Trust and Reciprocity Among Former Child Soldiers: An Experimental Approach

Melissa Trussell

Trust and Reciprocity among Former Child Soldiers: An Experimental Approach

Introduction

The Coalition to Stop the Use of Child Soldiers (2008) found 19 conflicts worldwide that involved

child soldiers between April 2004 and October 2007. The Coalition's report also notes that tens of

thousands of former child soldiers were released from combat between 2004 and 2008. The tragedy of

child soldiering, however, continues long past the end of armed conflict. Post-conflict societies are

faced with the daunting task of reintegrating into regular life children who have experienced

unspeakable physical, emotional, and psychological trauma.

UNICEF (1997) defines *child soldier* as follows:

"Any person under 18 years of age who is part of any kind of regular or irregular armed

force or armed group in any capacity, including but not limited to cooks, porters,

messengers and anyone accompanying such groups, other than family members. The

definition includes girls recruited for sexual purposes and for forced marriage. It does

not, therefore, only refer to a child who is carrying or has carried arms."

This paper takes an experimental approach to understanding trust and reciprocity

among former child soldiers in the West African country of Liberia with the goal of informing

reintegration efforts. The experiment seeks to answer the question *Do former child soldiers*

exhibit different trust/reciprocity behavior than others?

Background

The country of Liberia, in West Africa, was founded in the 1840s by former slaves who had been

freed and sent back to West Africa from the United States (Liberianlaw.com, n.d.). These former slaves

and their descendants became known in Liberia as Americo-Liberians. In addition to its citizens with

Americo-Liberian roots, Liberia has a large population with a rich tribal history. While members of

Liberia's tribes have coexisted peacefully throughout most of the nation's history, tribal tensions in the 1980s led to fourteen years of brutal, nationwide civil war.[1] (BBC, 2011)

The experiment in this paper takes place in Saclepea, Liberia, in the county in which the civil war began. Prior to the war, Saclepea was home to relatively large groups from three tribes, two on one side of the conflict and the third on the other side; thus, its culture and economy were significantly disrupted by the fighting. In fact, Saclepea became a training ground for child soldiers during the war and has yet to recover from effects of the conflict. (Trussell & Moore, 2012)

When the war ended, the Liberian government, with support from the U.N. and other international organizations, organized a nationwide disarmament and reintegration program. In all, the program recorded 101,495 individuals who had been involved in the conflict and were disarmed through the program (Agència Catalana de Cooperació al Desenvolupament, n.d.). Records show that 70% of Liberians who had taken part in the fighting were children (Integrated Regional Information Networks, 2003).

Literature Review

Role of Trust and Reciprocity in Economic Decision-making

It is generally accepted by experimental economists that trust and reciprocity have significant economic implications. This assumption is based on decades of non-experimental literature linking trust with economic activity. Knack and Keefer (1997) use surveys to measure both trust and cooperation and compare the survey results from 29 countries with economic growth in those countries. They find significantly higher growth rates in countries with more trust and cooperation. Zak and Knack (2001) produce a general equilibrium model that shows higher levels of investment in more trusting countries,

---

[1] For a more detailed account of the history of Liberia's civil wars, see Trussell and Moore (2012).

and Guiso, Sapienza, and Zingales (2004, 2008, 2009; as cited in Fehr, 2009) show implications of trust for international trade as well as for microeconomic behavior of individuals in markets.

Fehr (2009) casts doubt on the existing literature's ability to establish a causal relationship between trust/cooperation and economic outcomes, but he acknowledges the likelihood that such a relationship exists and provides some avenues for testing for the relationship. This paper seeks to determine whether trust-related outcomes may differ between former child soldiers and others in post-war Liberia.

Effects of Child Soldiering on Trust Behavior

While trust is not a central element of papers on child soldiering, several authors list it among factors to be considered when working with former soldiers and child soldiers. Child Psychologists O'Callaghan, Storey, and Rafferty (2012, p. 88) examine the existence and effects of Post-Traumatic Stress Disorder in former child soldiers in Uganda, and they list "loss of trust" as one of several possible effects of child soldiering. Dickson-Gómez (2002), an anthropologist, interviews four former child soldiers in El Salvador and concludes these children were deprived of formation of basic trust, which may be a reason for their choosing to join conflict. Loss of trust among child soldiers is a theme even among literary scholars and novelists (Moynagh, 2011). On the other hand, Jareg (2005) notes that distrust among former child soldiers can be reduced through appropriately designed reintegration programs. This paper seeks to better inform designers of such programs.

Effects of Child Soldiering on Education and Labor Outcomes

Most existing studies of child soldiering focus not on economic impacts but on physical, social, and psychological impacts or political/legal ramifications of the practice, and almost all of these studies use anecdotal or case study approaches, rather than scientific or statistical analysis (see, for example,

Betancourt et al., 2010; Breen, 2007; Klasen, et al., 2010; Rosen, 2010). A few authors have touched on education and employment topics in their analyses. No studies were found that had explored these topics experimentally.

In her book *Youngest Recruits: Pre-war, War & Post-war Experiences in Western Côte D'Ivoire*, Chelpi-den Hamer (2010) reports findings from her interviews of 21 male and female child soldiers. She focuses on children who take part in an NGO post-war reintegration program, and she interviews them three to four years after their military recruitment. She finds mixed labor-market results for her interviewees. Most had no desire to go back to school, and upon follow-up a year after her initial interviews, Chelpi-den Hamer found few of her subjects were still in apprenticeship positions provided them by the reintegration program.

With a similar descriptive style and still without a comparison group of non-soldiers, Woodward and Galvin (2009) interview ten former Liberian child soldiers who, at the time of the interviews, were refugees in a camp in Ghana. In contrast to Chelpi-den Hamer's findings, all of Woodward and Galvin's ten interviewees expressed keen interest in returning to school and becoming employable. They highlight the difficulty of finding work for refugees. Many of their former soldiers were not legally classified as refugees, making employment hard to obtain in their host country, and most of them faced the reality that returning home to Liberia to find work would be incredibly dangerous after having deserted their soldiering units.

Denov (2010) interviews 36 boys and 40 girls in Sierra Leone and finds a significant impact on former soldiers of a war-torn national and local economy. A battered, post-war economy is particularly burdensome for child soldiers, who face considerable disadvantage in employment because their education was interrupted by war. The boys and girls, though many of them received vocational training, cited lack of available paying jobs as their primary reason for not working. Denov does not

include a comparison group against which to test effects of war on child soldiers, nor does she consider reverse effects of child soldiering on the economy.

Özerdem and Podder (2011) compile essays on child soldiering in their book *Child Soldiers: From Recruitment to Reintegration*. They emphasize the importance of tailoring reintegration programs to children based on their recruitment and war experiences. They find that maintaining ties formed during soldiering can improve post-war economic outcomes. In fact, the very act of joining war may, itself, be an economic decision for many children.

Finally, Blattman and Annan (2010) offer the first econometric analysis of child soldiers in the context of a relevant comparison group. They start with a random sample from a World Food Programme list of households in Uganda, and they survey from that sample 741 boys. They divide the boys into categories of *abducted* – former child soldiers – and *non-abducted* – children who did not take part in fighting; the former group is oversampled. Controlling for selection bias by including several pre-war characteristics for each boy, they find abducted children, on average, have ten percent less schooling than non-abducted and are "nearly twice as likely to be illiterate than nonabductees" (p. 889). Further, Blattman and Annan find that while abducted and non-abducted boys have similar employment rates, non-abducted youth perform significantly higher quality work than abducted youth. These authors also spend a bit of time on psychosocial outcomes associated with child soldiering in Uganda.

Experimental design and protocol

Setting

Saclepea, Liberia, has fewer than 20,000 residents and is located 375 kilometers from Monrovia, the nation's capital city (Trussell & Moore, 2012). Figure 1 shows a map of Liberia with Saclepea's location marked. Once per week, Saclepea hosts one of Liberia's largest outdoor markets, where clothing, household supplies, food, and other products are sold. In the center of town, small shops are

open daily to sell food, clothing, electronics, and household items on a much smaller scale than the weekly market.

During parts of the war, education, healthcare, and economic activity were nonexistent in the city (Trussell & Moore, 2012). Saclepeans now have access to a public health clinic, and schools and businesses have resumed operation, but effects of the war are still felt in Saclepea. Economic growth has been hindered by slow rebuilding of infrastructure that was destroyed during the war. Homes and businesses lack electricity, plumbing, and reliable transportation. Liberia's schools have not caught up with other West African schools, and in Saclepea, effects of child soldiering further dampen education outcomes. Child soldiers have attained lower levels of education, and they face limited job opportunities (O. Toway, personal communication, September 20-21, 2011).

The experiment in this paper was conducted under the auspices of the Saclepea Women's Center in Saclepea, Liberia, and the experiment took place using the Center's facilities. The Center is centrally located in the city. It is run by local women and exists to fight gender based violence and to empower women economically (Trussell & Moore, 2012). The women graciously allowed full use of the building for conducting this experiment.

Recruitment

Subjects were recruited by the city mayor's office and by members of Refuge Baptist Church, a congregation that is active in the area and highly regarded by Saclepeans. Recruitment was done by word of mouth and through a series of ads on the local radio station. To control for the possibility of gender or age effects, only men between the ages of 22 (12 years old at war's end) and 35 (11 at war's beginning; 25 at war's end) were recruited. At the recruitment stage, subjects came to the Women's Center to participate in a short interview indicating the extent of their war experiences (see Appendix A). The recruitment interviews were conducted by the experimenters, not by volunteer recruiters.

Subjects were not told the purpose of the experiment, so they had no incentive to falsify war experience information in the recruitment interview. At the time of recruitment, individuals were told that participation in the experiment would guarantee them at least 300 Liberian Dollars (approximately $4 USD) and give them a chance to earn up to 2000 LD (approximately $25 USD) more. Two versions of a bill before the Liberian legislature in 2013 would require a national minimum daily wage of $6.40 or $7.20 USD (Legislature of Liberia, 2013); thus, the experimental payoffs are deemed economically significant amounts. Each subject who completed the recruitment process and qualified to participate in the experiment was given an appointment to return to the Women's Center for one of ten experimental sessions in the following two weeks.

The recruitment interview was used by the experimenters to sort subjects into four groups: child soldiers (CS), adult soldiers (OS), non-soldiers (NS), and random (R). During the experiment, a participant was considered a child soldier if and only if he reported having joined a warring faction or militia before age 18. Non-soldiers, however, must fall completely outside the UNICEF definition of child soldier; he or she must not have been "part of any kind of regular or irregular armed force or armed group in any capacity" (UNICEF, 1997). Adult soldiers joined a warring faction or militia after age 18. Category R contains all three types of subjects.

The Experiment

On the day of the experiment, participants first played the standard investment game developed by Berg, Dickhaut, and McCabe (1995). The game involves a first mover (FM) and a second mover (SM), each with an initial endowment of 500 LD. The FM may choose to pass any amount of his endowment (0-500 LD) in increments of 50 LD to the second mover, after which thrice the amount chosen by the FM will be given to the SM. The SM then chooses to return to the FM any amount (from zero to all) in increments of 50 LD from what the SM received from the FM. The SM is instructed not to

pass to the FM any of the SM's initial endowment. This game was chosen over other trust games

because of the relative simplicity of play, minimizing issues of misunderstanding that could occur in a

subject pool that may contain illiterate or uneducated participants. Subject instructions were adapted

from those used by Cox (2004) in the investment game portion of his paper "How to Identify Trust and

Reciprocity."

FMs and SMs were paired according to Table 1, with approximately 30 pairs participating in each

experimental group. The random category was included so that any differences in first mover behavior

between groups would not restrict a group's choices as second mover. For example, if child soldiers

were only paired with non-soldiers and child soldiers were found never to send any of their first-mover

endowments, it would be impossible to measure non-soldiers' second-mover behavior. In the analysis

of results, a participant from the random experimental category is included as a child soldier, adult

soldier, or non-soldier, depending on his reported war experiences.

Before the game began, FMs and SMs gathered in one room to be fully informed of the game, so

each would know both his own choices and the choices of the other player. Subject instructions were

read by a local Saclepean so there would be no issues with understanding experimenters' American

accents. Then, players were separated into two waiting rooms, from which each player was called into a

separate room to be informed of his role in the game and to make his decision privately, with only the

experimenter.

In the private room before a subject was asked to make his decision, the experimenter reviewed

the game tasks and answered any questions the subject may have had about the game. A FM was then

given an envelope with his initial endowment, or a SM was given his initial endowment and an envelope

containing triple the amount passed to him by the FM. The subject was then asked to make his decision

by placing in a second envelope the amount he wished to pass to the other player. Each subject played

only once, and the experiment and payoffs were single-blind. Neither player in a pair was given any information about the other player. Subject instructions for the game are included in Appendix B.

After playing the game, participants privately completed an interview (see Appendix C) in which subjects were asked to answer questions about their soldiering experiences and, to improve policy relevance, to describe any previous participation in reintegration programs that may have impacts on trust/reciprocity behaviors. The post-game interview also included demographic questions. Evidence suggests an increased likelihood of illiteracy among former child soldiers, so all surveys and instructions for this experiment were administered orally and in English, Liberia's national language and the language of instruction in Liberian schools.

Record Keeping

Record keeping is one of the more challenging aspects of conducting an experiment in a developing country with limited access to electricity, computers, and the internet. For recruitment and participation on the day of the experiment, subjects were asked to verify their identities with photo IDs. Two local women were hired to assist in identifying participants who did not have photo IDs. These same two women were present at each experimental session to ensure no subjects were allowed to participate more than once.

Hypotheses

The following hypotheses are based on literature that shows worse economic outcomes for former child soldiers and literature that indicates lack of trust may be a common characteristic among former child soldiers. Groups are referenced from Table 1.

Hypothesis A: Group 1 vs. Group 2

As FMs, former child soldiers will exhibit less trusting behavior (pass less of their endowments) than non-soldiers.

Hypothesis B: Group 3 vs. Group 4

As SMs, former child soldiers will exhibit less reciprocal behavior (return less of what is passed to them) than non-soldiers.

Hypothesis C: Group 1 vs. Group 5

Former child soldiers will exhibit less trusting behavior as FMs than other soldiers.

Hypothesis D: Group 3 vs. Group 6

Former child soldiers will exhibit less reciprocal behavior as SMs than other soldiers.

Results

Child soldiers vs. other Liberian groups

Child soldiers (CS) are compared with both other groups of subjects: other (adult) soldiers (OS), and non-soldiers (NS). Non-soldiers are also compared with adult soldiers. For this analysis, child soldiers are any subjects who report having joined a faction or militia in any capacity below the age of 18. Non-soldiers are subjects who report never having been part of a fighting faction or militia. Other soldiers are those who report having joined a faction or militia in any capacity when they were 18 years old or older. Descriptive statistics for each group of subjects are reported in Table 2, and histograms of first mover and second mover decisions are shown in Figures 2 and 3.

Table 3 shows results of nonparametric comparisons of group means and distributions. Means are reported as mean number of 50 LD notes passed by first movers and as mean percent returned by second movers from the tripled number of notes they received. Mann-Whitney (1947) tests the likelihood that two samples are drawn from identical random variables. Mann-Whitney results are

reported since the test is capable of dealing with ties, which the data certainly include since subjects have a limited number of certificates with which to make their choices. Epps-Singleton test results, which measure similarities between empirical characteristic functions for both discrete (amount sent by first mover) and continuous (percent returned by second mover) samples, are also shown (Goerg & Kaiser, 2009). Goerg and Kaiser (2009) have shown Epps-Singleton to be a more powerful test than Kolmogorov-Smirnov, which tests for differences between cumulative distribution functions (Smirnov, 1948), but since Kolmogorov-Smirnov is more widely used, both of these tests are included for continuous categories. Kolmogorov-Smirnov is not a valid test for discrete data. These nonparametric tests and their relevant test statistics are described in more detail in Appendix D.

Table 3 shows evidence of statistically significant differences between amounts sent by first mover child soldiers vs. other soldiers and between both first and second mover non-soldiers vs. adult soldiers. Child soldier FMs sent a mean of 6.17 notes, while other soldiers sent a mean of 7.33 notes. Neither Mann-Whitney nor Epps-Singleton shows a significant difference in these two groups, but the t-test indicates that the mean amount sent by first movers differs between child soldiers and adult soldiers. The means test also shows a statistically significant difference between non-soldier FMs and adult soldier FMs, who sent an average of 5.97 and 7.33 notes, respectively. Epps-Singleton shows a statistically significant difference between non-soldier and adult soldier SMs, as well. As SMs, non-soldiers returned 55.7% of what they received, and adult soldiers returned only 52.16%. According to these nonparametric tests, there are no statistically significant differences between child soldiers and non-soldiers either as first movers or as second movers, and there is no difference in second mover behavior between child soldiers and other soldiers.

Since nonparametric tests show mixed results, it is desirable to perform parametric tests to control for other characteristics that may differ between groups. A censored negative binomial model is

used since the data are count data with censoring at zero and ten for first movers and at zero and the

tripled amount received for second movers. The estimated models are of the following form.

First Mover Model

$$\ln(\mu_s) = \alpha_0 + \alpha_1 * treat + \alpha_2 X$$

Second Mover Model

$$\ln(\mu_r) = \beta_0 + \beta_1 * treat + \beta_2 * received + \beta_3 * treat * received + \beta_4 X$$

The dependent variables are expected value of amount sent by first movers and expected value

of amount returned by second movers. Treatment variables are binary and equal 1 for child soldiers in

models that include child soldiers or equal 1 for non-soldiers in the model comparing non-soldiers with

adult soldiers. Control variables for first movers include a treatment variable, age at the time of the

experiment, age at the time one entered the war, number of months spent with a faction or militia, an

indicator for participation in post-war reintegration programs, an indicator for high school graduation,

and an indicator for whether the subject did any work for money during the week prior to the

experiment. The second mover models add a variable for tripled number of 50 LD notes received and a

term interacting treatment and amount received. Tables 4 and 5 show results of censored negative

binomial regressions for observations divided for group comparisons of FMs and SMs, respectively.

The first mover models (Table 4) indicate a difference between trusting behavior of child

soldiers and each comparison population. Other things equal, child soldiers sent an average of 1.46

times the number of notes sent by non-soldiers,[2] which equates to 23 more LD, or approximately .29

USD. Child soldiers also sent 1.88 times the number of notes sent by adult soldiers, about 44 LD or .55

USD more. Child soldiering is not the only factor found to make a statistically significant impact on FM

behavior. Among child soldiers and non-soldiers, age also affects behavior: older subjects send more,

---

[2] The negative binomial model estimates an equation for the log of the dependent variable. Thus, reported results
may be exponentiated and interpreted as incident rate ratios.

and among child soldiers and adult soldiers, high school graduates send more. No difference is found

between non-soldiers and adult soldiers using the parametric model.

Table 5 shows results of the censored negative binomial model for second movers. For these

participants, no statistically significant difference was found among the three types of subjects. The

only variable that affects the amount returned in all models is the tripled amount received from the

second movers' paired first movers. For each additional 50 LD certificate received by second movers,

the average return to first movers increased by 4 or 5 percent. Among SM child soldiers and non-

soldiers, age at the time of the experiment is again a predictor of behavior, with older subjects returning

more of their receipts than younger subjects.

Among child and adult soldiers who participated as SMs, age at the beginning of involvement in

the war and participation in post-war reintegration programs are predictors of number of notes

returned to first movers. SMs who were older at the beginning of their involvement returned more than

those who were younger by about 4.71 LD (.06 USD) per additional year of age. Adult and child soldiers

who had gone through reintegration programs returned .59 times – or 29 LD (.37 USD) less than – the

amount returned by soldiers who had not participated in such programs.

Liberian subjects vs. American subjects

The next step in this analysis is to examine whether differences exist between Liberian subjects

and American subjects who have played the same investment game. Table 6 shows results when

Liberian data from this experiment are compared with data combined from Berg, Dickhaut, and

McCabe's (1995) original investment game experiment and the investment game treatment of Cox's

(2004) triadic design experiment. Data in the two American samples are not significantly different from

each other, indicating American trust and reciprocity attitudes are relatively stable over time. Thus,

passage of time is not a concern in the comparison with Liberian data. All tests other than the Mann-

Whitney test confirm there is a statistically significant difference in both first mover data and second mover data between the two countries. Liberians send more as first movers and return a higher percent as second movers. This result is further confirmed on the last line of Table 6 using a censored negative binomial model for second-mover behavior.

Discussion

Second mover results will have bearing on the interpretation of first mover results, so second movers are discussed first. As second movers, all three groups showed a tendency to reciprocate progressively, returning a higher percentage of their receipts to first movers who sent higher amounts to them. Even groups who were more reluctant to trust demonstrated willingness to engage in positive exchange if the other player first extended a gesture of trust.

The age effect found in the child soldier vs. non-soldier model is not likely to reflect a difference between child soldiers and others since age at time of the experiment is not highly correlated with war experience. The model with both child and adult soldiers, however, may give some insight into war's effects on reciprocity. This second model found statistically significant effects on reciprocity of age at beginning of war involvement and of participation in post-war reintegration programs. The effect of age of involvement suggests child soldiers are less reciprocal than adult soldiers and that the difference is driven by the age at which they began fighting. This is consistent with literature that shows negative outcomes for child soldiers and with hypothesis D of this paper.

The strong negative effect of reintegration programs on reciprocity could have a couple of explanations: 1) National reintegration programs, the most popular programs, required that soldiers disarm in order to participate; thus, those who participated would have been those who had carried arms and who may have had harsher war experiences than those who did not have arms and were not eligible to participate in the national program. Harsher war experiences may lead to less reciprocal

14

tendencies. 2) Additionally, several subjects reported never having received assistance that was promised them by reintegration programs. This experience could have had a negative effect on program participants' behavior.

First mover results show statistically significant differences between Liberian child soldiers and other Liberian soldiers and between child soldiers and non-soldiers. Child soldiers are more trusting than either other group of subjects. These results conflict with hypotheses A and C, and they are somewhat surprising in light of existing literature that suggests child soldiers experience trust deficiencies that result in more difficult reintegration into post-war society. It is relevant to note that the result for child vs. adult soldiers holds after controlling for time spent in the war and participation in post-war reintegration programs. Simply being a child involved in war affects one's trusting behavior differently than fighting as an adult or not fighting at all.

The effect seen on child soldiers is likely explained by experiences had during subjects' formative years. Former child soldiers may be more trusting because they were forced at an early age to learn to trust other soldiers in order to survive. On the other hand, observed FM behavior among former child soldiers could be explained more by a conditioned expectation of reciprocity, negative or positive, than by trust. The latter explanation seems more likely in light of the fact that as SMs, child soldiers returned less than others. Knowing they had the final move of the game, subjects were free to behave without concern for how others might react. It does not require a stretch of one's imagination to suppose that early exposure to extreme punishments and rewards in the context of war could affect how former child soldiers would behave in an investment situation.

Liberians vs. Americans

Johnson and Mislin (2011) conduct a meta-analysis of 162 investment game experiments and find that, on average, Africans from 5 sub-Saharan nations both send and return less than players from any other region of the world. This average is over 15 separate instances of investment game

experiments in the countries of Cameroon, Kenya, South Africa, Tanzania, and Uganda. However, Liberians in this study show greater propensity toward both trust and reciprocity than Americans, and FM and SM averages for Liberian subjects are higher than averages for any region included in the Johnson and Mislin analysis.

Most of the five meta-analysis countries have experienced relatively recent war within their borders (citation needed), so it is not possible to parse any war effect that may cause differences in behavior between these Africans and Liberians. But, in the explanation of their result for African subjects, Johnson and Mislin cite trust and reciprocity deficiencies stemming from historical involvement in the slave trade. This theory is consistent with a different result for Liberian subjects, since Liberia's slave trade history is unique among other African nations. Liberia was founded by freed slaves and is the only African nation founded by the United States (citation needed). From its beginning, Liberian culture has largely been shaped by American influence, and it therefore makes sense that Liberian subjects would behave differently than other Africans.

The question remains why Liberian subjects differ so significantly from American subjects? Two primary differences exist between Liberian and American cultures: 1) though Liberia was founded by the U.S., a majority of Liberians still claim roots to indigenous African tribes; and 2) Americans have not seen widespread destruction and war on their home soil in more than a century. Differences between Americans and Liberians in investment game behavior are likely a combined result of Liberians' historically tribal, community-driven society and community dependence developed out of necessity to survive during and after their wars.

16

Caveats

Trust/Reciprocity or Other-regarding Preferences?

Cox (2004) demonstrates a fallacy in experimentalists' thinking when it comes to the investment game. He shows that further experimentation is required in order to distinguish conclusively between behaviors attributable to trust and reciprocity and behaviors caused by other-regarding preferences such as altruism or inequality aversion. Cox presents a triadic experimental design that does allow for such a distinction. Due to constraints on time and resources, the two additional treatments of Cox's design were not implemented for this study but are open for future research.

Indeed, child soldiers may have been motivated by fear of negative reciprocity rather than by trust, and some Liberian subjects indicated altruistic motives for their decisions during this experiment. Thus, any findings of this experiment are open to criticisms offered by Cox. Though this experiment cannot conclusively assign trust and reciprocity as motivating factors, it does provide interesting and useful insights into effects of war on economic investment decisions. Moreover, after controlling for other behavioral variables, Cox does find evidence of trust and reciprocity in investment game decisions by his subjects. It is reasonable to suspect that Liberian subjects' investment decisions may also be influenced by these qualities.

Problems with Causal Inference: Which Comes First?

It is unclear whether selection may affect results of a trust experiment with child soldiers. Do more/less trusting children choose to fight, or do war experiences make children more/less trusting? This question hinders the ability to establish causal inference from this study, but it does not dampen the importance of the results. Regardless of cause, policymakers should consider trust-related differences when constructing reintegration programs for child soldiers.

Selection into the Experiment

Since the recruitment design depends on potential subjects' willingness to believe that the experimenter and community organizations involved are trustworthy, those who selected into this experiment may have been more trusting than those who did not. But, since all participants would be subject to this selection effect, ordinal differences found among groups stand even in the presence of this potential bias.

Another possible selection concern comes from attrition among potential subjects. Soldiers and non-soldiers included in this experiment are, obviously, those who survived the war and its resulting hardships. It is possible, particularly for soldiers, that those who learned best to trust, placate, and/or reciprocate were more likely to survive. On the other hand, unwillingness to trust may be positively correlated with survival if less trusting individuals are more vigilant or work harder to survive on their own without relying on others. Since it is impossible conclusively to show what effect, if any, trust and/or reciprocity may have on probability of survival in war, it is difficult to know whether subjects in this experiment are representative of all child soldiers. But, for policy relevance, it is necessary only to understand effects on survivors, since these are the individuals in need of rehabilitation and reintegration. Thus, this selection/attrition concern does not dampen the importance of results found in this experiment.

Conclusions and Implications

This paper is the first experimental economic study of the behavior of former child soldiers. Liberian subjects' decisions in the standard investment game indicate that former child soldiers are more trusting – or otherwise motivated to invest more – than either subjects who began fighting after age 18 or subjects who were never members of warring factions or militias. Soldiers who were younger at the beginning of their involvement in war are less willing to reciprocate than those who started

fighting at later ages, and those who participated in reintegration programs are less reciprocal than those who did not take part in these programs. As a whole, Liberians tend both to trust and to reciprocate more than Americans who played the same investment game in previous studies.

Future research can refine the results of this study. First, motivations other than trust and reciprocity could be ruled out by further studying the Liberian populations using the other two parts of the Cox (2004) triad. Second, the causal relationship between war experiences and differences in investment behavior could be developed through similar investment game studies conducted in African countries who have not experienced recent war but whose cultures are otherwise similar to the Liberian culture.

Finally, Policymakers should note that participation in reintegration programs predicts differences in soldiers' investment behavior. Former soldiers could experience better economic outcomes if these programs were designed to counsel them through war-related trust or reciprocity issues. Adult soldier and non-soldier results in this experiment indicate they, too, could benefit from post-war trust-building programs. In wars like the ones in Liberia, no one is unaffected, regardless of his level of direct involvement. Whole communities need help reinstating economic confidence and neighborly trust.

References

Agència Catalana de Cooperació al Desenvolupament. (n.d.). Liberia (Disarmament, Demobilisation,

Rehabilitation, and Reintegration, 2003-08). Ministerio de Asuntos Exteriores y de Cooperacion.

Retrived from http://escolapau.uab.cat/img/programas/desarme/mapa/liberia08i.pdf

BBC. (2011). Liberia country profile. BBC News. Retrieved from

http://news.bbc.co.uk/2/hi/africa/country_profiles/1043500.stm

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, Reciprocity, and Social History. *Games and Economic*

Behavior, 10(1), 122-142.

Blattman, C., & Annan, J. (2010). The consequences of child soldiering. The Review of Economics and

Statistics, 92(4), 882-898.

Chelpi-den Hamer, M. (2010). *Youngest recruits: Pre-war, war & post-war experiences in western Côte*

D'Ivoire. Amsterdam University Press. Retrieved from EBSCOhost.

The Coalition to Stop the Use of Child Soldiers. (2008). Child Soldiers Global Report 2008. Retrieved from

http://www.childsoldiersglobalreport.org

Cox, J. C. (2004). How to Identify Trust and Reciprocity. *Games and Economic Behavior, 46*, 260-281.

Cox, J. C., Ostrom, E., Walker, J. M., Castillo, A. J., Coleman, E., Holahan, R., Schoon, M., & Steed, B.

(2009). Trust in private and common property experiments. *Southern Economic Journal, 75*(4),

957-975.

Denov, M. (2010). *Child soldiers: Sierra Leone's revolutionary united front*. Cambridge University Press.

Retrived from EBSCOhost.

Dickson-Gómez, J. (2002). Growing up in Guerrilla Camps: The Long-Term Impact of Being a Child Soldier

in El Salvador's Civil War.*Ethos*, (4), 327. doi:10.2307/3651878

Fehr, E. (2009). On the Economics and Biology of Trust. *Journal Of The European Economic Association*,

(2/3), 235. doi:10.2307/40282752

Goerg, S. J. & Kaiser, J. (2009). Nonparametric testing of distributions – the Epps-Singleton two-sample test using the empirical characteristic function. *The Stata Journal*, 9(3), 454-465.

Integrated Regional Information Networks. (2003). Liberia: Preparing for the transition from war to normal life. *In Depth: Child Soldiers*. Retrieved from http://www.irinnews.org

Jareg, E. (2005). Crossing bridges and negotiating rivers – Rehabilitation and reintegration of children associated with armed forces. Coalition to Stop the Use of Child Soldiers. Retrieved from http://www.pscentre.org/wp-content/uploads/2013/03/crossing_bridges_childsoldiers.pdf

Johnson, N. D., & Misllin, A. A. (2011). Trust games: A meta-analysis. *Journal of Economic Psychology, 32*, 865-889. doi: 10.1016/j.joep.2011.05.007

Knack, S., & Keefer, P. (1997). Does Social Capital Have an Economic Payoff? A Cross-Country Investigation. *The Quarterly Journal Of Economics*, (4), 1251. doi: 10.2307/2951271

Legislature of Liberia. (2013). Hon. Zayzay wants decent work bill re-introduce. Retrieved from http://legislature.gov.lr/content/hon-zayzay-wants-decent-work-bill-re-introduce

Liberianlaw.com. (n.d.). Approved revised draft constitution of the Republic of Liberia. Retrieved from http://www.liberianlegal.com/constitution1986.htm

Lundberg, M., Blattman, C., & Annan, J. (2010). Evaluating a landmine action ex-combatant reintegration program in Liberia. Ref. LBR_2009_LMA_v01_M. Dataset downloaded from http://microdata.worldbank.org on March 5, 2012.

Mann, H. B., and D. R. Whitney. 1947. On a test of whether one of two random variables is stochastically larger than the other. *Annals of Mathematical Statistics, 18*(1), 50–60. doi: 10.1214/aoms/1177730491

Moynagh, M. (2011). Human Rights, Child-Soldier Narratives, and the Problem of Form. *Research In African Literatures*, *42*(4), 39-59. doi:10.2979/reseafrilite.42.4.39

O'Callaghan, P., Storey, L., & Rafferty, H. (2012). Narrative analysis of former child soldiers' traumatic

experiences. *Educational & Child Psychology*, *29*(2), 87-97.

Özerdem, A. & Podder, S. (Eds.). (2011). Mapping child soldier reintegration outcomes: exploring the

linkages. In *Child soldiers: From recruitment to reintegration* (chapter 17). Palgrave Macmillan.

Retrieved from EBSCOhost.

Smirnov, N. (1948). Table for estimating the goodness of fit of empirical distributions. *The Annals of

Mathematical Statistics, 19*(2), 279-281. doi: 10.1214/aoms/1177730256

Trussell, M., & Moore, R. (2012). Local economic development in Africa: The case of Saclepea, Liberia.

Journal of Sustainable Development in Africa, 14(8), 15-33.

UNICEF. (1997). Cape Town principles and best practices. Retrieved from

http://www.unicef.org/emerg/files/Cape_Town_Principles(1).pdf

Woodward, L., & Galvin, P. (2009). Halfway to nowhere: Liberian former child soldiers in a Ghanaian

refugee camp. Annals of the Association of American Geographers, 99(5), 1003-1011.

doi:10.1080/00045600903245698

World Food Programme. (2011). Liberia, Nimba County, General Logistics Planning Map. [map].

1:410,000. Retrieved from http://www.wfp.org/maps/liberia-nimba-county-general-logistics-

planning-map-27-july-2011

Zak, P. J., & Knack, S. (2001). Trust and Growth. *The Economic Journal*, (470), 295. doi:10.2307/2667866

Informed Consent: Thank you for coming today to sign up to participate in our study. I want to ask you some questions to be sure you qualify for the study. I will keep your answers to these questions in a password-protected file on my computer until after the study is over. I will then destroy any document that links you or your name to your responses.

You will not receive payment for answering these questions today, but if you qualify for the study, you will earn at least 300 LD and will have a chance to earn up to 2000 LD.

I want to ask you about war experiences. Sometimes the war may be disturbing to talk about. Feel free not to answer any question. Just say, "I prefer to go to the next question."

If you feel uncomfortable after the interview is over, you may choose to talk with a professional counselor. I will give you a card with information to contact a counselor, Bob R. Sayon, Sr., who works for the Nimba County Child Protection Program based in Saclepea.

If you are willing to volunteer for this research, please indicate below with your signature or fingerprint.

Participant: _____   Date: _____

Researcher Obtaining Consent: _____   Date: _____

Demographic Information

Q1: Do you know your age? (If no, move on to Q2)

    Q1a: What is your age? (exact or approximate is acceptable)

Q2: How many years of school have you completed?

Soldiering Experiences

Q3: Since Doe time, were you ever part of an army or faction, either as a soldier or any other role? This could be a Liberian faction, or even a faction in another country. (If no, move to conclusion)

Can I ask you about these experiences, or do you want to move on to other questions?

Q4: Were you forced to join?

Q5: Did you join willingly?

Q6: In what year did you first join this faction?

Q7: How long did you stay with this faction?

Q8: Did you carry a gun in this faction?

Q9: Were you ever on the front line?

Conclusion

Thank you for taking time to answer my questions. [Instruction of where and when to show up for the

experiment.]

---

[i] Questions adapted from questions asked by Lundberg, Blattman, and Annan (2010)

Group Instructions: Groups X and Y Together

No Talking Allowed

Now that the experiment has begun, we ask that you do not talk. If you have a question after I finish reading the instructions, please raise your hand and I will approach you and answer your question in private.

Two Groups

You have all been divided into two groups, Group X and Group Y. After we have gone over these instructions, I will assign you to one of two rooms and will inform you which group you belong to.

Anonymity

Each person in Group X will be randomly paired with a person in Group Y. No one will learn the identity of the person he is paired with. You will make all of your decisions in private, and only the experimenter will know your choices.

Group Y Show-Up Fees

Each person in Group Y will be given ten 50-LD certificates as a show-up fee to put in his pocket.

Group X Show-Up Fees

Each person in Group X will be given ten 50-LD certificates as a show-up fee. As I will explain, each Group X person will have a decision to make about what to do with his show-up fee.

Group X Decision Task

After Group X and Group Y people move into separate rooms, I will call each Group X person individually into a private room with no one else besides the experimenter present. Then, each person in Group X will decide whether to keep all ten of his 50-LD show-up fee certificates or give some or all of them to his paired person in Group Y. Every certificate given by a person in Group X to a person in Group Y will be tripled by the experimenter. For example, if a Group X person gives 150 LD to a Group Y person, the experimenter will give the Group Y person a total of 150 times 3, which is 450 LD. I will now give each of you a table that shows how this works.

After a Group X person has made his decision, he will place the amount he wishes to give to his paired Group Y person into an envelope to be given to the Group Y person. Then, the Group X person will return to the Group X room to wait until all participants have made their decisions.

The Group Y Decision Task

I will call each Group Y person individually into a private room with no one else besides the experimenter present. In the private room, each Group Y person will receive an envelope containing the tripled number of certificates given to him by his paired Group X person. The Group Y person will decide whether to return some, all, or none of the tripled number of certificates to the same person in Group X who gave them.

After a Group Y person has made his decision, he will place the amount he wishes to return to his paired Group X person into an envelope to be given to the Group X person.

Post-Game Interview

After the game has been played, I will ask all Group X and Group Y people to participate in an interview in private with only the experimenter present. After the interview has been completed, you will receive your final payment, and your participation in the study will be completed.

Please raise your hand if you have any questions.

What Happens to LD Given by Group X to Group Y

If the Group X Person Gives	The Experimenter Triples the Amount	And the Group Y Person Receives
0	0×3	0
50	50×3	150
100	100×3	300
150	150×3	450
200	200×3	600
250	250×3	750
300	300×3	900
350	350×3	1050
400	400×3	1200
450	450×3	1350
500	500×3	1500

Individual Instructions: Group X

First, do you have any questions about the Consent Document I read to the group?

Please sign or mark the Consent Form indicating that you agree to participate in today's tasks and interview.

Thank you. We will now proceed to the task portion of the experiment.

You are in Group X. Inside the envelope I am giving you now are ten 50-LD certificates. Your task is to decide whether to keep all ten of the 50-LD certificates or give some or all of them to the Group Y person with whom you are paired. Every certificate you give to your paired Group Y person will be tripled by me. The table I have given you shows how this works. Your paired Group Y person will later decide to return some, all, or none of the tripled number of certificates to you.

Please place the amount you wish to give to your paired Group Y person into this envelope to be given to the Group Y person.

Thank you. Please return to the Group X room to wait until all participants have made their decisions. Please do not talk to anyone about the decision you have made.

After all participants have made their decisions, I will call you back into this room to ask you a few short questions and give you your final payment.

Individual Instructions: Group Y

First, do you have any questions about the Consent Document I read to the group?

Please sign or mark the Consent Form indicating that you agree to participate in today's tasks and interview.

Thank you. We will now proceed to the task portion of the experiment.

You are in Group Y. Inside the envelope I am giving you now are ten 50-LD certificates. Please place these certificates in your pocket now. They are yours to keep.

I will now give you a second envelope containing the tripled number of certificates given to you by the person in Group X with whom you are paired. Your task is to decide whether to return some, all, or none of the tripled number of certificates to the same person in Group X who gave them to you. You may keep what you do not return.

Please place the amount you wish to return to your paired Group X person into this envelope to be given to the Group X person.

Thank you. Now I would like to ask you a few short questions about yourself.

Introduction: I want to ask you about yourself and about your war experiences. Sometimes the war may be disturbing to talk about. Feel free not to answer any question. Just say, "I prefer to go to the next question."

Demographic Information

1- Do you know your age?

      a. **Yes:** What is your age? (exact or approximate is acceptable)

      b. **No:** move on to #2.

2- What year were you born?

3- Were you born in Liberia?

      a. **Yes:** What county?

      b. **No:** What country?

4- What is your tribe?

5- What is your religion?

Education

6- In school, what class did you stop in?

      a. **HS Graduate:** What level of university did you complete?

7- Are you able to read letters and books in English?

8- Have you ever received any skills training of apprenticeships?

      a. **Yes:** What skills?

Work & Income

9- Last week, how many days did you do any kind of work for money (e.g. farming, selling goods, small business, driving/motorcycle taxi, tapping rubber)?

10- So in the last week, how much profit did you get from these activities (in LD)?

11- How much money can you usually get in a month for all your regular jobs and small work (in LD)?

Family

12- When you were small, who took care of you: your born mother, another mother, or no mother?

13- That mother, what class in school did she stop in?

14- Is she still alive?

    a. **Yes:** Move on to #15.

    b. **No:**

        i. I'm sorry. Was she killed during the war or die by herself?

        ii. About how old were you when she died?

15- When you were small, who took care of you: your born father, another father, or no father?

16- That father, what class in school did he stop in?

17- Is he still alive?

    a. **Yes:** Move on to #18.

    b. **No:**

        i. I'm sorry. Was he killed during the war or die by himself?

        ii. About how old were you when he died?

18- Do you currently have a wife or partner?

19- How many partners do you support?

20- How many children do you have in your whole life?

Trust/Reciprocity Questions[iii]

21- Would you say that most people can be trusted, or that you can't be too careful dealing with people? (Possible answers include Most people can be trusted/can't be too careful/don't know)

22- Do you think that most people would take advantage of you if they got a chance, or would they try to be fair? (Possible answers include most people would take advantage/they would try to be fair/don't know)

Risk Attitude

23- Suppose you have money to do business. Which business will you take? A business that can give plenty of profit, but there is a chance you can lose your money anytime, or a business with low profit, but you can't lose your money?

Soldiering Experiences

24- Since Doe time, were you ever part of an army or faction, either as a soldier or any other role? This could be a Liberian faction, or even a faction in another country.

    a. **No:** Skip to Conclusion section

Can I ask you about these experiences, or do you want to move on to other questions?

25- Were you forced to do labor by a faction?

26- Did someone shoot bullets at you?

27- Did someone attack you with a cutlass or other weapon?

28- Did you see someone get beaten or tortured?

29- Did you see someone get killed?

    a. **Yes:** How many people did you see get killed: Plenty, some, or few?

30- Did you see someone forced to have sex with someone else?

31- Were you forced to have sex with someone?

32- Were you on the frontline or witness battles?

33- Was a family member or close friend killed during the war?

34- Did you receive a serious beating to the body by non-family members?

35- Did you receive a serious physical injury in a battle or attack?

36- Were you forced to commit a violent act?

    a. **Yes:** How many violent acts were you forced to commit: Plenty, some, or few?

37- Were you a refugee outside Liberia?

38- Were you displaced within Liberia?

Factions & Reintegration

Can I ask about the armies or factions you were part of?

39- What was the first faction or army that you were part of?

40- Were you forced to join?

    a. **Yes:** Were you abducted?

    b. **No:** Did you join willingly?

41- Why did you join?

42- In what year did you first join this faction?

43- How long did you stay with this faction?

44- Did you carry a gun in this faction?

45- Were you ever a member of another fighting force?

    a. **No:** Skip to Reintegration section.

46- Were you forced to join?

    a. **Yes:** Were you abducted?

    b. **No:** Did you join willingly?

47- Why did you join?

48- In what year did you first join this faction?

49- How long did you stay with this faction?

50- Did you carry a gun in this faction?

Reintegration

51- Did you go through any part of the first DDRR program in 1996/1997?

    a. **No:** Continue to next question

    b. **Yes:** Briefly describe your experiences in that program.

52- Did you go through any part of the DDRR program in 2004/2005?

    a. **No:** Continue to next question.

      b. **Yes:** Briefly describe your experiences in that program.

53- Were you involved with any other reintegration program after the conflict ended?

      a. **No:** Skip to Conclusion

      b. **Yes:**

            i. Which program were you in?

            ii. Briefly describe your experiences in that program.

Conclusion

Thank you for taking time to answer my questions. I would like you now to count your payment and sign a payment receipt before you leave. Please remember not to talk to anyone about your decisions or payment during this experiment.

[ii] Questions adapted from Lundberg, Blattman, and Annan (2010)
[iii] Trust/Reciprocity questions from Cox, et al. (2009)

Appendix D

Mann-Whitney (1947) tests the hypothesis that two samples are drawn from equivalent random

variables. Observations from the two samples are combined, ordered, and assigned rankings. The

samples are re-divided, and each sample is given a score equal to the sum of the rankings of all

observations in that sample. The values reported in Table 2 are the Mann-Whitney U statistic and the

one-tailed probability *p* that the two samples are from the same random variable given the calculated U.

Mann-Whitney's U is defined below and should be interpreted as the number of pairs (x_1, x_2) with x_1

from the first sample, x_2 from the second sample, and $x_1 > x_2$.

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - T,$$

where n_1 is the number of observations in the first same sample, n_2 is the number of observations in the

second sample, and *T* is the rank sum for the first sample.

Epps-Singleton tests the probability that two samples are drawn from the same distribution. The test

compares the characteristic functions of the two samples, the Fourier transforms of their empirical

distribution functions. The reported test statistic is a standardized measure of the distance between the

characteristic functions. The Epps-Singleton test works for both continuous and discrete variables and

has been found to have more power than the Kolmogorov-Smirnov test. (Goerg & Kaiser, 2009)

The **Kolmogorov-Smirnov** test is similar to the Epps-Singleton test but measures the distance between

cumulative distribution functions (CDFs) of samples, rather than between the characteristic functions

(Smirnov, 1948). CDFs only make sense for continuous variables; thus, the Kolmogorov-Smirnov test is

only useful for continuous data.