

Watch your mouth! The effects of parental harsh control on child's aggressiveness during early childhood

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Abstract

The management of aggressiveness is a key feature of living in collective settings. This construct has the violent behavior as one of its most frequent manifestations, and is also an important predictor of family stability, involvement with crime and job stability. In this paper, we estimate a model that relates the degree of authoritarianism in the parental style and covariates, with the propensity of children to use bad language and verbal aggression. In our analysis, we use a unique dataset from the municipality of Rio Branco, the capital of Acre, one of the smallest Brazilian states and an enclave in the south part of the Amazon forest. We have information about how the current parents were treated by their own parents (i.e. the grandparents of the children), and we use it as instrumental variables (IV) to mitigate the simultaneity bias typically found in this literature. In our identification strategy, the crucial hypothesis is that the way grandparents parental style affects child aggressiveness is only through its effect on how parents raise their children. While our probit regressions show relatively small effects of parental harshness on child's verbal aggressiveness, very close to the magnitudes found in Kawabata et al (2011), the IV results are much larger and economically meaningful. The results imply a strong and little explored mechanism of intergenerational transmission of skills in the economics literature.

Resumo

A gestão da agressividade é uma característica fundamental da vida em ambientes coletivos. Esse construto tem o comportamento violento como uma de suas manifestações mais frequentes, sendo também um importante preditor de estabilidade familiar, envolvimento com o crime e estabilidade no emprego. Neste artigo, estimamos um modelo que relaciona o grau de autoritarismo no estilo parental e covariadas, com a propensão das crianças usarem linguagem inadequada e agressão verbal. Em nossa análise, usamos um conjunto de dados único do município de Rio Branco, capital do Acre, um dos menores estados brasileiros e um enclave na parte sul da floresta amazônica. Temos informações sobre como os pais atuais foram tratados por seus próprios pais (ou seja, os avós dos filhos), as quais usamos como variáveis instrumentais (IV) para mitigar o viés de simultaneidade normalmente encontrado nesta literatura. Em nossa estratégia de identificação, a hipótese crucial é que o caminho pelo qual o estilo parental dos avós afeta a agressividade da criança é apenas através do efeito de como os pais criam seus filhos. Embora nossa regressão probit mostre efeitos relativamente pequenos da rigidez dos pais na agressividade verbal da criança, muito próximas das magnitudes encontradas em Kawabata et al (2011), os resultados com IV são muito maiores e economicamente significativos. Os resultados implicam um mecanismo forte e pouco explorado de transmissão intergeracional de habilidades na literatura econômica.

Keywords: Early childhood. Parental style. Aggressiveness. Externalizing behavior.

Palavras-chave: Primeira infância. Estilo parental. Agressividade. Comportamento externalizante.

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Classificação JEL: I15, I12

1. Introduction

The management of aggressiveness is a key feature of living in collective settings. This construct has the violent behavior as one of its most frequent manifestations, and is also an important predictor of family stability, involvement with crime and job stability (ALMLUND et al, 2011). Among the various expressions of this construct, it is fair to say that verbal aggressiveness is probably gaining importance with the expansion of the internet and consolidation of virtual relationships. In fact, the interest in understanding the origins, development and consequences of verbal aggression has increased substantially over time, especially since the 1990s¹.

Theoretical research has shown that parental attitudes and behaviors towards the children should be one of the main causes of child's aggressiveness. There are at least four influential psychological theories that relate the way parents raise their children with the arousal of aggressive inclinations. In the work of the Social Learning theorists, inaugurated by Bandura (1973)², parents serve as role models for their children, who tend to mimic their aggressive behavior.

On the other hand, the Attachment Theory (BOWLBY, 1969/1982; SOENENS et al., 2008), advocates that children who are neglected and maltreated do not develop secure attachment with their caregivers, and therefore display lack of confidence in themselves and in the others, resulting in poor peer relationships.

Similar to this argument, the Emotion Regulation Theory states that the primary caregivers have a central role in teaching children how to regulate emotions in the first years of life. Sensitive parents prevent children of becoming overly distressed and provide guidance on how to recognize and regulate emotions (CROCKENBERG et al., 2007; ALINK et al., 2009). This reasoning is related to a line of investigation in neuroscience which documents that maltreated children may have permanent brain damage due to long exposition to the so-called *toxic stress*, a prolonged activation of the stress-response system. Neglected children, or those frequently exposed to stressful situations and that do not have affective support from their caregivers, may have changes in the synaptic formation and disarranges in their hormonal systems that affects cognitive and emotional development (FOX & SHONKOFF, 2011).

Finally, according to the Social Information Processing theory, children learn how to react to different situations by forming an opinion about the intentions of the others (CRICK & DODGE, 1994; NELSON, MITCHELL, & YANG, 2008). Parents in this case help children to interpret ambiguous situations in a hostile or peaceful fashion. In this sense, parents who behave aggressively at home send messages to their children, which often lead them to interpret relational cues negatively.

Empirical work, however, has only modestly confirmed the strong theoretical predictions established above. Gershoff (2002) summarize in a meta-analysis of 88 studies the statistical association between corporal punishment by the parents and medium and long term outcomes of the child. The conclusions are robust in providing evidence that children become more aggressive and more likely to display anti-social behavior in the future. Her results also show that this association becomes larger with age, which means that parental harsh control predicts aggression in adulthood even more than during the infancy. Kawabata et al (2011) meta-analysis of 48 studies, for instance, find a modest correlation of around 0.12 standard deviation (sd) between scales of harsh parenting and child's relational aggression. This association drops to 0.05 sd in studies that control for covariates. Pinquart (2017), on the other hand, uses broader indicators of externalizing problems and includes more studies (1435) in his meta-analysis to document much larger associations of 0.2 sd. Interestingly, the author also shows that parents react to their child's behavior by changing their parental styles. Filtering the database to keep only longitudinal studies, he demonstrates that an extra standard deviation of the child's externalizing problems in period zero are associated with a change of +0.08 standard deviation in a scale of harsh control between periods 1 and 2. This finding suggests that statistical associations between parental styles and child behavior cannot be immediately interpreted as causal. On the contrary, there is likely simultaneity in the determination of both variables.

¹ See Hamilton (2012).

² See Nelson and Crick (2002) for a more recent view of the subject.

The present research

In this paper, we estimate a model that relates the degree of authoritarianism in the parental style and covariates, with the propensity of children to use bad language and verbal aggression. In our analysis, we use data from the municipality of Rio Branco, the capital of Acre, one of the smallest Brazilian states and an enclave in the south part of the Amazon forest, next to the borders with Peru and Bolivia. The data were originally collected to provide baseline information for an impact evaluation of the program *Primeira Infância Acreana*, a home visiting intervention that aims to support and strengthen parenting in the most vulnerable areas of the city. Rio Branco was chosen to receive this intervention precisely because it has some of the poorest early childhood development indicators in the whole country, with mortality rates above 15/thousand births (the national average is 13.5). In our sample, about 25% of the parents reported to use corporal punishment in some circumstance with their under 6 year-old children, and we believe that this should be one of the main sources of the defiant behavior in children.

Besides documenting for the first time the statistical association between parental harsh control and aggressiveness in children in such a vulnerable population, we also contribute to the literature by addressing the causality problem. It is plausible that parents decide how to treat their children based, among other things, on the child's behavior. If a defiant child make it more likely that parents adopt a harsh style, then estimated effects of parental style on child aggressiveness that ignore simultaneity should be upward biased. On the other hand, if parents react to child's aggressiveness by using less corporal punishment, then the naïve estimates should be downward biased.

In our data, we have information about how the current parents were treated by their own parents (i.e. the grandparents of the children), and we use it as instrumental variables (IV) to mitigate the simultaneity bias typically found in this literature. In our identification strategy, the crucial hypothesis is that the way grandparents parental style affects child aggressiveness is only through its effect on how parents raise their children. While our probit regressions show relatively small effects of parental harshness on child's verbal aggressiveness, very close to the magnitudes found in Kawabata et al (2011), the IV results are much larger and economically meaningful.

The results imply a strong and little explored mechanism of intergenerational transmission of skills in the economics literature. Children of harsh parents tend to become more aggressive and reproduce this parental style with their own offspring. In terms of public policy, we found support for the interventions that aim to reduce aggressiveness in children by teaching parents how to educate them. In fact, the parental style revealed to be by far the most important determinant of verbal aggressiveness in children according to our estimates.

The paper is organized in four more sections other than this introduction. The next section presents the literature related to the definition of parental style and its relation to child development as a whole. In section three, there is the discussion of the utilized empirical method and the presentation of the database and the variables of interest. Section four brings the obtained results, and the last section follows with the conclusions.

2. Parental styles and their relation to child development

Children's accessibility to care that requires support, dedication and sensitivity by adults is relevant in terms of adequately calibrating their perceptions and protecting their developing brains. Thus children that benefit from a favorable relationship with their parents are able to absorb that, when faced with a stressful situation, they might feel anguish, communicate their negative feelings and, like that, obtain help from their caretakers (ALVARENGA, WEBER, BOLSONI-SILVA, 2016; GUNNAR, HERREIRA, HOSTINAR, 2013).

On the other hand, if deprived of this type of support, due to exposure to diverse parental practices, children might experience aggressiveness, impulsiveness and defying behavior issues (ALVARENGA, PICCININI, 2001). Indeed, child development relates to – among other factors, like genetics – the observation of models (DODGE, 1993). That means that, in case the child obtains advantages, such as attention, privileges or waiver of tasks they consider unpleasant as response to their impulsive, defying or frustration intolerant behavior, it can reaffirm such inadequate behaviors, providing incentives to their continuity (PINHEIRO et al., 2006).

Parents make use of diverse strategies to guide their behavior towards their children. The strategies are used to suppress behaviors considered inadequate or to encourage the occurrence of desired ones. These socialization strategies – called educational practices – can be “positive” or “negative”. The positive ones are practices of reinforcement to conscious behavior, identification of socially skillful or unskillful behaviors, and establishment of rules. For example: communication (talking, asking), expression of feelings and opinions, demonstration of affection, fun games, establishment of limits and rules, being consistent, agreeing with the partner, keeping promises, apologizing. The negative ones, on the other hand, are practices that cause intense emotions on the child. Examples are spanking, using an aggressive voice tone, expressing negative feelings and opinions in an imposing and incisive way.

Baumrind (1966) has developed the pioneer work that sought to analyze the effect of an adult’s behavior, in terms of authority, on a child, being a landmark study in the parents-children education field. It consists of a theoretical model that presents three parental prototypes based on control:

i) *permissive style*: permissive parents aim to behave in a non-punitive way, accepting affirmatively the child’s impulses, desires and actions. They demand few responsibilities from the child, allowing he or she to self-regulate.

ii) *authoritarian style*: authoritarian parents seek to control and evaluate their children’s attitudes and behavior based on high standards of conduct. There are restrictions to the child’s autonomy and his or her own will is not taken into account. These parents value obedience as a virtue and frequently make use of punishment and negative reinforcement.

iii) *authoritative style*: parents who aim to direct the child’s activities, evaluating his or her point of view. They use reason, power and mainly positive reinforcement to reach their objectives.

Maccoby and Martin (1983) proposed a new classification of parental styles based in the Baumrind’s (1966) model. These authors tried to capture the parenting styles as a function of two dimensions that incorporate emotional and behavioral aspects. The first one is *exigence (control)* which are parents’ attitude to impose limits and rules, and refers to parental behaviors related to supervision and discipline. The second one is *responsiveness (affection)* that is related to attitudes of comprehension towards the children and refers to behaviors of support and acceptance, which favor the children’s individuality and self-affirmation.

The parental styles that emerge from the combination of these two dimensions are the same proposed by Baumrind (1966), with the permissive style splitting into two categories, indulgent and negligent, however, with a new nomenclature proposed in Baumrind (1971): democratic-reciprocal; authoritarian; permissive and neglectful. According to this new classification by Baumrind, permissive parents are more responsive than demanding, they allow the children to self-regulate and avoid confrontation. Democratic-reciprocal parents are as responsive as demanding, they impose and monitor clear standards of conduct. Authoritarian parents are demanding, but not responsive; they expect their orders to be followed incontestably. Finally, neglectful parents are not demanding or responsive, in other words, they are indifferent to their children.

In terms of results, Baumrind’s initial work (1967 and 1971) suggests that the authoritative style would have beneficial effects on the promotion of children’s and teenagers’ psychological health and academic performance. According to the author, this happens because when the parents are sensitive to the needs and abilities of the child and his or her demands are reasonable and appropriate, the child is more open to accept and follow the parents’ suggestions and advice. In contrast, authoritarian parents tend to use power strategies, prohibitive and punitive, and tend to develop children with low self-esteem and negative attitudes towards the world (WEISS et al., 1992).

In the same line, Avenevoli et al. (1999), examining the relations between the parental styles and the behaviors of adolescents, found that adolescents in authoritative families have better emotional adjustment, better academic performance, higher self-esteem and less probability of presenting delinquent behaviors. In contrast, adolescents in families with authoritarian or negligent parents are associated with greater anguish, low self-esteem and low academic performance. Finally, permissive parents, even though they are more associated with an adaptive development than with the authoritarian style, are still less effective than the authoritative style.

Campbell and Gilmore (2007) found that intergenerational continuity was established for authoritarian and permissive styles, and that continuity concerning the same gender is stronger than between

genders. Additionally, the perceptions of resemblance between generations are stronger in fathers and sons than in mothers and daughters, and that authoritative parenting exhibits intergenerational discontinuity. Finally, they discovered that current parents find themselves less authoritarian and more authoritative and permissive than their own parents, indicating that the intergenerational transmission of parental characteristics can be moldered by a sociocultural change of more authoritarian practices, aiming the development of more democratic children.

3. Empirical model, database and construction of variables of interest

3.1 Empirical model

The objective of this paper is to investigate to what extent the parental style affects children's behavior in terms of aggressive attitudes. Suppose that Y_i^* is a latent continuous variable of the aggressiveness level of the child. However, we only observe if the child has an aggressive behavior (Y_i) or not. In terms of the latent variable, we observe an aggressive behavior if Y_i^* is higher than a threshold (c).

$$\begin{cases} Y_i = 1 & \text{if } Y_i^* > c \\ Y_i = 0 & \text{if } Y_i^* < c \end{cases} \quad (1)$$

So, ideally we want to estimate the following model:

$$Y_i^* = a + bX_i + cW_i + U_i \quad (2)$$

where X_i is a variable that takes values (1, 2, 3 4) depending on the parental style (Light authoritative, Medium authoritative, Heavy authoritative and Violent-Authoritarian); W_i is a vector of exogenous variables and U_i is an error term with Normal distribution. Because we observe Y_i , we can only estimate the following model:

$$P(Y_i = 1/X, W) = \Phi(a + bX_i + cW_i) \quad (3)$$

where Y_i is a binary variable that captures if the child exhibits an aggressive behavior or not and Φ is the standard normal CDF. Our first interest is the parameter b , which captures precisely the effect of parental style on the probability that child i exhibits an aggressive behavior, conditional in other exogenous variables.

However, one problem in estimating (3) is that X is an endogenous regressor. Particularly, there is simultaneity between parental style and child behavior. On the one hand, the parental style affects the child behavior (the causality relation that we want to estimate). On the other hand, the child behavior also should affect the parents' attitudes. For example, if a child has a naturally more aggressive temperament, parents can take a more authoritarian behavior in response to child aggressiveness.

To break the simultaneity between X_i and Y_i we use an instrumental variable (Z_i) that measures the type of parental style that the children's parents were exposed to when they were kids. In other words, we assume that the grandparents parental style (Z) affects the child only through the behavior of the parents (X). This is a very plausible hypothesis because we ask parents if they were beaten up and if they witness scenes of violence at home when they were kids. So, we have information from (at least) 15-20 years before, concerning the parent childhood. The idea is that there is not a direct link between the grandparents' attitude and the child behavior. There is no reason to believe that these variables will affect child aggressiveness except through an impact in the parental style (X). Additionally, there is evidence in the literature linking parents' childhood experiences and their own parental behavior (BELSKI, 1984, CONGER et al., 2009, KOVAN et al., 2009), which is an important necessary condition for Z to be a good instrument.

The first-stage equation is similar to an ordered probit model. We order the parental styles in increasing order of parent aggressiveness (Authoritative-Light to Authoritarian). Again, we can model different parental styles with a latent variable approach:

$$X_i^* = d + fZ_i + gW_i + \Psi_i \quad (4)$$

Where $\Psi_i \sim N(0,1)$. The “choice” of parental style occurs according to the following conditions:

$$\begin{aligned} X_i &= 1 \quad \text{if} \quad \alpha_0 < X_i^* < \alpha_1 \\ X_i &= 2 \quad \text{if} \quad \alpha_1 < X_i^* < \alpha_2 \\ X_i &= 3 \quad \text{if} \quad \alpha_2 < X_i^* < \alpha_3 \\ X_i &= 4 \quad \text{if} \quad \alpha_3 < X_i^* < \alpha_4 \end{aligned}$$

where $\alpha_0 < \alpha_1 < \alpha_2 < \alpha_3$ and are called thresholds of the latent variable X_i^* . The values for X_i takes the values 1, 2, 3 or 4 according to different parental styles.

Hypothetically, U_i and Ψ_i are zero-mean error terms, and the correlations between U_i and Ψ_i are presumably nonzero. The literature about the intergenerational effects of parental styles discussed in the previous section supports this hypothesis. The estimation method used is the so-called *conditional mixed-process models* (ROODMAN, 2007). There is a broad class of models that can be estimated under this approach and the estimation of (2) and (4) are a particular application. In our case, the method consists in the joint estimation of both equations by a Limited-Information Maximum Likelihood estimator, which assures gains in efficiency if compared with separating estimation of each equation.

3.2 Database

The data utilized in this article is the baseline of an impact evaluation of a childcare policy targeting children up to 6 years old in *Rio Branco*, Rio Branco is the capital of the Brazilian state of Acre, located in the Amazon forest region. Rio Branco is a medium size city, with about 350,000 inhabitants.

The sample has interviews of 1162 families from three different neighborhoods: *Calafate* (513 families), *Cidade do Povo* (103 families) and *São Francisco* (546 families). These are the most socioeconomically vulnerable neighborhoods in the city. The interviews took place between June 27 and September 2, 2016. The families interviewed had pregnant women or children with ages between 0 and 6 (incomplete) years old at the moment of the interview. Considering that one family can have more than one child aged 0-6 or pregnant women, we have information for 1472 people. The questionnaire encompassed several dimensions: parenting, child development, socioeconomic conditions, health conditions of the family members and characteristics of the pregnant women and children. In general, we aimed to interview the woman responsible for the young children, once she probably has the highest knowledge about the children.

3.3 Construction of main variables

3.3.1 Dependent variable

The paper will focus on the children aged between 5 and 6 years old what reduces our sample to 428 children. We restrict the sample to this age range because it is difficult to capture aggressiveness in younger children with our data collection framework (household interview). To build the child’s aggressiveness variable, it was used the adult’s answer to the question: “Does the child make use of obscene gestures or offensive language?” that could be answered with “Yes”, “No” or “Sometimes”. Then, from the collected answers, we generated a binary variable that assumes value 1 for the cases in which the answer was “Yes” or “Sometimes” and value 0 for “No”.

3.3.2 Explanatory variable of interest

With respect to the construction of the explanatory variable capturing the parental style, we ask the following questions:

- 1) “When children disobey their parents, how should the parents react?”
- 2) “When children lie to their parents, how should the parents react?”
- 3) “When children attack other children to the level of making them cry, how should the parents react?”
- 4) “When children steal something from a commercial establishment, how should the parents react?”

The questions are placed in a “general” context, which means that the intention is to know the opinion of the interviewed on how *any* parent should react to each different situation. The idea is to reduce the social desirability bias that could occur if the mother think and refer to herself in the answer.

Such questions could be answered in a multiple way. So, more than one option among the following could be selected: “scolding or warning verbally”; “grounding”; “giving advice and explaining that such attitude is unacceptable”; “letting it go”; “giving soft physical punishment, like a pinch or a slap”; “beating the child up” or “forbidding the child from doing or eating something he or she likes”. Based on the classification suggested by Baumrind (1971) for the parental style, we attributed values to the possible answers, as follows:

Table 1 – Possible Answers for questions defining parental style and attributed values for each response

Answer	Attributed value
Scolding or verbal warning	1
Advice and explanation	1
Grounding	2
Prohibitions	2
Soft physical punishment	3
Letting it go	4
Beating	5

The questionnaire also included questions about the parents’ affectionate behavior. However, we do not observe variability in responses. When asked if they agreed or not with affirmatives such as “It is fun to be with my child” or “I like having my child nestled with me”, all parents answered “Totally agree” or “Agree”. For that reason, it was not possible to ordinate the parental styles by that aspect (affection).

Table 2 – Parental style and parent behavior

Parental styles	Parents’ behavior
Light authoritative	Scolding or verbal warning, advice and explanations
Medium authoritative	Punishments and prohibitions
Heavy authoritative	Light physical punishment, like a pinch or a slap
Neglectful	Letting it go
Violent-Authoritarian	Beating

That way, to construct the parental style the solution was to attribute higher values to attitudes that involved higher neglect and aggressiveness of parents towards their children. As mentioned, in each question, the mother could choose more than one answer. If the mother chooses grounding and beating, we attributed her the value 5 (the maximum value among the chosen answers in the question). The smaller the value, the closer to the democratic-reciprocal style and the higher the value, the closer to the authoritarian and neglectful style. Therefore, for each mother, we construct five different parental styles as can be seen in Table 2.

3.3.3 Instrumental Variable

To solve the endogeneity problem (between parental style and child’s aggressiveness) we used the child grandparent’s parental styles as instrumental variable. The questionnaire contains information about the environment where the children’s parents were raised, especially about the aggressiveness of the grandparents towards the parents. The first question is: “When you were a child, did your father or mother (or the person who raised you) beat you up?” The possible answers to that question were “Always”, “Sometimes”, “Rarely” or “Never”. We attribute to each answer, respectively, the values 4, 3, 2 and 1, in a way that the higher the value, the higher the violence frequency. The other question is: “When you were a child, did you witness scenes of violence at home (the father beating the mother up)?” The possible answers were “Yes, several times”, “Yes, sometimes” and “No”. We attribute the values 3, 2 and 1, respectively, to the answers. Again, higher values represented higher levels of violence. The variable *Z* is the product of

these two previous variables. This was done to provide more variability to Z giving a higher value to people that was always beaten up and always witnesses violence scenes ($Z_i = 12$) than for someone that, for instance, were sometimes beaten up and always witnesses violence ($Z_i = 9$).

3.4 Exogenous variables

The exogenous variables that compose the vector W are:

Child's variables: gender (binary, assuming value 1 for women), education (binary, assuming value 1 for children who attend primary school full or partial time or daycare), child wakes up during the night (binary).

Mother's variables: mother works (binary, assuming value 1 for mothers that work outside the home), white mother (binary, assuming value 1 for white mothers), mothers' education (binary, assuming value 1 when mother has education equal or superior to complete high school), age at which the mother had her first child, stress level of the mother (binary, value 1 for moderate or intense stress).

Father's variables: father works (binary, assuming value 1 for fathers that work outside the home), present father (binary, assuming value 1 if the father lives in the same house as the child).

Socioeconomic variables: number of people in the family; socioeconomic status (index from a factor analysis that took into account the number of rooms in the house where the child and the responsible person live, existence of bathroom inside and of a separate room for the kids, presence of toys adequate to the child's age, access to the internet, possession of washing machine, and the pavement of the street where the house is located); family received conditional cash transfer benefits (binary, assuming value 1 if the family is beneficiary of the *Bolsa Familia* program) and a dummy variable that indicates if the family has debt.

4. Results

4.1 Descriptive Analysis

Because our dataset is unique and original, it is important to present data that serve as the basis for the paper. In that way, the first two tables below present, respectively, the distribution of the dependent variable and the explanatory variable of interest.

Table 3 – Child's Aggressiveness

Does the child make use of obscene gestures or offensive language?	N. of children	%
No (Non-aggressive)	262	61.21
Yes (Aggressive)	166	38.79
Total observations	428	100.0

Most of the children were classified as non-aggressive – 61.21% - and the most frequent parental style is the Medium-Authoritative despite the question that is being used. These parents use punishments and prohibitions. Light-Authoritative parents also appear with relatively high frequency. These parents apply scolding or verbal warning, advice and explanations. It is interesting to notice that for the question that referred to “the most severe action of all” among the options – if the child steals something from a commercial establishment -, the percentage of Violent-Authoritarian parents reaches 25%. It is clearly noticeable that the parents change their answer when the question refers to a more severe action. In that way, the question “If the child disobey?” can better separate the parents with more aggressive attitudes from the other types of parents, because they answer that beat up the child even in face of a “soft” misbehavior of the child. Another observation from the table above is the small number of cases of the Neglectful parent in the sample. According to this result, we excluded these cases from the analysis and worked with only four parental styles.

Table 4 – Distribution of Parental Style According to Answers of Different Questions

	Child disobeys		Child lies to the parents		Child attacks other child		Child steals something from a commercial establishment	
	n. obs.	%	n. obs.	%	n. obs.	%	n. obs.	%
Light authoritative	112	26.64	151	35.53	141	33.41	93	23.97
Medium authoritative	200	47.90	171	40.24	191	45.26	148	38.14
Heavy authoritative	67	15.65	64	15.06	49	11.61	47	12.11
Negligent	3	0.70	3	0.71	5	1.18	4	1.03
Violent-authoritarian	39	9.11	36	8.47	36	8.53	96	24.74
Total	428	100	425	100	422	100	388	100

Another analysis of interest refers to the relation between the child's aggressiveness and the parents' style. Table 5 presents the percentage of children identified as aggressive for different parental styles (for each one of the questions used to define the parental style). The percentage of aggressive children is higher among the most aggressive parents.

Table 5 – Fraction of Aggressiveness Children by Parental Style

	Child disobeys		Child lies to the parents		Child attacks other child		Child steals something from a commercial establishment	
	n. obs.	%	n. obs.	%	n. obs.	%	n. obs.	%
Light authoritative	114	44.7	151	39.1	140	35.0	92	38.0
Medium authoritative	203	32.0	169	33.1	190	35.3	146	32.9
Heavy authoritative	66	33.3	63	39.7	48	45.8	47	42.6
Violent-authoritarian	39	71.8	36	72.2	36	69.4	96	51.0

Table 6 brings information about the instrumental variable: aggressiveness of the child's grandparents. It presents the tabulations of the two variables that served as a basis for the construction of the instrument for the different styles of parents. We opted for presenting only the results when the question "is used to build the parents' style. However, the results have the same pattern when the other questions are used to build the parental styles.

Table 6 – Parental style and grandparents' aggressiveness

Grandparents behavior	Parents answer	Parental Style			
		Light	Medium	Heavy	Violent
Grandparents spanked	No	76.1	72.4	58.2	63.9
	Yes, sometimes	12.4	16.8	28.4	5.6
	Yes, several times	11.5	10.8	13.4	30.7
	Total	100.0	100.0	100.0	100.0
Witnessed violent scenes	Never	28.3	18.1	16.4	11.1
	Rarely	18.6	18.1	16.4	33.3
	Sometimes	42.5	42.7	44.8	19.4
	Always	10.6	21.1	22.4	36.2
	Total	100.0	100.0	100.0	100.0

We observe a positive relation between the parents' and the grandparents' aggressiveness, corroborating the hypothesis of transgenerational transference verified in the literature. Among the parents that were classified as Light Authoritative, 11.5% indicated that their parents frequently spanked them; among the parents classified as Authoritarian-Violent, this percentage reaches 30%. The same pattern occurs for the question about the parents witnessing violent scenes.

Table 7 presents descriptive statistics of control variables. As we can observe, 54.3% of the children are girls, 76.3% frequently wake up in the middle of the night, 78.8% attend primary school or daycare, keeping in mind that children are 5 and 6 years-old, most of them being 5 years-old (77%), the reason why the indicator doesn't get close to the 100%.

Table 7 – Description of the other control variables – vector W

Control variables	Mean	Standard Deviation
% of girls	0.543	0.499
% that attends primary school or daycare	0.788	0.409
% of children that wake up during the night	0.763	0.426
% of working mothers	0.292	0.455
% of white mothers	0.131	0.338
Age at which the mother had the first child	19.177	4.314
% of mothers who live under situation of moderate or intense stress	0.268	0.444
% of mothers with education equal or superior to complete high school	0.405	0.491
% of fathers who live in the same house	0.631	0.483
% working fathers	0.755	0.430
Number of people in the family	4.971	1.826
% of families that benefit from <i>Bolsa Família</i>	0.614	0.487
% of families that has debts	0.608	0.489
Socioeconomic status	0.115	0.945

Besides, 29.2% of the children have mothers who work outside the home, 40.5% have mothers with, at least, complete high school, 26.8% of the mothers claim to live in a situation of moderate or intense stress and had their first child at the average age of 19.2 years. Finally, 61.4% of the families are beneficiary of the *Bolsa Família* program indicating a low socioeconomic status.

4.2 Econometric results

In this section, we present the results of econometric model relating parental styles and child aggressiveness. The results for equation (4) are in the Appendix (Tables A1 and A2). The grandparent

aggressiveness (the instrumental variable) was statistically significant for the parental styles constructed with the questions “If the child disobeys” and “if the child lies to the parents” and the higher grandparents’ aggressiveness the lower the probability of the parent to have a Light Authoritative style and the higher the chance of the other parental styles (Medium-authoritative, Heavy-authoritative e Violent-Authoritarian).

Table 8 presents the impact of the parental style on child aggressiveness (equation 2). Each column adds new control variables in order to verify the stability of the parental style effect. In the last column, we present results with no correction for endogeneity in parental style variable. In this table, the parental style variable was constructed based in the responses of the following question: “*When children disobey their parents, how should the parents react?*”

Table 8 – Marginal effects of explanatory variables on probability of child aggressiveness for different model specifications in terms of control variables

	I	II	III	IV	V
Parental Style	0.296*** (0.009)	0.290*** (0.009)	0.284*** (0.010)	0.289*** (0.010)	0.049 (0.030)
Girl	0.006 (0.032)	0.010 (0.033)	0.040 (0.039)	0.041 (0.040)	0.029 (0.057)
Attends primary school or daycare (dummy)	0.033 (0.040)	0.051 (0.041)	0.001 (0.048)	-0.003 (0.050)	0.008 (0.072)
Child wake up during the night (dummy)	-0.010 (0.039)	-0.000 (0.039)	0.022 (0.044)	0.028 (0.046)	-0.052 (0.067)
Mother works (dummy)		-0.000 (0.037)	0.020 (0.042)	0.035 (0.044)	0.042 (0.064)
White mother (dummy)		-0.023 (0.048)	0.002 (0.059)	0.002 (0.059)	-0.062 (0.087)
Age at which the mother had the first child		-0.007* (0.004)	-0.007 (0.005)	-0.006 (0.005)	-0.007 (0.007)
Mother lives under situation of moderate or intense stress (dummy)		0.059 (0.038)	0.084* (0.046)	0.083* (0.046)	0.158** (0.064)
Mother with high school level of education or higher (dummy)		0.029 (0.037)	-0.002 (0.042)	0.033 (0.045)	-0.040 (0.065)
Father lives in the same house (dummy)			-0.002 (0.050)	-0.004 (0.051)	-0.075 (0.073)
Father Works (dummy)			-0.005 (0.048)	-0.004 (0.048)	0.043 (0.070)
Family size				0.026** (0.012)	0.041** (0.018)
Family benefits from <i>Bolsa Família</i> (dummy)				0.030 (0.043)	-0.011 (0.062)
Family has debts (dummy)				-0.005 (0.040)	-0.001 (0.058)
Socioeconomic status				-0.020 (0.021)	- (0.030)
Number of observations	400	384	288	278	280

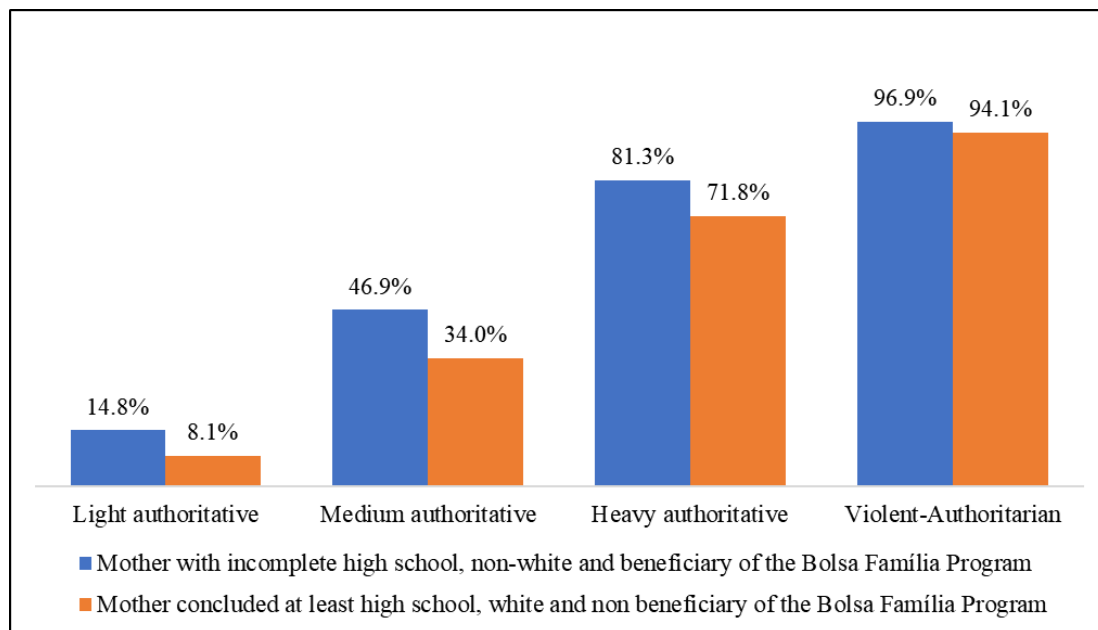
Obs: Columns (I) to (IV) are result of the estimation of conditional mixed-process models that takes into account the endogeneity of parental style variable. Column (V) present the marginal effects of a probit model that do not consider endogeneity of parental style. * represents marginal effects that are statistically significant at 10% level; ** represents marginal effects that are statistically significant at 5% level; *** represents marginal effects that are statistically significant at 1% level.

In all model specifications, there is no variability in the effect of parental style on child aggressiveness. The estimated effect implies that changing parental style in direction of more aggressive ones increases the probability of child aggressiveness behavior in about 30 percentage points. Another interesting fact is that control variables are, in general, non-significant. The exception is the variables related to mother stress and family size. Both are associated positively with child aggressiveness.

As a robustness check, we also estimate the specification in Table 8, column (IV) – the most complete and our preferred one – using parental styles defined by three other questions (how should the parents act if the child lies to the parents, if the child attacks other child and if the child steals something from a commercial establishment). In Table A3 in Appendix, we present these results together with the result of Table 8, column (IV) for comparison. The magnitude and size of parental style effect on child aggressiveness are robust to the way that we measure parental style. In all specifications, the effects vary in the range 0.23 – 0.29, a very strong effect.

To better illustrate the meaning of the parental style effect magnitude on child aggressiveness, we simulate how the probability of child aggressiveness changes according to parental styles for two different mother profiles. One of the profiles focuses in white mothers, with high school level (at least) and that do not receive *Bolsa Família*. The other profiles is of non-white mothers, without high school level and that receive *Bolsa Família* transfers. The other characteristics are the same in both groups. Figure 1 presents this predicted probability for both profiles according to different parental styles. There is a non-linear increase in aggressiveness probability when we compare different parental styles (from Light Authoritative to Authoritarian). The highest growth in this probability occurs when the parent moves from a Medium-Authoritative to a Heavy-Authoritative style. In this case, the aggressiveness probability increases more than 34 percentage points for both profiles. Another important aspect of this Figure is that the difference between the profiles narrows when we examine the Violent-Authoritarian parental style. More than 94% of the children in this group have already behave aggressively in both profiles. Finally, it seem that mother education or socioeconomic status alone are not capable of offset the adoption of a more violent parental style. So child aggressiveness is not a formal education (or income) issue, but mainly a parental style problem.

Figure 1 –Aggressiveness probability at ages 5-6 according to different mother profiles and parental styles



5. Concluding Remarks

Aggressiveness is a key feature of living in collective settings. This construct has the violent behavior as one of its most frequent manifestations, and is an important predictor of family stability, involvement with crime and job stability. Therefore, it is important to understand the main causes of an aggressive behavior since childhood.

This paper investigates the relation between the type of parental style and the aggressive behavior in children aged between 5 and 6 years-old using an original dataset collected in a Brazilian rain forest state (Acre). We propose an instrumental variable to handle the simultaneity bias existing in this situation: the information about the type of parental style that children's parents were exposed when they were children.

Our results highlight that parental style has an important impact on aggressiveness. The more aggressive the parental style is, the higher is the probability of children behave aggressively at 5-6 years old. If we compare the Light-Authoritative parental style (when the parents, in response to situations of children disobeying or lying only gives verbal warning, advice and explanations) with the Authoritarian-Violent one (when the parents beat up the child in the same situation), the probability of child aggressiveness increases more than 70 percentage points. The parental style is the most relevant variable explaining the child aggressive behavior and other control variables (socioeconomic status, mother education, if the father lives in the same house, etc.) has no impact on child aggressiveness. This result is robust to different model specifications and to different ways used to define the parental styles.

Therefore, it seems important to shed light to parenting activities that stimulates the use of less aggressive parental styles since childhood. This paper documents that, at least in a very particular dimension (child aggressiveness), interventions that achieve this goal can be very useful in order to break the intergenerational transmission of an aggressive parental style.

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Appendix

Table A1 – Results for the parental style variable - ordered probit (equation 4)

	Child disobeys	Child lies to the parents	Child attacks other child	Child steals something from a commercial establishment
Girl	-0.162 (0.136)	-0.057 (0.138)	-0.033 (0.138)	0.120 (0.143)
Attends primary school or daycare (dummy)	0.023 (0.171)	0.031 (0.174)	-0.100 (0.174)	-0.066 (0.182)
Child wake up during the night (dummy)	-0.201 (0.159)	-0.180 (0.163)	-0.075 (0.163)	0.001 (0.165)
Mother works (dummy)	-0.034 (0.152)	0.091 (0.155)	0.064 (0.157)	0.085 (0.160)
White mother (dummy)	-0.127 (0.202)	-0.221 (0.209)	-0.049 (0.206)	-0.027 (0.215)
Age at which the mother had the first child	0.014 (0.016)	-0.006 (0.017)	0.000 (0.017)	0.016 (0.018)
Mother lives under situation of moderate or intense stress (dummy)	-0.078 (0.162)	-0.040 (0.163)	-0.076 (0.165)	-0.259 (0.174)
Mother with high school level of education or higher (dummy)	-0.239 (0.155)	-0.118 (0.160)	-0.373** (0.160)	-0.243 (0.166)
Father lives in the same house (dummy)	-0.122 (0.175)	0.098 (0.178)	0.158 (0.181)	0.085 (0.182)
Father Works (dummy)	0.082 (0.165)	0.169 (0.169)	0.110 (0.169)	0.100 (0.173)
Family size	-0.039 (0.043)	0.032 (0.043)	-0.063 (0.045)	0.043 (0.045)
Family benefits from <i>Bolsa Família</i> (dummy)	-0.166 (0.148)	-0.071 (0.150)	-0.062 (0.151)	0.107 (0.155)
Family has debts (dummy)	0.052 (0.138)	-0.203 (0.140)	-0.397*** (0.142)	-0.194 (0.144)
Socioeconomic status	-0.050 (0.074)	-0.030 (0.075)	-0.086 (0.075)	-0.154** (0.078)
grandparents' aggressiveness	0.047** (0.024)	0.045* (0.024)	0.038 (0.024)	0.004 (0.024)
/cut1	-0.766 (0.479)	-0.246 (0.485)	-0.994** (0.491)	-0.304 (0.497)
/cut2	0.502 (0.477)	0.852* (0.485)	0.412 (0.487)	0.852* (0.500)
/cut3	1.150** (0.482)	1.566*** (0.493)	1.006** (0.492)	1.237** (0.501)
Number obs	278	275	277	253
LR chi2(15)	13.48	12.93	25.34	16.12
Prob > chi2	0.566	0.608	0.046	0.374
Pseudo R2	0.020	0.020	0.040	0.025

Obs.: * represents marginal effects that are statistically significant at 10% level; ** represents marginal effects that are statistically significant at 5% level; *** represents marginal effects that are statistically significant at 1% level.

Table A2 - Marginal effects of grandfather's aggressiveness on the probabilities of each type of parental style

	Child disobeys	Child lies to the parents	Child attacks other child	Child steals something from a commercial establishment
Light authoritative	-0.016** (0.008)	-0.017* (0.009)	-0.013 (0.008)	-0.001 (0.007)
Medium authoritative	0.001 (0.001)	0.004* (0.002)	0.004 (0.003)	0.000 (0.002)
Heavy authoritative	0.007** (0.003)	0.007* (0.004)	0.005 (0.003)	0.000 (0.002)
Violent-authoritarian	0.008* (0.004)	0.006* (0.003)	0.005 (0.003)	0.001 (0.007)

Obs.: * represents marginal effects that are statistically significant at 10% level; ** represents marginal effects that are statistically significant at 5% level; *** represents marginal effects that are statistically significant at 1% level.

Table A3 - Marginal effects on the probability of the child being aggressive - For parenting styles generated from different questions

	Child disobeys	Child lies to the parents	Child attacks other child	Child steals something from a commercial establishment
Parental Style	0.289*** (0.010)	0.236*** (0.061)	0.281*** (0.074)	0.231*** (0.021)
Girl	0.041 (0.040)	0.018 (0.047)	0.017 (0.045)	-0.011 (0.043)
Attends primary school or daycare (dummy)	-0.003 (0.050)	0.007 (0.059)	0.030 (0.057)	0.003 (0.053)
Child wake up during the night (dummy)	0.028 (0.046)	-0.001 (0.060)	-0.012 (0.059)	-0.033 (0.051)
Mother works (dummy)	0.035 (0.044)	0.016 (0.053)	0.026 (0.051)	0.013 (0.047)
White mother (dummy)	0.002 (0.059)	-0.003 (0.075)	-0.045 (0.070)	-0.000 (0.064)
Age at which the mother had the first child	-0.006 (0.005)	-0.003 (0.006)	-0.004 (0.006)	-0.007 (0.005)
Mother lives under situation of moderate or intense stress (dummy)	0.083* (0.046)	0.109* (0.061)	0.106* (0.061)	0.143** (0.056)
Mother with high school level of education or higher (dummy)	0.033 (0.045)	-0.015 (0.055)	0.038 (0.061)	0.036 (0.050)
Father lives in the same house (dummy)	-0.004 (0.051)	-0.072 (0.061)	-0.080 (0.058)	-0.066 (0.054)
Father Works (dummy)	-0.004 (0.048)	-0.010 (0.061)	0.000 (0.058)	0.019 (0.053)
Family size	0.026** (0.012)	0.022 (0.018)	0.038** (0.015)	0.007 (0.015)
Family benefits from <i>Bolsa Família</i> (dummy)	0.030 (0.043)	0.001 (0.051)	0.007 (0.049)	-0.022 (0.045)
Family has debts (dummy)	-0.005 (0.040)	0.042 (0.049)	0.098* (0.053)	0.054 (0.042)
Socioeconomic status	-0.020 (0.021)	-0.046 (0.031)	-0.033 (0.035)	-0.006 (0.029)
Number of observations	278	275	277	253

Obs: * represents marginal effects that are statistically significant at 10% level; ** represents marginal effects that are statistically significant at 5% level; *** represents marginal effects that are statistically significant at 1% level.