1994 in the assessment of the impacts of the genocide is likely to bias the presumed genocide effect downward.²

The Rwandan 2002 census data also provides information on several household-level indicators. For example, information identifying household heads and their spouses can be used to generate indicators of their respective demographic and socioeconomic indicators that can then be linked to child-specific information within each household using unique household identification numbers. In terms of wealth, the census provides information on the availability of various assets and amenities within each household. It is therefore possible to identify households that own automobiles, TVs, or radios, those that have access to electricity, the internet, and pipe-borne water supply, and households that don't. These data are generally important for two reasons. First, they are useful for assessing the comparative prevalence of specific household amenities in orphan and non-orphan households. Secondly, they are also useful for generating proxy indicators of household wealth that are essential to the analysis of how wealth affects schooling disparities by orphan status.

Summary indices are increasingly being used to as indicators of wealth in countries in which conventional indicators, such as data on incomes or expenditures, are either unavailable or unreliable (e.g. Hong and Hong 2007; Gareene and Hohmann-Gareene 2003). Following previous studies, the study uses Principal Components Analysis (*see* Duntelman 1989; Montgomery et al. 2000; Filmer and Pritchett 2001) to develop a living standards index that captures variations in household wealth. This data reduction strategy transforms data available in multiple dimensions (e.g. indicators on the possession of TV sets) into a one a dimensional indicator (e.g. a living standards index) in a process that involves no significant loss of information.

Analytically, the dynamics of schooling progress focuses on schooling disruption, or the likelihood of *not* currently attending school, among children who at the time of the census had already made some progress in their schooling. The final sample is therefore restricted to children who have completed at least 1 year of schooling. Admittedly, this focus presents only one perspective on the schooling outcomes of orphans since the impact of orphan status can manifest itself in other schooling outcomes e.g. enrollment. As mentioned earlier, previous studies have demonstrated that orphans in Rwanda are less likely to be enrolled in school than non-orphans.³ Of interest in this analysis, however, is the question of how orphan status affects schooling progress among children already enrolled in school. In other words, beyond the impact of parental death on enrollment status, the study examines

² While this restriction in child age is unlikely to eliminate the potential impacts of HIV/AIDS on orphan status in 2002, it at least increases the likelihood that the orphans in the study had parents who died during the genocide.

³ Enrolled orphans may therefore differ from non-enrolled orphans in their background characteristics and there may be similar differences between enrolled and non-enrolled non-orphans. These differences are important. However, they are more likely to affect schooling estimates *within* the orphan (or non-orphan) population. As a result, the study does not discuss the differences between enrolled and non-enrolled children because the analysis focuses only on disparities among children with a history of school enrollment.

the possible ways in which parental death may be associated with disparities in children's schooling progress.

The study's measure of schooling disruption is also a proxy indicator of current dropout status since *non-enrollment* is examined from the perspective of children for whom there is evidence of prior schooling progress (i.e. those who have completed at least one year of schooling). A similar approach is used in other studies using cross-sectional data to examine the likelihood of schooling dropout (e.g. Marschall 2006; Fry 2007; Lillard and DeCicca 2001). Logistic regression analyses with household-level random effects are then used to examine how orphan status and family contexts affect schooling disruption. The general estimation equation used in the regression analysis is described in Eq. 1. The dependent variable, D_{ij} , captures the logit of the probability that child i in household j is not currently attending school, given that child i completed at least 1 year of schooling prior to the census. This dependent variable, D , is considered to be a function of orphan status (O), a vector of child-level attributes (C), e.g. age and sex, household-level characteristics (H), e.g. Single-parent (i.e. households with only a head present) or two-parent (i.e. households with both heads and spouses) and household size, and household-level random effects, μ_j .

$$D_{ij} = \alpha_0 + \alpha_1 + \beta_a O_{ij} + \beta_b C_{ij} + \beta_c H_{ij} + \mu_j \quad (1)$$

Descriptive Results

Summary characteristics of orphans and non-orphans in the sample are presented in Table 1. Young orphans in Rwanda are more likely to have lost only their fathers, (i.e. paternal orphans), or both parents (i.e. double orphans), compared to having lost only mothers. The actual numbers of orphans, by orphan-type, in single-parent and two-parent households are presented in Appendix 1. Regardless of orphan-type, however, Table 1 shows that orphans are more likely to live in disadvantaged household contexts compared to non-orphans. For example, non-orphans are the least likely to live in single-parent and female-headed households. In terms of household wealth, measured in national quintiles from the poorest—Quintile 1, to the wealthiest—Quintile 5 (i.e. quintiles stratifying wealth using information on all households in Rwanda), non-orphans are also less likely than all orphans to live in the households within the lowest national wealth quintiles. Notwithstanding the comparative wealth disadvantage of orphans, however, other important variations in household socioeconomic conditions exist that are conditional on orphan-type. Paternal orphans, for example, are more likely to live in single-parent households than other orphans. This is generally consistent with reported decreases in the remarriage rates among Rwandan widows in the years following the genocide (Newbury and Baldwin 2000). At the same time, the lowest percentage of orphans living in female-headed or single-parent households is observed among maternal orphans, i.e. orphans whose fathers are still alive.

Apart from the socioeconomic disadvantages implied by the higher percentage of single-parent and female-headed households among paternal orphans, Table 1

Table 1 Descriptive characteristics of orphans and non-orphans in the sample

	Non-orphans	Paternal orphans	Maternal orphans	Double orphans
Live in single-parent households	22.7	90.0*	55.0*	66.4*
Female household-heads (%)	20.8	88.2*	22.7*	53.2*
Relationship with household head				
Child	90.3	77.3*	58.1*	—
Grand child	5.1	11.2*	13.6*	33*
Sibling	0.1	1.1*	10.5*	25*
Other relative	2.0	7*	11.7*	28.9*
Non-relative	0.1	1.8*	2.4*	5.5*
Other relationships	2.0	1.6*	3.6*	7.6*
National Wealth Quintile				
First	18.9	25.2*	22.1*	21.0*
Second	18.2	25.3*	19.6*	20.7*
Third	23.3	17.8*	20.7*	20*
Fourth	24.4	16.4*	20.9*	18.8*
Fifth	15.1	15.2*	16.6*	19.6*
Household Size (mean)	7.0	5.6*	6.0*	5.8*
N	60,447	23,093	4,744	5,667

* $P < 0.05$

suggests that these orphans are the most likely to live in households with the lowest levels of wealth. Thus, about half of all paternal orphans lived in households in the two lowest wealth quintiles. Among orphans, paternal orphans are more likely to live with their own biological parent (i.e. be the child of their household head), although both maternal and paternal orphans are still less likely than non-orphans to live with biological parents. Not surprisingly, non-parental living arrangements are more important for double orphans compared to other children. Double orphans are, therefore, the most likely to live with grand parents, siblings, non-relatives, or other relatives.

Disparities in the prevalence of schooling disruption by sex, orphan status, and family structure are presented in Table 2. Several striking patterns are illustrated in these results. First, despite extensive research confirming the buffering effects of two-parent families on children's schooling, Table 2 suggests that these impacts are not consistent across orphan status. Specifically, the prevalence of schooling disruption among paternal orphans and female double orphans is significantly *higher* in two-parent families than in single-parent families. For paternal and double orphans, therefore, more positive schooling outcomes are associated with living in single-parent families and *not* in two-parent families. These associations are antithetical to those observed among non-orphans. As Table 2 demonstrates, non-orphans generally have outcomes consistent with the expectation that children will have more favorable schooling outcomes in two-parent than in single-parent families.

Table 2 Percentage distribution of schooling discontinuity by orphan-status and family-type

	Single-parent households	Two-parent households	All households
Males			
Paternal only orphans	13.9*†	18.8*	14.3*
Maternal only orphans	18.8*	18.4*	18.6*
Double orphans	16.3	19.0*	17.2*
Non-orphans (Ref.)	15.2†	13.0	13.5
Females			
Paternal only orphans	14.0†	21.2*	14.7*
Maternal only orphans	18.4*	18.1*	18.3*
Double orphans	16.4*†	20.2*	17.7*
Non-orphans (Ref.)	14.1	13.3	13.5

* $P < 0.05$ compared to non-orphans within families

† $P < 0.05$ for differences between single-parent and two-parent families within orphan status

In general, the lower prevalence of schooling disruption among orphans in single-parent families seems counter-intuitive. Yet there is a differential relationship between schooling and family structure, that appears to reflect the fact that orphans in two-parent families are more likely to be involved in non-biological relationships (e.g. foster-children and step-children) than children in single-parent families. In fact, further analysis of the data revealed that while only 25% of all orphans in two-parent households were the biological children of their household heads, this percentage was much higher, i.e. 69%, among all orphans living in single-parent households.⁴ These differences are important because, as mentioned earlier, non-biological relationships are known to have a negative association with schooling outcomes especially among orphans.

With regard to schooling disparities among orphans, Table 2 shows that paternal orphans in *all* households have a lower prevalence of non-enrollment (i.e. 14.3% for all males and 14.7% for all females) compared to other orphans. This apparent paternal-orphan advantage is driven by the outcomes of paternal orphans in single-parent families. Given the fact that Table 1 suggests that household socioeconomic disadvantages are higher among paternal orphans, their lower comparative levels of non-enrollment are somewhat surprising. At the same time, maternal orphans have the highest relative levels of schooling disruption among children in single-parent households but not among children in two-parent households. In two-parent households, schooling disparities among paternal, maternal, and double orphans in Table 2 are less distinct.

Multiple Regression Results

A more comprehensive analysis of how family contexts mediate orphan status disparities in schooling disruptions is presented in Table 3. According to these results, child-level demographic factors, i.e. age and sex, do not explain the non-

⁴ Census data only identifies relationships with household heads and not with the spouses of household heads.

enrollment disadvantage of orphans compared to non-orphans (Model 1). Similarly, accounting for child-level demographic controls does not eliminate the higher relative disadvantage of maternal and double orphans previously observed in Table 2. Chi-square tests (bottom panel), however, reveal that there is no significant difference between the estimated likelihood of schooling disruption of maternal and double orphans. Model 1, therefore, confirms that it is among young Rwandan children without living mothers and those with two dead parents that the highest risks of schooling disruption are found.

Although Rwandan orphans live in households with greater socioeconomic disadvantages relative to non-orphans, socioeconomic disadvantage does not account for their higher likelihood of schooling disruption. Thus, when household-level covariates, such as household size and wealth are controlled (Model 2), the relative disadvantage of maternal orphans is only slightly reduced. Nevertheless, the relative risk of schooling disruption among both maternal and double orphans remains. Significantly, paternal orphans continue to have more favorable outcomes relative to other orphans, even after other factors are controlled (Model 2). This finding is generally consistent with the notion that mothers take on an expanded role in their children's schooling after the death of their husbands. Furthermore, given the relatively higher socioeconomic disadvantage of paternal orphans this finding also reflects the fact that among orphans having a living mother is likely to offset the negative association between schooling and household poverty status.

Model 3 examines whether household wealth has a differential association with schooling that is conditional on orphan status. It therefore includes three interaction terms that capture the relationship between household wealth and likelihood of schooling disruption for each orphan-type, relative to non-orphans. Unlike maternal orphans, paternal and double orphans experience significantly higher risks of schooling discontinuity relative to non-orphans as household wealth increases. Orphans with a living father, i.e. maternal orphans, do not experience significantly different risks of schooling disruption than non-orphans as household wealth increases. The significant disparities between non-orphans and other orphans (i.e. paternal and double orphans) in wealthier households are consistent with the expectation that wealthier parents invest more resources on the schooling outcomes of biological children relative to those of non-biological children. Notably, as Model 3 suggests, significant differentials in schooling with increasing household wealth are less likely to occur if orphans have a living father.

Family Structure and Schooling Disparities

By stratifying the sample based on whether or not children lived in single or two-parent families, Table 3 also investigates how contextual influences associated with differences in household structure mediate the relationship between orphan status on schooling. A striking feature of these results is that family structure has a stronger association with the schooling of paternal orphans relative to other children. Significantly, family context is a facilitator and impediment to the schooling of paternal orphans in single and two-parent households respectively.

Table 3 Coefficient estimates from logistic regression models showing disparities in schooling among children in Rwanda

Models	All households			Single-parent households			Two-parent households		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Maternal orphans	0.77***	0.69***	0.50**	0.65***	0.45**	0.62*	0.73***	0.69***	0.22
Paternal orphans	0.17**	0.28***	-0.11	-0.18*	-0.09	-0.16	1.18***	1.18***	-0.02
Double orphans	0.62***	0.65***	0.24	0.22	0.22	0.04	0.97***	1.01***	0.69*
Non orphans (Ref.)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.37***	0.37***	0.37***	0.40***	0.39***	0.39***	0.33**	0.35***	0.35***
Males	0.01	0.01	0.01	0.05	0.04	0.04	-0.01	0.00	0.00
Live in single-parent household		0.21	0.22*		-	-		-	-
Female household head		-0.30***	-0.48***		-0.47***	-0.47***		-0.02	0.04
Age of household head		0.00*	0.00*		0.00	0.00		0.01	0.01*
Wealth index (continuous)		-0.44***	-0.71***		-0.37**	-0.45*		-0.52***	-0.70***
Wealth × Maternal Orphans			0.28			-0.42			0.90
Wealth × Paternal Orphans			0.80***			0.14			2.16***
Wealth × Double Orphans			0.78**			0.40			0.57
No. of children below age 7		0.26***	0.26***		0.34***	0.34***		0.22***	0.22***
Household size		-0.17***	-0.17***		-0.16***	-0.16***		-0.17***	-0.17***
Constant	-9.06***	-7.84***	-7.84***	-9.19***	-7.5***	-7.44***	-8.3***	-7.9***	7.87***
N	93,951	93,951	93,951	40,888	40,888	40,888	53,063	53,123	53,063
Rho	0.85**	0.84***	0.84***	0.85***	0.81***	0.81**	0.83***	0.84***	0.84***
Log likelihood	-34,883	-34,789	-34,777	-15,629	-15,596	-15,595	-19,238	-19,153	-19,140
Chi2 test: Maternal = Paternal	35.2***	16.51***		39.42***	14.94***		6.94**	7.65**	

Table 3 continued

Models	All households		Single-parent households		Two-parent households				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Chi2 test: Maternal = double	1.6	0.13		7.12**	1.97		1.72	2.96	
Chi2 test: Paternal = double	23.5***	17.05***		14.2***	8.65**		1.55	0.90	

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$

In single-parent households (Model 4), for example, paternal orphans are the least likely to drop out of school. This paternal orphan advantage is not significant after differences in household-level attributes such as the characteristics of household heads, the number of young children living in households, and household wealth are controlled (Model 5). Nevertheless, the direction of the coefficient estimate for paternal orphans in Model 5 continues to suggest that they have better outcomes than other children in single-parent household contexts. In contrast, maternal orphans in single-parent households are more likely than other children to experience schooling disruption (Model 4). This maternal-orphan disadvantage persists even after other household-level attributes are controlled (Model 5).

In Model 7, the contextual influences of two-parent households are shown to have a stronger negative association with schooling among paternal orphans than on other children. Chi-square tests, however, indicate that the differences between paternal and double-orphans in two-parent households are not significant. The general disadvantage of paternal orphans in two-parent families is, however, robust and is therefore not explained by differences in other household-level attributes (Model 8). The results also indicate that part of the paternal orphan disadvantage in two-parent households may be driven by the differential impacts of household wealth on paternal-orphans relative to non-orphans. Accordingly, interaction terms for household wealth and orphan status reveal that it is especially in two-parent households (Model 9), and not single-parent households (Model 6), that the disparity between paternal orphans and non-orphans becomes more accentuated as household wealth increases. Significantly, however, the contrasting associations between single-parent and two-parent households and schooling among paternal orphans suggest that the importance of maternal role expansion after the death of a father is generally contextual. In short, while having a living mother is generally beneficial, the presumed significance of mothers for schooling outcomes is mediated by family structure.

Sex of Household Heads and Schooling Disparities

Crucial to the understanding of how orphans fare in single and two-parent households is the question of whether the sex of their household heads affects schooling disparities in both household types. Since single-parent orphans still have one living parent, it is important to examine, for example, whether their outcomes will differ from those of non-orphans in single-parent households if the sex of all single-parents is held constant. Similarly, there is also the question related to how the schooling outcomes of paternal and maternal orphans in two-parent households are affected by whether or not these households are headed by the living parent (i.e. headed by their mother or father) or a proxy parent (i.e. non-related head) of these orphans. Understanding the nature of these differences is important because of the need to clarify whether association conditional on differences in family structure are driven by altruistic relationships.

In Table 4, Panel A, estimates are presented for the likelihood of schooling disruption, by orphan status, in single-parent and two-parent households stratified by the sex of household heads. These models only include additional controls (not

Table 4 Disparities in schooling discontinuities by orphan status, sex of the household head, and family structure

Models	Single-parent household		Two-parent household	
	Male Head (1)	Female Head (2)	Male Head (3)	Female Head (4)
Panel A : (Other controls: child age and sex)				
Maternal	0.13	0.79***	0.73***	2.95
Paternal	0.58*	−0.17*	1.22***	0.42
Double orphan	0.08	0.18	0.94***	4.24***
Non-orphan (Ref.)	(0.00)	(0.00)	(0.00)	(0.00)
Chi 2 Test: Maternal = Paternal	2.46	26.89***	8.05***	1.26
Chi 2 Test: Maternal = Double orphan	0.03	8.42**	1.41	0.25
Chi 2 Test: Paternal = Double orphan	2.41	8.95**	2.50	4.59*
Panel B: (Other controls: child age, sex, child of H. Head)				
Maternal	0.34	0.34***	0.36**	2.38
Paternal	−0.21	−0.09	−0.18	0.47
Double orphan	−0.71*	−0.28*	−0.48**	3.71
Non-orphan (Ref.)	(0.00)	(0.00)	(0.00)	(0.00)
Chi 2 Test: Maternal = Paternal	2.7	4.46*	8.19**	0.6
Chi 2 Test: Maternal = Double orphan	11.12**	8.61**	18.39***	0.26
Chi 2 Test: Paternal = Double orphan	2.42	1.87	3.01	2.67

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$

shown) for child age and sex. Panel B of Table 4 presents similar estimates of the association between orphan status on schooling. However, its estimated coefficients are derived from models that also control for age, sex, and whether or not orphans and non-orphans are the children of their household heads.

Among children in single-parent household headed by females (Panel A, Model 2), paternal orphans, i.e. orphans with a living mother, have better outcomes compared to other orphans and non-orphans. This paternal-orphan advantage is driven by the fact that in such households, paternal orphans are more likely to be the children of their household heads. Accordingly, when we control for whether or not orphans and non-orphans are the children of their household heads (Panel B, Model 2), the significance of the paternal orphan schooling advantage is eliminated. For both maternal and paternal orphans, however, schooling outcomes are comparatively worse when the sex of their household head is the same as the sex of their dead parent. Thus, among paternal orphans, living in male-headed two-parent households, for example, is associated with comparatively larger schooling disadvantages (Panel A, Model 3), but not in those headed by females (Panel A, Model 4). Accounting for whether or not children have a biological relationship with their household heads (Model 3, panel B) completely eliminates the paternal orphan disadvantage in male-headed two-parent households. In short, two-parent

households are likely to be worse for paternal orphans relative to other children because the former are more likely to lack biological relationships with the male head of such households.

While the correspondence between the sex of a single-parent household head and that of a living parent is associated with greater schooling advantages for paternal orphans relative to all children this relationship does not appear to hold for maternal orphans. In other words, living in male-headed single-parent households does give maternal orphans a schooling advantage over other children (Panel A, Model 1). At the same time, maternal orphans experience a higher likelihood of schooling disruption in single-parent households headed by females (Panel A, Model 2). With regard to double-orphans, the coefficients in panel A suggest their schooling outcomes are less favorable than those of non-orphans across family contexts, regardless of the sex of their household heads. Unsurprisingly, however, this disadvantage is generally explained by the lack of biological relationships between double-orphans and their household heads (Models 1-3, Panel B).

Other Determinants of Schooling among Orphans

Restricting the analysis only to the sample of orphans, Table 5 further examines the extent to which factors such as sibship size, specific types of relationships between orphans and their household heads, and other factors affect disparities in schooling disruption. Furthermore, Table 5 also investigates whether the differential relationships between the sex of household heads on orphans schooling observed in the previous section are robust to the possible influence of household socioeconomic indicators.

Orphans are generally more likely to drop out of school as the number of children below age 7 living in their household increases. This finding has two important implications. The first is that because children below age 7 are below the official school entry age in Rwanda (ORC Macro 2004), it provides confirmation for the presumed schooling impediment associated with family childcare responsibilities (Model 2). Wealth dilution explanations are unlikely to account for this relationship since household wealth is concurrently controlled. Secondly, within households, children below age seven are likely to include new children born to the parents of maternal or paternal orphans who remarried after the genocide.⁵ Thus, the negative association between schooling and living with such children may also reflect the negative impacts of competition for other parental resources among orphans and these new younger children.

Model 1, however, clarifies that the presumed negative relationship between children below age seven and orphans' schooling is mediated by orphan-type. Accordingly, interaction terms examining the significance of larger young-sibship sizes among orphans indicate that maternal, and to some extent paternal orphans, are less likely than double orphans to be negatively affected by increases in the

⁵ At the earliest, children below age seven in the 2002 were born in 1996, about a year and a half after the 1994 genocide. If we allow a nine-month conception period for children in new post-genocide relationships, this control is likely to capture almost all new young children born to widowed parents who remarried after the genocide.

Table 5 Coefficient estimates from logistic regression models showing the predictors of schooling disruption among orphans in Rwanda

Models	House-hold type									
	All				Single-parent				Two-parent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Maternal only orphans	0.25	-0.16	0.40*	0.43*	0.14	0.52	-0.48*	0.63		
Paternal only orphans	-0.15	0.37*	0.21	-0.14	0.58	0.53	0.43	0.3		
Double orphans (Ref.)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		
Age	0.47**	0.43***	0.41***	0.40***	0.40***	0.39***	0.63***	0.57***		
Males	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	0.01	-0.05		
Relationship with household heads										
Non-relative			3.91***			3.92***		6.18***		
Other relationships			1.69**			1.54***		2.64***		
Sibling			0.53**			0.69**		0.4		
Other relative			0.41**			1.54***		0.82*		
Grand child			0.24			0.02		1.22**		
Child (Ref.)			(0.00)			(0.00)		(0.00)		
Live in Single-parent household	-0.15		0.1			-				
Female household Head	-0.68**	-0.46*	-0.41*	-0.50**	-0.35	-0.33	3.72***	4.13		
Maternal × Female head		0.71**	0.22		0.41	0.12	-1.34	-3.72		
Paternal × Female head		-0.76***	-0.08		-0.94*	-0.36	-4.63*	-3.68		
Age of household head	-0.01	0.00	0.00	0.00	0.00	0.01	-0.01	-0.01		
Wealth index	-0.53**	-0.21	-0.42**	-0.58***	-0.34*	-0.48**	0.29	-0.13		
No. of children below age 7	0.33***	0.39***	0.38***	0.00	0.39***	0.42***	0.43***	0.39**		
Maternal × child. below 7	-0.30*			-0.31						
Paternal × child. below 7	-0.09			-0.33*						

Table 5 continued

Models	House-hold type							
	All				Single-parent			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household size	0.00	-0.17***	-0.17***	0.00	-0.16***	-0.17***	-0.20***	-0.18***
Constant	-9.49***	-7.73***	-8.42***	-7.78***	-7.57***	-8.36***	13.08***	-13.35***
<i>N</i>	33504	33504	33504	27162	27162	27162	6342	6342
Rho	0.90**	0.84**	0.83**	0.83***	0.83***	0.83*	0.95***	0.95***
Log Likelihood	-13269	-13279	-13102	-10,396	-10371	-10287	-2883	-2786

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$

number of younger children within households. Although the patterns of association are similar for paternal and maternal orphans in single-parent households (Model 4), the association is only significant among the former. There are no significantly different results on the relationship between schooling and sibship size, by orphan type, in two-parent households.

Interaction terms are also included in Model 2 to test the extent to which the suggested impacts of having female household heads among paternal and maternal orphans (Table 4) are robust to the influences of household size, wealth, and the number of children below age 7 living within households. In general, the robustness of the differential patterns of association among female household heads is confirmed. Furthermore, Models 5 and 7 confirm that the positive association between schooling and having a female household head among paternal orphans is consistent across family structure. However, they also show that the respective relationship between schooling and having female household heads among maternal orphans is not significant after other household-level factors are controlled.

Significantly, Table 5 also shows a strong association between degrees of relatedness between orphans and their household heads and schooling disruption. Also underscored in these findings is the important role of the extended family in caring for the needs of orphans in Africa that has been reported in other studies (e.g. Foster 2000). Accordingly, Table 5 shows that orphans do have better schooling outcomes when they have an extended familial relationship their household head (e.g. grandchild or other relatives of household heads) than when they do not (i.e. not related to their household head). Additionally, the disadvantage of non-related orphans is also mediated by family structure since they have even less favorable outcomes compared to other orphans in two-parent (Model 8) than in single-parent (Model 6) contexts. Unlike other previous studies, there is no significant sex difference in the likelihood of schooling disruption among orphans. Unsurprisingly, however, schooling discontinuities decrease as household wealth increases (e.g. in Model 1). This wealth effect is more important among orphans in single-parent rather than in two-parent households.

Discussion and Conclusions

A decade and a half after the genocide in Rwanda, lingering questions remain about the effects of this crisis on subsequent population processes. This study, therefore, contributes towards expanding our understanding of post-genocide Rwanda, by locating the schooling outcomes of orphans and non-orphans within the context of their association with familial contexts. Given the exceptionally high rates of orphanhood in Rwanda and several other African countries, the limited focus on whether the relationship between schooling and family structure mediates orphan schooling disparities is somewhat surprising. A broader conceptual contribution of this study is that it situates the possible influences of single and two-parent families within the larger context of degrees of relatedness between children and their household heads.

Despite orphans' higher overall risk of dropping out of school, the study finds that the disadvantage of orphans associated with differences in family structure, and for single parent-orphans, the sex of their surviving parent. Family structure is associated with schooling discontinuities among orphans in ways that deviate from its known relationship with children's schooling outcomes. Accordingly, while the percentage of non-orphans experiencing schooling discontinuities is lower in two-parent families but higher in single-parent families, the reverse is true among orphans in such families. On the basis of these differentials, the intuitive expectation that disparities in altruistic investments are smaller in single-parent families represents a plausible explanation of these findings.

Although two-parent family contexts have a stronger negative association with schooling disruption among all orphans, paternal orphans are less likely to experience such disruptions than both their non-orphan and other orphan counterparts in single-parent families. While the expanded maternal role that follows the death of a father likely explains the advantage of paternal orphans over other orphans in single-parent households, the reasons for the schooling advantage of paternal orphans relative to *non-orphans* in such households are not quite clear (Table 4). One plausible hypothesis is that the higher risk of conflict between the residential parent of children in single-parent families and their non-residential parent (Amato 2005), negatively impacts stress-related factors which can, in turn, affect *non-orphan's* schooling outcomes. In spite of the paternal-orphan advantage in single-parent households, all other orphans still continue to be more likely to experience schooling disruptions than non-orphans in single-parent families. More importantly, because paternal orphans live in the least favorable socioeconomic conditions (Table 1) but are still the least likely to drop out of school in single-parent families (Models 1 and 2, Table 4) this study argues that among orphans, having a living mother possibly offsets the negative impacts of household poverty on school enrollment outcomes.

The disparate outcomes of children in both family types are consistent with previous research on the schooling outcomes of children living with biological mothers, but not with biological fathers, in single and two-parent family contexts. Nord and West (2001), for example, argue that while living with a biological mother in a single-parent family has a positive impact on schooling, having a biological mother and a non-biological father in two-parent families negatively affects children's schooling. Reinforcing this argument is the study's finding that paternal orphans in Rwanda have better schooling outcomes in single-parent families because their household heads in such families are likely to be their own biological mothers. In two-parent families, the findings also suggest that their disadvantage is associated with the fact that although they have lost their biological fathers, their household heads in two-parent households are more likely to be males. Part of the paternal-orphan disadvantage in two-parent families may therefore be explained by the fact that non-biological fathers are less likely to provide for children's schooling expenditures and help with their homework, which can lead to negative schooling outcomes (Anderson et al. 1999). Similarly, since biological mothers in two-parent families are less involved in the education of their biological children from previous relationships who also live with her (Nord and West 2001), the paternal-orphans

disadvantage in such contexts may be exacerbated by maternal role reductions among the mothers in blended two-parent families.

Notwithstanding the heuristic significance of these findings the extent to which they are replicable in other contexts will require additional scholarly attention. In particular, unprecedented mortality during the Rwandan genocide generated rates of orphanhood that are currently unmatched even by countries with a high prevalence of HIV/AIDS. Consequently, the question of whether the scale of orphanhood affects familial responses to orphans should be further examined. Furthermore, familial responses to orphans may also differ in Rwanda than in high HIV/AIDS mortality countries if orphans in these countries are viewed differently (e.g. as a result of the social stigma of HIV/AIDS) than their counterparts in Rwanda.

Significantly, however, many conceptual relationships found in the analysis are consistent with previous studies on issues such as the significance of altruism and the role of blended families on the welfare of children (Ginther and Pollak 2004; Sear et al. 2002). In this regard, these results provide a useful illustration of how these factors operate in a uniquely Rwandan context to affect the welfare of orphans. At the same time, these findings also have other implications for policy and future research. Although two-parent families have traditionally been known to provide positive contextual influences on the outcomes of children, better strategies need to be developed to ensure that orphans experience comparable schooling outcomes as their non-orphan counterparts in such families. Effective support systems are also needed to build upon the slight advantage of orphans in single-parent families, since despite their better disruption outcomes in single-parent families, the schooling outcomes of maternal and double-orphans are still worse than those of non-orphans in single-parent families (Table 3). Finally, future research needs to further examine whether differences in family contexts affect other welfare indicators among orphans. Comparisons of orphans in pre and post-genocide societies will also illuminate our understanding of how these contexts operate before and after civil conflicts. As these issues are illuminated in future research, the impacts of family processes on the outcomes of orphans will be better understood and enhance our comprehension of the role of family contexts on the welfare of orphans.

Appendix 1

See Table 6.

Table 6 Distribution of children in the sample in single and two-parent households, by orphan status

	Single-parent Household	Two-parent household
Maternal orphans	2,610	2,134
Paternal orphans	20,788	2,305
Double orphans	3,764	1,903
Non-orphans	13,726	46,721
Total	40,888	53,063

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