

# Replication Project

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3/17/2020

## **Abstract**

Hager, Krakowski, and Schaub show that exposure to ethnic violence negatively affects prosocial behavior to both the opposing ethnic group, but also one's own. I was almost entirely successful in replicating their main statistical models that demonstrate the negative effect the 2010 Osh, Kyrgyzstan ethnic riots had on prosocial behavior, but their work does have some replication issues. My own extensions explore confounders for their Uzbek sample—the victimized ethnic group—and more intensely explore their Kyrgyz—the aggressor ethnic group— sample. I find a stronger confounder in common language usage and also identify that for affected Kyrgyz, prosocial behavior was actually partially positively affected by victimization, which is contradictory to the authors' argument. My results demonstrate that the effects of ethnic violence on community relations differs on a case-by-case basis and arguing that general trends exist is problematic.

## Introduction

I will be replicating the paper “Ethnic Riots and Prosocial Behavior: Evidence from Kyrgyzstan” written by Anselm Hager, Krzysztof Krakowski, and Max Schaub.<sup>1</sup> Using survey data gathered in Osh, Kyrgyzstan after the 2010 ethnic riots that includes 1200 responses, this paper explores the question of whether exposure to ethnic riots has a negative effect on both in and out group prosocial behavior. Previous literature on prosocial behavior following ethnic violence suggests that prosocial behavior towards the aggressor group is negatively affected. Some literature also suggests that prosocial behavior towards the in-group, or the victim group, should improve as a result of shared conflict. This paper finds, however, that prosocial behavior for both in and out groups are negatively affected. The authors measure prosocial behavior by having their research subjects complete a prisoner’s dilemma (PD) scenario and dictator’s game (DG) hypothetical to measure prosocial behavior towards both the in-group and out-group. After running linear regressions measuring the outcomes of these tests as a result of being affected in the riots, they find that there is a strong negative effect on prosocial behavior towards both the in-group and out-group. Using the same models, they test for confounders and then explore an instrumental variable—distance to armored personnel carrier (APC), which were used in the riots—to further improve their robustness testing. Throughout this testing they find their original conclusions hold true and they offer theoretical, qualitative reasoning for why prosocial behavior is negatively affected towards both in and out group members.

I have replicated the key models and figures from the paper using R to perform all statistical analysis and visualizations.<sup>2</sup> The replications are also based off of the raw data and code the authors provided and uploaded at the American Political Science Review Dataverse.<sup>3</sup> My specific replication code, results, and later extensions are available on Github.<sup>4</sup> The replications that I have included and will discuss in this paper are the key models the authors of the original paper use to evidence their key finding of universal lower prosocial behavior. I would like to note, however, that I have not included figures from the original paper that were created using GIS software or other, non-R, programs. I have also not included any models from the author’s Appendix that are not relevant to my own extension models, but I will include a link to their online appendix as well.<sup>5</sup> I have successfully replicated almost all of the author’s key figures with the exception of certain instrumental regressions that rely on spatial weights. While I have found a non-replicable issue with the original paper’s work, I argue that their findings are still strong despite this flaw. I also argue that there are certain areas of their data that should be more thoroughly explored. I have chosen to explore these aforementioned areas through my own extension models. This is not to say that my extensions are exhaustive, but they illustrate areas of the author’s original work that I believe warrant greater attention. The author’s models focus primarily on how the Uzbek sample of their survey data was affected by the riots in terms of prosocial behavior. The majority of their robustness testing focuses on this sample as well. The authors explored confounders besides victimization that might explain prosocial behavioral outcomes including wealth, community state capacity, community policing, and accessibility. I believe they neglected to include their subject’s general attitude towards outgroup members as a potential confounder even though they measure for this in their survey. In extending their analysis to include this measure, I found that while victimization is still statistically significant, a subject’s set prosocial attitude intuitively plays an influential role in prosocial outcome. I also believe the authors generally neglected to explore their Kyrgyz comparative sample as extensively as they did their Uzbek sample. Analyzing prosocial behavior among the Kyrgyz sample with the same methodological approach the authors took to with the Uzbek sample, reveals a partial improvement in prosocial behavior towards the outgroup, which is somewhat contradictory to the author’s findings. I believe the authors purposefully presented their Kyrgyz modelling in a manner that would ignore this complication of their narrative.

This paper will consist of a review of the relevant literature for understanding scholarship on prosocial behavior and the ethnic riots of Osh, Kyrgyzstan. It will also spend some time to introduce and describe the

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<sup>1</sup>Hager, Krakowski, and Schaub 2019

<sup>2</sup>R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

<sup>3</sup><https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/WVBZNE>

<sup>4</sup>[https://github.com/CianStryker/Replication\\_Data](https://github.com/CianStryker/Replication_Data)

<sup>5</sup><https://static.cambridge.org/content/id/urn:cambridge.org:article:S000305541900042X/resource/name/S000305541900042Xsup001.pdf>

survey data that the authors provided because this paper is non-observational and more attention should be paid to the data itself, the author’s data gathering methodology, and the general demographical spread on their survey sample. Then there will be a discussion and analysis of the author’s key models and findings with attention paid to areas of potential weaknesses and non-replication. This will then lead into a presentation of my own extensions and what they add to both the original paper’s findings, but also to the broader fields of ethnic riots and Central Asian studies. All replications and extensions can be found in the tables and figures section with all code included in the appendix available online.<sup>6</sup>

## Literature Review

Ethnic riots are defined as sudden bursts of lethal violence by civilians of one ethnic group against civilians of another ethnic group, who are attacked specifically because of their ethnic identity.<sup>7</sup> Often these riots are prompted by political competition that is framed in such a way as to be given an ethnic dimension or are linked to resentment regarding societal status.<sup>8</sup> Ethnic riots occur regularly throughout the world and fundamentally affect societal relations when they occur. Since 2010, there have been over one thousand fatal riots in Africa and Southern Asia alone and are often the most common form of violence overall.<sup>9</sup> Most of the literature that addresses ethnic riots explores the causal factors behind why they occur in the first place.<sup>10</sup> Research that addresses the effects that ethnic riots produce within these communities is relatively rarer.<sup>11</sup> Within this area of scholarship, however, the results of researchers vary in terms of how specifically prosocial behavior is affected both towards the in-group and out-group. Early scholarship that relied on over 250 riots posited that ethnic riots improve in-group prosocial behavior but negatively affect behavior towards the outgroup.<sup>12</sup> Some scholarship that addresses the effects of wartime violence on cooperation also found that prosocial behavior towards the in-group improved.<sup>13</sup> Some scholars have posited that this effect could be due to increased investments in social capital or because societal preferences shift towards prosociality after ethnic violence.<sup>14</sup> These findings are not universal, however, because a second area of scholarship has found that prosocial behavior towards the in group were in fact negatively affected.<sup>15</sup> Finally, a third group of literature finds that prosocial behavior is negatively affected regardless of in or out-group status, which they believe may be a result of undermined trust or post-traumatic stress disorder.<sup>16</sup> The original paper’s authors believe that their results are consistent with this third camp of literature having studied prosocial behavior in the aftermath of the 2010 Osh ethnic riots.

Osh is the second largest city within the Central Asia Republic of Kyrgyzstan. The area was historically predominantly populated by Uzbeks but began to see a large-scale migration of in the late Soviet period.<sup>17</sup> Following the fall of the Soviet Union and Kyrgyzstan independence, the young Kyrgyz Republic began to develop national identity by drawing on ethnic, Kyrgyz narrative.<sup>18</sup> This in addition to some discriminatory Kyrgyz political policies, drove many Uzbeks to seek irredentist behavior in 2003 that would both fail and prompt retaliatory Kyrgyz ethnic violence. In 2010 a resurgence of ethnic violence occurred after the successful revolution against President Kurmanbek Bakiyev that created a power vacuum. Bakiyev was from Southern Kyrgyzstan, where Osh was located, and had generally pursued discriminatory policies against the Uzbek minority. He also enjoyed high levels of support within Osh’s Kyrgyz population.<sup>19</sup> The new

<sup>6</sup>[https://github.com/CianStryker/Replication\\_Data](https://github.com/CianStryker/Replication_Data)

<sup>7</sup>Horowitz 2001

<sup>8</sup>Kopstein and Wittenberg 2018; Wilkinson 2004; Bohlken and Sergenti 2010; Mitra and Ray 2014

<sup>9</sup>Raleigh 2010; Kishi, Raleigh Linke 2016

<sup>10</sup>Kopstein and Wittenberg 2018; Varshney 2002; Wilkinson 2004

<sup>11</sup>Aidt and Leon 2016

<sup>12</sup>Horowitz 2001

<sup>13</sup>Bauer et al. 2016; Bellows and Miguel 2009; Blattman 2009;

<sup>14</sup>Gilligan, Pasquale and Samii 2014; Bauer et al. 2014; Voors et al. 2012

<sup>15</sup>Bauer et al. 2016; Hadzic, Carlson, and Tavits 2017; Rohner, Theonig and Zilibotti 2013

<sup>16</sup>Cassar, Grosjean and Whitt 2013; Cecchi and Duchoslav 2018; Ruttan, McDonnel, and Nordgren 2015

<sup>17</sup>Allworth 2013; Liu 2012

<sup>18</sup>Huskey 2003

<sup>19</sup>Huskey 2003

government appealed to Uzbeks for support following Bakiev’s fall, but local Kyrgyz leaders used this an opportunity to create a narrative that labelled local political instability as the result of Uzbeks trying to secede again.<sup>20</sup> Following a violent gambling related argument a Uzbek mob violently confronted Kyrgyz police officers, which in turn prompted thousands of local Kyrgyz to arm themselves and begin attacking Uzbeks within Osh. They even stole APCs which they used to break through local Uzbek barricades. This violence resulted in around 470 people dead, the majority of whom were Uzbek, and over 2,843 properties destroyed.<sup>21</sup> The authors point out that the relative haphazardness of the violence, the use of APCs, the return of victims makes the 2010 Osh riot a strong case for studying the effect of ethnic riots on prosocial behavior.

The authors performed a survey of 880 Uzbeks and 220 Kyrgyz living in Osh between August and September 2017, which corresponds to when many labor migrants are returning to the city. Their survey data is split between those affected by the riots and those unaffected. Generally speaking, their data has comparable demographical statistics both between affected and unaffected groups, but also between the two ethnicities involved in their survey. Levels of wealth, education, and background are also adequately comparable between their samples. In terms of measuring prosocial behavior, the authors had participants participate in a Prisoner’s Game Dilemma (PD) to show cooperation and then also a Dictator’s Game (DG) to measure altruism. In the prisoner’s game respondents could choose between cooperating and not cooperating. Their outcome—a payout between 20 and 100 Kyrgyz Somoni (KGS) — was dependent on both their own and their partners choices. If both chose cooperation, then both received 80 KGS, if they both chose non-cooperation then each would get 60 KGS. If one chose non-cooperation but the other chose cooperation, then the first would receive 100 KGS and the latter 20. The dictator’s game consisted of the authors giving respondents 50 KGS and then being asked how much, if any, of this amount would they share with another resident of Osh. In both the prisoner’s dilemma and the dictator’s game, the respondents were told the ethnicity of their partner. The outcomes of these two simulations form the prosocial data of the original paper.

## Main Models

The replicable and essential figures of the original paper are Figures 4, 5, 6, 8, and 9, as well as Table 1. Figures 1, 2, 3, and 7 are made either via GIS software or are simply maps of Osh, which I will not include. Figures 4, 5, 8, 9 and Table 1 are fully replicable, but I cannot currently replicate all of Figure 6 from the original paper. Of these figures, Figure 4 (“Payoff Illustration in the PD) simply demonstrates the various payoff scenarios of respondents who participate in the prisoner’s game dilemma administered by the authors.

Figure 5 (“Effect of Riot on Prosocial Behavior) is the model that illustrates the core findings of the authors. In this model, the authors compare Uzbek respondents in the affected and non-affected primary sample units (PSUs). This figure plots the coefficients and confidence intervals of OLS regressions of prosocial outcomes on the destruction dummy. The destruction dummy is simply the victimization variable that is measured on a binary scale of affected or non-affected. The prosocial outcomes are measured by five categories: Prosociality Index, Dictator Game Outgroup, Prisoner’s Dilemma Outgroup, Dictator Game Ingroup, and Prisoner’s Dilemma Ingroup. While the PD and DG outcomes are self-evident, the Prosociality Index is a score that the authors created by combing and scaling the scores of the other four categories. The figure finds that Uzbek respondents in damaged neighborhoods show much lower levels of prosocial behavior. They are around 0.16 standard deviation (SD) less likely to cooperate with Kyrgyz. They allocate 0.47 SD less to Kyrgyz in the DG. Also, this reduction in prosocial behavior is evident in the outcomes with Uzbeks as well. Affected Uzbek respondents are 0.23 SD less likely to cooperate with Uzbeks in the PD and 0.46 SD less likely to allocate money to Uzbeks in the DG. Figure 5, therefore, evidences the author’s fundamental claim that ethnic riots negatively affect prosocial behavior towards both the in and out-group. All subsequent figures to Figure 5 are robustness checks.

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<sup>20</sup>“Report of the Independent International Commission of Inquiry into the Events in Southern Kyrgyzstan in June 2010” 2011

<sup>21</sup>KIC 2011

Table 1 (“Effect of Destruction on Prosocial Behavior (Controlling for Confounders and Mobilization)”) shows the author’s exploration of potential confounders for Figure 5’s results. They point out that a variety of social, economic, and political forces may explain why certain areas of Osh were affected by the ethnic riots. Relying on interviews and qualitative interviews, the authors believe that the most likely confounders that would determine both victimization and prosocial behavior would be wealth, state capacity, community policing, accessibility, and voting for the overthrown President’s party. They discuss these confounders in their Appendix, but generally they explored these confounders for the following reasons. First, they believe that the wealth of an area might attract rioters who are seeking monetary benefit. Also wealth may have positively affected prosocial behavior. Second, rioters may have target certain areas because they have lower state capacity, which means the risk to themselves is lower. Also, lower state capacity might affect cooperation because the state is unable to properly enforce contracts. Third, lower community policing may also attract rioters because then they also have a lower chance of detainment. Lower policing might also reduce cooperation by limiting the chance to punish defectors. Fourth, rioters might have targeted areas of Osh that are more accessible because they were easier to attack. Accessibility might also positively affect prosocial behavior because these areas might have higher levels of interactions. Fifth, they include the vote share of the Ata-Jurt (AJ) political party during the 2010 elections, which they use to measure support for the ousted president Bakiyev.

In performing OLS regressions of prosocial outcomes on the victimization variable and the five confounders, they find that the victimization variable is virtually unchanged and continues to be statistically significant in that affected Uzbeks have lower prosocial behavior. Of note might be, however, that state capacity has a statistically significant positive effect for Uzbeks’ dictator game results towards both the ingroup and outgroup, which is also true for prosociality index. The authors, however, do not comment on this result and instead focus on the main fact that including these confounders did not affect the consistently negative and significant effect of victimization.

Figure 6 (“Effect of Riot Destruction on Prosocial Behavior (IV)”) is the introduction and exploration of an instrumental variable, which is the distance between subjects and armored vehicles (APCs) that were captured from the Kyrgyz military by rioters and used to break through Uzbek barricades. Areas of Osh where rioters did not have access to APCs saw little to no destruction. This suggests that access to APCs might act as an exogenic assignment mechanism that explains post-riot differences across subject responses. They believe that distance to APC locations capture the ‘intent-to-treat’ effect and therefore they created a closeness instrument by inputting subjects’ distance to APC locations. They create this instrumental variable by invoking five key assumptions. First, they show that distance to APCs is strongly correlated to the destruction dummy with an F-Stat of 271.9. Of note may be that this F-Stat is exceedingly high. Second, they rule out defiers or individuals selecting to be victimized despite being assigned. Third, they present a falsification test which demonstrates the instrument is unrelated to prosocial behavior in a sample of 136 nearby villages, which underlines the exclusion restriction. Fourth, they address SUTVA concerns by estimating spatial error models. Fifth, and finally, they argue that APC location is exogenous and demonstrate that distance to APC is not predicted by aforementioned confounders. Based on these assumptions the authors a series of regular OLS regressions substituting victimization for the closeness variable and also a series of two-stage least squares (2SLS) regressions where they keep the original victimization OLS regression but include the instrument. They see that their original results hold. Specifically they find that destruction during the riot—instrumented— has a causal negative impact of 0.55 SD on the Prosociality Index. Overall, the authors use their instrumental variable 2SLS regression to serve as an even more compelling robustness test to their original results in Figure 5.

While Figure 6 may be the author’s most compelling robustness check, there are fundamental replication issues with it as well. This model has three regression series using the instrumental variable. Two of the regression series rely on the survey data that the authors have provided, which I have commented on above. They also include a third regression that relies on spatial weights. These spatial weights are included in a csv file within the dataverse, but when loaded in, they fail to replicate with the code they have provided. I chose to replicate two of their three regression series, however, and their spatial weight regressions differ little from the OLS instrument regressions and play no role in the 2SLS regressions. While this is a serious issue of replication, considering the authors’ 2SLS results, I do not believe this non-replication refutes their fundamental findings. Their use of these spatial regressions for their later Kyrgyz comparison testing,

however, is much more problematic see figure A. 17 in their Appendix. Figure 8 (“Randomization Inference”) is, as the name implies, a randomization check for Figure 6. The authors develop this inference to further prove the robustness of their findings. They want to show how likely it is to observe Figure 6’s effect size if the location of APCs were randomized. They then simulate pseudo locations where APCs could have been stolen by creating a band around the city center that includes two actual APC theft locations. Through this process they create 10,000 pseudo locations with 5,000 east of the river Ak-Buura and 5,000 west of it. They then re-estimate their reduced-form IV regressions 10,000 times and for each estimation they draw two pseudo starting points—one from the eastern and also western samples—calculate the distance between them and the interview location, and the regress the Prosociality Index on them to create the estimates. Figure 8 depicts the results of these estimates and demonstrates that most pseudo distances do not yield a negative correlation with prosocial behavior. This means that their estimated effect from Figure 6 is unlikely to be a product of chance.

Figure 9 (“Effect of Riot Destruction on Losses”) is the author’s last main model in the main paper. The authors use this figure to further prove that their destruction dummy does actually capture the victimized areas of Osh. During their survey they asked their respondents to report if they had recently lost or had damaged the following items: their business, money, house, TV, or car. Figure 8 shows the results of OLS regressions that explore each of these types of losses as a result of the destruction dummy. They find that for each type of loss there is a significant negative effect, which demonstrates that this variable is valid in that it correctly captures victimization during the ethnic riots.

## Extensions

I believe there are a few areas that could be expanded upon in this paper that the authors did not fully explore. A fundamental issue with extending this paper’s findings is that it is non-observational and was published recently in late 2019, which means that I cannot either incorporate additional data or incorporate new additional literature that suggests a weakness in the authors’ methodological approach. Even so, there are two areas where I feel more exploration of the data is warranted or where fundamental assumptions can be challenged. These areas would be a more in-depth exploration of prosocial confounding variables for the Uzbek data and a far more robust exploration of the Kyrgyz sample of the survey data.

I find that the author’s exploration of confounding variables for the Uzbek subset of the data is limited in its scope. They combine a variety of survey scores together to create their confounders that might explain victimization and/or prosocial behavior, but I believe other variables should be included that more directly explain prosocial behavioral scores. Namely, the survey variables of use of common language and ethnicity of employer should be more robustly tested. Using the common language of the outgroup directly measures prosocial behavior because individuals choose to opt into or out of this behavior. More so than any other variable measured in the authors’ survey, this variable directly measures an individual’s overall prosociality. The ethnicity of one’s employer is also important because if one’s employer is of the opposite ethnic group, this mandates interaction with the out-group, which might also generate higher prosocial behavior. My Table 1 demonstrates the OLS regression results explaining all five prosocial outcomes as a result of the destruction dummy, common language usage, and the ethnicity of one’s employer. Of note is that the destruction dummy still has a statistically significant negative correlation to prosocial behavior. That being said, the effect size is diluted across all five measures, which did not occur when the authors tested for their original confounders. Also of note is that common language use also has a statistically significant but positive correlation to all five prosocial measures. No employer ethnicity had consistently significant results, however, which suggests this particular measure does not affect prosociality as strongly as either common language usage or victimization.

I decided to expand on Table 1’s results by isolating just the destruction dummy and common language usage in Table 2. I rerun the OLS regressions from Table 1 with only these two variables, but include an interaction between the two. These results are interesting because the negative effect of victimization becomes even more muted and for PD outgroup, the coefficient outright loses its statistical significance. Other measures see their significance decreases as well. The same is true, however, for common language

usage which is no longer statistically significant for either in or out-group PD scores. None of the interaction coefficients are significant either. Overall, I believe that Table 1 and 2 generally further support the author's initial findings that victimization has a strong negative correlation to Uzbek prosocial behavior. I would argue, though, that common language use is a more valid confounder than the authors' original confounders and that its inclusion is important to understanding how personal prosociality behavior might affect the results of the paper more broadly.

I would like to emphasize that I the paper's argument of Uzbek prosocial behavior towards both the in and out-groups was negatively affected. I argue, however, that the same is not true for their Kyrgyz sample. The survey data includes 222 surveys of Kyrgyz citizens of Osh and within this amount over a third were negatively affected by the ethnic riots. This amount is much less than the nearly half out of 878 Uzbeks citizens that were affected, but they form an interesting point of comparison for the study, which the authors themselves note. They use the affected Kyrgyz sample as a comparative only by regressing their prosocial behavior outcomes using the instrumental variable that relies on spatial weights, which can be seen in their figure A.17 in their online Appendix. I am critical of this approach because their instrumental variable with spatial weights is non-replicable. Also, their instrumental variable was a robustness test to support Figure 5, but the authors decided to not test the Kyrgyz sample with OLS regressions. Similarly, in looking at their figure A.17, it is noticeable that the authors chose to only include the results of the Prosociality Index as opposed to showing the results for all five prosocial measures. Between non-replicability issues, the admission of four prosocial measures, and the fact that this comparative model was relegated to the Appendix, despite being referenced as a useful comparison in the paper, I decided that a more robust exploration of the Kyrgyz sample was warranted.

Model 1 is the first extension that focuses on Kyrgyz prosocial behavior. I use the same code and approach that the original authors do for their Figure 5 but now on the Kyrgyz subset of the data instead. The results are interesting for a few reasons. The main reason being that for the prisoner's dilemma outgroup scores there is a noticeable positive correlation to victimization. This suggests that Kyrgyz who were affected by the riots have on average higher levels of prosocial behavior towards Uzbeks. The variance is fairly high, but the positive nature of the coefficient is constant. For the other measures the coefficients are negative like the author's Figure 5, but noticeably less negative. This suggests that at least for the Kyrgyz portion of the authors' survey, prosocial behavior did not universally decrease, but that at least within the prisoner's dilemma—the measure of cooperation—affected Kyrgyz are more willing to cooperate with Uzbeks than non-affected.

To further explore this trend, I follow the authors' approach to their Table 1 to create my Table 3 that measures prosocial outcomes as a result of victimization and the five confounders the authors created in their original paper. The results of my Table 3 are mixed. First of all, almost none of the confounders have statistically significant results and the results are on par with the author's findings for confounder effects. When viewing the destruction dummy, however, a few key differences to the authors' findings are clear. Again PD Out-group behavior is statistically significant and positive in nature. Interestingly, PD In-group prosocial behavior is statistically negative, which suggests affected Kyrgyz have very different attitudes towards cooperation with their coethnics and non-coethnics. No other measure is statistically significant though, which differs from the authors' original findings for Uzbeks.

Finally, I decided to further test the robustness of my Kyrgyz findings in the same manner as the authors by introducing the instrumental variable of distance to APC. Following their code and procedure I created Model 2 that shows both the instrument's OLS regression coefficients and the 2SLS coefficients for each prosocial measurement. This further corroborates my Model 1's findings by showing that for PD Out-Group scores, victimization—instrumented— had a positive causal effect on prosocial behavior. In viewing the other coefficients it is clear that while the other measures tend to be negative in nature, their variances now include some positive coefficients, which is also contradictory to both the authors' Figure 5 findings and also their overall argument.

My three extensions—Model 1, Table 3, and Model 2— do not necessarily directly contradict the findings of the original authors. They do, however, suggest that victimization is more complicated in its effects than the authors believe. In further testing the Kyrgyz sample of their survey, I show a positive effect on prosocial behavior amongst Kyrgyz towards the out-group. This might capture a sense of empathy towards

the victimized Uzbek minority. It might also capture the degree of antipathy that affected Kyrgyz have towards their coethnics who harmed them during the ethnic riots that has caused affected Kyrgyz to prefer cooperation with Uzbeks to other Kyrgyz. Generally speaking, when the other four measures of prosocial behavior are taken into consideration the authors' claim that prosocial behavior is negatively impacted is still generally true, but this PD out-group result directly contradicts their findings. The variance is high and when aggregated with the other measures to create the Prosociality Index, the overall effect is still negative. That being said, my extension results the authors' findings do somewhat contradict the author's results even if only within one prosocial measure. At the very least my results suggest further exploration.

## Conclusions

The authors make an important contribution to our understanding of ethnic violence's effect on community relations and prosocial behavior. The literature regarding this area has so far produced a variety of contradictory results. The authors use the 2010 ethnic riots in Osh, Kyrgyzstan to add to this overall understanding. Their findings support the area of scholarship that argues ethnic violence decreases prosocial behavior towards both the in and out-groups. The authors demonstrate this through a series of regressions performed on a large n survey. Through OLS linear regressions, confounder robustness testing, and the inclusion of an instrumental variable with IV regressions, the authors are confident that prosocial behavior is negatively affected regardless of ethnic group.

In replicating their main tables and figures I found that their claims were consistent with their argument in the paper. Despite finding a replicability issue in their Figure 6, I still argue that their results for the Uzbek sample of their survey data is consistent with their narrative: affected Uzbek prosocial behavior is negatively affected towards both Uzbeks and Kyrgyz. I chose to explore other confounders for this Uzbek sample in my Table 1 and 2. I find that common language usage is a stronger confounder to victimization than the five confounders the authors originally present, but that even with this variable included, overall Uzbek prosocial behavior is negatively affected. I also find that the ethnicity of one's employer had little to no effect on prosociality despite my hypothesis.

My second set of extensions focused on further exploring the Kyrgyz portion of their survey data. The authors made mention of affected Kyrgyz as a useful comparison to check the robustness of their findings that prosociality is negatively impacted across in and outgroups. They choose to do this by including their Figure A.17, which shows the Prosociality Index of Kyrgyz is negatively affected, but these regressions rely on their non-replicable spatial weights. I chose to further explore the Kyrgyz sample using the same approaches taken by the authors for the Uzbek sample. My Model 1, Table 3, and Model 2 demonstrate that for the prisoner's dilemma prosocial outcome, victimization has a positive causal effect on out-group prosocial behavior. In testing for confounders we also see that negative prosociality is weaker within the other four measures as well. Finally, in including the instrumental variable, we see that each of the five measures is either positive or has variance that includes positive coefficients. My extension results, therefore, contradict the authors' overall argument.

After my extension I am critical of the authors' analysis of their Kyrgyz sample. Even ignoring the replicability issue with their Figure A.17, their approach has serious flaws. Had they been as robust in testing the Kyrgyz sample as they were with the Uzbek sample, they would have had to address the inconsistency that my extensions found in their argument. I am also critical of how they chose to present their Kyrgyz analysis. They relied on non-replicable spatial weights and only depicted the coefficients on the Prosociality Index, which is a combination of their four other measures. In choosing to only include the spatial weight regressions and only the Prosociality Index, they avoided presenting contradictory results to their main argument. My extensions, therefore, demonstrate an area of ethnic riot's effect on prosocial behavior that the authors neglected to address, that the victimization of the aggressor ethnic group may generate higher prosocial behavior towards the targeted ethnic group. They also demonstrate that the authors may have either accidentally failed to properly test a portion of their data purposefully chose to omit data that did not support their conclusions.



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## Figures and Tables

**Table 1: Uzbek Confounders**

	<i>Dependent variable:</i>				
	Prisoner's Dilemma (In-Group)	Dictator Game (In-Group)	Prisoner's Dilemma (Out-Group)	Dictator Game (Out-Group)	Cooperation-Index
	(1)	(2)	(3)	(4)	(5)
Destruction	-0.221** (0.068)	-0.428*** (0.066)	-0.143* (0.068)	-0.417*** (0.065)	-0.303*** (0.048)
Common Language Usage	0.054* (0.024)	0.109*** (0.023)	0.050* (0.024)	0.161*** (0.023)	0.094*** (0.017)
Education	-0.014 (0.021)	-0.036 (0.021)	0.002 (0.021)	-0.043* (0.020)	-0.023 (0.015)
Kyrgyz Employer	0.149 (0.129)	0.202 (0.125)	0.158 (0.130)	0.187 (0.123)	0.174 (0.090)
Uzbek Employer	0.259 (0.312)	0.241 (0.303)	0.280 (0.314)	0.304 (0.298)	0.271 (0.219)
Russian Employer	0.131 (0.101)	0.217* (0.098)	0.205* (0.101)	0.283** (0.096)	0.209** (0.071)
Unemployed	0.369** (0.133)	0.180 (0.130)	0.320* (0.134)	0.196 (0.128)	0.266** (0.094)
Constant	-0.143 (0.164)	-0.153 (0.160)	-0.287 (0.165)	-0.333* (0.157)	-0.229* (0.115)
Observations	877	877	877	877	877
R <sup>2</sup>	0.027	0.081	0.016	0.110	0.091
Adjusted R <sup>2</sup>	0.019	0.074	0.009	0.103	0.083
Residual Std. Error (df = 869)	0.990	0.963	0.996	0.947	0.695
F Statistic (df = 7; 869)	3.464**	10.941***	2.077*	15.399***	12.398***

Note:

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Table 1 demonstrates the OLS regression results explaining all five prosocial outcomes as a result of the destruction dummy, common language usage, and the ethnicity of one's employer. Of note is that the destruction dummy still has a statistically significant negative correlation to prosocial behavior. That being said, the effect size is diluted across all five measures, which did not occur when the authors tested for their original confounders. Also of note is that common language use also has a statistically significant but positive correlation to all five prosocial measures. No employer ethnicity had consistently significant results, however, which suggests this particular measure does not affect prosociality as strongly as either common language usage or victimization.

**Table 2: Uzbek Victimization and Common Language Usage Interaction**

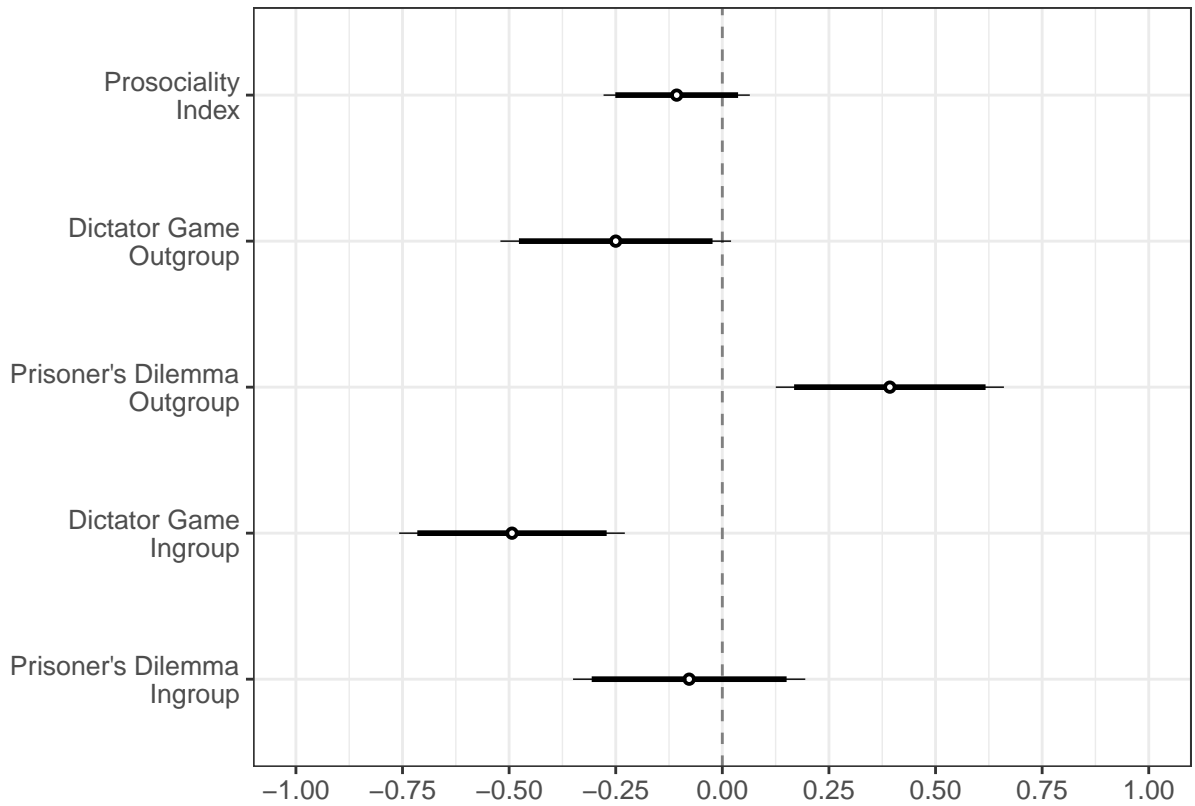
	<i>Dependent variable:</i>				
	Prisoner's Dilemma (In-Group)	Dictator Game (In-Group)	Prisoner's Dilemma (Out-Group)	Dictator Game (Out-Group)	Cooperation-Index
	(1)	(2)	(3)	(4)	(5)
Destruction	-0.350* (0.160)	-0.484** (0.156)	-0.267 (0.161)	-0.389* (0.154)	-0.372*** (0.113)
Common Language Usage	0.023 (0.031)	0.081** (0.030)	0.020 (0.031)	0.139*** (0.030)	0.066** (0.022)
Interaction	0.039 (0.046)	0.013 (0.045)	0.037 (0.046)	-0.016 (0.044)	0.018 (0.032)
Constant	0.037 (0.111)	-0.049 (0.109)	0.007 (0.112)	-0.236* (0.107)	-0.060 (0.079)
Observations	877	877	877	877	877
R <sup>2</sup>	0.018	0.070	0.010	0.093	0.075
Adjusted R <sup>2</sup>	0.015	0.067	0.006	0.090	0.072
Residual Std. Error (df = 873)	0.992	0.966	0.997	0.954	0.699
F Statistic (df = 3; 873)	5.411**	21.927***	2.904*	29.827***	23.619***

Note:

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

Table 2 contains OLS regressions that explain prosocial outcomes as a result of only two variables: victimization and common language usage. Table 2 also includes an interaction between these two variables. The negative effect of victimization becomes even more muted than even Table 1's victimization coefficients. For PD outgroup, the coefficient is no statistically significant. Other measures also see their significance decreases as well. The same is true, however, for common language usage which is no longer statistically significant for either in or out-group PD scores in comparison to Table 1. None of the interaction coefficients are significant either. Overall, I believe that Table 2 further supports the author's initial findings that victimization has a strong negative correlation to Uzbek prosocial behavior. I would argue, though, that common language use is a more valid confounder than the authors' original confounders and that its inclusion is important to understanding how personal prosociality behavior might affect the results of the paper more broadly.

### Model 1: Kyrgyz Prosocial Behavior



Model 1 consists of OLS linear regressions measuring prosocial outcomes as the result of victimization for the Kyrgyz sample of the authors' survey data. The most noteworthy results is that the prisoner's dilemma outgroup coefficient is positive. This suggests that Kyrgyz who were affected by the riots have on average higher levels of prosocial behavior towards Uzbeks. The variance is fairly high, but the positive nature of the coefficient is constant. For the other measures the coefficients are negative like the author's Figure 5, but noticeably less strong. This suggests that at least for the Kyrgyz portion of the authors' survey, prosocial behavior did not universally decrease, but that at least within the prisoner's dilemma—the measure of cooperation—affected Kyrgyz are more willing to cooperate with Uzbeks than non-affected.

**Table 3: Kyrgyz Confounders**

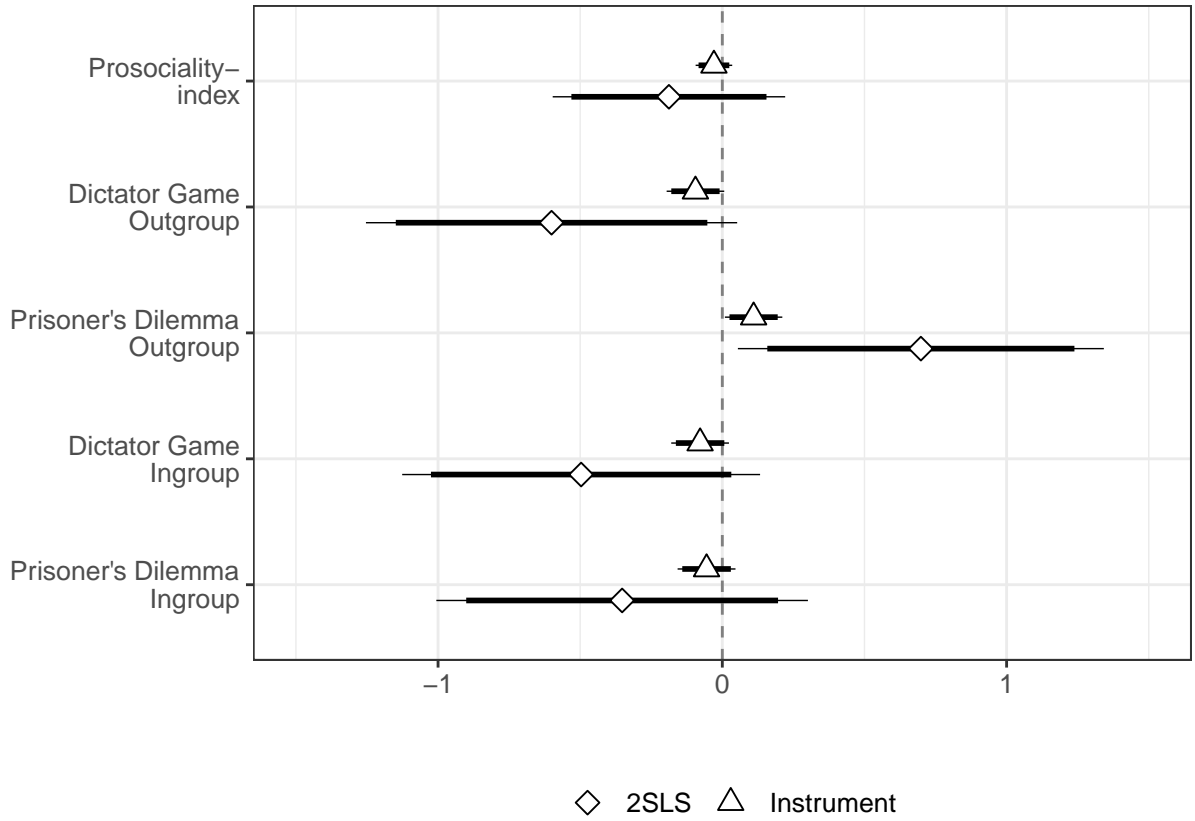
	<i>Dependent variable:</i>				
	Prisoner's Dilemma (In-Group)	Dictator Game (In-Group)	Prisoner's Dilemma (Out-Group)	Dictator Game (Out-Group)	Cooperation-Index
	(1)	(2)	(3)	(4)	(5)
Destruction	-0.078 (0.143)	-0.522*** (0.138)	0.391** (0.139)	-0.273 (0.142)	-0.121 (0.089)
Wealth index	-0.572 (0.660)	-0.436 (0.639)	0.020 (0.643)	0.039 (0.655)	-0.237 (0.412)
State capacity index	0.112 (0.256)	0.015 (0.248)	0.345 (0.250)	0.255 (0.254)	0.182 (0.160)
Community policing index	0.095 (0.070)	0.132 (0.067)	0.051 (0.068)	0.110 (0.069)	0.097* (0.043)
Accessibility index	-0.534 (0.619)	0.502 (0.599)	1.013 (0.603)	0.276 (0.614)	0.314 (0.386)
AJ Constant	0.252 (0.659)	-0.770 (0.638)	-0.400 (0.642)	-0.885 (0.654)	-0.451 (0.411)
Observations	222	222	222	222	222
R <sup>2</sup>	0.018	0.080	0.068	0.034	0.043
Adjusted R <sup>2</sup>	-0.009	0.055	0.042	0.007	0.016
Residual Std. Error (df = 215)	1.005	0.972	0.979	0.996	0.626
F Statistic (df = 6; 215)	0.654	3.133**	2.624*	1.263	1.614

Note:

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

Table 3 measures prosocial outcomes as a result of victimization and the five confounders the authors created in their original paper through OLS regressions. The results are mixed. First of all, almost none of the confounders have statistically significant results and the results are on par with the author's findings for confounder effects. When viewing the destruction dummy, however, a few key differences to the authors' findings are clear. Again PD Out-group behavior is statistically significant and positive in nature. Interestingly, PD In-group prosocial behavior is statistically negative, which suggests affected Kyrgyz have very different attitudes towards cooperation with their coethnics and non-coethnics. No other measure is statistically significant though, which differs from the authors' original findings for Uzbeks.

## Model 2: Kyrgyz Prosocial Behavior with Instrumental Variable



Model 2 further tests the robustness of my Model 1's results by introducing the instrumental variable of distance to APC. Model 2 shows both the instrument's OLS regression, where the destruction dummy is replaced by the closeness instrument, and the 2SLS coefficients, where the destruction dummy is instrumented with APC location, for each prosocial measurement. The results show that both the instrument OLS regression and 2SLS coefficients for PD out-group are positive, which means that victimization—instrumented—had a positive, causal effect on prosocial behavior in this measure. In viewing the other coefficients it is clear that while the other measures tend to be negative in nature, their variances now include some positive coefficients. This is contradictory to both the authors' Figure 5 findings and also their overall argument.