YOUNG LIVES STUDENT PAPER

No Time to Thrive: Armed Conflict and Early Language and Cognitive Development in Ethiopia and Peru

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The data used in this paper comes from Young Lives, a longitudinal study investigating the changing nature of childhood poverty in Ethiopia, India (Andhra Pradesh), Peru and Vietnam over 15 years. For further details, visit: www.younglives.org.uk.

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Young Lives
An International Study of Childhood Poverty

NO TIME TO THRIVE: ARMED CONFLICT AND EARLY LANGUAGE AND COGNITIVE DEVELOPMENT IN ETHIOPIA AND PERÚ

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ABSTRACT

Experts unanimously agree that armed conflict is harmful to children. However, few studies exist that examine the link between armed conflict and language and cognitive development in the early years. This paper uses the Young Lives data from Perú and Ethiopia to analyze the relationship between armed conflict and early language and cognitive development using two standardized measures, the Peabody Picture Vocabulary Test (PPVT) and the Cognitive Development Assessment-Quantitative (CDA-Q), both administered at or near age 5. The results show that after holding a variety of child, family, and community factors constant, living in a region of the country that has experienced war more recently is associated with lower receptive language (PPVT) scores in Perú, while intensity of the conflict is associated with lower PPVT scores in Ethiopia. Attending preschool and higher levels of family wealth are strong predictors of higher PPVT scores. These findings suggest that children living conflict or post-conflict situations are particularly vulnerable to language disadvantages that could impact opportunities throughout the lifespan. Therefore, early childhood development should be prioritized in emergencies and post-conflict reconstruction, with a special emphasis on equity to ensure generations of rural and poor children in conflict-affected areas are given opportunities to thrive.

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Introduction

An estimated one billion children under the age of 18 live in a country affected by armed conflict, and approximately 300 million children younger than age 5 live in conflict-affected areas (UNICEF, 2009a). The consequences of armed conflict are widespread. First, children can experience war firsthand through witnessing violence, being injured or killed in combat, and being recruited as a child soldier. If a child is fortunate enough to live in an area outside the immediate vicinity of the conflict, she may have a family member such as a parent or older sibling who leaves to fight in the war. This may result in a decrease in family income, loss of a family member, and/or an increase in family stress. Even if the child's family remains intact during the conflict, the state will likely use all available resources to fight the war and cut back on education, social, and health services. These factors lead to what Marshall & Gurr (2005) call the "conflict-poverty trap," whereby political instability leads to a breakdown of state-provided services, which in turn leads to increasing poverty, and, in turn, produces further instability.

The United Nations Children's Fund acknowledges that "the impact of armed conflict on children remains difficult to fully ascertain. The information available is patchy, and it varies in both specificity and accuracy" (UNICEF, 2009a, p. 18). Children are renowned for being resilient to negative events early in life, but how far does this resiliency extend? Using data from the Young Lives Project, this paper will address the following question: Do children living in conflict-affected areas exhibit lower levels of language and cognitive development? While these atrocities are undoubtedly damaging to children and adolescents, it may be the youngest children who experience the most irreversible consequences of war. How are the youngest children

faring in war time and in the wake of armed conflict? This question has important policy implications for humanitarian relief and continuity of social protection during conflict. If these negative early experiences do indeed impact child cognitive development, donors and humanitarian relief programs should focus on strategies to ameliorate this damage as soon as possible.

Literature Review

An estimated 200 million children younger than age 5 are not fulfilling their developmental potential due to poor nutrition, disease, and under-stimulating environments (Grantham-McGregor, et. al., 2007). Much of the research on child development and conflict or violence has focused on the negative effects on physiological health and behavior or mental health (UNICEF, 2009a; Obel, 2003). Since both physical and mental health are linked to language and cognitive development (Engle et. al. 2007), it is reasonable to assume that violent conflict will also have a negative effect on these areas of development. In my research and consultation with experts in the field I was unable to find any study that directly addressed the relationship between conflict and language and cognitive outcomes. However, the literature reveals three main pathways in which conflict may affect the language and cognitive development of young children; environmental stress, family resources, and state resources.

Environmental Stress

Experiencing armed conflict firsthand can be detrimental to a child's brain development. Shonkoff & Phillips (2000) find that chronic, unrelenting stress in early childhood can be toxic to the developing brain. When a child is under extreme stress

due to fear, abuse, or exposure to violence, the body releases stress hormones. While these hormones are a natural part of the human adaptive response to stress and can mitigate the damage caused by his environment in the short-term, it has a toxic effect on the brain if present for long periods of time. This damage can be very harmful to the child's cognitive development, behavior, and health. Children exposed to violence often develop depression, anxiety, and Post Traumatic Stress Disorder (PTSD) (Shonkoff & Phillips, 2000; Obel, 2003).

Living in a conflict-affected area causes children and adults to be under constant stress and fear (UNICEF, 2009a). Many children and families are forced to leave their homes and countries during conflict; the UN High Commission on Refugees (UNHCR) (2010) estimates that in 2009 there were approximately 10.4 million refugees and 15.6 million internally displaced persons (IDPs) worldwide. For pregnant mothers, prenatal stress is linked to child mental health problems such as Attention Deficit-Hyperactivity Disorder (ADHD), depression, and even schizophrenia (Obel, 2003). The hyper-vigilant state caused by stress is also linked to permanent, negative effects in the brain chemistry of young children which affect behavior and learning (Shonkoff et. al., forthcoming).

Family Resources

Numerous studies, mostly in the industrialized world, point to the early years as predictors of later performance, since early childhood is a time when brain elasticity offers both opportunities for great learning and the potential for lasting detrimental effects (Fox, Levitt, & Nelson, 2010; Shonkoff & Phillips, 2000. Grantham-McGregor, et. al., 2007). Early events, beginning prenatally and continuing throughout the early years, can have long-lasting impacts on brain development (Shonkoff, Richter, van der Gaag, & Bhutta, forthcoming).

When members of a child's family leave the household because of armed conflict, family resources can be greatly constrained and the caregiving process for children age 5 and younger can be upset (UNICEF, 2009a). Caregiving behaviors that are critical to a child's healthy development, such as breast-feeding, diagnosing illnesses, weaning, stimulating language and cognitive capacities, and providing emotional support (Longhurst & Tomkins, 1995), are often disrupted in times of conflict.

Living in poverty is also associated with cognitive development. Children living in poverty have higher incidences of developmental delays, learning disabilities, and grade repetition, and are more likely to be suspended, expelled, and drop out of high school than their more advantaged peers (Brooks-Gunn & Duncan, 1997). Furthermore, children who live in poverty during their preschool and early school years have lower rates of school completion than children and adolescents who experience poverty only in later years (Brooks-Gunn & Duncan, 1997).

Families living in poverty have decreased access to health services, which can lead to an increase in child health problems (Paxson & Schady, 2007). Furthermore, poor families have difficulty providing enough food for their children, and breastfeeding mothers also pass along poor nutrition to their babies (UNICEF, 2009b). Malnourished children tend not to reach their full potential cognitively or physically (UNESCO, 2011; World Bank 2006). A child's weight is associated with cognitive outcomes, with children who are underweight showing disadvantages in cognitive ability (Grantham-McGregor, et. al, 2007).

In the case of death of a family member, the outcomes for children can be especially grim. A study using the Young Lives data in Ethiopia found that children

whose mothers had died were 20% less likely to enroll in school, 21% less likely to be able to write, and 27% less likely to be able to read (Himaz, 2009).

State Resources

The resources expended by a state during armed conflict can lead to an interruption and disintegration of social services, including education and health services (Vargas-Barón & Alarcón, 2005, UNICEF, 2009a). In fragile states, this can lead to an economic collapse. Development is halted when conflict begins, and conflict-affected countries and territories consistently lag behind non-conflict countries on progress towards the Millennium Development Goals (MDGs).[1] Additionally, the impacts of infectious disease and natural disasters tend to be higher in countries experiencing armed conflict as resources are stretched thin (Vargas-Barón & Alarcón, 2005, UNICEF, 2009a). These social and economic consequences trickle down to families and children, increasing poverty rates (UNICEF, 2009a).

UNESCO (2011) identifies 21 poor countries that spend more on military expenditures than primary education. In Pakistan, military expenditures are seven times higher than primary education, followed by Angola (almost five times higher), Chad, Guinea-Bissau, and Afghanistan (each four times higher). In Ethiopia, military expenditures are more than double expenditures for primary education.

A break down in state-provided education services during conflict can make it impossible for students to ever catch up, and these effects can endure for generations (Vargas-Barón & Alarcón, 2005; UNESCO, 2011). There are 28 million children of

[1] The Millennium Development Goals (MDGs) are eight development goals that all UN member nations have agreed to meet by 2015. The eight goals are: 1) eradicate poverty and hunger; 2) achieve universal primary education; 3) promote gender equality and empower women; 4) reduce child mortality; 5) improve maternal health; 6) combat HIV/AIDS, malaria and other diseases; 7) ensure environmental sustainability; and 8) develop a global partnership for development. Source: UNESCO, 2011.

primary age who are out of school in conflict-affected countries. Not only are children in conflict-affected countries less likely to enroll in primary school, they also are more likely to drop out (UNESCO, 2011). The cycle continues as children become parents: maternal education is correlated with cognitive development as parents are a child's first teachers, and the language children hear in the home has a profound effect on children's early language acquisition (Paxson & Schady, 2007; Hart & Risley, 2003).

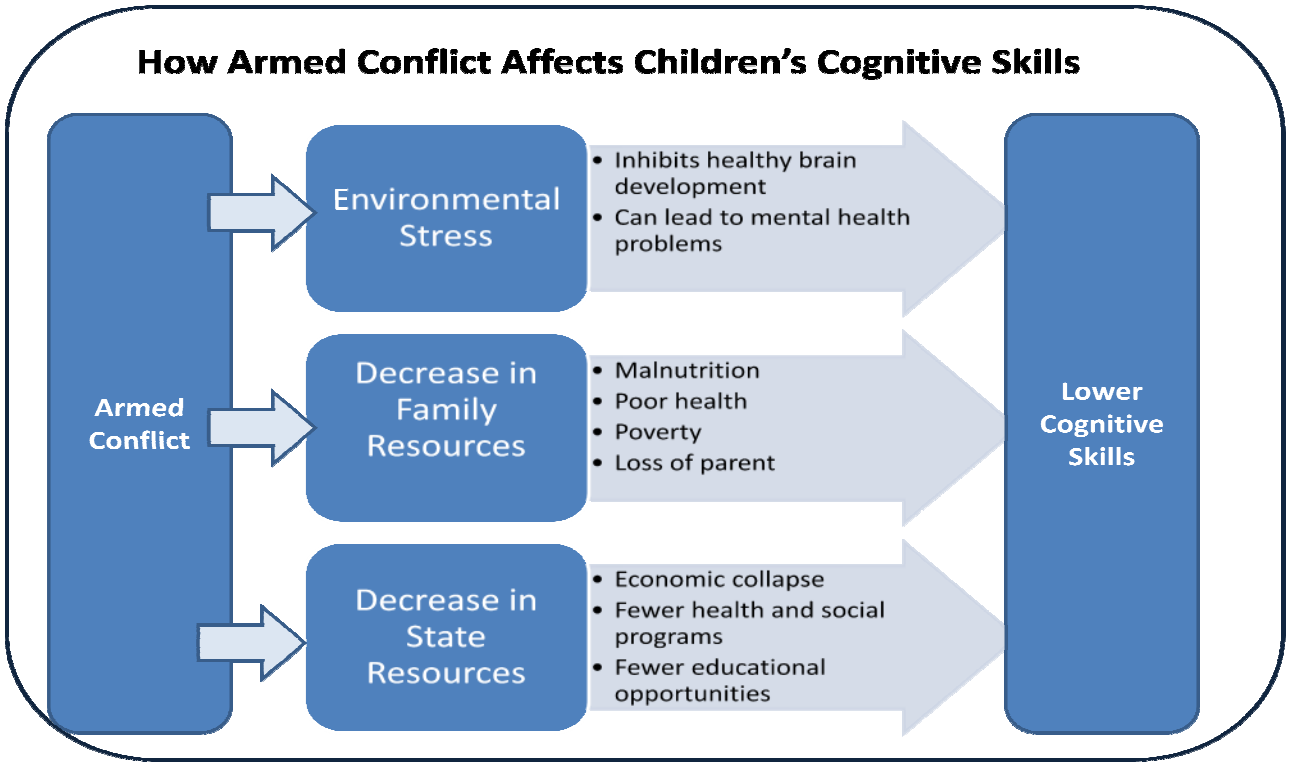
Conceptual Model and Hypothesis

Low levels of early language and cognitive ability can have lifelong consequences. Currie and Thomas (1999) found that early cognitive ability has significant effects on future educational and labor market outcomes. They also found that low-SES children reap both larger gains from having high age 7 test scores and smaller losses from having low age 7 test scores. Not only are low language and cognitive abilities damaging for the individual children affected by conflict, but they can be detrimental to the development of the state. Hanushek and Woesmann (2009) found that levels of cognitive achievement and learning are a better predictor of economic growth in developing countries than the number of students enrolled in school.

Child development is a complex, dynamic process that is determined by a variety of genetic and environmental factors, with the first five years of life being critical to later development. When a child lives under conditions of extreme adversity, her short-term physiological and psychological adjustments that allow her to survive can cause a range of health and developmental problems later on (Thompson, 2001). Armed conflict also brings a host of negative externalities on the citizens of a country

(UNICEF, 2009a; UNESCO, 2011). Figure 1 shows the conceptual relationship between armed conflict and child cognitive outcomes.

Figure 1: Conceptual Model



Given the conceptual relationship and prior research on the links between conflict and development, I hypothesize that living in regions where there has been recent conflict has a significant negative impact on child language and cognitive development. Therefore, I predict that, the closer in time an armed conflict occurred in a region, the lower children's language and cognitive development scores will be, holding child, family, and community factors constant. I also predict that the intensity of a conflict is associated with language and cognitive development, with children who live in regions with more intense conflicts scoring lower on measures of language and cognitive ability.

Background

Large-scale data on language and cognitive development is limited in developing countries, especially countries affected by conflict. Therefore, to examine the relationship between conflict and cognitive development, it was necessary to find high-quality research studies taking place in countries where there was recent conflict. The Young Lives data set, a longitudinal study of children living in poverty in Ethiopia, India (Andhra Pradesh), Perú, and Viet Nam, offers comprehensive child- and family-level data in developing countries. Two of these countries, Ethiopia and Perú, experienced armed conflict during the past 15 years.[2] The conflict in these two countries varied by region, with active conflict occurring in some regions but not in others. This allows for analysis of the relationship between child development and conflict within the two countries. General statistics on Ethiopia and Perú, including data on recent conflicts, are described below.

Ethiopia

In Ethiopia, children and families face multiple challenges in early childhood and beyond. Children in Ethiopia consistently score low on a range of developmental indicators and child outcomes (World Bank, 2010; UNESCO, 2010). In 2005, 78% of Ethiopians lived on less than $2 USD per day and 39% lived on less than the international poverty line of $1.25 USD per day (World Bank, 2010). The under-five mortality rate is 109 per 1,000 births[3] and 20% of Ethiopian infants born with low-birth

[2] While India has engaged in armed conflict during the past 15 years, notably against Pakistan over the disputed Kashmir region, the Young Lives data focuses on the State of Andhra Pradesh, which has experienced no significant armed conflict since 1947. Source: Uppsala Conflict Database, 2010.
[3] By comparison, the under-5 mortality rate is 6 deaths per 1,000 births in industrialized countries and 65 deaths per 1,0000 births across all countries.

weights (UNICEF, 2009b).[4] Educational attainment in Ethiopia is among the lowest in the world. Only 36% of adults and 50% of youth are literate (UNESCO, 2010).[5] This is partially due to low levels of primary and secondary school enrollment. The net enrollment rate for primary education is 71% and the net enrollment rate for secondary education is 24% (UNESCO, 2010).

Two significant armed conflicts occurred between 1980 and 2007 in the regions where Ethiopian study children lived. The largest was a border dispute between Ethiopia and neighboring Eritrea (Uppsala Conflict Data Program, 2011; Beenher, 2005). In 1998, Eritrean troops entered an area under Ethiopian control. Because of the deteriorating relations between the two countries, the event triggered an all out war that lasted from 1998 to 2000. A peace accord was signed in 2000; however, the two countries have failed to agree on the demarcation of the border. Between 70,000 and 100,000 lives were lost in this conflict (ICG, 2003; Marshall, 2010).

The second recent conflict in Ethiopia is the Oromo independence movement. Oromia is the largest region in Ethiopia, and the Oromo ethnic group makes up around half of the Ethiopian population. Led by the Oromo Liberation Front (OLF), the conflict has been ongoing since the rebel group launched an armed struggle for independence in 1973. An estimated 2,000 lives were lost in this conflict (Marshall, 2010).

Perú

In Perú, children fare better than children in Ethiopia. In 2007, 18% of citizens lived on less than $2 USD per day and only 8% lived on less than $1.25 USD per day (World Bank, 2010). The under-five mortality rate in Perú is 24 per 1,000 births and 8%

[4]This figure can be compared with the world average of 16%.
[5] By contrast, the average literacy rates in developing countries are 80% (adult) and 87% (youth).

of Perúvian infants are born with low-birth weights (UNICEF, 2009b). Perú has very high literacy rates—90% of adults and 97% of youth are literate (UNESCO, 2010). The net enrollment rate for primary education is 96% and the net enrollment rate for secondary education is 76% (UNESCO, 2010).

In Perú, intrastate conflict has been ongoing since 1965 (Uppsala Conflict Data Program, 2011). Two Marxist revolutionary groups, the Sendero Luminoso, (or "Shining Path") and the Movimiento Revolucionario Túpac Amaru (MRTA) emerged in the early 1980s, engaging in a violent insurgency that was accompanied by human rights abuses by all sides. From 2000 to 2006 the conflict was dormant, but in 2007 the Sendero Luminioso movement became active again and the struggle continues today. A conservative estimate of lives lost is 30,000, with many civilian casualties (Marshall, 2010).

The other recent conflict affecting citizens in Perú was the Perú-Ecuador border dispute in 1995. This dispute primarily occurred in the Amazonas region. Approximately 1,000 battle related deaths occurred during this conflict (Uppsala Conflict Data Program, 2011; Marshall, 2010).

Data and Methods

This section describes the data set, measures, and empirical model used for my analysis.

Data Source

This paper uses child- and family-level data from Young Lives: An International Study of Child Poverty. Young Lives is core-funded by UK aid from the Department for International Development (DFiD). The data set is maintained at Oxford University and is partially funded by the Netherlands Ministry of Foreign Affairs. Young Lives is an

international study of childhood poverty tracking 12,000 children in Ethiopia, India (in the state of Andhra Pradesh only), Perú and Viet Nam over a 15-year period. Approximately 3,000 children per country are tracked in the dataset. The data set contains extensive data on two cohorts of children; the *younger cohort* and the *older cohort*. For the *younger cohort*, a household survey was conducted when the children were approximately 1 year old (in 2002) and again when the children were 4-6 years old (in 2006-7). For the *older cohort*, a household survey was conducted when the children were approximately 8 years old (in 2002) and 12-13 years old (in 2006). Attrition was very low for this study: only slightly more than 4% of the younger cohort for both Perú and Ethiopia dropped out of the study between Round 1 and Round 2. Table 1 shows the available Young Lives survey data, with the data used for this analysis in bold.

Table 1. Young Lives Survey Rounds and Cohorts

Survey Round	Year	Younger Cohort Age	Older Cohort Age
Round 1 survey	2002	Approximately 1 year	Approximately 8 years
Round 2 survey	2006-7	**Approximately 5 years**	Approximately 12 years

The dataset includes child assessment data using standardized measures,[6] as well as parental perceptions of school readiness and school quality. In addition, it includes rich demographic, economic, and community-level data. For my analysis, I focus on the younger cohort during the second round of data collection in 2006/2007 when the children were between 4 and 6 years old. The analysis for this paper focuses on children in the younger cohort for two reasons. First, early language and cognitive development in conflict is an area that is under-researched and has important policy implications. Second, studying children before school entry mitigates the need to control for

[6] Child assessments were not conducted with 1-year-old children.

additional variables that may bias language and cognitive outcomes. For example, it is more difficult to control for the quality of a child's education or a child's experience in the labor market.

The project used a sentinel site surveillance methodology to select participating households. Using this method, households were randomized within each sentinel site, which was a village or community chosen for having high numbers of children living in poverty. The study designers chose sentinel sites to construct a data set that reflected the regional, cultural, and linguistic makeup of each country.

Measures

This section describes the variables used in the model and the way in which each is measured.

Dependent Variable

The dependent variables for this analysis are child language and cognitive scores. Child language was measured by the Peabody Picture Vocabulary Test (PPVT), a standardized assessment of receptive language. Cognitive ability was measured by the quantitative subscale of the Child Development Assessment (CDA-Q). The third edition of the PPVT (PPVT-III) was used in Ethiopia. The Spanish version of the PPVT-R, the Test de Vocabulario en Imagenes Peabody (TVIP), was used in Perú. The tests were then translated into each country's main languages by the local team and verified by a local expert before the pilot study conducted prior to the second round of data collection (Cueto, Leon, Guerrero, & Muñoz, 2009). Raw scores are used instead of standardized scores for the PPVT because the measure was not normed in the countries examined in this study. [7] Because of the differences in these tests across countries, researchers

[7] The PPVT-III contains 204 possible items and the TVIP contains 125 possible items.

familiar with the data set do not recommend comparing the PPVT and CDA-Q scores across countries or combining the data sets for empirical analysis (Cueto, et. al. 2009). I follow this advice in my analysis.

The data set also included a question on whether the conditions for administering the PPVT or CDA-Q were adequate. Conditions could be inadequate due to interruptions, lack of flat workspace, or a distracting environment. All observations for which the conditions were inadequate were dropped from the analysis. A total of 262 observations were dropped from the Ethiopia data set and 146 observations were dropped from the Perú data set. In Perú, these observations were evenly distributed among the 14 regions in the study; however in Ethiopia, assessment conditions in the Oromia region were disproportionally inadequate when compared to the other regions in the study. The implications of this are discussed in the findings section of this paper.

Independent Variables

Time since conflict. The year of the last armed conflict in the region was determined through a search of multiple conflict databases and review by several regional conflict experts for accuracy.[8] The number of years between the time the Young Lives survey was administered to the second cohort and the last armed conflict were calculated for each child. The variable includes armed conflicts that took place any time between 1980 and 2007.[9]

[8] Data on the last conflict were collected from the Uppsala conflict database, Center on Sustainable Peace, Global Security, and the Truth and Reconciliation Commission of Perú reports, and validated by experts in the field of global security.

[9] Regions with no armed conflict during this period were coded as having a last conflict in 1980. The year 1980 was chosen as a floor for this variable to ensure that the period of analysis at least covers the adult lives of the parents of the study children. In the regions with no conflict since 1980, further research identified that no significant conflicts had occurred since 1947. The year 2007 is the ceiling because it the last year in which data were collected for this cohort.

Recent conflict. Time since conflict is also measured by a binary variable for recent conflict, coded as 1 if there was conflict since 1995 and 0 if there was no conflict since 1995.

Intensity of last conflict moderate/high. I also considered the intensity of the most recent conflict. For this I consulted the "Major Episodes of Political Violence" list by Marshall (2010). This list assigns magnitudes to conflicts on a 1-10 scale based on the societal effects of the conflict. Conflicts associated with the regions in this study ranged from a level 1 (just over the threshold of 1,000 battle-related deaths to qualify for Marshall's list) to a level 5 (the Ethiopia-Eritrea border dispute in 1998-2000).[10] The magnitude represents the impact on the country as a whole; therefore, while each region likely experienced the conflict differently, all regions involved in the conflict are coded at the same level. Among the regions in my sample, all conflicts were coded at a level of 1, 3, or 5. A conflict was considered to be moderate/high if it was a level 3 or above. Regions with no conflict were coded as 0.

Battle-related deaths, total in last conflict (000s). The number of battle-related deaths is another proxy for conflict intensity. Data on battle-related deaths was not accessible by region, so the number of deaths for the entire conflict is used as another way to measure conflict intensity.

Table 2 shows the conflicts affecting all regions where Young Lives study children live in Perú and Table 3 shows the conflicts affecting the regions in Ethiopia

[10]The highest magnitude of conflict recorded on this scale, which includes all conflicts since 1946, is a level 7. Three conflicts were rated a level 7: the Viet Nam War of 1958-1975; the Afghanistan civil war of 1978-2002; and the ethnic violence targeting Tutsis in Rwanda, ongoing since 1994. The Ethiopian-Eritrean ethnic conflict that occurred from 1974-1991 and concluded with Eritrean independence was rated a level 6.

where they study children live. Data collection for Round 2 was completed in 2007, so I did not consider conflicts occurring after that period.[11]

Table 2. Conflicts affecting Young Lives regions in Ethiopia, 1980 to 2007

Place	Year	Conflict	Battle Deaths (entire conflict)	Intensity
Oromia	2007	Oromo Liberation Front	2,000	1
Tigray	2000	Eritrea/Ethiopia war	100,000	5
SNNP	None since 1980	n/a	0	0
Amhara	None since 1980	n/a	0	0
Addis Ababa	None since 1980	n/a	0	0

Table 3. Conflicts affecting Young Lives regions in Perú, 1980 to 2007

Place	Year	Conflict	Battle Deaths (entire conflict)	Intensity
Amazonas	1995	El Salvador Border Dispute	1000	1
Ancash	2000	Sendero Luminoso	30,000	3
Apurimac	2000	Sendero Luminoso	30,000	3
Arequipa	None since 1980	n/a	0	0
Ayacucho	2006	Sendero Luminoso	30,000	3
Cajamarca	2000	Sendero Luminoso	30,000	3
Huanuco	2006	Sendero Luminoso	30,000	3
Junin	2000	Sendero Luminoso	30,000	3
La Libertad	2000	Sendero Luminoso	30,000	3
Lima	2006	Sendero Luminoso	30,000	3
Piura	None since 1980	n/a	0	0
Puno	2000	Sendero Luminoso	30,000	3
San Martin	2006	Sendero Luminoso	30,000	3
Tumbes	None since 1980	n/a	0	0

Figures 2 and 3 show the intensity of conflict across regions in Ethiopia and Perú for the regions used in this analysis.

[11] These figures were collected from reputable databases on global conflict and security. However, there are conflicting reports for regional-level data on years since conflict and battle-related deaths. The binary variables *recent conflict* and *intensity of last conflict moderate/high* attempt to capture the conflict variables using more widely accepted assumptions.

Figure 2. Regional Map of Ethiopia Depicting Conflict Intensity

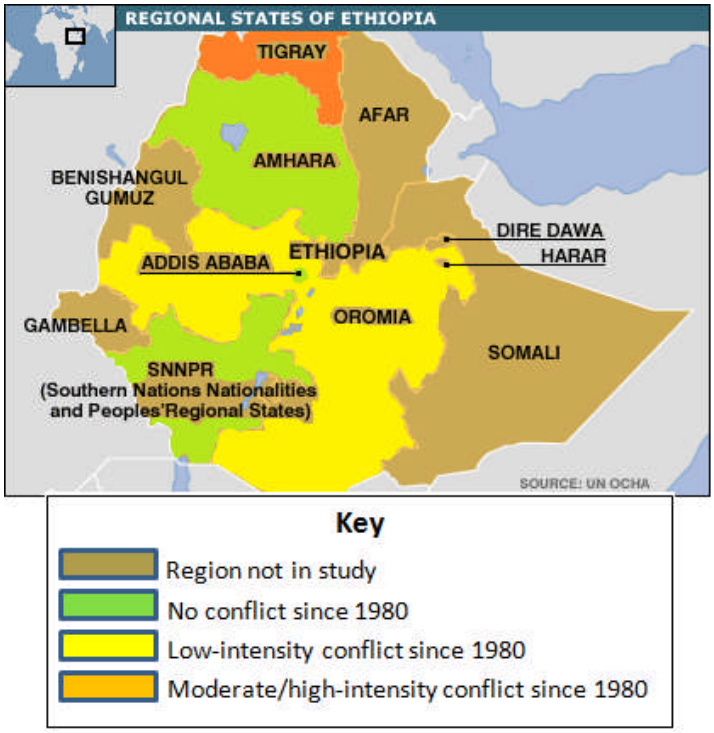


Figure 3. Regional Map of Perú Depicting Conflict Intensity

Control Variables

The model includes a number of control variables for child, household, and community characteristics. Child level control variables include child age, gender, height, weight, preschool experience, and first language. Family level variables include maternal education level and family wealth. I include a community level variable of living in an urban or rural area.

Age in months. A one unit increase in age corresponds with a 1 month increase in age. Since all children were initially enrolled in the study around age 1, children's dates-of-birth were captured during the initial data collection period. The date of birth was then used to calculate the child's age during the next round of data collection.

Female. For child sex, a binary variable is assigned as a 1 for female children and a 0 for male children.

Stunting. A child's growth is considered to be stunted if the child has a height-for-age that is two standard deviations below the mean. This is the definition of stunting developed by the World Health Organization. Children were measured by data collectors and the child's height in centimeters was recorded. The child's height was then converted to a height-for-age z score using the growth standards from the World Health Organization.

Weight-for-age z score. Another proxy variable for child health and nutrition is the child's weight-for-age z score. Children were weighed by Young Lives data collectors during the household survey and their weight was recorded in kilograms. A weight-for-age z score was calculated by the Young Lives investigators using the growth standards from the World Health Organization.

Preschool attendance. Caregivers were asked if the child was currently enrolled in preschool or had been at any time in the past and the duration of the enrollment. Children who were enrolled in preschool at the time of the survey or who had been for at least 6 months[12] at any point in the past were assigned a 1 for this variable and

[12] Six months was chosen as an indicator of substantial time in preschool because the next response category, 1 year, may not have included children who had been in a 8- or 9-month academic year preschool program.

children who had never attended preschool or at some point in the past had attended for less than 6 months were assigned a 0.

First language is country official language. A proxy variable for marginalization is whether the child's first language was the official language of the country. The child's first language was recorded in the data set. In Ethiopia, the official language is Amharic. In Perú, the official language is Spanish. Children whose first languages are the country official language are assigned a 1 and all other children were assigned a 0.

Mother has at least a primary education. Maternal education level is measured by number of years in school. In both Ethiopia and Perú, the duration of primary education is 6 years (UNESCO, 2010). Observations for which maternal education was 6 years or greater are considered to have completed primary education and coded as 1. Observations for which the mother had no education, less than a primary education, or non-formal education are coded as 0.

Wealth index. A family wealth index was developed by the Young Lives investigators and is a function of the assets owned by the family (e.g. livestock, property, savings). The index has a minimum value of 0 and a maximum value of 1.

Rural. The household was coded either as urban or rural. For this analysis, rural households are coded as 1 and urban households are coded as 0.

Methods

To understand the relationship between armed conflict and child development, I use an Ordinary Least Squares (OLS) regression model. The dependent variable is child cognitive outcomes, measured by raw scores on the PPVT and CDA assessments. The

first independent variable of interest is time since the last conflict, measured both by number of years since the region a child lived in was last in conflict and by a binary variable for whether or not there was conflict in the region since 1995. The second independent variable of interest is the intensity of the last conflict, measured by number of battle-related deaths and magnitude rating. The theoretical model for this analysis uses OLS regression as follows:

$$\text{childoutcomes} = \beta_0 + \beta_1(\text{lastconflict}) + \beta_2(\text{conflictintensity}) + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \varepsilon$$

where "childoutcomes" is child cognitive outcomes, "lastconflict" is a variable measuring the time since the region was last engaged in armed conflict, "conflictintensity" is a variable measuring conflict intensity, x_3 is a vector of child characteristics, x_4 is vector of family characteristics, and x_5 represents community characteristics.

Descriptive Statistics

This section describes the descriptive statistics for the dependent and independent variables for Ethiopia, Perú, and both countries. Table 3 at the end of this section shows the complete descriptive statistics for the sample. Table I in Appendix A presents the t-statistics and p-values for a comparison of both countries.

Child Outcomes

The mean PPVT raw score was 21.98 (s.d.=12.56) in Ethiopia and 30.07 (s.d.=8.53) in Perú. This means that on average, children in Ethiopia could correctly identify approximately 22 pictures of progressively more difficult vocabulary words and

children in Perú could identify approximately 30 words. By comparison, the mean PPVT raw score for children of similar ages exiting Head Start, a federally-funded preschool program for low-income children in the U.S., is approximately 57 (U.S. Department of Health and Human Services, 1998).[13]

The mean CDA-Q score for all children was 8.41 (s.d.=2.52) in Ethiopia and 8.83 (s.d=2.03) in Perú out of 15 total test items. This means that on average, children correctly answered between 8 and 9 questions about quantity (more/less, long/short, etc.).

Conflict Indicators

In Ethiopia, the average number of years since the study children's region was in conflict was 17.6, with 39% of the study children living in a region where there was conflict since 1995. In Perú, the average number of years since conflict was 8.7 and 79% of the children lived in a region where there was conflict since 1995.

Child, Family, and Community Variables

Ethiopia

Study children in Ethiopia were between 52 and 75 months (4.3 – 6.3 years) at the time they were surveyed, with an average age of 61.87 months. Nearly half (47%) of the Ethiopia sample was female. Nineteen percent of the study children suffered from stunting. Children's average weight-for-age z scores were 1.31 standard deviations below the mean. In Ethiopia, 25% of the sample children attended preschool for at least 6 months or were enrolled in preschool at the time of the survey.

[13] The mean standard score for 5-year-old exiting Head Start in 1998 was 93. This corresponds to a raw score of approximately 57.

In Ethiopia, 46% of the sample spoke Amharic, the official language, as their first language. Family wealth and maternal education are used to account for family characteristics. The mean wealth index for the study children in Ethiopia was 0.16. Only 26% of mothers of the study children in Ethiopia reported completing primary education. Rural households accounted for 58% of the sample.

Perú

The mean age for the children in the Perú sample was 63.65 months (5.3 years), with a range of 53-75 months (4.4 – 6.3 years). Half of the children in the Perú sample were female. Thirty percent of children suffered from stunting, and the average weight-for-age z score was 0.46 standard deviations below the mean. Approximately 76% of study children were enrolled in preschool at the time of the survey or had been in preschool at some point for at least six months. Spanish, the official language of Perú, was the first language of 88% of the study children.

The average wealth index for children in Perú was 0.52 on a 1.0 point scale. Sixty-eight percent of children in the Perú sample had mothers who had completed primary education. Rural households accounted for 41% of the sample in Perú. Table 4 shows the descriptive statistics for the sample. Table 7 in Appendix A shows the summary statistics for both samples.

Table 4: Descriptive Statistics

Variable	Ethiopia n=1577				Perú n=1768			
	Mean	*Std. Dev.*	*Min*	*Max*	*Mean*	*Std. Dev.*	*Min*	*Max*
Assessment scores								
PPVT	21.98	12.56	1	121	30.07	17.78	0	95
CDA	8.41	2.97	0	14	8.53	2.03	0	12
Conflict indicators								
Recent conflict	0.39	0.49	0	1	0.79	0.40	0	1
Years since conflict	17.60	11.38	0	27	8.68	9.70	0	27
Intensity of last conflict moderate/high, (0,1)	0.23	0.42	0	1	0.75	0.43	0	1
Battle-related deaths, total in last conflict (000s)	11.77	20.85	0	100	22.46	12.96	0	30
Child Variables								
Age in months	61.86	3.86	52	75	63.65	4.65	53	75
Female child (0,1)	0.47	0.50	0	1	0.50	0.50	0	1
Stunting (0,1)	0.19	0.39	0	1	0.30	0.46	0	1
Weight for age z score	-1.31	0.93	-4.94	3.47	-0.46	1.02	-3.78	3.83
Attended preschool at least 6months (0,1)	0.25	0.43	0	1	0.76	0.43	0	1
1st language is country official language (0,1)	0.46	0.50	0	1	0.88	0.32	0	1
Family Characteristics								
Wealth index (0.0-1.0)	0.16	0.13	0.01	0.72	0.52	0.22	0.01	0.98
Mother has at least a primary education (0,1)	0.26	0.44	0	1	0.68	0.47	0	1
Community Characteristics								
Rural (0,1)	0.58	0.49	0	1	0.41	0.49	0	1

Regression Results

Using Ordinary Least Squares (OLS), I estimate three regression models for each country with PPVT scores as the dependent variable and three regression models for each country with CDA-Q scores as the dependent variable. The measures for conflict are the only variables that change in each model. Model 1 contains the binary variable *recent conflict* and *number of battle-related deaths (000s).* Model 2 contains *years since*

conflict and *number of battle-related deaths (000s).* Model 3 contains *years since conflict* and *intensity of last conflict moderate/high*. All models contain the control variables *age in months, female, stunting, weight-for-age z score, attended preschool at least 6 months, first language is country official language, wealth index, mother has at least a primary education,* and *rural*.

PPVT Results for Ethiopia

OLS regression results for Ethiopia show no significant relationship between PPVT scores and time since conflict after controlling for child, family, and community characteristics. However, the intensity of the last conflict is significantly negatively associated with PPVT scores. Children living in a region that experienced a moderate-to high-level conflict scored 1.2 points lower than children who lived in regions with a low-level conflict or no recent conflict (p=.09) in Model 3. Furthermore, each 1,000 battle-related deaths are associated with a .02 point decrease in PPVT scores (p=.07) in Model 1. In other words, approximately 50,000 battle related deaths are associated with a one-point decrease in PPVT scores.

All observations were dropped from analysis in which conditions for administering the PPVT were inadequate. In Ethiopia, this resulted in 32% of the observations in the Oromia region being dropped. The Oromia region was one of the regions affected by recent conflict; therefore, the omission of these observations may positively bias the coefficient for recent conflict. Furthermore, the Oromia region is the largest region in the country in terms of both population and area. While the Oromo Liberation Front conflict occurred in the southern and eastern parts of the region, it is possible that children and families in the north and west parts of the region were not directly affected by the conflict.

A child's age is positively associated with PPVT scores; this is expected because as children get older they typically acquire more vocabulary words. In Ethiopia, each month of age is associated with a 0.7 point increase in PPVT scores ($p<.01$). [14] In other words, for each year of age a child is predicted to score 8.4 points higher on the PPVT. Child height and weight also appear to be positively related to PPVT scores, with children with heights in the normal range scoring 1.5 points higher than children suffering from stunting ($p<.07$). Weight-for-age z score is similarly positively associated with each standard deviation corresponding to 0.9 points on the PPVT ($p<.01$).

Children who attended preschool at least 6 months, or were currently enrolled in preschool, scored 5.8 points higher than children who did not attend preschool. ($p<.01$). Children whose first language is Amharic, the official language of Ethiopia, scored 2.0 points lower than children whose first language was not Amharic ($p<.01$).

Family wealth was also significantly associated with PPVT scores, with children at the top of the scale scoring 13.6 points higher than children at the bottom of the scale ($p<.01$). Children in the Ethiopia sample who had mothers with primary education scored 4.3 points higher on the PPVT ($p<.01$). Additionally, children living in rural areas scored on average 2.6 points lower than children living in urban areas ($p<.01$).

PPVT Results for Perú

For the Perú data set, OLS multivariate regression results show a significant positive association between PPVT scores and time since conflict. Children living in regions where there was a conflict since 1995 scored 3 points lower on the PPVT than children living in regions with no recent conflict ($p=.03$) in Model 1. Each year since

[14] Regression results are reported in the following pages using regression Model 1 unless otherwise noted. All three models yielded similar coefficients for control variables.

the child's district experienced conflict is associated with a 0.14 increase in PPVT scores (p=.07) in Model 2. For example, a child living in a district that experienced conflict 15 years ago is predicted to score almost 2 points higher than a child living in a region that experienced conflict 1 year ago. Interestingly, conflict intensity is positively associated with higher PPVT scores, with children living in an area with medium- to high-level recent conflict scoring 6.9 points higher than children living in a district with low-level or no conflict (p<.01) in Model 3. In the findings section of this paper I discuss reasons why the predicted PPVT score may be higher in regions with more intense conflict.

Child's age is positively associated with language development. Each month of age is associated with a 0.94 point increase in PPVT scores (p<.01).[15] In other words, children in the Perú sample scored 11.5 points higher per year of age, holding other variables in the model constant. Weight-for-age z score is also positively associated with language development, with each standard deviation corresponding to 3 points on the PPVT (p<.01). Children who attended preschool at least 6 months, or were currently enrolled in preschool, scored 2.9 points higher than children who did not attend preschool. (p<.01).

Family wealth was also significantly associated with PPVT scores, with children at the top of the scale scoring 23.3 points higher than children at the bottom of the scale (p<.01). Children living in rural areas scored 7.4 points lower than children living in urban areas (p<.01). Table 5 shows the predicted PPVT raw scores for children in Ethiopia and Perú.

[15] Regression results are reported in the following pages using regression Model 1 unless otherwise noted. All three models yielded similar coefficients for control variables.

Table 5. Predicted PPVT Raw Scores

	Ethiopia			Perú		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Conflict in the past 12 years (0,1)	1.364			-2.955*		
	(1.47)			(-2.19)		
Years since last conflict		-0.048	-0.047		0.135†	0.128†
		(-1.38)	(-1.37)		(-1.84)	(-1.80)
Intensity of last conflict moderate/high, (0,1)			-1.192†			6.861***
			(-1.70)			(-4.43)
Battle-related deaths (000s), entire conflict	-0.016†	-0.012†		0.224***	0.235***	
	(-1.84)	(-1.70)		(-5.46)	(-4.38)	
Child Variables						
Age in months	0.709***	0.711***	0.711***	0.937***	0.944***	0.944***
	(8.71)	(8.75)	(8.75)	(-13.40)	(-13.47)	(-13.46)
Female child (0,1)	-0.656	-0.658	-0.658	0.55	0.577	0.577
	(-1.19)	(-1.19)	(-1.19)	(-0.94)	(-0.99)	(-0.99)
Stunting (0,1)	-1.456†	-1.456†	-1.456†	0.046	0.031	0.035
	(-1.84)	(-1.84)	(-1.84)	(-0.06)	(-0.04)	(-0.05)
Weight-for-age z score	0.853**	0.855**	0.855**	2.969***	2.987***	2.987***
	(2.74)	(2.74)	(2.74)	(-8.29)	(-8.29)	(-8.29)
Attended preschool>6months (0,1)	5.841***	5.831***	5.831***	2.903***	2.922***	2.922***
	(5.81)	(5.80)	5.8	(-4.26)	(-4.29)	(-4.29)
First language is country official language (0,1)	-1.974**	-1.998**	-1.998**	0.044	-0.02	-0.007
	(-2.93)	(-2.96)	(-2.96)	(-0.05)	(-0.02)	(-0.01)
Family Characteristics						
Wealth index	13.604***	13.635***	13.633***	23.300***	23.086***	23.099***
	3.60	3.60	3.61	(-11.82)	(-11.72)	(-11.73)
Mother has at least a primary education (0,1)	4.322***	4.323***	4.323***	0.092	0.14	0.138
	5.16	5.16	5.16	(-0.13)	(-0.20)	(-0.19)
Community Characteristics						
Rural (0,1)	-2.572***	-2.573***	-2.573***	-7.437***	-7.465***	-7.454***
	(-3.56)	(-3.56)	(-3.56)	(-8.34)	(-8.43)	(-8.41)
Constant	-22.627***	-21.436***	-21.457***	-42.595***	-46.673***	-46.440***
	(-4.31)	(-3.99)	(-3.99)	(-9.17)	(-9.61)	(-9.59)
Observations	1577	1577	1577	1768	1768	1768
R-squared	0.284	0.284	0.284	0.532	0.532	0.532
t-values in parentheses; †p<0.10, * p<0.05, ** p<0.01, *** p<0.001						

CDA-Q Results for Ethiopia

OLS regression results show little evidence that CDA-Q scores are significantly associated with the amount of time since a child's district experienced conflict. In Ethiopia, the years since conflict is actually negatively associated with CDA-Q scores, with each one year since the region was in conflict corresponding to a 0.02 point decrease in CDA-Q scores ($p<.01$) in Model 2. This is a small, yet statistically significant result. Children living in a region where there was conflict since 1995 scored on average 0.5 points higher on the CDA-Q than children living in a region where there was no conflict since 1995 ($p=.01$) in Model 1. In the next section I discuss why CDA-Q scores may show an increase during times of conflict.

The intensity of the last conflict is negatively associated with CDA-Q scores, with children living in regions with a medium- or high-level conflict scoring 0.4 points lower on the CDA-Q than children living in areas with low-level conflict or no recent conflict ($p=.05$) in Model 3. Each 1000 battle-related deaths corresponds to a decrease in CDA-Q scores by 0.005 points ($p=.05$) in Model 1.

Two control variables were associated with an increase in CDA-Q scores of one point or more: preschool attendance and wealth. Children who attended preschool for six months or more or were currently enrolled in preschool scored 1.5 points ($p<.01$) [16] higher on the CDA-Q than children who had not attended preschool. Children at the top of the wealth index scored 2.5 points ($p<.01$) higher than children at the bottom of the index.

[16] Regression results are reported in the following pages using regression Model 1 unless otherwise noted. All three models yielded similar coefficients for control variables.

CDA-Q Results for Perú

None of the conflict variables (years, intensity level, battle-related deaths) was statistically significantly related to CDA-Q scores for children in the Perú sample in any model.

One control variable, family wealth, was associated with an increase in CDA-Q scores of more than one point. Children at the top of the wealth index scored 1.7 points ($p<.01$) higher on the CDA-Q than children at the bottom of the index. Table 6 shows the predicted CDA-Q raw scores for children in Ethiopia and Perú.

Table 6. Predicted CDA-Q Raw Scores

	Ethiopia			Perú		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Conflict in the past 12 years 0,1)	0.530*			-0.075		
	(2.56)			(-0.29)		
Years since last conflict		-0.021**	-0.020**		-0.006	-0.005
		(-2.70)	(-2.67)		(-0.47)	(-0.46)
Intensity of last conflict moderate to high, (0,1)			-0.414*			0.062
			(-1.98)			(-0.24)
Battle-related deaths (000s), entire conflict	-0.005*	-0.004*		0.008	0.002	
	(-2.32)	(-1.98)		(-0.98)	(-0.22)	
Child Variables						
Age in months	0.096***	0.097***	0.097***	0.103***	0.104***	0.104***
	(-5.20)	(-5.25)	(-5.25)	(-9.57)	(-9.65)	(-9.64)
Female child (0,1)	0.135	0.135	0.135	0.172*	0.167†	0.168†
	(-1.00)	(-1.00)	(-1.00)	(-1.97)	(-1.92)	(-1.92)
Stunting (0,1)	-0.158	-0.160	-0.160	-0.240*	-0.248*	-0.248*
	(-0.81)	(-0.82)	(-0.82)	(-2.03)	(-2.10)	(-2.10)
Weight for age z score	0.210**	0.209**	0.209**	0.132**	0.128**	0.128**
	(-2.60)	(-2.59)	(-2.59)	(-2.81)	(-2.74)	(-2.74)
Attended preschool>6months (0,1)	1.515***	1.513***	1.513***	0.337**	0.335**	0.336**
	(-6.98)	(-6.98)	(-6.98)	(-3.04)	(-3.03)	(-3.03)
First language is country official language (0,1)	-0.294	-0.286	-0.286	-0.304†	-0.319†	-0.318†
	(-1.59)	(-1.55)	(-1.55)	(-1.82)	(-1.93)	(-1.92)
Family Characteristics						
Wealth index	2.488***	2.497***	2.497***	1.740***	1.741***	1.740***
	(-3.38)	(-3.39)	(-3.39)	(-6.12)	(-6.12)	(-6.12)
Mother has at least a primary education (0,1)	0.465*	0.462*	0.462*	0.083	0.079	0.08
	(-2.42)	(-2.40)	(-2.40)	(-0.82)	(-0.78)	(-0.78)
Community Characteristics						
Rural (0,1)	-0.651***	-0.653***	-0.653***	-0.169	-0.191	-0.19
	(-3.60)	(-3.60)	(-3.60)	(-1.26)	(-1.43)	(-1.42)
Constant	2.253*	2.754*	2.738*	0.989	1.102	1.097
	(-1.97)	(-2.38)	(-2.37)	(-1.37)	(-1.40)	(-1.40)
Observations	1577	1577	1577	1768	1768	1768
R-squared	0.201	0.202	0.202	0.21	0.21	0.21
t-values in parentheses; †p<0.10, * p<0.05, ** p<0.01, *** p<0.001						

Discussion

OLS regression results show evidence that PPVT scores are positively associated with the time since a child's district was involved in armed conflict in Perú

after controlling for the intensity of the conflict and child, family, and community characteristics. There is some evidence that children in regions with more intense conflicts have lower PPVT scores than children in regions with no conflict or less intense conflicts in Ethiopia. This finding supports my hypothesis that children living in regions affected by conflict have lower levels of language ability as measured by the PPVT. This could be due to many factors outlined in my literature review; environmental stress, constrained family resources, and limited state resources.

Another explanation for lower language scores is that family dynamics may change during times of hardship. Early language development happens primarily in the home; during times of conflict parents may simply talk to children less. They may have more urgent matters to discuss that are not appropriate for children and less time to spend engaging with the youngest children. Children also acquire language through experiences in the community, and these may be limited when there are external threats.

There was no evidence that CDA-Q scores are positively associated with the length of time since a child's district was involved in conflict. In fact, there is a small but statistically significant decrease in CDA-Q scores in Ethiopia for each year since the last conflict. There are several hypotheses for why quantitative understanding would increase in conflict-affected areas. Children may be more exposed to work, either as child laborers or to accompany their parents. They may learn quantitative concepts through these activities, such as how many baskets of crops they collect, concepts such as big and small, colors, and patterns. Similarly, conversation in the home may be constrained to resource issues: a parent is gone for 6 months, there are only two

chickens left, there are less men in the village now.[17] It is also possible that the CDA-Q measure itself, containing 15 questions on quantitative knowledge, is not a comprehensive proxy for child cognitive development.

This analysis does not control for policies or programs in the communities that may affect the children's PPVT and CDA-Q scores. There are many government and non-governmental organizations operating in Perú and Ethiopia which target marginalized children and families in emergencies. In 2007, Perú received US $61 million and Ethiopia received US $331 million in official development assistance (ODA) for education (UNESCO, 2011). This might explain, for example, why the intensity of conflict is positively associated with PPVT scores in Perú or why children in Ethiopia whose first language is Amharic have lower predicted PPVT scores.

The control variables with the largest and most consistently significant coefficients in the model were preschool attendance and wealth. Preschool attendance is positively associated with children's PPVT and CDA-Q scores in both Perú and Ethiopia, with larger expected gains in Ethiopia than Perú. Family wealth is also significantly positively associated with language and cognitive scores in both countries, but is associated with larger gains in PPVT scores in Perú and larger gains in CDA-Q scores in Ethiopia.

Mother's education level is significantly associated with increased language and cognitive scores in Ethiopia, but not in Perú. Children with mothers who had completed primary education scored higher than their peers on both measures in Ethiopia, but did not show significantly different scores in Perú.

[17] These hypotheses are based on the author's experience working with vulnerable children and families and are not necessarily supported by the literature.

There appears to be no gender gap in language and cognitive scores among study children. The results showed that girls' scores were not significantly different from their male peers on the PPVT. Girls' scores significantly exceeded boys' scores on the CDA-Q in Perú, but in Ethiopia there was no significant difference between groups. In both countries, children in rural areas scored significantly lower than children in urban areas on the PPVT, but while rural children in Ethiopia scored lower in the CDA-Q, rural children in Perú did not show any significantly different CDA-Q scores.

These results indicate that preschool attendance, rural residence, and household wealth may be important in factors to consider when designing ECD programs to mitigate the effects on language development that children living in conflict may experience. My findings suggest that programs designed to mitigate other factors, such as maternal education, stunting, and child weight, should be considered on a country-by-country basis given the needs and cultural context of the region.

Policy implications

Three ECD policy implications emerge from these findings: Preschool is an important compensating factor for conflict, involving families is necessary to improve outcomes, and equity is critical.

Preschool is important

In times of conflict or shortly thereafter, preschool programs should provide a safe place for parents to leave their young children while they work. UNESCO (2011) reports that while ECD programs prepare children for school and mitigate the effects of household deprivation, ECD policies in many developing countries are hindered by inadequate funding, fragmented planning, and inequitable delivery.

While this analysis did not address the importance of preschool quality, it is a dimension of ECD that must be addressed when designing interventions. Access to preschool remains an important issue, especially in Ethiopia where only 25% of the sample was enrolled in preschool or had been at some point for 6 months or more. A recent study using the urban Ethiopian population of the Young Lives data set also finds a positive relationship between preschool attendance and PPVT and CDA-Q scores (Woldehanna, 2011).

Families are necessary

Some of the strongest predictors of a child's performance on the PPVT were family indicators of wealth and maternal education. Stunting and weight-for-age are also characteristics that are largely determined by health and nutrition practices in the home. Because so many children in the sample live in rural areas, access to services remains a challenge. Therefore, ECD interventions must be designed to take place within the home. Several promising models are available. For example, Janssens and Rosemberg (forthcoming) found evidence that a home visiting program in which visitors involve parents in age-appropriate stimulating activities s may improve cognitive gains among young children in the Caribbean.

Equity is critical

Quality preschool and family support programs are only successful if the programs are reaching the children who need them the most. My analysis revealed statistically significant gaps between urban and rural children, high- and low-income families, and educated vs. non-educated mothers. These gaps cannot be closed if programming only reaches the more urban, wealthy, and educated citizens. While these citizens may still be disadvantaged by industrialized country standards, they do not

represent the populations in greatest need of these services. In conflicts that only affect parts of a country, care must be taken to ensure that early childhood programs are delivered in parts of a country that are most affected by conflict.

The achievement gap between boys and girls is often amplified in countries engaged in violent conflict (UNESCO, 2011). However, a promising finding from this research is that there is no gender gap in early childhood among the children in this study. This presents an opportunity for ECD programs to prevent the gender gap rather than attempting to close it later.

Conclusion

The U.S. government spends $485 million annually on education in conflict-affected fragile states, more than any other bilateral donor (Save the Children, 2010). The majority of this assistance is spent in counties that directly align to U.S. policy objectives (Winthrop, 2010). In 2008, more than 60% of U.S. foreign aid to education in conflict went to Pakistan (US $109 million), Egypt (US $106 million) and Iraq (US $88 million) (Save the Children, 2010). In order to reach young children who could benefit the most from these funds, the U.S. will have to ramp up its aid commitments to conflict-affected countries regardless of the alignment to U.S. foreign policy objectives.

One promising development in U.S. policy toward education in conflict occurred earlier this year. The U.S. Agency for International Development (USAID) released its Education Strategy 2011 in February 2011, which focuses on three goals for USAID's work in developing countries: improved reading skills, improved capacity in tertiary and workforce development, and increased equitable access to education in crisis and conflict environments. The recommendations in this paper directly address

goals one and three, and indirectly address goal two as children's early development is connected to later development and workforce participation (Hanushek & Woessmann, 2007). The USAID strategy document does not explicitly address early childhood development, but rather includes ECD in the definition of basic education. An emphasis specifically on the early years could positively impact all areas of USAID's education strategy.

The results provide preliminary evidence that children in conflict-affected regions experience lower levels of language development in early childhood than their peers in the same country. While further analysis should be conducted using data from other conflict-affected countries, this paper provides a first look at the added strain of conflict on children in families in developing countries. More data on child development in conflict-affected countries is critical for further research on this topic. The Young Lives project provides a rich data set but is only conducted in four developing countries. Data on conflict at the regional or sub-state level was very difficult to find, and I was unable to find data on battle-related deaths at the regional level at all.

This analysis reiterates the findings of prior research that conflict is detrimental to children's healthy development. In countries experiencing conflict or post-conflict reconstruction, ECD programming is an essential component of humanitarian and development assistance.

Appendix A. Supplementary Table

Table 7. Summary Statistics for Ethiopia and Perú

	Ethiopia and Perú Combined n=3345			
	Mean	*Std. Dev.*	*t-stat*	*p-value*
Assessment scores				
PPVT	26.26	16.05	-15.03	<.001
CDA	8.47	2.52	-1.29	0.20
Conflict indicators				
Recent conflict	0.60	0.49	-26.18	<.001
Years since conflict	12.92	11.39	24.47	<.001
Intensity of last conflict moderate/high, (0,1)	0.50	0.50	-34.96	<.001
Battle-related deaths, total in last conflict (000s)	17.41	17.95	-18.01	<.001
Child Variables				
Age in months	62.81	4.38	-12.00	<.001
Female child (0,1)	0.48	0.50	-1.58	0.11
Stunting (0,1)	0.25	0.43	-7.53	<.001
Weight for age z score	-0.86	1.07	-25.34	<.001
Attended preschool>6months (0,1)	0.52	0.50	-34.24	<.001
1st language is country official language (0,1)	0.68	0.47	-29.49	<.001
Family Characteristics				
Wealth index (0.0-1.0)	0.35	0.26	-57.03	<.001
Mother has at least a primary education (0,1)	0.48	0.50	-26.72	<.001
Community Characteristics				
Rural (0,1)	0.49	0.50	9.76	<.001

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