



Mothers, fathers, and others: Competition and cooperation in the aftermath of conflict

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ABSTRACT

We investigate the possibility that women and men have distinct behavioral reactions to victimization. We conducted an experiment to elicit preferences for in-group egalitarianism and individual competitiveness for a random sample of 751 individuals in Sierra Leone (aged 18–85) to contrast the behavioral consequences of victimization during the 1991–2003 civil war across sex and parental status. Our results show that mothers and fathers display the highest level of cooperation, yet conflict exposure does not affect them. Egalitarianism increases after victimization only among non-parents, with an effect stronger for males, who are the least egalitarian to start with. Conflict exposure tames everyone's competitive tendencies, but has the opposite effect for mothers, the least competitive group in the absence of conflict. Measures of competitiveness among 191 parents from Colombia show a similar pattern. Our results suggests that conflict, by closing sex and parental gaps in behavior, may prime individuals toward strategies that either benefit the group or the individual, depending on sex and parental role.

1. Introduction

Behavioral studies in the aftermath of conflict point to the emergence of a set of psychological traits —such as parochial altruism, egalitarianism, and selective trust (i.e. a preferential treatment of members of the in-group vs. the out-group) – conducive to societal cooperation and coordination (e.g. [Bellows and Miguel 2009](#); [Voors et al., 2012](#); [Bauer et al., 2014](#); [2016](#); [Cassar et al., 2013](#)). When one considers behavior under the function aspect, these results are typically explained within the evolutionary framework that traces the evolution of human prosociality to intergroup competition ([Darwin, 1871, 1981](#); [Alexander 1987](#); [Henrich 2004](#); [Choi and Bowles 2007](#); [Bowles 2006](#); [2008](#); [2009](#); [Turchin 2016](#)). The idea is that, if intergroup conflict was a frequent human experience, evolution has favored groups with higher proportions of prosocial individuals, i.e., individuals ready to fight and sacrifice themselves for their in-group against the out-group, and to share resources with the in-group more equally in order to facilitate cooperation and to enhance group survival (e.g. [Bernhard et al., 2006](#); [Bowles 2009](#); [Boyd et al., 2003](#); [Bowles et al., 2003](#)). The proposition that competition between groups can create circumstances favorable to the emergence of cooperation has been supported by experimental works where costly punishment of norms violators and other group-functional behaviors can be sustained once the competitiveness of a situation is made salient ([Gunnthorsdottir and Rapoport 2006](#); [Burton-Chellew et al., 2010](#); [Sääksvuori et al., 2011](#)).

With few exceptions (e.g., [Micheletti et al., 2020](#)), these models either leave out the role of females in the evolution of prosociality,

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or they focus on specifically male adaptations, making the evolution of female strategies in this context an understudied topic. Measuring preferences in post-conflict societies, by comparing individuals with varying degrees of victimization exposure, has been used in recent years to get insights into the behavioral reactions expected to be adaptive to group and/or individual survival. Namely, if a specific behavior is empirically observed to react to a certain event, by asking which functions it was serving, it may tell us something about the selection pressures that contributed to shape it (e.g., [Henrich et al., 2001](#); [Bernhard et al., 2006](#); [Apicella and Silk 2019](#)). In this paper, we investigate the hypothesis that the motivational system behind egalitarianism-based cooperation and individual competitiveness may differ across both sex and parental status. Our empirical strategy is to contrast the effect of individual victimization across men and women along the parental stage (as we expect the presence of children to matter for understanding behavior) in a novel sample of 751 individuals in Sierra Leone. We consider the reactions to different types of victimization (injury, destruction of material resources, and loss of life of a household member during the 1991–2003 civil war) on social preferences towards the in-group and on individual competitiveness.

We start by deriving a series of hypotheses linking reactions to conflict to an individual's sex and parental status according to a set of theories rooted in evolutionary psychology. Then, we proceed to our empirical results which show that both sex *and* parental status matter. First, we find that conflict victimization is associated with the strengthening of prosociality (both through an increase in-group egalitarianism and a decrease in competitiveness), which is larger in magnitude for males. Second, conflict exposure leaves consequences for *non-parents*, both males and females, those who may be most needed to contribute to group survival and are the least likely to do so in the absence of conflict. Overall, the outcome of war on strengthening egalitarianism is strongest for non-parent males, who are the least egalitarian to start with. Third, while conflict experience tames competitive tendencies towards the in-group in general, it has the opposite effect for mothers, making them more competitive.

The magnitude of these outcomes is considerable, to the extent that conflict victimization completely closes the gap in-group egalitarianism between parents and non-parents and closes the gap in competitiveness between males and females. Hence, a correlate of our results is that conflict victimization reduces within-group behavioral differences in cooperation and competitiveness. Insofar as similarity promotes cooperation, such reactions further lend credence to the hypothesis that conflict primes individuals toward behaviors that are associated with an increase in the odds of group survival. Yet, an analysis along sex and parental lines adds important caveats and offers some new ideas.

Our work contributes to the literature on sex differences in behavior, with a particular focus on female strategies from an evolutionary perspective. Existing studies on the effects of conflict on social preferences are surprisingly silent about gender, an interesting fact in light of the vast literature on the behavioral differences between men and women in the absence of conflict (e.g., [Niederle, and Vesterlund 2007](#); [Cassar et al., 2016](#); [Cassar and Rigdon 2021](#)). In addition, our work contributes to accumulating empirical evidence on the behavioral consequences of war victimization from the perspective of inter-group conflict as potential catalyst to prosociality and cooperation. While our results are consistent with the rest of the literature that documents increases in-group egalitarianism, we bring a finer understanding of the underlying mechanism by documenting heterogeneous effects across gender and parental status and discuss how these results fit within the theory. We also shed light on a vastly understudied trait in relation to the behavioral consequences of conflict and disasters: competitiveness. [Cecchi et al. \(2016\)](#) provide the work closest to our own, however they study competitiveness towards the out-group and only for males. In contrast, our novel evidence suggests that conflict curbs in-group competitiveness. This result complements the existing literature by showing that competitiveness comes at the expense of egalitarianism, suggesting that curbing competitiveness may promote cooperation within the group.

2. Theoretical background

The theories that root human cooperation in intergroup competition are based on evolutionary models in which conflicts between groups select for adaptive psychological reactions that promote the success of one's group ([Darwin, 1871, 1981](#); [Alexander 1987](#); [Boyd et al., 2003](#); [Henrich 2004](#)). A first set of theories focuses on purely genetic evolution, where conflicts among different groups shift the share of individuals displaying prosocial behavior directly, favoring parochial altruists, i.e., individuals displaying ingroup prosociality and antagonism towards outsiders ([Bowles 2006](#); [Choi and Bowles 2007](#); [Wilson 2012](#)). A second set of theories relies on the interaction between cultural and genetic evolution, where intergroup competition favors cultural practices (such as norms and institutions) that promote the success of one's social group ([Henrich and Boyd 2001](#); [Richerson and Boyd 2001](#)). Selection within one's group would then favor psychological reactions that incentivize stronger adherence to those local norms and beliefs that have already been selected (via cultural evolution) for greater societal cooperation, therefore improving the group's potential for success in competitions. These models thus predict an increase in preferences functional to cooperation among those who more closely experience conflict.

Empirical evidence generally finds increased prosociality (widely defined) following conflict exposure. For example, [Gneezy and Fessler \(2012\)](#) conduct experiments with senior citizens before, during and after the 2006 Israel–Hezbollah war, and report that, during wartime, people are more willing to incur costs to punish non-cooperative group members and reward cooperative group members than before or after the war. [Blattman \(2009\)](#) shows that past abduction by rebels is linked to increased political engagement in northern Uganda. [Bellows and Miguel \(2009\)](#) find a positive correlation between an experience of violence and political and social behavior in Sierra Leone. [Voors et al. \(2012\)](#) show that individuals who have experienced violence in Burundi, either directly or indirectly in communities that have been attacked, display more altruistic behavior towards their neighbors. [Bauer et al. \(2014\)](#) find that war victimization increased people's egalitarian motivations toward their in-group long after the wars in the Republic of Georgia and Sierra Leone ended.

2.1. Sex

These empirical works do not report separate effects for females. From a theoretical perspective, the models described above, where selection operates at the group level, are either silent about sex or, insofar as those more actively engaged in war are primarily males, expect males to react more strongly to conflict cues and victimization. Models that explicitly look at sex when explaining prosociality focus primarily on the needs of men's organized activities—the formation of coalitions to defeat adversaries—and analyze the selection of traits, such as altruism with the insiders and aggression towards the outsiders, expected to be predominantly male (e.g., Wrangham 2018, Benenson and Markovits 2014). The hypothesis of a male-specific coalition psychology has been advanced to suggest a tendency in men towards group-based competition, i.e., to behave spitefully toward the out-group (Tooby and Cosmides 1988). Such psychology would have evolved in response to mate selection, a pressure especially felt by men, as men would improve their fitness by gaining access to more women and securing the gains from prestige, whereas women would not. Proposed as the “male warrior hypothesis” (Vugt et al., 2007), men would have evolved a group-oriented psychology that motivates them to display in-group bias: higher cooperation and altruism towards insiders with, concurrently, spiteful behavior towards outsiders. These complementary traits would be the result of conflict between male coalitions and the mechanisms that continue to produce it.

Existing empirical evidence find some support for these ideas. Tribal warfare in traditional societies appears almost exclusively the domain of men, and male warriors have been found to hold greater status within their community and to have more sexual partners than other men (Chagnon 1988). Male gang members in the U.S. have been reported to have above-average mating opportunities (Palmer and Tilley 1995). Laboratory experiments appear to support the idea that men exhibit stronger in-group biases compared to women, even in minimal groups (groups formed on trivial social categories like preferring a painter over another) and one-shot settings. For example, Vugt et al. (2007) find men to be more sensitive to threats of intergroup conflict by cooperating more with their group. Yuki and Yokota (2009) also find men more sensitive than women to priming of intergroup competition and only men to show an in-group bias. An interesting finding repeated across experiments is that, while in-group biases are indeed found more present in men than in women, most studies fail to report a concurrent spiteful behavior towards the out-group, hence removing an important pillar of the male warrior hypothesis (Yamagishi and Mifune 2009). The “display of solidarity” hypothesis has then been suggested to explain this unconditional nature of male in-group cooperation and still anchor the evolution of prosociality to males' needs. According to this hypothesis, the benefits that a successful display of solidarity could bring, i.e., the visible size of the coalition, would be a value in and of itself because it would actually serve as a deterrent to further conflict (Gould 1999). The hypothesized real benefit to in-group cooperation would be saving having to physically fight in war, a cost born primarily by men (Sidanius and Pratto 2001). Summarizing, all these theories predict that reactions to war experiences and conflict cues should occur more strongly among the male (potential) fighters:

H1: War victimization strengthens prosociality (increases egalitarianism and lowers competitiveness), especially among men.

2.2. Parental status

In our work, we ask whether women's motivations and preferences follow a path similar to men's. When it comes to female contribution to the evolution of prosocial preferences, the models above remain largely silent. A notable exception is Micheletti et al. (2020), which derives the conditions (dispersal and scale of the competition) that should influence the overall levels of within-group altruism specific to each sex. In fact, female preferences tend to be more explicitly investigated in models that focus on kin-selection, parental investment, and cooperative breeding, as it is in the domain of contribution towards the successful raising of offspring (and their offspring's offspring) that evolutionary psychology traces the origins of sex differences in preferences and behavior (Trivers 1972; Hrdy 2009; Cassar and Zhang 2021).

Here, we propose to distinguish along life stages and look at differences in the costs and benefits that similar strategies impose on individuals who already have offspring (parents) and those that do not (non-parents). At the individual level, where kin selection favors the reproductive success of an individual's relatives, individuals don't just compete against each other (for resources, mating opportunity and the success of their offspring) but also cooperate with others to help genetic relatives. A characteristic of our species is a social system of child rearing where mothers have to rely on group members to help care for, protect, and nourish their unusually slow-maturing and energetically expensive children (Hrdy 2009). Help with childcare has been found to be based mainly on reciprocity, mutual trust, and altruism, rather than coercion, as well as on strong social norms regulating cooperation in reproduction (Bogin et al., 2014). The needs felt by parents, especially mothers, to catalyze help in caring for their children would bring about preferences functional to tame intragroup competition to support some level of intragroup cooperation geared towards childrearing.

This pressure to cooperate for survival would be felt by all, but especially those who already have offspring: mothers not capable of providing all the necessary resources to support their children just by themselves; fathers required to provision and protect; other members of the group, especially postmenopausal women, expected to provide caloric input and help in child rearing. With this model in mind, we expect that, when it comes to prosociality, individuals with children may put more weight on societal cooperation than individuals without children who may not regard the help from others as equally critical. When one's group includes more close relatives, selection can favor cooperative behaviors because prosocial acts benefit, directly, others who carry the same genes and, indirectly, those who help care for them. Laboratory experiments are starting to return evidence that a parental caregiving motivation leads people to behave less selfishly. For example, Wolf et al. (2021) reports an increase in general prosocial motivation and behavior in adults following manipulations of children salience. Cassar et al. (2023) document that help received with childcare is the most robust predictor of reciprocity and altruism. Palomo-Vélez et al. (2020) find links between (especially one's own) children and

prosocial values and behavior geared toward environmental conservation. Gilead and Liberman (2014) show that the activation of caregiving motivations can enhance bias against out-groups following manipulations in which their members pose a salient threat. These considerations suggest that parents may feel more invested in the interests of the group, cooperating at higher levels than non-parents:

H2: Parents are more prosocial than non-parents (more egalitarian and less competitive).

As with the intergroup competition models, it is reasonable to expect that an increase in adversity, as brought about by conflict, would strengthen prosocial bonds and lower individual competitiveness to better react as a group to external dangers. Since parental success is likely to be intertwined with group survival, an overall reaction that improves cooperation at the group level is expected both by models in which parental investment is mainly driven by biological considerations and by models in which parental investment (especially maternal) is induced by culturally enforced norms of parental obligations (Bogin et al., 2014). Therefore, it is plausible to expect parental status to be relevant, but we can see several alternative hypotheses. On the one hand, parents may react stronger than non-parents to safeguard the group, because of the greater returns to their inclusive fitness. That is since they already have children in the group who represent high residual reproductive value and whose survival depends on their parents' sharing networks. On the other hand, adversity may have a lower scope to further increase prosociality among parents, who already cooperate at higher levels than non-parents and may experience a concurrent higher need to provide for their own offspring. If the parents' incentives to benefit the group (first effect) are stronger than the costs to the individual (second effect), we may see an increase in egalitarianism, or a decrease or no change in case the reverse is true.

For non-parents, the balance between costs and benefits to the group vs. the individual may be different. While they may not be as invested in the group in the absence of threat, they may have both more to gain, relative to parents, in cooperating to out-compete the other group when winning comes with increased reproductive opportunities (e.g., by signaling to potential romantic partners their qualities, commitment, and skill through displays of contributions to the group, especially under conditions of intergroup conflict), and the capacity to do so (fewer dependents to provide for). Combining this prediction with the male warrior hypothesis, we expect the strongest behavioral response to conflict cues to occur among non-parent males:

H3: Non-parents react more strongly to conflict than parents (increasing cooperation and reducing competition), especially non-parent males.

2.3. Women competitiveness

When it comes to female competitiveness, the traditional paradigm based on parental investment theory – according to which the sex required to make the largest investment in offspring would be the one the other sex competes for – predicts that women should be less competitive than men (Darwin, 1871, 1981; Bateman 1948; Trivers 1972).

Yet, more recent work has documented the occurrence and evolutionary significance of female competitiveness, given the many benefits that resources and status provide to one's offspring (e.g., Hrdy 1981; 2009; Knight 2002; Clutton-Brock 2007; Brown et al., 2009; Stockley and Campbell 2013; Benenson 2013; for a review see Cassar and Rigdon 2021). Rather than being less competitive, women may be motivated by different incentives, namely those that could provide benefits to their children: dedicated material resources and social support. The role of material resources has been analyzed in a series of experiments that show that when the rewards are explicitly designed as advantageous to their children, mothers compete as much as fathers (Cassar et al., 2016; 2021). The role of social support and the importance of maintaining the potential for cooperation are studied in another series of experiments which show how introducing an option for winners to share the gains with the losers raises women's competitiveness and closes the gender gap with men (Cassar and Rigdon 2021a, 2022b, 2023). By strategically suppressing displays of competitiveness and by favoring situations signaling egalitarian intentions rather than winner-take-all distributions, women could prevent making enemies out of losers and catalyze cooperative behavior from males and females, turning natural competitors (other women) into allies and men into supportive partners (Cassar 2022).

In this paper, we ask the additional question of how women's competitiveness would react to conflict victimization, and we propose to conceptualize it along the lines of scarcity and adversity. On the one hand, scarcity may lower women competitiveness further, in order to secure more cooperative partners. On the other hand, an increased need for resources may push the costs of not competing above the benefits of displaying non-competitive intentions and induce an increase in competitiveness. This second effect may be particularly relevant for those who have higher direct obligations, such as mothers needing to provide for their children.

A related hypothesis has been advanced by Falk and Hermle (2018) which finds gender differences to be strongest in economically developed and gender-egalitarian countries, highlighting the critical role of availability of material and social resources for the expression of gender-specific preferences. In other words, suppressing competitiveness, while potentially beneficial to strengthen cooperation, may be a luxury not affordable for women living in poverty and experiencing scarcity. In our work, we isolate one specific component of material and social scarcity: having been victimized and having sustained relational and economic losses; and one specific determinant of need: having children, especially young. Specifically, mothers with a past history of victimization may react by turning up their competitiveness. If conflict and victimization are capable of inflicting long-lasting consequences on behavior (Bauer et al. 2014; Gangadharan et al., 2022; Couttenier et al., 2019), we may be able to find evidence of an increased competitiveness among mothers. Summarizing, if parental investment is higher for women than for men, mothers can be expected to be the ones for whom resources at critical times of need are more salient and for whom suppressed competitiveness more costly. This argument can be

summarized in our final hypothesis:

H4: Women are generally less competitive than men, but may react more strongly than men to conflict victimization depending on parental status (mothers increase their competitiveness, whereas others may not).

In summary, previous models reveal a complex trade-off between societal cooperation and individual interests. The set of theories based on intergroup conflict predicts a reaction to victimization expected to increase preferences that permit better cooperation within the group. The male warrior and display of solidarity hypotheses expect such higher prosociality to be felt especially by males. When we consider our cooperative breeding nature and look at strategies along life stages, we expect parents to be more invested in group cooperation. Yet, a further increase in egalitarianism and reduction in competitiveness may be more costly to parents than non-parents, as it would reduce resources available for one's offspring. Hence, the strongest shift in increased prosociality as a result of exposure to conflict may actually be expected among individuals without children. Along the parental lines is where the hardest trade-off between individual and group interests resides. If parental investment is indeed higher for women than for men, mothers can be expected to be the ones for whom an increase in prosociality is more costly and could be expected to increase their competitiveness as a reaction to conflict.

3. Data and methods

3.1. Background on the Sierra Leone conflict

The Civil War in Sierra Leone lasted over a decade from 1991 to 2003. It started when the Revolutionary United Front (RUF) attempted to overthrow the government of then President Joseph Saidu Momoh, with the eventual support of the foreign forces of Liberian Charles Taylor's National Patriotic Front of Liberia (NPFL). The civil war began as a revolt against a longstanding dictatorship and its causes could be traced to the corruption, mismanagement, and electoral violence that characterized the society since the country's independence from the United Kingdom.¹ Soon after the start, the RUF took over large territories in eastern and southern Sierra Leone where large diamond reserves were mined to purchase weapons. The rebels, and to some extent also the regular soldiers, brutalized and inflicted great atrocities onto the population. Locals, including children, were forcefully conscripted to work in the diamond mines which funded their military campaign. As highlighted in a contemporary *New York Times* article, "Sierra Leone is no place to be young" (Goodwin 1999). Young boys were made to work in mines or take up arms. Young girls that were captured were forced to take up arms, used as sex slaves, work in the diamond mines or utilized for labor. After being kidnapped, the RUF forced the children to take drugs and commit atrocities in their own villages, so that they would not be able to go back to their own group but only stay with the rebels. The conflict left between 50,000 and 200,000 people dead, and around 27,000 Sierra Leoneans are estimated to have been disabled or have had one or more of their limbs amputated.

Given the nature of rebels' attacks, living close to a rebel camp was likely the main driver of exposure to conflict. However, within a village there is no evidence that certain people were targeted more than others; men, women, girls, and boys were all targeted, although the incidence of injury victimization is slightly higher for males (see Table A1). Furthermore, most were children, likely victims of indiscriminate violence. Therefore, conditional on certain characteristics, violence appears randomly assigned within a village. In our analysis, we include village fixed effects to control for the variation between villages due to proximity to rebel camps and other locally invariable unobserved drivers of conflict exposure and only rely on variation between individuals within the same village.

3.2. Sampling strategy

Our study uses a novel dataset collected during May-August 2018 with a team of nine local enumerators from BRAC International (Building Resources Across Communities) which has extensive experience administering survey and implementing programs in Sierra Leone. The sample consists of 751 individuals from fourteen randomly selected villages chosen from two regions selected at random among the four provinces of Sierra Leone (Makeni in the Northern Province and Kenema in the country's Eastern Province). In each village, starting from pre-specified points of randomly selected neighborhoods, our team of researchers and enumerators invited into the study the occupants of every third house until the predetermined number of participants was reached. One condition for inclusion in the sample was for each household to have most of its adult members able and willing to participate at the same time. Given the poverty of the region and lack of work opportunities outside the homes, most individuals were either already home at the time of the study or not too far to be called home by their family members. The monetary incentives were, on average, about a day's worth of day labor per participant, which resulted in a considerable amount of cash per participating household. Literacy or numeracy were not required to participate (as the activities were carried out one-on-one). This resulted in 91 % of the household invited to participate actually participating. Through this sampling process and the inclusion of most adult members of a household, we obtained a random sample of rural Sierra Leonean villagers. All the activities took place outside the participants' homes in secluded areas, ensuring participants' privacy when playing and confidentiality of answers.²

¹ The causes "could be traced to the corrosive effects of the personalized and monolithic rule of the Congress, which led to the destruction of civil society and democratic accountability" (Zack-Williams 1999).

² A copy of the questionnaire is provided in Online Appendix II.

We provide in Appendix C a replication analysis in a sample of 191 parents of schoolchildren in Medellin, Colombia for whom we obtained preferences for competitiveness.

3.3. Experimental design

Each experimental session consisted of a series of games designed to elicit individual preferences for competition and cooperation, plus a final survey. Each participant was paid a show up fee of Le15,000 as compensation for the hours of labor potentially missed while participating in this study, plus a variable payment of about Le1,827 for one round, randomly chosen, of the experimental games. In total, the average payout each participant received was Le16,827 (about \$2.15 at the time when \$1=Le7,900). This is a non-trivial amount in Sierra Leone which has a minimum wage in the bottom one percent of all countries, at Le500,000 per month. Each participant took his/her decision in private and such choices were kept confidential to both elicit more truthful responses and to eliminate the potential for retaliation or expected redistribution of the gains after the session. All the activities were conducted in random order to balance learning effects.

3.3.1. The cooperation game

The cooperation game is based on the [Fehr et al. \(2008\)](#) protocol to elicit other-regarding preferences including egalitarianism. A modified version (where we added a fourth game, costly envy) was used to assess levels of egalitarianism for children and adults in the aftermath of conflict in a previous study of Sierra Leone and Georgia (see [Bauer et al., 2014](#)). The complete protocol includes a series of four dictator games (the costly sharing, costless sharing, costly envy, and costless envy games) played against a series of characters in a participant's network. In these games, egalitarian choices are defined as those in which money is divided evenly between the sender and the receiver. The participants were instructed that they would be paid only for one round randomly drawn at the very end, a standard experimental procedure for keeping each game salient and preventing correlations across rounds.

The results discussed in this paper center on prosocial preferences towards the in-group, so we focus the analysis on the behaviors elicited through the costly versions of these games played against an anonymous other person (see [Borgerhoff et al. \(2021\)](#) for the study of intrahousehold prosociality among monogamously and polygynously married individuals). The in-group elicitation procedure is usually done through a same village/distant village manipulation of the recipient. Despite our best effort at incentivizing the games for both senders and receivers, during piloting we had to make the change to implement only the senders' decisions (i.e., how much our participants kept for themselves), because the local enumerators were worried that sending nothing to certain neighbors versus a positive amount (no matter how small) to other neighbors would create tensions in the village. The participants knew that their choice would be implemented for themselves (i.e., they would get paid according to how much they chose to keep), and whatever they gave to others would remain with the local enumerators and be used to pay other study participants. This modification of the original feature (leaving the money allocated to the other player with the enumerators who would use these funds to continue the research and pay other study participants vs. a random villager) may bias our results against us finding significant levels of generosity (if the subjects would consider a future study participant more socially distant than a random villager, they would keep more of the endowment for themselves). Importantly, this bias should affect everyone in a similar manner as we cannot think of a reason that would alter the behavior selectively by sex or parental status. Yet, as we show in the next sections, participants systematically and significantly chose very egalitarian distributions of the resources, displaying deeply seated norms of cooperative behavior. Specifically, 53.1 percent choose the egalitarian option in the costly sharing game and 50.6 percent choose the egalitarian option in the costly envy game, sending, in both games, significant amounts of money to others at a cost to themselves.

The Costly Sharing game, depicted in Appendix Fig. A.1, presents the participant with the choice between splitting the pie equally (Le5,000 for self and Le5,000 for the receiver) or keeping it all for his/herself (Le10,000 and Le0). Sharing could be an expression of generosity and costly gift-giving or could be a desire to maintain equality between the matched partners. Whatever the motivation behind the choice to share, the economic impact on the receiver would be unambiguously positive while on the sender it would be unambiguously negatively costly.

The Costly Envy game deals with disadvantageous inequalities. The sender has to choose between the egalitarian option (Le5,000 for self and Le5,000 for the receiver) or Le10,000 for self and Le30,000 for the receiver (see Appendix Fig. A.1). The former choice would reveal either a strong preference for egalitarianism or a dislike of disadvantageous inequalities to the point that one is willing to pay a cost for the other not to have more. The latter choice could reveal either a preference for desiring more resources for self, a desire to send more resources to the partner, and/or a will to maximize the resources extracted from the experimenter.

To better understand preferences and isolate the motive producing a certain behavior we proceed by combining the choices between these two games and create categories of behavior. Here, we are interested in prosocial motives that may be conducive to an egalitarian approach to fostering societal cooperation. The literature has isolated egalitarianism as an important catalyst of intragroup cooperation. In the evolutionary approaches, intergroup competition works through the curtailing of within-group differences in fitness to cement internal cohesion and invigorate cooperation ([Bowles 2006](#)). In laboratory experiments, individuals are repeatedly found to be willing to alter the income of others to ensure a more egalitarian outcome even when it costs them, and this behavior has the effect of promoting further cooperation ([Fehr et al. 2002](#); [Andreoni et al., 2003](#)). Rather than just reducing other's income, egalitarian motives appear to be driving this income-altering behavior and are suggested to be a critical factor underlying the evolution of strong reciprocity and cooperation in humans ([Dawes et al., 2007](#)). Consistent with this view, a growing number of empirical studies have linked higher inequality to greater social disharmony, from higher illiteracy to more stress, violence, drug dependence and mental illness ([Wilkinson and Pickett 2010](#)), to slower economic growth ([Sokoloff and Engerman 2000](#)), and to societal wellbeing or collapse ([Boehm 1999](#); [Turchin 2016](#)).

In our analysis, we define *Egalitarianism* as the choice of the (1,1) option for both the costly sharing and costly envy games described above. That is, a participant is egalitarian if they choose the equal split of the gains rather than keeping more or less than the amount sent to the receiver, despite the cost to self. Participants who conform to this category have a value of 1 for this variable, the others have a 0.

3.3.2. The competition game

The competition game is based on an oral version of the standard experimental protocol for eliciting competitive preferences (Niederle and Vesterlund 2007; Cassar and Zhang 2021). The game's main task is to perform one-minute of mental summation: $1 + 8 = 9$, $9 + 3 = 12$, $12 + 2 = 14$, etc. Adding up in one's mind is a quotidian function in Sierra Leone where even those with little education and low literacy perform it regularly to complete transactions and, in general, are very good at it. To keep the task difficulty constant and equal among participants, we worked from a predetermined list of additions, adding only one-digit number to each previous total.

The competition game unfolds in a sequence of three rounds as shown in Appendix Fig. A.2. The first two rounds are the same for everyone and expose the participants to two different payment schemes. The first method, termed Piece-Rate, is a payment method for which participants receive a relatively low but certain amount per correct answer (Le1,000). A second scheme, named Tournament, is a compensation method in which participants are paid twice as much per correct answer as the Piece-Rate method (Le2,000 per correct answer), but only if they solve correctly more additions than a randomly matched partner. This second round is a compulsory competition against an anonymous person from the same village whose score has been obtained in advance (during pilots of the experiment).

What matters for us is not how well a participant can solve additions as in Round 1 or 2, but which payment scheme is preferred by a participant that has experienced both environments: a low but certain rate or a higher, yet uncertain, one that involves measuring oneself against others. The relevant part of the experiment, then, starts with Round 3, when participants are asked to decide, privately, whether they choose to be paid according to the Piece-Rate rule or the Tournament rule for the round to follow. The important feature to this design is that, when tournament is chosen, each participant's current performance is matched against an anonymous villager past performance in Round 2. This was done for several reasons: to compare both competitors' performances under the same competitive environments, to make sure each participant had a partner (the new partner may have chosen piece-rate), and, most important of all, to remove the motive of not wanting to impose a cost (by winning) on another and confound competition with other-regarding preferences. We focus on the round where each participant is given the choice to compete or not against an anonymous person from the same village as a measure of in-group competitiveness. In our analysis, we define *Competitiveness* as this choice to compete, coded as 1 when the subject chooses Tournament, 0 otherwise.

Since competitiveness is inextricably linked to confidence and tolerance to risk, we also elicit a measure of risk aversion by including an incentivized simple risk game experimental module (unitary lottery as in Eckel and Grossman 2008) and a "guess how good you were" module to measure respondent's confidence. Controlling for risk and confidence enables us to isolate competitiveness behavior from its usual confounds. We also control for respondents' ability (measured by the number of correct answers in Round 1), which could influence willingness to compete.

3.4. Descriptive statistics

Demographics. Our sample consists of 751 adults (653 parents and 98 non-parents, a natural imbalance given the adult age range we targeted). The relevant descriptive statistics are in Table 1. Since we aim to contrast the effect of conflict along reproductive stages and gender, we present our analysis both for the full sample and separately for parents vs. non-parents, and for women vs. men. By virtue of the demographic composition of rural villages and the prevalence of polygyny, women are slightly over-represented in our sample of parents (387 mothers vs. 266 fathers) but balanced in the sample of non-parents (47 females and 51 males). The average number of children (intensive margin) is 3.69, with fathers reporting more children compared with mothers due to the high prevalence of polygyny in our sample (44.94 % of our sample is in a polygynous household). The majority of our sample is Christian, with the Muslim minority slightly over-represented in the non-parent sample (19 % vs. 13 %, two-sample *t*-test with equal variance difference in means *p*-value: 0.07 – hereafter reported *p*-values of difference in means come from two-sample *t*-tests with equal variance). In the survey, we asked about people's age. However, inspecting the age distribution reveals bunching around multiples of five, suggesting that people do not report their age precisely.³ To reduce measurement error, we capture age by terciles of the age distribution: young (18, our youngest respondent, to 28), middle aged (29–39), and old (above 40). Non-parents are, expectedly, younger than parents (89 % are young, compared to 29 % of parents).

Egalitarianism and competitiveness. For egalitarianism, choosing the equal split in both the costly sharing and costly envy games, as described in Section 3.1., the observed divide is not across genders, but across parental status. Parents are a lot more egalitarian than non-parents: 36 % of parents are egalitarian within their in-group, compared to 26 % of non-parents (*P*-value: 0.05), with no difference between mothers and fathers (35 % vs. 36 %, *P*-value: 0.73) or between non-parent men and non-parent women (25 % vs. 26 %, *P*-value: 0.99).

³ When a numerical variable, such as age, cannot be accurately measured, it may be justifiably converted into a categorical variable (Powers and Xie 2008). This happens, for example, when the respondents are unable to state their exact age because they are illiterate or their culture is not concerned by its precise measurement, but are able to say that they are in their twenties, thirties, or forties with varying degrees of granularity (Andrade 2017). This is common for people living in rural Sierra Leone (Sierra Leone DHS 2019).

Table 1
Descriptive statistics.

Variable	Full sample					Female					Male				
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max
Panel A: Parents															
Egalitarian	653	0.36	0.48	0	1	387	0.35	0.48	0	1	266	0.36	0.48	0	1
Competitiveness	652	0.58	0.49	0	1	387	0.54	0.50	0	1	265	0.65	0.48	0	1
Injured	652	0.66	0.47	0	1	386	0.63	0.48	0	1	266	0.71	0.45	0	1
Destruction	651	0.79	0.41	0	1	386	0.76	0.43	0	1	265	0.83	0.37	0	1
Killed	650	0.60	0.49	0	1	386	0.58	0.49	0	1	264	0.63	0.48	0	1
Middle Age	653	0.35	0.48	0	1	387	0.37	0.48	0	1	266	0.33	0.47	0	1
Old	653	0.36	0.48	0	1	387	0.23	0.23	0	1	266	0.56	0.50	0	1
Muslim	653	0.13	0.33	0	1	387	0.12	0.32	0	1	266	0.14	0.35	0	1
# Children	653	3.69	2.39	1	18	387	3.21	1.76	1	10	266	4.39	2.96	1	18
Risk	653	3.18	1.85	1	6	387	3.11	1.86	1	6	265	3.28	1.85	1	6
Ability	652	5.36	2.83	0	9	387	4.79	2.94	0	9	265	6.18	2.45	0	9
Confidence	652	2.11	2.42	−6	9	387	1.84	2.39	−6	9	265	2.50	2.42	−5	9
Panel B: Non-Parents															
Egalitarian	98	0.26	0.44	0	1	47	0.26	0.44	0	1	51	0.25	0.44	0	1
Competitiveness	98	0.60	0.49	0	1	47	0.60	0.50	0	1	51	0.61	0.49	0	1
Injured	94	0.53	0.50	0	1	45	0.51	0.51	0	1	49	0.55	0.50	0	1
Destruction	94	0.61	0.49	0	1	45	0.56	0.50	0	1	49	0.65	0.48	0	1
Killed	94	0.47	0.50	0	1	45	0.47	0.50	0	1	49	0.47	0.50	0	1
Middle Age	98	0.07	0.26	0	1	47	0.06	0.25	0	1	51	0.08	0.27	0	1
Old	98	0.04	0.20	0	1	47	0.09	0.28	0	1	51	0.00	0.00	0	0
Muslim	98	0.19	0.40	0	1	47	0.19	0.40	0	1	51	0.20	0.40	0	1
Risk	98	3.59	1.80	1	6	47	3.40	1.90	1	6	51	3.76	1.72	1	6
Ability	98	5.96	2.30	0	9	47	5.38	2.55	0	9	51	6.49	1.91	0	9
Confidence	98	2.73	2.05	−3	9	47	2.38	1.97	−3	7	51	3.06	2.09	−1	9

In contrast, for competitiveness (choosing to compete in the tournament, as described in Section 3.1.), the main divide is observed across gender lines. Competitiveness does not differ across the two samples of parents and non-parents (58 % vs. 60 %, two-sided difference in means P-value: 0.72). However, men, and especially fathers, are more competitive than women: the two-sided difference in means between fathers (65 %) and all women (54 %) P-value is 0.01.

Victimization. We consider three measures of individual victimization. The first (*Injured*) is an indicator variable taking value 1 if either the respondent was injured or if his or her household member was injured during the civil conflict. The second (*Destruction*) takes value 1 if the respondent reported loss of property as a result of the conflict. The third (*Killed*) is an indicator variable taking value 1 if a member of the respondent’s household was killed during the conflict. Incidence of victimization is very high in our sample. Since parents are older on average and the conflict spanned over the entirety of the 1990s, incidence of victimization is particularly high in the sample of parents. 66 % of parents and 53 % of non-parents report injury; 60 % of parents and 47 % of non-parents report death; 79 % of parents and 61 % of non-parents report destruction.

3.5. Empirical strategy

Empirical specification. We investigate how war victimization affects preferences for in-group egalitarianism and competitiveness. We focus on victimization measures that capture both material costs and trauma: (i) whether one or one’s family member was injured (engendering medical expenditures and loss of earning potential), and (b) whether the household’s property was destroyed, as a result of the conflict. We consider in the Appendix the possible effect of having a family member killed during the conflict (which may add to material injuries also emotional hurt and loss of kin support), as well as other specifications that consider the cumulative effects of different incidences of victimization, and the results are consistent. The analysis compares individuals who suffered these types of victimization to individuals that did not, using an Ordinary Least Square Regression, with our proxies for in-group competition and cooperation as the dependent variables. We verify in the Appendix (see Tables A.4 and A.10) that our results are robust to using a non-linear estimation model, but we choose to focus on OLS as our main specification due to issues arising from the estimation of interactions in non-linear models (see Ai and Norton 2003).

We focus on two axes of heterogeneity in our analysis: parental status and gender. To estimate whether the association between conflict and pro-social preferences differs across parental status and gender, we estimate models that include an interaction term between victimization and either female (eq. (1)) or parental status (eq. (2)). We also conduct subsample analyzes by sex or parental status. We combine two-sample split analysis with two-way interaction to keep our results tractable.

We estimate the following equations:

$$Y_{ij} = \beta_0^1 + \beta_1^1 V_{ij} + \beta_2^1 F_{ij} + \beta_3^1 F_{ij} * V_{ij} + \beta_4^1 X_{ij} + \gamma_j^1 + e_{ij}^1 \tag{1}$$

$$Y_{ij} = \beta_0^2 + \beta_1^2 V_{ij} + \beta_2^2 P_{ij} + \beta_3^2 P_{ij} * V_{ij} + \beta_4^2 X_{ij} + \gamma_j^2 + e_{ij}^2 \tag{2}$$

Our outcome variables Y_{ij} proxy behavioral preferences (alternatively egalitarianism and competitiveness) of respondent i in village j ; V_{ij} is a measure of individual victimization, F_{ij} is an indicator for female respondents, P_{ij} indicates parental status, X_{ij} is a set of individual controls (age groups, gender, religious affiliation, number of children, and, for the competitiveness specifications: confidence, ability, and risk preferences – we explain the choice of these controls below), and γ_j is a set of village fixed effects. Standard errors are corrected for heteroskedasticity and clustering at the village level. To adjust for the small number of clusters (14 clusters), we use the cluster bootstrap method based on 1000 replications, as recommended by Cameron and Trivedi (2010). The parameters of interest are β_3^1 , which captures the differential consequence of victimization for females and β_3^2 , which captures the differential consequence of victimization for parents.

Identification. The identification of the causal effect of violence could be impaired if victims are different from non-victims for specific reasons that are correlated with our outcomes of interest. In that case, any comparison of victims and non-victims may conflate the impacts of war with pre-existing differences that led some people to be victimized. This issue encompasses not only selection into victimization per se, i.e. the possibility that different people may have been systematically targeted by violence, but also survivor bias, i.e. the possibility that people with specific characteristics were more likely to survive violence. Moreover, since we survey individuals in their villages several years after the end of the conflict, selective migration is also a concern. Victims of violence, and of specific types of violence, in particular sexual violence, may have been more likely to migrate out of their villages into other locations, such as cities, refugee camps, or other countries, which would also potentially introduce a sample selection bias.

To investigate whether selection into victimization, survivor bias, and selective migration are major concerns, we analyze the determinants of victimization in Table A.1. The idea of this analysis is that if these biases were present, we would expect large, systematic, and significant differences between reported victims and non-victims of the conflict along individual characteristics. We present the estimation results of a regression of our indices of victimization on a wide range of individual controls. We include individual controls that are pre-determined (e.g., gender, age) as well as controls that are more likely to be correlated with prosocial preferences, such as confidence, ability, and risk preferences. Inspection of Table A.1 reveals no evidence of systematic selection into victimization. The only robust correlate of victimization is age, with older people more likely to having been injured or having experienced destruction, a logical result since the conflict took place between 1991 and 2003. We also find that women are less likely to have been injured as a result of the conflict. No other characteristic is systematically associated with any kind of victimization.

We control, in all specifications, for age and either gender and/or parental status (depending on the subsample). It is uncommon in the setting we study to remain childless after a certain age, and only 6 % of participants over age 25 are childless in our sample. Yet,

parents and non-parents of a certain age (those over 25 years) appear comparable on a number of other observable characteristics, in particular education, employment, and exposure to war (see Table A.2). This similarity alleviates concerns of bias resulting from potential selection into parenthood. To further reduce the scope of a potential endogeneity bias, we include γ_j , a set of village fixed effects (alternatively village random effects as reported in Appendix Tables A.3 and A.9) to account for the local nature of the conflict. With these, identification of the causal effect of conflict requires victimization to be -as good as- randomly assigned within villages, conditionally on individual characteristics.

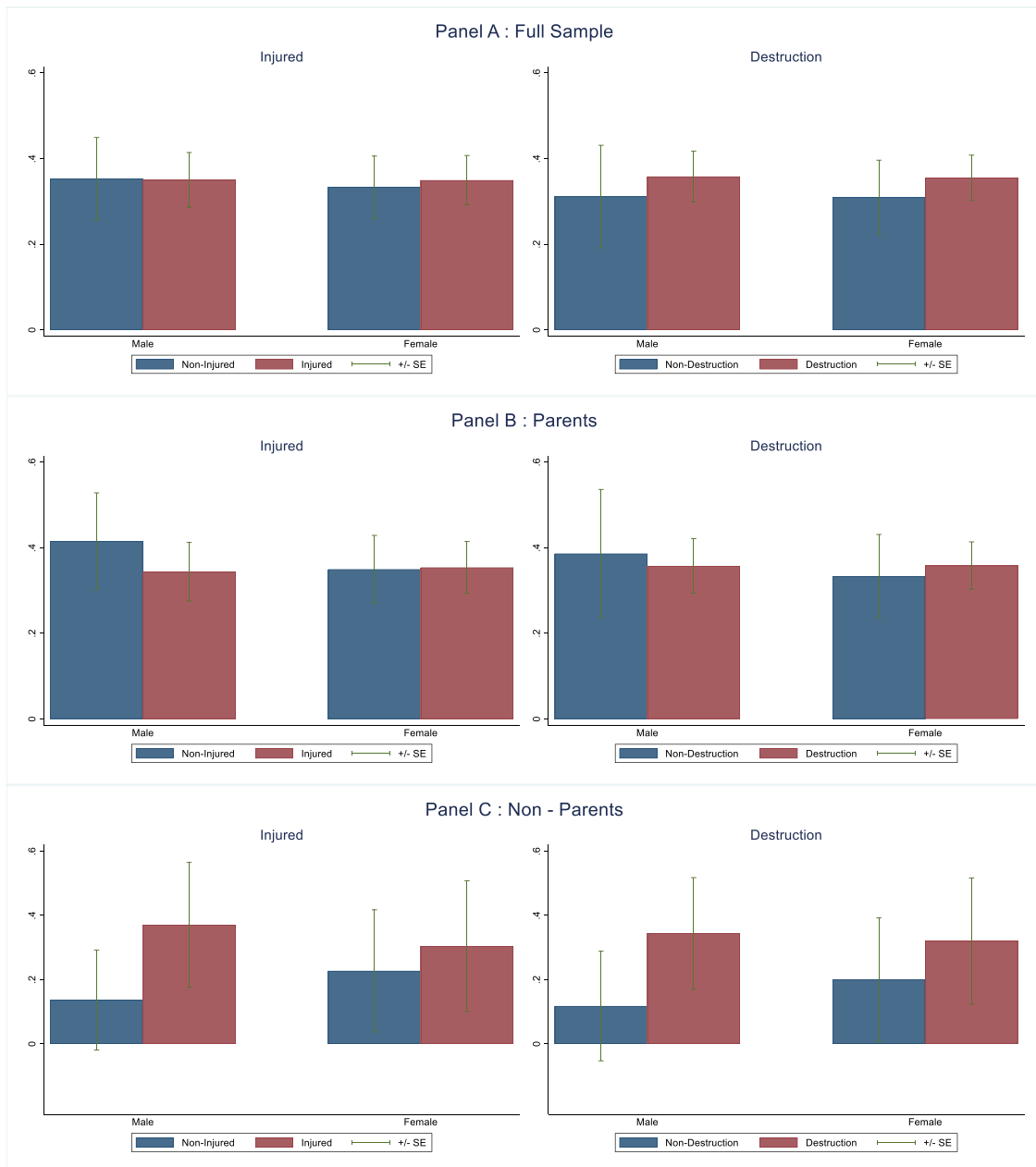


Fig. 1. Mean egalitarian preferences by gender and parental status.

Note: The graphs illustrate the unadjusted differences in egalitarianism between men and women as a function of individual victimization. *Egalitarian* is an indicator variable equal to 1 if the respondent chooses the costly sharing and the costly envy option in the cooperation games. *Injured* is an indicator variable equal to one if the respondent or any member of the respondent's household was injured during the conflict while *Destruction* is an indicator variable equal to 1 if the respondent reports any loss of property as a result of the conflict. Panel A shows that there is no gender gap or change in egalitarian preferences as a result of victimization. Panel B and C disaggregate these preferences by Parents and Non-Parents to show that victimization increases egalitarianism in non-parents to close the gap with parents. This increase in egalitarian preferences is higher for non-parent males than females. There is no change in egalitarian preferences as a result of victimization for parents, either mothers or fathers.

Table 2
Victimization and egalitarian preferences.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable: <i>Egalitarian</i>											
Sample	Full				Parents		Non-Parents		Females		Males	
Measure of Victimization	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.
Female	−0.01 (0.06) [0.88]	−0.00 (0.07) [0.95]			−0.06 (0.07) [0.61]	−0.06 (0.09) [0.60]	0.09 (0.12) [0.39]	0.13 (0.12) [0.25]				
Victimization	0.05 (0.06) [0.32]	0.07 (0.07) [0.40]	0.23*** (0.09) [0.00]	0.23*** (0.09) [0.00]	−0.01 (0.07) [0.89]	−0.01 (0.08) [0.94]	0.33** (0.15) [0.00]	0.34** (0.14) [0.00]	0.21* (0.12) [0.08]	0.23* (0.12) [0.03]	0.29** (0.12) [0.00]	0.32*** (0.12) [0.00]
Female * Victimization	0.01 (0.07) [0.83]	0.00 (0.08) [0.97]			0.07 (0.08) [0.57]	0.07 (0.09) [0.51]	−0.10 (0.18) [0.68]	−0.13 (0.19) [0.46]				
Parent			0.15** (0.07) [0.00]	0.16** (0.08) [0.00]					0.13 (0.11) [0.15]	0.16 (0.10) [0.01]	0.29** (0.12) [0.00]	0.34** (0.13) [0.00]
Parent * Victimization			−0.19** (0.09) [0.00]	−0.19** (0.09) [0.00]					−0.11 (0.13) [0.27]	−0.15 (0.13) [0.04]	−0.38*** (0.14) [0.00]	−0.41*** (0.14) [0.00]
Individual controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of clusters	14	14	14	14	14	14	12	12	14	14	14	14
Observations	746	745	746	745	652	651	94	94	431	431	315	314
Oster coefficient	0.35	−1.15	−6.13	−1.58	1.36	−1.54	0.33	7.24	−0.97	−1.01	−1.00	−0.48
R-squared	0.18	0.18	0.18	0.19	0.18	0.19	0.27	0.27	0.25	0.25	0.16	0.16

Notes: OLS regression with a constant. Robust standard errors are given in parentheses below the coefficients. Star significance is based on their corresponding p-values (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$. Standard errors are also corrected for potential heteroskedasticity and for potential clustering at the village level using the cluster bootstrap method based on 1000 replications. The corresponding bootstrap p-values are shown in square brackets below the robust standard errors. All specifications include fixed effects at the village level. *Egalitarian* is an indicator variable equal to 1 if the respondent chooses the costly sharing and the costly envy option in the dictator game while playing with someone from the same village indicating their preference for egalitarianism. *Injured (Inj.)* is an indicator variable equal to one if the respondent or any member of the respondent's household was injured during the conflict. *Destruction (Des.)* is an indicator variable equal to 1 if the respondent reports any loss of property as a result of the conflict. Individual controls include the respondents' age, gender, religious affiliation (Muslim vs Christian), number of children. Age is captured by terciles of age distribution: young (18, our youngest respondent, to 28), middle age (29–39), and old (above 40). "Oster coefficient" corresponds to the value of the delta coefficient according to Oster (2019) computed either for β_1^1 (estimation of Eq. (1)) or β_3^2 (estimation of Eq. (2)), compared to a specification with no included controls and a maximum R-squared of 1.

In addition, we control for other potential correlates of preferences in order to improve the precision of our estimates, specifically religious affiliation (Muslim vs. Christian), number of children, as well as confidence, ability, and risk preferences in the specifications for competitiveness. Finally, to address remaining concerns about potential omitted variable bias we also conduct Oster tests and report the corresponding coefficients in our main tables as recommended by Oster (2019).

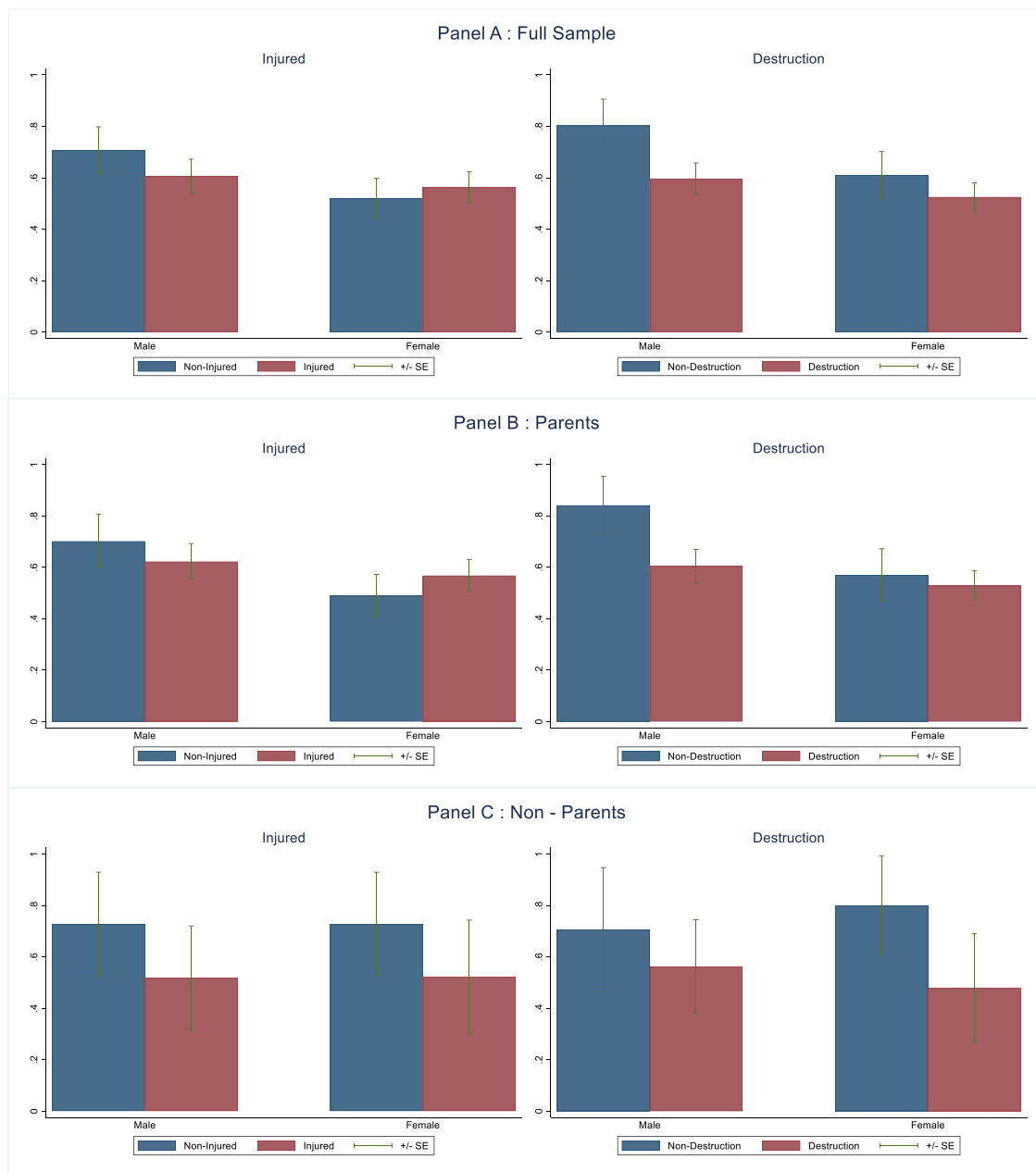


Fig. 2. Mean competitive preferences by gender and parental status.

Note: The graphs illustrate the unadjusted differences in the mean choice to compete between men and women for measures of individual victimization. *Competitiveness* is an indicator variable equal to one if the respondent chooses the tournament in the competitiveness game. *Injured* is an indicator variable equal to one if the respondent or any member of the respondent’s household was injured during the conflict while *Destruction* is an indicator variable equal to 1 if the respondent reports any loss of property as a result of the conflict. Panel A shows that men are more competitive than women overall and that victimization reduces this gender gap in preferences. Panel B and C show that the gender gap in competitive preferences is driven almost entirely by parents. Non-parents do not exhibit any gender gap in competitiveness regardless of victimization status. Everyone tames competitiveness, with the exception of mothers.

4. Results

4.1. Egalitarianism

Conflict closes the parental gap in egalitarianism. Descriptive statistics suggest that the main dividing line in predicting egalitarianism ran along parental status, with parents being a lot more egalitarian. The framework in Section 2 predicts that parents, in general, should be more attentive to in-group cooperation than non-parents, hence more egalitarian, but that conflict exposure should act especially on those group members that are initially less cooperative, i.e. non-parents, both male and female, and who should become more egalitarian as a result. Parents are, in general, more egalitarian (36 % vs. 26 %, P-value: 0.05) and, as predicted, we find that conflict closes the gap between parents and non-parents. Fig. 1 (Panel A) shows unadjusted differences in egalitarianism between men and women, as a function of individual victimization. In the full sample, we see no average correlation between egalitarianism and victimization. Once we break down the samples across parents and non-parents in Panels B and C, it becomes clear that conflict is associated with an increase in egalitarianism, but only for non-parents (the least egalitarian to start with). Moreover, the increase in egalitarianism is stronger for non-parent males rather than females, as predicted by the inter-group conflict theoretical framework, although estimates are noisy due to the small sample of non-parents.

Table 2 confirms these results in a regression framework, controlling for individual characteristics and village fixed effects, as specified in eq. (1) and eq. (2). Columns (1) to (4) present the results for the full sample. We also present the results separately for our sample of parents (Columns 5 and 6), non-parents (Columns 7 and 8), females (Columns 9 and 10) and males (Columns 11 and 12). Columns 1 and 2 confirm that in the whole sample, there is no heterogeneity along gender lines in the relationship between conflict and egalitarianism. Columns 3 and 4 show that parents display no change in egalitarianism associated with victimization. In contrast, non-parents who have experienced injury or destruction are much more egalitarian than non-victimized ones. The magnitude is large, with a 33-percentage point increase in egalitarianism associated with injury (Column 7) and a 34-percentage point increase in egalitarianism associated with destruction of property (Column 8). The results are moderately stronger for non-parent males, with a 29-percentage point increase in egalitarianism as a result of injury experience (Column 11) or 32 percentage points for destruction of property (Column 12) compared to non-parent females who show a 21 and a 23 percentage point increase in egalitarianism for the

Table 3
Victimization and competitive preferences.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dependent variable: <i>Competitiveness</i>											
Sample	Full		Parents		Non-Parents		Females		Males			
Measure of Victimization	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.	Inj.	Des.
Female	-0.08 (0.05) [0.12]	-0.09 (0.06) [0.09]			-0.10* (0.06) [0.10]	-0.16** (0.07) [0.01]	0.03 (0.16) [0.77]	0.12 (0.17) [0.34]				
Victimization	-0.07 (0.05) [0.28]	-0.09 (0.06) [0.11]	-0.13 (0.09) [0.03]	-0.08 (0.09) [0.06]	-0.05 (0.06) [0.38]	-0.13** (0.06) [0.04]	-0.22* (0.13) [0.15]	-0.03 (0.14) [0.69]	-0.09 (0.13) [0.17]	-0.16 (0.13) [0.08]	-0.16 (0.12) [0.23]	-0.00 (0.13) [0.98]
Female * Victimization	0.14** (0.06) [0.02]	0.13* (0.07) [0.34]			0.15** (0.07) [0.02]	0.20*** (0.07) [0.00]	0.08 (0.21) [0.65]	-0.07 (0.23) [0.60]				
Parent			-0.05 (0.07) [0.41]	-0.02 (0.08) [0.76]					-0.06 (0.10) [0.56]	-0.09 (0.10) [0.32]	-0.02 (0.13) [0.80]	0.10 (0.14) [0.33]
Parent * Victimization			0.17* (0.09) [0.00]	0.09 (0.09) [0.14]					0.20 (0.14) [0.11]	0.23* (0.14) [0.05]	0.07 (0.14) [0.39]	-0.13 (0.15) [0.12]
Individual controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of clusters	14	14	14	14	14	14	12	12	14	14	14	14
Observations	745	744	745	744	651	650	94	94	431	431	314	313
Oster coefficient	25.96	-12.13	1.33	1.04	7.44	42.05	-0.59	0.22	1.33	2.29	0.58	-2.18
R-squared	0.37	0.37	0.37	0.37	0.39	0.39	0.39	0.37	0.40	0.40	0.37	0.37

Notes: OLS regression with a constant. Robust standard errors are given in parentheses below the coefficients. Star significance is based on their corresponding p-values (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$). Standard errors are also corrected for potential heteroskedasticity and for potential clustering at the village level using the cluster bootstrap method based on 1000 replications. The corresponding bootstrap p-values are shown in square brackets below the robust standard errors. All specifications include fixed effects at the village level. *Competitiveness* is an indicator variable equal to one if the respondent chooses tournament. *Injured (Inj.)* is an indicator variable equal to one if the respondent or any member of the respondent's household was injured during the conflict. *Destruction (Des.)* is an indicator variable equal to 1 if the respondent reports any loss of property as a result of the conflict. Individual controls include the respondents' age, gender, religious affiliation (Muslim, Christian), number of children as well as risk, ability, and confidence scores. Age is by terciles of age distribution: young (18–28), middle age (29–39), and old (above 40). "Oster coefficient" corresponds to the value of the delta coefficient according to Oster (2019) computed either for β_3^1 (estimation of Eq. (1)) or β_3^2 (estimation of Eq. (2)), compared to a specification with no included controls and a maximum R-squared of 1.

respective measures of victimization (Column 9 and Column 10).

In robustness checks, we show that our results are robust when we include village level random effects (Table A.3) or when we estimate non-linear models (Table A.4). The results of Oster coefficient tests reported in Table 2 show that estimated delta coefficients are often negative, which occurs when the magnitude of the coefficients of interest increases with the inclusion of controls; and when positive, they are above one, suggesting that the influence of unobservable variables would have to be more than proportional to the influence of observable characteristics to drive the coefficient of interest towards zero. Table B.1 in the Appendix shows similarly that non-parent men and women become more egalitarian after victimization when the proxy for victimization is *killed*, but the estimated coefficients fall short of statistical significance. In Table A.5 we present the results of a horse race specification in which we control for *destruction* together with *injured*. The results show that the increase in egalitarianism among non-parents is primarily driven by injury, although the economic channel of destruction of property is a consistent predictor of higher egalitarianism (Column 4 and Column 6). While we do not have information about the value of asset destruction, or the severity of the injuries, to estimate the effect at the intensive margin, we construct measures of conflict exposure that take into account the different dimensions of exposure. We define two alternative variables that capture all three measures of victimization: (i) Extensive margin of exposure (*Ext.*): an indicator variable equal to 1 if the respondent reports either one of our measures, i.e., either injured, or destruction, or killed; and (ii) Intensive margin (*Int.*) as the sum of injured, destruction, and killed. As shown in Appendix Table A.6, our main results remain unchanged.

4.2. Competitiveness

Conflict closes the gender gap in parents. Fig. 2 (Panel A) reports the uncontrolled differences in preferences for competition between men and women, as a function of individual victimization. Panel B and C disaggregate the results for parents and non-parents. Overall, men are more competitive than women, but conflict reduces men's preferences for competition to a much greater extent than that of women. As a result, the gender gap in competition is drastically reduced by the experience of conflict. Panel B and C show that victimization lowers the desire to compete significantly for all except mothers.

Table 3 confirms these results in a regression framework, controlling for individual characteristics and village fixed effects, as specified in eq. (1) and eq. (2). Columns (1) to (4) presents the results for the full sample while Columns (5) to (12) present the results for the subsamples along parental status and sex lines. The coefficient associated with the interaction between female and victimization is positive and statistically significant in the whole sample, and Columns (5) to (8) show that this result comes from mothers. Moreover, destruction of property reduces competitiveness among men. As a result, the experience of victimization closes the gender gap in competitiveness among parents. Controlling for village fixed effects and individual controls in Column (5), mothers who have not

Table 4
Competitive preferences: mechanism - parents.

	(1)	(2)	(3)	(4)	(5)	(6)
Sample:	Dependent variable: <i>Competitiveness</i>					
	Single, widowed or divorced	Partnered	Many children	Few children	Young children	Older children
Female	−0.36** (0.14) [0.25]	−0.11 (0.08) [0.12]	−0.22** (0.11) [0.05]	−0.12 (0.09) [0.17]	−0.25*** (0.10) [0.01]	−0.04 (0.09) [0.62]
Destruction	−0.38*** (0.12) [0.00]	−0.08 (0.07) [0.24]	−0.17* (0.10) [0.09]	−0.10 (0.09) [0.20]	−0.20** (0.09) [0.00]	−0.04 (0.08) [0.62]
Female * Destruction	0.40* (0.16) [0.23]	0.15* (0.08) [0.00]	0.24** (0.12) [0.00]	0.18* (0.10) [0.04]	0.27** (0.11) [0.01]	0.08 (0.10) [0.37]
Individual controls	Y	Y	Y	Y	Y	Y
Number of clusters	14	14	14	14	14	14
Observations	124	521	324	326	255	395
Oster coefficient	2.84	−106.31	20.47	23.50	2.90	6.85
R-squared	0.37	0.41	0.40	0.41	0.43	0.39

Notes: OLS regression with a constant. Robust standard errors are given in parentheses below the coefficients. Star significance is based on their corresponding p-values (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$). Standard errors are also corrected for potential heteroskedasticity and for potential clustering at the village level using the cluster bootstrap method based on 1000 replications. The corresponding bootstrap p-values are shown in square brackets below the robust standard errors. All specifications include fixed effects at the village level. *Competitiveness* is an indicator variable equal to one if the respondent chooses tournament. *Single, widowed or divorced* considers only the parents who are either single, divorced or have been widowed, while *Partnered* considers only those parents who currently have a partner. *Many Children* considers only the parents with more children than the village average, while *Few Children* are those that have either the same number of children as the village average or fewer. *Young children* are those whose children are 10 years old or under on average. *Older children* are those whose children are over 10 years old on average. *Destruction (Des.)* is an indicator variable equal to 1 if the respondent reports any loss of property as a result of the conflict. Individual controls include the respondents' age, gender, religious affiliation (Muslim, Christian), number of children as well as risk, ability, and confidence scores. Age is by terciles of age distribution: young (18–28), middle age (29–39), and old (above 40). "Oster coefficient" corresponds to the value of the delta coefficient according to Oster (2019) computed for β_3^1 in Eq. (1), compared to a specification with no included controls and a maximum R-squared of 1.

experienced injury are 10 percentage points less likely than non-victimized fathers to choose the competition tournament. However, mothers who have experienced injury are 5 percentage points more likely to do so when compared to non-victimized fathers. For destruction (Column 6), the magnitude is even larger and more precisely estimated.

For non-parents, we do not see any evidence of a gender gap in competitiveness. Still, we observe that both genders are less competitive if victimized. The results are similar for another measure of victimization: whether the respondents had a household member killed during the conflict (results in Table B.2). We also confirm that our results are robust when we include village random (instead of fixed) effects (Table A.7) or when we estimate non-linear models (Table A.8). As shown in Table A.9, our results are also robust to using two alternate latent variables that capture all three measures of victimization: (i) Extensive margin of exposure (*Ext.*) to victimization which is an indicator variable equal to 1 if the respondent reports either one of our measures, i.e., either injured, or destruction, or killed; and (ii) Intensive margin (*Int.*) of victimization as a sum of incidences of injury, destruction, and death.

While the reduction in competitiveness for mothers who were victimized is significant across all measures of victimization, the magnitude is largest for *destruction*. In a horse race specification in which we control for injury and destruction together (Table A.10), the results show that the observed increase in competitive preferences among victimized mothers is being primarily driven by destruction of property (Column 3).

Protection Mechanisms. We examine the mechanisms that may explain the relative increase in competitiveness in mothers as a result of conflict. The results from the horse race specification discussed above suggest that behavioral changes experienced as a result of victimization primarily come from increased material stress. We would then also expect the changes to be more pronounced in mothers who need to compete most for scarce resources, such as single, widowed, or divorced mothers; those who have more children; or those who have younger children. We test for these mechanisms using the sub-sample of parents and victimization through material destruction in Table 4. We estimate eq. (1) for different subsamples, defined by marital status, number of children (more or less than the village average), and average age of children. The results show that the possible repercussions of destruction in increasing the relative competitiveness of mothers is more statistically robust and much larger in magnitude for single, widowed, or divorced mothers (Column 1) as opposed to partnered mothers (Column 2); for women with many (Column 3) as opposed to fewer (Column 4) children; and for women with children below 10 years of age (Column 5) as opposed to older children (Column 6). In particular, the relationship between conflict and competitiveness is more than two and a half times as large for single, widowed, or divorced mothers compared to their partnered counterparts. Mothers with experience of economic damage due to conflict and have to rely on only themselves, who have to take care of many children, or younger children that require more resources, are no less competitive than men. This result is consistent with our theoretical predictions rooting women's competitive preferences in the parental investment framework. These results are robust to the inclusion of village random effects (Table A.11).

4.3. Competition versus cooperation

We have so far discussed in-group egalitarianism-based cooperation and competition separately. To reconcile our findings and paint a richer picture of the relationship between conflict and in-group social preferences, it is useful to study how in-group competition and cooperation interact, and whether one comes at the expense of the other. To study this, we correlate our measure of egalitarianism on our measure of competitiveness in a regression framework and report the results in Table A.12. We include the usual controls and village fixed effects.

The raw correlation between competitiveness and egalitarianism cooperation is negative (Columns 1 and 2), suggesting that competition comes at the expense of cooperation (although it is not statistically significant). However, when we inspect how this correlation differs by parental status in Columns (7) and (8), we find that competitiveness comes at the expense of egalitarianism only for those who do not have children. For parents, there is no such trade-off. In Table A.13, we include interaction terms between, on the one hand, measures of competitiveness and, on the other hand, parental status, and age (defined by the terciles of the age distribution). The coefficient associated with the interaction with parental status remains positive and statistically significant, while the coefficient associated with the interaction with age is not. This confirms that the suppression of the trade-off between competition and cooperation is really driven by parental status, as opposed to age.

5. Discussion

Our study, using the quasi-natural experimental variation in material and relational scarcity brought about by conflict, supports the general idea that exposure to conflict strengthens prosociality (*H1*). Importantly, it contributes to the literature the idea that both sex and parental status matter since not everyone starts equally invested in the group and/or can sacrifice as much for the group. In the absence of conflict, parents are significantly more egalitarian than non-parents (*H2*), yet it is non-parents that react the most to conflict (*H3*). Mothers are the least competitive in the group, yet, while all others have lower competitiveness when exposed to conflict, mothers have higher competitiveness when exposed to conflict (*H4*). Our results suggest that the evolutionary theories based on intergroup conflict, which have been the prevalent framework of the pre-existing studies of conflict, cannot, on their own, fully explain the variegated relationship between conflict exposure and social preferences. We suggest, instead, that the inclusion of the cooperative childrearing framework could contribute and shed light on the complexity of the relations between conflict and prosocial preferences and how much depend on both sex and parental status.

We find that conflict's influence on in-group egalitarianism, which has been the focus of most of the previous literature, is, in fact, mainly driven by non-parent males, who are, furthermore, the group that is the least cooperative to start with. Mothers and father do not show a reaction to conflict cues but maintain the highest levels of egalitarianism. Our interpretation is that the needs of group

survival exacerbated by conflict—and/or the opportunity that a recognized contribution to group interests may afford the individual increased reproductive opportunities—induce people to become more cooperative towards the in-group, and that this is especially binding for those who may not be necessarily inclined to do so otherwise and, by not having offspring, may sacrifice some individual interest for the benefit of others. We find that evidence for this effect is present for both sexes but slightly stronger for non-parent males, perhaps because group survival may depend not only on their willingness to share resources, as it does for women in a context of cooperative childrearing, but also on their willingness to fight for their group, as predicted by evolutionary theory of inter-group conflict and those that take into account the individual fitness gains of achieving high status (male coalition psychology, male warrior and display of solidarity hypotheses).

We also document how the in-group competitive tendencies of males are curbed as a result of victimization. Given that competitiveness comes at the expense of cooperation for them, the reduction in-group competitiveness may be necessary both to guarantee sharing of resources within the group and to strengthen the group's position in inter-group conflict. By contrast, mothers, and especially those who are likely to struggle most economically, become more competitive as a result of conflict exposure. Yet, victimization does not significantly alter mothers' egalitarianism, which stays roughly constant across conflict exposure, and always higher than the egalitarianism displayed by non-mothers: for economically constrained mothers provisioning children may dominate group interests. As the theory we advanced would suggest, being a mother is the life stage/sex more torn between the interests of the group and those of her offspring.

Through these contrasting impacts, conflict closes the competition gap across genders, and closes the cooperation gap across parental status, thereby leading to much more homogenous behavior across the subgroups. To the extent that group harmony may be enhanced by the lowering of within-group differences in competitiveness and cooperation, these results further lend credence to the idea that the behavioral effects of conflict contribute to prime individuals towards group survival. Yet, a fine-grained look at reactions via sex and parental status reveals a more complex trade-off between group vs. individual interests and that not everyone reacts in a similar manner. Non-parents start as the least prosocial towards the group, but they react the strongest, especially the males. Parents start as more invested in the group, yet they react very little to victimization, with mothers even increasing their competitiveness when experiencing adversity. This set of results paints a rich picture of the interdependencies of life in a group, where selection is likely to operate contemporaneously at different levels.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jebo.2023.09.007](https://doi.org/10.1016/j.jebo.2023.09.007).

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