Violence in the School Surroundings and Its Effect on Social and Emotional Traits

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Introduction

Research on the origins of human well-being in the XXI century have emphasized that success in different dimensions of life require more than knowledge and cognitive ability. Heckman et al. (2006) and Cattan (2010), for instance, show that personality characteristics are at least as important as cognitive skills in determining wages. Lindqvist and Vestman (2011) find an even stronger effect when personal interviews conducted by a professional psychologist are used as measures of these traits. Similar findings are found for other dimensions of success in life, such as longevity (Roberts et al., 2007), and crime and violence (John et al., 1994; Gottfredson & Hirschi, 1990).

The literature on educational performance and attainment is vast and emphasizes the feedback effects that produce simultaneous determination of educational outcomes and the development of character in schools (Cunha et al., 2010; Almlund et al., 2011). There is, however, a robust conclusion that personality attributes are among the main predictors of dropout, achievement test scores, and years of schooling (Almlund et al., 2011; Duckworth et al., 2010; Carneiro et al., 2007; Poropat, 2009).

On the other hand, research from different fields is unanimous in informing us that the school environment is a major factor responsible for personality changes (Durlak, 2011; Heckman and Rubinstein, 2001). Heckman et al. (2006), Cunha et al (2010) and Heckman, Pinto, and Savelyev (2013) show that non-cognitive channels are at least as important as the cognitive ones in explaining why more educated people have better average outcomes over the life cycle. Lleras-Muney (2010) shows that personality characteristics are important mediators of the relationship between education and health.

Although the evidence is robust in showing that non-cognitive traits are important for life and that schools are environments in which these traits are affected, much less is known about the mechanisms through which these changes occur. Research on early child development suggests that social and emotional characteristics are strongly influenced by the presence of toxic stress, that is, long exposure of children to unprotected situations of violence, anxiety, and unpredictability (Shonkoff & Garner, 2012; Schindler et al., 2015).

Violence in the school environment is also shown to strongly affect the educational performance of the students. Grogger (1997) shows that students in violent schools have 5.1 less percentage points of chance of completing high school. Students who reported they worried over safety matters display lower performance in test scores (Pratt, Tallis, & Eysenck, 1997). Bullying and violence are also associated with absenteeism, tardiness and lower attention spans (Hoffman, 1996). Ammermueller (2007) generalizes these conclusions by showing that performance in test scores is significantly affected by school violence in 11 European countries, especially for boys and in big cities.

The role of early exposure to violence in shaping personality traits, and the evidence that violence in schools harms educational performance naturally leads to the hypothesis that educational performance may be explained by an intermediary effect of school violence on social and emotional characteristics, that ultimately lowers educational outcomes.

The literature that explores the link between violence and changes in personality characteristics can be roughly grouped into two streams. In the first group, research is focused on the post-traumatic psychological effects of becoming a victim of violent episodes. Much research has emphasized the cumulative effects of stressors like exposure to abuse, neglect, danger and aggression on various forms of internalizing and externalizing behavior, including depression, anxiety, affliction, stress, concentration, safety awareness, sleeping difficulties, and suicide intentions (Astone, Misra, & Lynch, 2007; Evans, 2004; Evans & English, 2002; Evans, Kim, Ting, Tesher, & Shannis, 2007; Geronimus, Hicken, Keene, & Bound, 2006; Lucey, 2007). Margolin et al (2010) found similar results for older children. Joseph (1999) showed that children who experienced violence produce more “fight or flight” hormones, atrophying the brain areas that control emotional regulation, empathy, social functioning, and other skills imperative to healthy emotional development. Attar, Guerra and Tolan (1994) and Evans and English (2002) reported that these effects are particularly strong for low SES children and teenagers. Sieger et al. (2004) and MacMillan (2001) documented that magnitude and duration of the impacts are inversely related to age, since younger children do not have the tools to deal with adversity.

The second stream of the literature deals with the psychological effects resulting from the fear and pressure of living or attending schools in violent neighborhoods. While being a direct victim of violence in general causes post-traumatic stress consequences, mainly related to internalizing and externalizing behaviors, witnessing violence may be more related to changes in interpersonal behaviors (such as trust in others and empathy) and attitudes, reflecting preventative strategies to protect oneself. Impacts on emotional stability appear to strongly depend upon the closeness of the victim to the individual (Perkins, Graham-Behrmann, 2012), the strength of the message (watching violence has stronger effects than listening to stories about violence), and to the frequency and chronicity of the occurrences. Changes in internalizing behavior are the most frequent responses in young children, whereas adolescents tend to externalize their reactions (Fowler et al., 2009). Hurt et al. (2001), Delaney-Black et al. (2002) and Ratner et al. (2006) estimate structural models in which they show that an important part of the violence effect on cognitive performance is mediated by changes in self-esteem, anxiety, stress, and fear of unsafety.

Hardaway, McLoyd and Wood (2012) found a solid association between community violence and internalizing (anxiety and feeling of loneliness) and externalizing (aggressiveness and delinquency) behaviors among youth. They also investigated the role of potential mediators of this relation, and concluded that participation in after-time school activities and child-parent relationship strongly moderated the impact of violence on externalizing behavior among low-SES students. Buckner, Bearslee and Bassuk (2004) documented that individuals adopt precautionary attitudes to protect themselves, friends and relatives in response to fear of violence in the neighborhood. Explanations for increases in aggressiveness in these papers include trivialization of violence (Guerra, Huesmann and Spindler, 2003), neurological reactions (Cooleyquille et al., 2001), and demonstration effects, such as the valorization of violent behavior in making people popular in a group[1].

1 Austen-Smith and Fryer (2005) use this last argument to explain the “nerd harassment” or the inhibition of “acting white” behavior in some Black schools in the US. A similar mechanism is suggested by Anderson (1994), to describe how violence shapes the “street codes” that makes the so called “street parents” to transmit violent values to their children

The Brazilian context – and especially the state of Rio de Janeiro – is particularly useful to examine the role of violence in schools and its association with social and emotional development of youth.

First, Brazil experienced a sharp growth in homicides during the last 30 years, followed by a decrease in the biggest cities of the Southeast region in the first decade of the XXI century. But these cities still have epidemic homicide rates. For example, Rio de Janeiro still had 18.6 homicides per 100 thousands inhabitants in 2015[2]. Young men usually represent the biggest group both among victims and among perpetrators. According to Waiselfisz (2006, 2013), Brazil improved its position in the world map of juvenile violence from the 3rd to the 7th place between 2004 and 2011. However, this improvement seems to be more related to the worsening of other countries (for example, Guatemala and El Salvador) in the period, than to the reduction in the Brazilian violence rates. In fact, Brazil experienced more than 1 million homicides between 1980 and 2011 (39% of which were 14 to 24 year-old individuals; *The Associated Press*, 2013). Finally, and particularly important for this paper, in Rio de Janeiro state, 60% of people do not feel secure (at home, neighborhood, or city). This rate is the second highest in Brazil (Sant´Anna and Scorzafave, 2012).

Severnini (2007) shows that individuals who study in more violent schools have lower scores in Math. Monteiro and Rocha (2011) conclude that Rio de Janeiro is a particularly violent state for youth, and that students living in neighborhoods with armed gangs displayed lower scores in Math. Gama and Scorzafave (2013) found similar results for elementary school students of the municipality of São Paulo.

The Present Research

In this paper, we investigate the relationship between indicators of violence in the neighborhood of the school and psychological characteristics of the student in the state of Rio de Janeiro. Although many authors quoted above have documented that violence is related to low educational performance in Brazil, none of them have analyzed the association of criminal occurrences and social

2 http://www.isp.rj.gov.br.

and emotional skills of students in a representative sample. Even for international standards, it is uncommon to have a probabilistic sample of a broad region like a State. To investigate our objectives, we will examine student self-descriptions (N=23,113) on the SENNA 1 questionnaire (Primi and Santos, 2013), a personality-based measure to examine social and emotional skills. We will merge these individual-level self-report personality data with violence data retrieved from police districts to serve as indicators of violence in the school neighborhood. We will estimate the effects of different indicators of violence on six characteristics, the Big Five personality characteristics (Openness to New Experiences, Extraversion, Conscientiousness, Agreeableness, and Neuroticism) plus External Locus of Control.

Besides our primary goal of showing that violence is associated with these trait dimensions, we address a number of secondary questions with importance for public policy and academic interest:

i Which domain of personality is more related with violence in the school context? When the individual is the victim of an occurrence, the literature suggests that facets of Emotional Stability (such as anxiety and depression) are the most sensitive characteristics, especially due to post-traumatic reactions. In the present case, however, violence in the surroundings of the school is likely to create expectations of becoming a potential victim. It is unclear, therefore, if the psychological characteristics that change in response to these threats are necessarily related to emotional control. Interpersonal attributes like Extraversion (the willingness to engage with others) and Agreeableness (comprising trust and empathy) may be also affected, due to an increase in avoidance behavior. It is also plausible that individuals that study in adverse contexts become more conservative and less tolerant to diversity, hence reducing their levels of Openness to experiences.

ii Which type of crime affects students most? In the case of victimization, the psychological effect is usually proportional to the damage caused by violence. In the present research, however, violence in the surroundings of the school creates expectations of being a potential victim. Reactions to an uncertain event depend both on the magnitude of its consequences and on the (subjective beliefs about the) probability of its occurrence. We will make a distinction between crimes against property and against persons, and will

investigate which one has greater (partial) correlation with the psychological constructs of the students.

iii In which grade is the students' psychological state more sensitive to violence? First grade students may experience less protection of the group (which has just been formed), and face novelty situations that are related to the recent change of school environment that may create emotional vulnerabilities. On the other hand, seniors have been longer exposed to the violent context in which the school is located.

iv Who is psychologically more impacted by violence: boys or girls? Previous research show that boys are in general more emotionally stable, whereas girls have more interpersonal skills (Soto et al., 2011; Primi and Santos, 2013). These strengths and weaknesses lead to different potential strategies to face violent episodes, and it is unclear which group has the highest gradient between violence and personality traits.

v Does violence has a differential impact on students coming from vulnerable family backgrounds? We considered "vulnerable" those individuals whose mothers have less than a middle school degree. As mentioned before, previous research indicates that the impact of violence on educational performance is greater for low-SES individuals. If the channel through which this happens is by harming the vulnerable teenagers more (probably because they have a less protective family environment to resist the violence effects), we should expect that the gradient from violence to social and emotional attributes is greater for this group.

Empirical strategy

The goal of this paper is to estimate the association between violence in the school neighborhood and personality characteristics, after controlling for a number of confounders. The strategy consists of estimating ordinary least squares regressions that have psychological characteristics as the dependent variable, and violence indicators together with covariates as explanatory variables.

Formally, we intend to estimate the following equation:

$$y^{\theta} = \beta_0^{\theta} + \beta_1^{\theta} V + \Gamma^{\theta\prime} X + \varepsilon$$

where the superscript θ denotes that we will estimate different regressions, one for each personality trait θ = [Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism, and Locus of Control].

The second element on the right hand side, V, is our indicator of violence in the school district, and the corresponding parameter, β_1^θ represents in this equation the partial effect of violence on the construct y^θ. As will be discussed below, our data allow us to build different types of violence indicators, and we used this diversity to investigate what type of indicator is more related to the personality of the students. The last term, $\Gamma^{\theta\prime} X$, controls for the influence of covariates X on y^θ. Notice that, even though we have in our data different indicators of violence, we avoided using them together in the same estimation, due to the strong collinearity among them. Furthermore, our dependent variable, y^θ, was previously normalized to have a mean of zero and unitary variance in the sample. By doing so, we can interpret the magnitudes of the coefficients as the impact of an extra 1000 violence episodes on personality traits in terms of multiples of a standard deviation[3]. For example, if theft cases increase by 1000 in some region and if β_1^θ estimate of theft on openness is -0.5, this corresponds to a migration from percentile 50 to percentile 31 in the openness distribution.

Data from two sources were used. At the student-level, we used self-descriptions on SENNA 1 (Primi and Santos, 2013) form a representative sample of approximately 23,113 high school students of the Brazilian state of Rio de Janeiro.

Table 1 shows some characteristics of the students enrolled in high school: girls are the majority of students; and half of the mothers have only middle school in both grades. Furthermore, there is a considerable fraction (24% in 1st grade and 15% in 3rd grade) of students that are older than expected for their grade level, a particular feature of the Brazilian education system.

Table 1
SENNA 1 sample characteristics – High School, 2013

	1st grade	3rd grade
% Boys	43%	38%
% Mother with middle school	48%	45%
Age		
% 15 years old	37%	--

3 In the Rio de Janeiro data, one standard deviation of a psychological characteristic is approximately the distance between the 25th percentile and 75th percentile of the distribution. In other words, if we draw 100 random people from our sample and order them according to this characteristic, 1 standard deviation is the predicted distance between the 25th and the 75th persons of this row.

% 16 years old	38%	--
% 17 years old	18%	46%
% 18 years old	6%	39%
% 19 years old	--	11%
% 20 years old	--	4%
Observations	14504	8609

The SENNA 1 is a 92-item self-report measure suitable for group administration in educational environments, targeted to middle and high school students. SENNA1 represents the content reflected in eight questionnaires that are frequently used in social-emotional skill assessments[4]. The items were carefully adapted to the Brazilian context, with extensive consults to middle and high school teachers and principals, and selected from a large set after careful psychometric analyses. Students rate themselves on a 5-point Likert scale with scale anchors ranging from “Strongly Disagree” to “Strongly Agree”.

Constructs covered by SENNA include Openness to experiences (tendency to be curious, imaginative and sensitive to aesthetic experiences), Conscientiousness (tendency to be organized, focused and responsible), Extraversion (tendency to be engaged to the others, energetic and assertive), Agreeableness (tendency to be altruistic and with empathy), Neuroticism (tendency to be anxious, depressive, or easily frustrated), and Locus of Control (belief that one has control over what happens on his or her own life). Notice that the first five constructs form the well-known OCEAN acronym used to denote the big five domains of personality, whereas Locus of Control separates as a distinct dimension..

In addition to SENNA1 data, socioeconomic and demographic characteristics of students, such as maternal and paternal education, socioeconomic status, family attitudes toward education, and individual characteristics (sex, age and race) were available These contextual variables will be used as covariates in the regressions, together with geographic dummies.

SENNA1 data were supplemented with information about violence at the level of the school neighborhood provided by the State Secretary of Safety’s Public Safety Institute (ISP). The data contains detailed information at the school district level on the occurrences of more than 50 types of crime. Because the ISP personnel warned us that many types of crime are under-reported in the police stations, we chose to use only the ones considered more reliable, and

4 Big Five Inventory, Big Five for Children, Self-Efficacy Questionnaires, Norwick-Strickland Locus of Control, Rosemberg Self-Esteem Scale, CORE Self-Evaluation Scales, Grit Scale, and Strengths and Difficulties Questionnaires.

which also displayed a relatively high frequency (over 1 occurrence per thousand habitants/year). These occurrences were first grouped in two broad categories (crimes against property and crimes against persons). We then proceeded with a finer analysis that considers each type of crime separately. Table 2 shows the frequency of the different types of crime in the State during 2015:

Table 2
Most frequent crimes in the Rio de Janeiro State, 2015

Type of violence		Incidence (occurrences/100k)
Property		*1786,2*
	Larceny	217,1
	Theft	1091,3
	Street Robbery	271,6
	Stolen Vehicles	107,1
	Recovered Cars	99,1
Self		*1146,3*
	Threat	431,0
	Intentional Physical Aggression	466,8
	Unintentional Physical Aggression	248,5

Our analyses will focus on four main questions:

i. Is violence in the school neighborhood associated with pupil's social and emotional development? Which dimensions are more affected? Is it stronger for the freshmen (who had just changed schools and are being exposed to a new environment, or for the seniors (who have a longer history of exposure to the adversities of violence)?
ii. What types of violence in the neighborhood are mostly related to the social and emotional development of the students?
iii. Are these effects stronger for girls (who typically have less emotional stability) or for boys (who typically have lower interpersonal skills)?
iv. How do these impacts vary between vulnerable and non-vulnerable students[5]? Do the Rio data confirm the findings in Attar, Guerra, & Tolan (1994) and Evans & English (2002), that violence is particularly harmful for vulnerable children?

Results

i. Overall effects of violence

In our first analysis, we regressed each of the SENNA1 social and emotional constructs on an aggregate violence indicator, including covariates by high school grade. The results showed that the interpersonal domains extraversion and agreeableness were more related to the presence of more violent contexts.

5 We defined a student as coming from a vulnerable family whenever his/her mother has less than a middle school degree.

As discussed above, our violence indicators refer to the relative number of occurrences in the neighborhood of the school, as opposed to indicators of victimization of the student. While the first measures potential aggression against the individual affecting more interpersonal behaviors, the last would also cause post-traumatic sequels, and would probably have consequences on emotional stability.

ii. Effects of types of violence

Interestingly, crimes against property seem to be more associated with students' personality attributes than violence against persons. There may be two explanations for this phenomenon. First, part of the violence incidents that constitute the violence-against-persons variable refers to fights between neighbors and home aggression that the student may perceive as unlikely to encounter, as they not necessarily live in the school district or belong to the community that surrounds the school. On the other hand, crimes such as larceny, robbery and theft may affect everybody that circulates in the school district, whether or not living there. If this is the case, even though the police registers a significant amount of physical aggression and threat incidents occurring around the school, students may react little to this fact, if they perceive only a small probability that they will encounter this violence. A second explanation is that violence against persons is likely to be more under-reported than crimes against property, both because many individuals refuse to inform the police that a relative has harmed or threatened them, and because in the case of property, insurance companies usually request a proof of the crime to pay the indemnities[6]. In the classical statistical approach to measurement error, coefficients' magnitudes tend to zero if the explanatory variables are badly measured. We see that this may be the case when examining the unexpected signs (although not statistically significant) of the coefficients of Conscientiousness and Openness for the freshmen. For these reasons, we decided to proceed with the indicators of violence against property only from this point onwards.

Finally, it is plausible to speculate that senior students may be more affected by violence in the school surroundings than the freshmen, in terms of their interpersonal behavior (but not in the other dimensions of personality). This result is consistent with the fact that 3rd grade students have been exposed to that context for a longer period. In the case of extraversion, the effect almost doubles from the first to the third grade.

6 According to a Brazilian National Victimization Survey for 2010-2012, personal aggression is highly underreported (only 17% of reported occurrences to police). On the other hand, more than 80% of stolen vehicles occurrences were reported to police (SENASP, 2013).

Table 3

Least Squares estimations of the relationship between psychological characteristics and violence in the school context

Type of violence	Conscien-ciousness	Extraversion	Emotional Stability	Agreeableness	Openness	Locus of Control
Violence against the self						
1st grade/ HS	0.63	-0.60**	-0.36	-0.35	0.35	0.17
3rd grade/ HS	0.31	-0.29	-0.15	0.10	0.84	-0.37
Violence against the property						
1st grade/ HS	-0.12	-0.26***	0.11	-0.41**	-0.11	0.12
3rd grade/ HS	-0.12	-0.48**	0.03	-0.50*	-0.12	0.05

Variables represent occurences per 1000 habitants/ year, and only categories with more than 1/1000 episodes were considered.
Violence against the self includes Threat, Intentional Physical Aggression and Unintentional Physical Aggression.
Violence against property includes Larceny, Theft, Street Robbery, Stolen Vehicles, and Recovered Cars.
Obs: The vector of control variables include race, gender, age, maternal education, whether the mother lives in the same place, whether the family receives welfare benefits, the frequency the student watches his/ her parents reading, the student's reading frequency, house characteristics (has paved walkway, electricity, piped water and garbage collection and geographic location).

The next table shows results of crime against property by type of crime, and confirms that the interpersonal domains are the ones most strongly associated with this sort of violence. Larceny seems to be particularly harmful, which is somehow expected, since it involves a direct breakage in trust in the others. It is also interesting to see that Openness to experience is also associated by some types of crime. As mentioned before, we can expect negative coefficients for this construct, since in adverse contexts people may become more conservative and less tolerant of diversity. Finally, the freshmen are shown to be particularly vulnerable to street robbery, in contrast to the seniors.

Table 4

Sensitivity of the psychological traits to different types of crime against property

Type of violence	Conscien-ciousness	Extraversion	Emotional Stability	Agreeableness	Openness	Locus of Control
1st grade/ HS						
Larceny	-1.58**	-1.60**	0.87*	-2.39**	0.01	1.26*
Theft	-0.38**	-0.39**	0.14	-0.49**	0.00	0.23
Street Robbery	1.85	-1.55	1.31	-5.45**	-4.67**	1.11
Stolen Vehicles	0.30	-0.82**	0.41	-1.57***	-0.73*	-0.02
Recovered Cars	1.56	-1.10	0.63	-2.76**	-2.09**	-0.05
3rd grade/ HS						
Larceny	-1.05	-4.50***	-0.34	-3.59*	0.34	-0.13
Theft	-0.46	-0.71*	-0.38	-0.50	0.15	-0.23
Street Robbery	0.93	-3.05	1.77	-2.25	-2.52*	1.22
Stolen Vehicles	0.04	-1.00	0.70	-1.64**	-0.73	0.55
Recovered Cars	0.39	-1.75	1.26	-2.57**	-1.45	0.99

Variables represent occurrences per 1000 habitants/ year, and only categories with more than 1/1000 episodes were considered. Violence against the persons includes Threat, Intentional Physical Aggression and Unintentional Physical Aggression.
Violence against property includes Larceny, Theft, Street Robbery, Stolen Vehicles, and Recovered Cars.
Obs: The vector of control variables include race, gender, age, maternal education, whether the mother lives in the same place, whether the family receives welfare benefits, the frequency the student watches his/ her parents reading, the student's reading frequency, house characteristics (has paved walkway, electricity, piped water and garbage collection and geographic location).

iii. Gender differences

The literature on the gender differences in terms of the big five domains of personality is robust in showing that boys usually display higher levels of emotional stability, whereas girls have more interpersonal skills (Soto et al., 2011; Primi and Santos, 2013). It is plausible, therefore, that we see sharper gradients between violence and interpersonal traits for boys (the ones more vulnerable in these dimensions), and girls being more sensitive to violence reflected in lower Emotional Stability scores. As Table 5 suggests, coefficients for Agreeableness are in fact larger for boys, but in the case of Extraversion results are ambiguous. When statistically significant, the magnitudes are bigger for boys, but they do not seem to react to the most violent crimes (robberies) whereas girls do. For both boys and girls, there is no relationship between Emotional Stability and violence in the neighborhood of the school.

Table 5

Association between selected violence indicators and personality characteristics by gender

Type of violence	Conscien-ciousness	Extraversion	Emotional Stability	Agreeableness	Openness	Locus of Control
Boys						
Larceny	-1.17	-2.85***	0.53	-5.32***	-0.82	0.61
Theft	-0.36	-0.68***	0.07	-1.07***	-0.05	0.03
Street Robbery	2.65	-1.77	1.04	-4.43**	-5.11**	1.60
Stolen Vehicles	0.75	-0.58	0.35	-1.83***	-1.28**	0.03
Recovered Cars	1.91*	-0.58	0.54	-2.39**	-2.37**	0.32
Property (overall)	0.01	-0.35***	0.09	-0.71***	-0.25	0.04
Girls						
Larceny	-1.59**	-1.72**	0.66	-1.58*	0.27	1.05
Theft	-0.40***	-0.33**	0.04	-0.28*	0.04	0.18
Street Robbery	0.90	-2.33*	1.74	-4.27**	-3.47**	0.76
Stolen Vehicles	-0.03	-1.01***	0.56	-1.43***	-0.49	0.15
Recovered Cars	0.73	-1.84**	1.03	-2.85***	-1.68**	0.23
Property (overall)	-0.17	-0.28**	0.10	-0.31**	-0.06	0.11

Variables represent occurrences per 1000 habitants/ year, and only categories with more than 1/1000 episodes were considered. Violence against the persons includes Threat, Intentional Physical Aggression and Unintentional Physical Aggression.
Violence against property includes Larceny, Theft, Street Robbery, Stolen Vehicles, and Recovered Cars.
Obs: The vector of control variables include race, gender, age, maternal education, whether the mother lives in the same place, whether the family receives welfare benefits, the frequency the student watches his/ her parents reading, the student's reading frequency, house characteristics (has paved walkway, electricity, piped water and garbage collection and geographic location).

iv. Student vulnerability factors

The last table contains our estimations for vulnerable and non-vulnerable teenagers, as measured by their maternal education[7]. To the extent that the

7 We considered "vulnerable" those individuals whose mothers have less than a middle school degree.

family environment supplies protective factors to the individuals to resist violence, we expect that adolescents coming from poor families are also more vulnerable to violence.

As Table 6 indicates, most of the previously documented associations between violence in school neighborhoods and social and emotional skills are found in students with a poor family background. Indeed, only a few estimated coefficients were significant for non-vulnerable students. Crimes that typically involve guns (such as street robbery and stolen cars), and personal deceiving (larceny) are particularly associated with lower agreeableness for vulnerable pupils. Interestingly, for this group we detected also an important association with the beliefs that the individual controls his/ her own destiny (Locus of Control), therefore suggesting that people scoring higher on this dimension become hopeless with their own fate if exposed to violent contexts. This evidence may shed light on one of the most serious educational problems in Brazil, namely, high school dropout (currently around 50% of the population), frequently manifested among vulnerable teenagers.

Table 6

Association between selected violence indicators and personality characteristics by economic vulnerability

Type of violence	Conscien-ciousness	Extraversion	Emotional Stability	Agreeableness	Openness	Locus of Control
Vulnerable						
Larceny	-2.23**	-2.89**	1.35*	-3.24***	-0.19	2.05**
Theft	-0.55***	-0.52**	0.19	-0.60***	0.02	0.33
Street Robbery	0.18	-4.12***	1.64	-5.04***	-5.22***	3.34**
Stolen Vehicles	-0.38	-1.28***	0.49	-1.73***	-1.10***	0.96*
Recovered Cars	0.01	-2.31***	0.66	-2.94***	-2.68***	1.77*
Property (overall)	-0.26*	-0.42***	0.16	-0.51***	-0.18	0.29**
Not Vulnerable						
Larceny	-1.31**	-0.85	0.87	-1.68*	0.53	0.27
Theft	-0.34**	-0.25	0.13	-0.33	0.06	0.02
Street Robbery	3.44	1.81	1.83	-2.51	-2.20	-0.75
Stolen Vehicles	0.75	0.03	0.54	-1.17*	-0.13	-0.63
Recovered Cars	2.33*	0.55	0.93	-1.93	-0.66	-1.03
Property (overall)	-0.04	-0.09	0.13	-0.29*	0.00	-0.06

Variables represent occurrences per 1000 habitants/ year, and only categories with more than 1/1000 episodes were considered. Violence against the persons includes Threat, Intentional Physical Aggression and Unintentional Physical Aggression.
Violence against property includes Larceny, Theft, Street Robbery, Stolen Vehicles, and Recovered Cars.
Obs: The vector of control variables include race, gender, age, maternal education, whether the mother lives in the same place, whether the family receives welfare benefits, the frequency the student watches his/ her parents reading, the student's reading frequency, house characteristics (has paved walkway, electricity, piped water and garbage collection and geographic location).

Concluding Remarks

In this paper we investigated the relationship between indicators of violence in the school districts and psychological characteristics of high school students. Besides documenting this association, we intended to discuss which specific domains of personality are most associated with these indicators, which type of

crime has stronger associations, and whether these patterns are aggravated for more vulnerable groups of students.

The evidence robustly suggest that violence in the neighborhood of the school is closely related to low levels of interpersonal attributes, namely Extraversion (willingness to engage with others) and Agreeableness (tendency to care for what happens to the others). This is coherent with an interpretation that these indicators reflect expectation of becoming a potential victim of violence, which lead students to react by adopting precautionary behaviors that involve less contact with other people.

In our data, crimes against property revealed to be the most associated with psychological traits. This may be due to the fact that students see themselves as more likely to be a victim of this type of violence, than of violence against the person (like physical aggression or threats).

Regarding the profile of the students mostly affected by violence, our results strongly point to economic vulnerability as a key ingredient to social and emotional vulnerability. Indeed, we see almost no relation between violence and psychological variables for the non-vulnerable, whereas these gradients become significantly high for the poor. Furthermore, we also verified that boys' agreeableness is especially influenced by the presence of violence in the school surroundings, and that senior students (probably because of the longer period of exposition) display stronger associations between interpersonal traits and violence than the freshmen.

Our results are even more important in the Brazilian context. Investments in education have steadily increased in the country since the return of democracy, in the late eighties, but the evolution of indicators of educational performance in high school have been disappointing. The last educational census indicate that only a half of the students conclude high school, and Brazil still remain among the last positions in the results of PISA (Programme for International Student Assessment). Recent research coming from different fields concludes that personality characteristics are important inputs in the learning process, being also shaped in the educational environment, but very few large scale investigations have been conducted in Brazil to verify the role of these processes in explaining the high dropout rates and low performance in tests. We believe that our work has contributed to this debate by bringing new evidence from the state of Rio de Janeiro, one of the most diverse places of the Brazilian federation, where people can find both calm, countryside villages and extremely poor and violent shantytowns (also called favelas).

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