

Are Your Children More Aggressive After a Natural Disaster?

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Abstract

There are some studies that show that exposure to natural disasters makes people more violent. Yet, other studies find that natural disasters increase cooperation between individuals and improve social trust. Many of these evidence came from analyzing adults, but little is known about aggressive behavior in young people exposed to natural disasters. This paper analyzes the effects of natural disasters on aggressive behavior in young people between 13 and 18 years old in Mexico. Using a test that measures aggressive behavior (Achenbach and Rescorla, 2001), combined with data regarding natural disasters, I find: 1. exposure to natural disasters diminishes aggressive behavior among young people; 2. I do not find heterogeneous results by sex or age; yet, I find evidence of heterogeneous effects by number of siblings (the greater the number of siblings the greater the decrease in aggressiveness when facing a natural disaster); and 3. these results are mainly driven by hydrometeorological, earthquakes, and droughts (which are the most common natural disasters in Mexico). Yet, I also find evidence that in the case of less common natural disasters (such as tornadoes), the effect on aggressiveness tends to be positive.

Keywords: natural disasters; aggressive behavior

JEL: I14, I24, Q546.

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1 Introduction

Are people more aggressive after a natural disaster? There are some studies that show that exposure to natural disasters makes people more violent, e.g. increase in child abuse (Biswas et al., 2010), intimate partner violence (Anastario et al., 2009), and riots (Bellemare, 2015). Yet, other studies find that natural disasters increase cooperation between individuals and improve social trust (Toya and Skidmore, 2014). In addition to these apparent opposite results, there is little evidence regarding the effects of natural disasters on youth aggressive behavior (Scott et al., 2014).

To analyze the effect of natural disasters on youth aggressive behavior, I use a survey of adolescents between 13 and 17 years old participating in Mexico's PROGRESA social program. This data was collected in 2012 and includes information regarding psychological variables. Aggressive behavior is measured using the Youth Self-Report scale proposed by Achenbach and Rescorla (2001). In the case of natural disasters, I use a database collected by the Mexican government at the municipal level for all the types of natural disasters that have affected the country between 2000 and 2012. So, this information permits not only to analyze the impact, but also how the frequency of natural disasters affects the aggressive behavior of adolescents. The results show: 1. exposure to natural disasters diminishes aggressive behavior among young people. In addition, frequency of natural disasters decrease aggressive behavior; 2. heterogeneous effects by number of siblings, but not by sex or age; and 3. the results are mainly driven by hydrometeorological, earthquakes, and droughts (which are the most common natural disasters in Mexico).

One of the main assumptions behind these results is that adolescents remain in the municipality from their childhood until the period when the information was collected. Yet, it is possible that families migrated to other locations during the study period. To check the robustness of these results, I limited the data using only adolescents who have suffered a natural disaster in the year during which the information was collected (2012) and those who lived in municipalities not affected by natural disasters. To control for migration, I use a series of proxy variables such as change of address, change of school, and change of work by parents in the last 12 months. Using this strategy, the results continue showing a negative effect of natural disasters on aggressive behavior. Finally, I follow the procedures proposed by Altonji et al. (2005) and Oster (2017) to show that these results are unlikely to be driven by omitted variables.

This work relates to a small literature studying the effects of natural disasters on youth aggressive behavior. Marsee (2008), using a sample of 166 adolescents between 14 and 18 years old exposed to Hurricane Katrina in the USA, find a positive relation of natural disasters (through posttraumatic stress disorder) on aggressive behavior. In addition, the findings were invariant across gender. Scott et al. (2014) test whether the results presented by Marsee (2008) are maintained using a younger sample (8 to 15 years old) exposed also to hurricane Katrina. They confirm that there was no variation in the results between the younger sample and youth in the late childhood. Vigil et al. (2010), using a sample of 62 adolescents affected by Hurricane Katrina and 53 adolescents not affected (ages 12-19 years old), found a negative relation between exposure to natural disasters and aggres-

sion. In particular, they find lower levels of aggression among boys with exposure to Hurricane Katrina compared to matched controls who did not experience the disaster. This effect was not found for girls. Despite these efforts, the authors of the three former papers presented recognize important limitations on their results: i) those studies generally have small samples, thus may not be representative of those experienced hurricane Katrina, ii) they use only adolescents exposed to the hurricane (Vigil et al. (2010) try to improve this limitation including a control group); iii) these studies use linear regression models and structural equations models which show associations, but these results may be biased as a consequences of important omitted variables. In particular, it is possible that natural disasters affect other variables, such as death of the father, that are correlated with natural disasters and can affect the outcome of interest (youth aggressive behavior); and iv) these results are for one type of natural disaster (hurricane), but it is necessary to understand if these results are maintained for other kind of natural disasters (such as earthquakes and droughts) and other type of countries.

The main contributions of this paper are threefold. First, this paper contributes to a small literature regarding the effects of natural disaster on youth aggressive behavior. In particular, there are some evidence that young people can develop positive strategies in the face of adversity such as moral development and educational aspirations (Barber, 2009). In this case, I find that natural disasters decrease the aggressive behavior of youth people. Second, this paper contributes to a recent debate about how exposures to risk situations (such as natural disasters or war) have different impacts depending on gender. For example, Dimitry (2011) conducted a literature review from children exposed to armed conflict and

found that girls experience more anxiety (internalizing symptoms) and boys more aggressive behavior (externalizing symptoms). In this paper, I do not find evidence of natural disasters on aggressive behavior by gender. Finally, this paper presents evidence not only for hurricanes, but earthquakes, droughts and other type of natural disasters on aggressive behavior. I find that the main result (a negative relationship) is driven principally for the most common types of natural disasters: hurricanes, earthquakes, and droughts. Yet, the least common natural disasters (such as tornadoes) have a positive effect on aggressive behavior.

The rest of the paper is organized as follows: in Section II, I describe the data and empirical methods; in Section III, I present the results; and, Section IV is the conclusion.

2 Data and Empirical Methods

2.1 Description of Data

To estimate the impact of natural disasters on youth aggressive behavior, I use a database that was collected in 2012 to analyze socioeconomic and non-cognitive skills of adolescents living in poverty participating in Mexico's PROGRESA conditional cash transfer program.¹ The sample comes from a registry of 2,392,909

¹This program offers cash transfer to families living in poverty on the condition that they send their school-age children to school and attend health services. In 2012, the program served 5.8 million households, with around 24 million people nationwide (almost 1 in 4 Mexicans).

households.² From this list, a probabilistic survey of around 2,000 households was selected. And of these households, those with children between 13 and 17 years old were selected to apply a survey for adolescents. This corresponds to 1,275 adolescents and 837 households, distributed in 60 locations in 19 states (Palomar, 2012). Of these 1,275 young people, 1,089 youths were able to retrieve information.

To measure aggressive behavior, I develop an index based on principal components. The aggressive behavior index is based on Achenbach and Rescorla (2001), and the test was adopted by Palomar (2012) in Mexico. The test contains 17 items³ and have the following categorical answers: “always”, “frequently”, “rarely”, and “never”. To measure aggressive behavior, I use these items and develop an index based on principal components. I then standardized the value of the index to have a mean of zero and a standard deviation of one.

Regarding natural disasters, Mexico is among the top 30 countries most exposed to three types of natural disasters: hydrometeorological (storms, hurricanes, and floods), earthquakes, and droughts. According to the World Bank (2012), 41% of the Mexican territory is exposed to storms, hurricanes, and floods; 27% to earthquakes, and 29% to droughts. The data used to measure natural disasters came from the National Center for the Prevention of Disasters (CENAPRED). Beginning in 2000, Mexico began allocating resources to address natural disasters through the General Law of Civil Protection (World Bank, 2012). Resources are delivered through a fund that provides food support and resources for the reconstruction of damaged areas. The information is available since 2000, and it is classified by

²The program serves around 5.8 million families, but indigenous localities and localities with less than 45 houses were excluded. In this way, a record of 2,392,909 households was reached.

³The items are presented in Table 9

type of disaster (hydrometeorological, earthquakes, droughts, and others) for all municipalities in the country.

Table 1 presents descriptive statistics regarding aggressive behavior (this index has a mean of zero and a standard deviation of one). “Treatment” refers to adolescents who live in municipalities that have been affected by at least one natural disaster; and “Control” when the adolescents live in municipalities that have not been affected by a natural disaster since 2000. It is observed that the adolescents living in “Treatment” localities experience a lower level of aggressive behavior than those living in the “Control” localities. It is also presented information regarding other variables that will be used as controls: sex, age, sexual abuse, death of a parent, parent abandonment, parent in prison, and number of siblings. In addition, I also present information for other variables that can affect the level of aggressiveness of the adolescents: social support, authoritative parenting style, family relations of conflict, and neighborhood insecurity.

2.2 Empirical Strategy

This paper analyzes the effects of natural disasters on aggressive behavior of adolescents. The model to estimate is given by:

$$Y = \beta_1 T + \beta_2 T * \text{frequent} + \gamma X + e .$$

where Y is the outcome of interest (aggressive behavior), T is a dummy variable equal to 1 if the adolescent lives in a municipality affected by at least one natural

disaster during the period 2000-2012, and 0 otherwise; frequent is a variable that measure the total number of natural disasters that have affected the municipality during the period 2000-2012; X is a vector of observed control variables (sex, age, sexual abuse, siblings, father death, mother death, abandonment by father, abandonment by mother, parents in prison, and having social support); and e is an error term with mean zero.

A study of this type presents some econometric challenges. In particular, it is assumed that adolescents have lived in the affected localities since 2000 (there is no migration) and no omitted variables problems. Fortunately, the data contains variables that can be used as migration proxies. In particular, the data contains questions regarding whether in the last year they have changed their address, changed schools, or if the parents have changed jobs. So, to check the robustness of the results, I made a series of regressions where I only use the information of young people who were affected by a natural disaster during the year 2012, and young people who live in localities that have not been affected by a natural disaster since 2000.

Regarding the problem of omitted variables, it is possible that there are variables that are affected by natural disasters, that explain aggression, and which are not included in the data. To sort this problem of potential omitted variables, I use a bounding approach proposed by Altonji et al. (2005) and refined by Oster (2017). Altonji et al. (2005) observed that a common approach to evaluate robustness to omitted variable bias is to include additional control variables on the right hand side of the regression. If such additions do not affect the coefficient of

interest, then this coefficient can be considered to be unlikely biased. This strategy implicitly assumes that selection on observables is informative about selection on unobservables. Oster formalizes this idea, and provides conditions for bounds and identification. If the bounds exclude zero, then the results from the regressions can be considered to be robust to omitted variable bias.

3 Results

3.1 Main results

Table 2 column 1, presents a linear model of the impact of natural disasters and their frequency on adolescents' aggressive behavior. I control only for municipalities. The results show that adolescents who live in a municipality affected by a natural disaster experience a decrease of 0.22 standard deviations in the aggressive behavior index. In addition, it is observed that the frequency (number of natural disasters affecting the municipality) decrease the index of aggressive behavior by -.043 standard deviations. To check the robustness of these results, column 2 incorporates information regarding sex, age, suffering sexual abuse, and number of siblings; and column 3 uses information regarding the death of a father, death of a mother, abandonment by the father, abandonment by the mother, parents in prison, and having social support. The coefficients associated with natural disasters and the frequencies of natural disasters continue being statistically significant.

As it was mentioned on the empirical strategy, an important assumption be-

hind these results is that adolescents did not migrate and live for all the period (2000-2012) on the municipalities affected. This assumption is clearly doubtful. Thus, I reduce the data to only adolescents who were affected by a natural disaster in 2012 and adolescents who live in municipalities who have never been affected by a natural disaster since 2000. Table 3 presents the results using this strategy. Columns 1, 2 and 3 use the same control variables as those in Table 2. It is observed that the coefficient regarding natural disasters and frequency continue being statistically significant, yet I observe a considerable reduction in the number of observations (from 1,089 to 439). Then, to check how robust are the results to migration, I control for variables that are proxy for migration: address change, change of school, and change of work. The results using these proxy variables are presented in column 4, and the coefficients associated with natural disasters and frequency continue being statistically significant.

A crucial assumption for these results is that there is not an omitted variable bias problem. Thus, I estimate the range of estimated parameters using a bounding methodology proposed by Oster (2017). One of the information needed to generate these bounds is the R-squared for an hypothetical model that contains both the observable and omitted variables. A natural candidate for this value is an R-squared equal to one. Yet, it is possible that the variable of interest (in this case aggressive behavior) is measured with error, and it is not possible to get an R-squared equal to 1. In this sense, Oster propose to use a hypothetical R-squared equal to 1.3 the R-squared using the observed variables.⁴ Table 4 presents the re-

⁴This value results from a study conducted by Oster replicating randomized control studies publishing in top economic journals between 2008 and 2013. When using an hypothetical R-squared equal to 1, only 20% of the results were robust. And, when using an hypothetical R-squared equal to 1.3 times the R-squared using controls, reproduced 90% of randomized results.

sults of the bounding methodology for the variables regarding natural disasters and the frequency of natural disasters. I find that the bounds for the variables analyzed do not include the zero (regardless the assumption used for the hypothetical R-squared), suggesting that the results are robust against the problem of omitted variable bias.

3.2 Mechanisms

The mechanisms by which natural disasters affect aggressive behavior can be through family or community factors. In particular, I analyze three factors: parenting styles, conflict relationships within the household, and perception of insecurity in the community. Unfortunately, the data does not have information on social capital at the community level, which could be another potential mechanism.

Table 5 presents simple correlations between natural disasters and the variables that are possible mechanisms (authoritative parenting style, family conflict, and perception of neighborhood insecurity) controlled by fixed effects at the municipal level. Column 1 presents a positive relation between natural disasters and authoritative parenting style. The authoritative parenting style is characterized by reasonable demands and high responsiveness by the parents. Calvete et al. (2015) find that children who have good relations with their parents are less inclined to manifest aggression or upset. Column 2 shows a positive relation between natural disasters and family conflict (which is in line with the findings of Anastario et al. (2009)), but it is also observed that the frequency of natural disasters decreases family conflict. A similar situation occurs in the case of natural disasters and

perception of insecurity in the neighborhood (see column 3). Where there is a positive relationship between exposure to natural disasters, but a negative relationship between the frequency of natural disasters and perception of insecurity.

Table 6 analyzes whether the mechanisms by which natural disasters affect levels of aggressiveness are through parenting styles, conflict relationships, or perception of insecurity in the neighborhood. Column 1 reproduces the results presented in column 3 of Table 2 and only serves as a reference. It is observed that having authoritative parents decreases levels of aggressiveness (-0.081), living in a conflictive family is positively related (0.276) with aggressiveness, and there is also a positive relationship with insecurity in the neighborhood and aggressiveness (0.143). Yet, there is no conclusive evidence that the mechanisms by which natural disasters affect the aggressiveness of young people are through the aforementioned variables (see columns 2, 3, 4, and 5).

3.3 Heterogeneous effects

In this section, I analyze heterogeneous effects by sex, age, and number of siblings. There is not enough evidence on whether natural disasters have different effects by gender on the levels of aggressiveness of young people. For the literature of armed conflicts, we know that girls tend to develop greater levels of depression, and children greater levels of aggression (Dimitry, 2011). In the case of Hurricane Katrina, the evidence is not conclusive. Marsee (2008) found no evidence of heterogeneous effects per gender, but Vigil et al. (2010) finds that the effect is only in boys. In the case of heterogeneous effects by age, using evidence from hurricane

Katrina, Scott et al. (2014) finds no evidence that there are heterogeneous effects by age. Finally, little evidence exists regarding heterogeneous effects by number of siblings. On the one hand, we could think that having a greater number of siblings can be a way to receive support during a natural disaster; but, on the other hand, it is also possible that the scarcity of resources generate possible conflicts between the children.

Table 7 presents heterogeneous results by sex (column 1), age (column 2), and number of siblings (column 3). There is no evidence of heterogeneous effects by sex or age. In the case of the number of siblings, there is evidence of heterogeneous effects. The variable number of siblings takes the value of 1 when having one or zero siblings and 0 otherwise. In the case of exposure to natural disasters, a lower effect is observed in adolescents who have one or zero siblings (-0.395) compared to those who have two or more siblings (-0.590).

3.4 Effect of natural disasters on aggressive behavior by type of natural disaster

One of the questions that remains open is whether there is any difference by type of natural disaster in the levels of aggressiveness. The data disaggregates information by hydrometeorological disasters (storms, hurricanes, and floods), earthquakes, droughts, and other types. Table 8 presents the results by type of natural disaster in the index of aggressiveness. The results confirm a negative effect of hydrometeorological disasters, earthquakes, and droughts in aggressiveness levels.

An interesting result is that other types of natural disasters have a positive effect on aggressiveness.

4 Conclusion

Adolescents who display aggressive behavior are at risk of violent future behavior, delinquency, and school dropout (Orpinas and Frankowski, 2001). In this sense it is necessary to understand the factors that can affect this type of behavior in adolescents. One of the variables little studied and that can have important consequences are natural disasters. On the one hand, it is possible that in the face of a natural disaster, the stress levels of young people rise, and with them an increase on aggressive behavior (Marsee, 2008). But, it is also possible that in the face of an adverse situation, young people develop strategies of coping and cooperation, decreasing their levels of aggression (Barber, 2009).

Using data from adolescents between 13 and 17 years old participating in the Mexico's PROGRESA social program, and data of exposure to natural disasters, I find that: 1. exposure to natural disasters has a negative effect on the aggressive behavior of adolescents; 2. there is evidence of heterogeneous effects by number of siblings; but, not by sex or age; and 3. the results are mainly a consequence of the three most common types of natural disasters in Mexico: hurricanes, earthquakes, and droughts. To confirm that these results are not the consequence of omitted variable bias, I control for possible migration and using a bounding technique developed by Oster (2017). These approaches suggest that the results are not consequence of omitted variables.

It was not possible to establish what is the mechanism by which natural disasters affect the levels of aggressiveness among young people. The base has information on parenting styles, conflict relationships within the household, and neighborhood insecurity. These variables are affected by natural disasters and have an impact on levels of aggression. Yet, it was not found that these variables are the mechanisms. A possible alternative to explore in the future is to know the levels of social capital in the locality. This information was not collected. But, it is possible that when facing a natural disaster, individuals tend to cooperate more, and this behavior is reflected in a less aggressive behavior among adolescents.

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5 Appendix

Table 1: Descriptive statistics

	Treatment	Control
Aggressive symptom	-0.05	0.17
Natural disasters	3.16	0.00
Sex: 1 Female 0 Male	0.45	0.43
Age	14.94	14.83
Sexual abuse	0.01	0.00
Father death	0.04	0.05
Mother death	0.01	0.03
Abandonment by the father	0.07	0.06
Abandonment by the mother	0.03	0.02
Prison (parents)	0.04	0.05
Siblings	2.57	3.05
Social support	0.01	-0.03
Authoritative parenting style	0.01	-0.03
Family relations of conflict	-0.01	0.03
Neighborhood insecurity	0.02	-0.06
Observations	865	224

Source: Survey of Resilience and Social Mobility (Progres-Oportunidades Program)

Table 2: Impact of natural disasters on aggressiveness

	(1)	(2)	(3)
Dependent variable: aggressive symptom			
Natural disasters: 1 Yes 0 No	-0.225*** (0.000)	-0.272*** (0.034)	-0.313*** (0.037)
Natural disasters* Frequency	-0.043*** (0.000)	-0.044*** (0.005)	-0.048*** (0.007)
Sex: 1 Female 0 Male		-0.037 (0.079)	0.034 (0.072)
Age		0.009 (0.022)	0.009 (0.021)
Sexual abuse		0.939*** (0.344)	0.846*** (0.316)
Siblings		0.018 (0.023)	0.014 (0.021)
Father death			0.048 (0.181)
Mother death			-0.219 (0.247)
Abandonment by the father			-0.065 (0.173)
Abandonment by the mother			0.145 (0.230)
Prison (parents)			0.046 (0.161)
Social support			-0.274*** (0.030)
Municipality FE	Yes	Yes	Yes
R^2	0.13	0.14	0.20
Observations	1089	1088	1088

Note: Clustered standard errors displayed in parenthesis at the municipality level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Impact of natural disasters on aggressiveness (robustness check)

	(1)	(2)	(3)	(4)
Dependent variable: aggressive symptom				
Natural disasters: 1 Yes 0 No	-0.225*** (0.000)	-0.236*** (0.077)	-0.278*** (0.074)	-0.264** (0.105)
Natural disasters* Frequency	-0.043*** (0.000)	-0.050*** (0.011)	-0.053*** (0.011)	-0.056*** (0.014)
Sex: 1 Female 0 Male		0.030 (0.123)	0.088 (0.107)	0.088 (0.112)
Age		0.001 (0.034)	0.006 (0.038)	0.003 (0.039)
Sexual abuse		0.647 (0.836)	0.703 (0.884)	0.761 (0.819)
Brothers		0.044 (0.036)	0.019 (0.031)	0.020 (0.031)
Father death			-0.026 (0.274)	-0.009 (0.273)
Mother death			-0.052 (0.429)	0.037 (0.424)
Abandonment by the father			-0.138 (0.182)	-0.141 (0.181)
Abandonment by the mother			-0.159 (0.235)	-0.147 (0.243)
Prison (parents)			-0.095 (0.159)	-0.035 (0.173)
Social support			-0.287*** (0.060)	-0.285*** (0.060)
Address change				-0.007 (0.156)
Change of school				-0.276 (0.196)
Change of work (parents)				-0.015 (0.154)
Locality FE	Yes	Yes	Yes	Yes
R^2	0.08	0.09	0.16	0.17
Observations	440	439	439	439

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Bounding methodology

	Oster ($R_{max} = 1.3\tilde{R}$)	Conservative ($R_{max} = 1$)
Reduced sample of young people affected and not affected in 2012 (n=439)		
Natural disasters: 1 Yes 0 No	[-0.253,-0.275]	[-0.089,-0.440]
Natural disasters* Frequency	[-0.053,-0.059]	[-0.010,-0.102]
Other controls	Yes	Yes
Locality FE	Yes	Yes

Note: Other controls include: sex, age, sexual abuse, brothers, father death, mother death, abandonment by father, abandonment by mother, parents in prison, and having social support. It also includes address change, change of school, and change of work.

Table 5: Authoritative parenting style, family conflict, neighborhood insecurity and natural disasters

	Authoritative parenting (1)	Family conflict (2)	Neighborhood insecurity (3)
Natural disasters: 1 Yes 0 No	0.137*** (0.000)	0.090*** (0.000)	0.754*** (0.000)
Natural disasters* Frequency	-0.040*** (0.000)	-0.023*** (0.000)	-0.103*** (0.000)
Locality FE	Yes	Yes	Yes
R^2	0.07	0.10	0.11
Observations	1089	1089	1089

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Mechanisms: authoritative parents, family conflict, and neighborhood Insecurity

	(1)	(2)	(3)	(4)	(5)
Dependent variable: aggressive symptom					
Natural disasters: 1 Yes 0 No	-0.313*** (0.037)	-0.278*** (0.040)	-0.280*** (0.036)	-0.465*** (0.037)	-0.360*** (0.040)
Natural disasters* Frequency	-0.048*** (0.007)	-0.054*** (0.007)	-0.045*** (0.006)	-0.025*** (0.007)	-0.034*** (0.007)
Authoritative parents		-0.122*** (0.036)			-0.081** (0.036)
Family relations of conflict			0.327*** (0.039)		0.276*** (0.042)
Neighborhood insecurity				0.222*** (0.026)	0.143*** (0.032)
Locality FE	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes
R^2	0.20	0.21	0.29	0.25	0.31
Observations	1088	1088	1088	1088	1088

Other controls include: sex, age, sexual abuse, brothers, father death, mother death, abandonment by father, abandonment by mother, parents in prison, and having social support. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Heterogeneous effects with respect to sex, age, and number of brothers

	(1)	(2)	(3)
Dependent variable: aggressive symptom			
Natural disasters: 1 Yes 0 No	-0.369*** (0.075)	-0.238*** (0.087)	-0.590*** (0.078)
Natural disasters* Frequency	-0.044*** (0.015)	-0.046*** (0.011)	-0.019* (0.010)
Natural disasters × Sex: 1 Female 0 Male	0.037 (0.163)		
Natural disasters× Frequency × Sex: 1 Female 0 Male	0.014 (0.031)		
Natural disasters × Age: 1 less than 14 years old 0 Otherwise		-0.246 (0.168)	
Natural disasters× Frequency× Age: 1 less than 14 years old 0 Otherwise		0.028 (0.026)	
Natural disasters × Brothers: 1 having one or zero 0 Otherwise			0.761*** (0.225)
Natural disasters× Frequency × Brothers: 1 having one or zero 0 Otherwise			-0.056* (0.028)
Sex: 1 Female 0 Male	-0.032 (0.080)	0.031 (0.072)	0.041 (0.072)
Age: 1 less than 14 years old 0 Otherwise	-0.025 (0.056)	0.102 (0.125)	-0.028 (0.055)
Brothers: 1 having one or zero 0 Otherwise	-0.102 (0.073)	-0.102 (0.072)	-0.566*** (0.189)
Locality FE	Yes	Yes	Yes
Other controls	Yes	Yes	Yes
R^2	0.13	0.14	0.20
Observations	1089	1088	1088

Other controls include: sexual abuse, father death, mother death, abandonment by father, abandonment by mother, parents in prison, and having social support. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Impact of natural disasters on aggressiveness by type (hydrometeorological, earthquakes, droughts, and other)

	(1)	(2)	(3)
Dependent variable: aggressive symptom			
Hydrometeorological: 1 Yes 0 No	-0.816*** (0.000)	-0.823*** (0.025)	-0.910*** (0.041)
Earthquake: 1 Yes 0 No	-1.310*** (0.000)	-1.234*** (0.115)	-1.562*** (0.127)
Drought: 1 Yes 0 No	-0.276*** (0.000)	-0.290*** (0.043)	-0.303*** (0.069)
Other: 1 Yes 0 No	0.788*** (0.000)	0.831*** (0.027)	1.337*** (0.098)
Hydrometeorological*Frequency	0.154*** (0.000)	0.139*** (0.008)	0.150*** (0.010)
Earthquake*Frequency	0.973*** (0.000)	0.868*** (0.091)	1.022*** (0.096)
Drought*Frequency	-0.358*** (0.000)	-0.306*** (0.030)	-0.342*** (0.038)
Other*Frequency	-0.523*** (0.000)	-0.514*** (0.020)	-0.812*** (0.063)
Locality FE	Yes	Yes	Yes
Other controls	Yes	Yes	Yes
R^2	0.13	0.14	0.20
Observations	1089	1088	1088

Other controls include: sex, age, sexual abuse, brothers, father death, mother death, abandonment by father, abandonment by mother, parents in prison, and having social support. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Prevalence of aggressive symptom

	Treatment	Control
I discuss a lot	2.13	2.29
I'm bad with others	1.57	1.80
I try to get attention	1.61	1.63
I destroy my things	1.34	1.42
I destroy the things that belong to others	1.27	1.36
I disobey my parents	1.79	1.98
I disobey in school	1.60	1.79
I fight a lot	1.53	1.72
I physically attack other people	1.28	1.29
I scream a lot	1.71	1.77
I'm stubborn	1.74	1.85
My mood changes quickly	1.96	1.94
I am distrustful	2.00	2.00
I disturb others a lot	1.42	1.54
I have an explosive character	1.75	1.83
Threatening to hurt others	1.20	1.27
I'm more noisy than other boys	1.55	1.58

Source: Survey of Resilience and Social Mobility (Progres-a-Oportunidades Program)