



Pathways from witnessing Intimate Partner Violence during childhood to current involvement in violence: The roles of depression and substance use.

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3 **Pathways from witnessing Intimate Partner Violence during childhood to current**
4 **involvement in violence: The roles of depression and substance use.**
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8 **Pathways from Witnessing IPV During Childhood to the involvement with violence**

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54 **Conflict of Interest**

55 None
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Abstract

Objective: This study aimed to verify the direct and indirect pathways between witnessing intimate partner violence (WIPV) during childhood and being involved with it as a victim or a perpetrator in adult life. The mediating roles of depression and substance use were investigated.

Method: The data comes from the Second Brazilian National Alcohol and Drugs Survey, a multi-cluster probabilistic household survey which gathered information on the use of psychoactive substances, depressive disorder, history of childhood direct and indirect exposure to violence and intimate partner violence (IPV) in a population-based nationally representative sample. A subsample of 2,120 individuals 14 years and older, cohabiting with their partners was analysed. Weighted prevalence rates and adjusted odds ratios were calculated using Stata13 and Conditional Path Models were tested using Process for SPSS.

Results: Being a victim of IPV was reported by 6% of the sample, and 4.1% reported being perpetrators; these rates were 16.6% and 7.3%, respectively among WIPV (13%). WIPV was associated with being a victim of IPV but not with becoming a perpetrator. The conditional model showed a direct association between WIPV and IPV and this was mediated by depression. Alcohol consumption, age of drinking initiation and cocaine use mediated this association only when combined with depression.

Conclusion: Intergenerational transmission models of IPV through exposure during childhood can contribute to explain the high rates of domestic violence in Brazil. Our findings should provide evidence to focus on prevention strategies where they are needed the most: the victims of premature adverse experiences.

Keywords: “Intimate partner violence IPV”, Witnessing, “adverse childhood experiences ACE”, epidemiology, Brazil

Introduction

Intimate partner violence (IPV) is a major public health issue across the globe and in developing countries alike, with worldwide rates raging from 15% in Japan to 71% in Ethiopia. It is estimated that over one third of women around the world have experienced either intimate partner violence or non-partner sexual violence in their lifetime (1). The consequences of IPV go beyond harming partner's physical and/or psychological integrity. As IPV occurs within the household, it often affects children and adolescents, either as direct victims, suffering psychological, physical and/or sexual abuse, or indirect, witnessing parental violence (2-4).

Witnessing the perpetration of physical aggression within the family may turn as damaging as personally suffering violence, and both are associated with mood and anxiety disorders, including pos-traumatic stress disorder (3), and can trigger conduct disorders that may progress to the perpetration of IPV in adult life, when co-habiting (2, 5-7).

There is a large body of evidence linking adverse childhood events (ACE) with premature use of psychotropic substances and their misuse in adult life (8-12). Previous studies have also shown the association between the consumption of alcohol and illegal drugs with the occurrence of IPV (13-17). However, there are far less studies investigating the association between witnessing IPV as a child and becoming exposed to IPV as a victim and/or perpetrator (2, 18). Finally, to the authors knowledge, no previous studies have yet been performed to explore the mediating effects of depression and the use of drugs in the relationship between witnessing IPV as a child and being involved with IPV later in life. Given the literature gaps on this topic, the aim of this work is to describe national rates on exposure to IPV during childhood and in adult life. Further, we investigate the predictive value of exposure to WIPV during childhood and the occurrence of IPV in adult life controlling for being a victim of direct physical violence as a child. The pathways between

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3 WIPV and IPV were estimated in a conditional model considering the mediating effects of
4 depressive disorder, alcohol consumption, age of drinking initiation and cocaine use
5 frequency in the previous year were estimated .
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10 11 12 **2. Methods**

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14 This research protocol was submitted and approved by the Ethics Committee of the
15 Federal University of Sao Paulo and by National Commission of Ethics in Research
16 (CONEP). All subjects provided written informed consent prior to the interview.
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20 21 22 **2.1. Sampling and procedures**

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25 The Second Brazilian National Alcohol Survey (BNADS) was conducted between November
26 2011 and March 2012 (Gigliotti et al. 2014; Abdalla et al. 2014; Madruga et al. 2012). A
27 multistage cluster sampling procedure was used to select 4,607 individuals aged 14 years and
28 older from the Brazilian household population, including an oversample of 1,157 adolescents
29 (14 to 18 years old). The overall response rate was 77% and the adolescents oversample
30 response rate was 79%. The sampling process was conducted in 3 steps: 1) selection of 149
31 counties using probability proportional to size methods (PPS); 2) selection of two census
32 sectors for each county, totaling 375 census sectors, also using PPS; and 3) within each
33 census sector eight households were selected by simple random sampling, followed by the
34 selection of a household member to be interviewed using the “the closest future birthday”
35 technique. One-hour face-to-face interviews were conducted in the respondents’ home by
36 trained interviewers using a standardized fully structured questionnaire. This study analysed a
37 subsample of 2,120 individuals (46% of the total sample of survey respondents) who were
38 married or living with their partners.
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2.2 Measurements

2.2.1 Adverse Childhood Experiences (ACE) - Exposure to violence during childhood or adolescence was assessed in two different levels: 1) Direct violence related to being a victim of physical violence, and 2) Indirect violence regarding witnessing violence between parents. Suffering physical violence at any point during childhood was measured using seven items from the parent-child version of the Conflict Tactics Scale (CTS) (19). Responses were scored 0 (*never*), 1 (*some times*), 2 (*often*), 3 (*very often*). Scores were summed up to create a violence index with a possible range of 0 to 21. Witnessing parental violence (WIPV) was based on the following item of the CTS scale: “*During your childhood or adolescence, how frequent you saw your parents physically harming each other or others?*” with the same scores for responses ranging from “*never*” to “*very often*”.

2.2.2 Intimate Partner Violence (IPV) - All questions were adapted from the Conflict Tactics Scale (19), Form R. Respondents were asked a total of nine questions about the occurrence of different types of violent behaviors in the last 12 months, including less severe physical violence (throwing something; pushing, grabbing, or shoving; slapping) and severe physical and/or sexual violence (kicking, biting, or hitting; hitting or trying to hit with something; burning or scalding; forced sex; threatening with a knife or gun; using a knife or gun). First, the respondents were asked if they have perpetrated these acts against their partner (perpetration) and then were asked to report if their partner has perpetrated these acts against them (victimization).

2.2.3 Substance Use Assessment: Lifetime and previous year use of the main illicit drugs was assessed. Cocaine use (snorted and smoked) was further investigated through questions assessing severity of dependence (20). For the purpose of this study, information on current (last month) frequency of cocaine consumption was added into the conditional model. Frequency responses were scored as 0 (*never*), 1 (*one to two times in the week*), 2 (*three to*

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3 *five times in the week*) or 3 (*six times a week or every day*). In order to guarantee
4 confidentiality, all illicit drug related questions were not asked face-to-face, but reported
5 separately by the participant alone. Answers were returned at the end of the interview in
6 sealed envelopes and immediately placed in sealed bags in front of the respondent.
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11 Alcohol Consumption – The age of initiation of alcoholic beverages consumption was
12 assessed using the question “*At what age you started drinking alcohol (do not considered*
13 *when you only tried one or two sips)*”. The number of drinks consumed in a typical day
14 (alcohol intake) was also measured with the assistance of a unit/drinks demonstration chart.
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20 DSM-5 Alcohol Use Disorder (AUD) - This was assessed with the Brazilian version of the
21 Composite International Diagnostic Interview (CIDI 2.1) (21). Although this survey pre-dates
22 DSM-5, the questionnaire included inquiry about craving, which allowed for the creation of a
23 diagnosis based on DSM-5 criteria, covering the eleven criteria included in the DSM-5. In
24 the analysis herein, the presence of 2 or more criteria in the past 12 months was considered a
25 positive diagnosis of AUD.
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34 **2.2.4 Depressive Disorder:** Assessed using the Brazilian validated version of the 20-item
35 Center for Epidemiological Studies Depression Scale (CES-D). Responses ranged from 0
36 (*never*) to 4 (*most of the time*) and the score 16 was used as the cutoff point (22, 23) for the
37 preliminary analysis as case indication of depressive disorder. Scores were summed up to
38 create an index accounting for the presence and intensity of depressive symptoms, with a
39 possible range of 0 to 80, used to be tested as a mediating factor in the conditional model.
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48 **2.2.5 Control Variables:** Included gender, age, education, monthly income, and the physical
49 violence victimization during childhood score as control variables.
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52 53 **2.3 Statistical Analysis**

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56 The analysis was conducted using Stata 13.0 (24) for the weighted prevalence rates
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3 estimations and individual associations. In an attempt to account for the complex sample
4 design, data were weighted for the inverse of respondent's probability of selection, including
5 the oversampling of adolescents, and for the national census population structure regarding
6 gender and age. The Conditional Process Analysis was performed using SPSS21/PROCESS
7 ("processmacro.org" macro v2.14.), which is a computational procedure that implements
8 moderation or mediation analysis as well as their combination in an integrated conditional
9 process model (i.e., mediated moderation and moderated mediation). It uses a path analysis
10 framework similar to the approach described by Edwards and Lambert (2007) (25, 26). All
11 analyses accounted for the complex sampling design, and were conducted on data weighted to
12 correct for unequal probabilities of selection into the sample, and a post-stratification weight
13 was applied to correct for non-response and to adjust both samples to known population
14 distributions on demographic variables (education, age, gender and region of the country)
15 according to the Brazilian Censuses of 2010. Cross-tabulations were used to examine
16 prevalence rates of WIPV by the main risk factors (depressive and alcohol disorders, cocaine
17 use and IPV perpetration and victimization). A preliminary analysis using Logistic regression
18 models was used to assess the independent associations between WIPV and IPV, controlling
19 for sociodemographic factors, substance use and depression.

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41 **2.3.1 Conditional Modeling:** The hypothesis was to determine whether the direct association
42 between Witnessing Intimate Partner Violence during childhood (WIPV) and Intimate Partner
43 Violence (IPV) could be mediated by: 1) Depressive Disorder (measured by depressive
44 symptoms from the CES-D scale), 2) Alcohol Intake (AI, measured by amount of doses
45 consumed in a typical day) 3) Age of Drinking Onset (ADO) and 4) Frequency of Cocaine
46 Use. To test this hypothesis, we adopted the Parallel Multiple Mediator (PMM) Model from
47 the Conditional Process Analysis algorithms (27). WIPV was considered as the predictor (X),
48 and the two forms of IPV involvement as the outcome (Y) - as a Victim (IPV-V) and as a
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3 Perpetrator (IPV-P). These associations were tested with the four mediators in serial. All
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5 models were calculated as weighted linear composites of scale items and controlled by the
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7 covariates sex, age, income and being a victim of physical aggression during childhood. The
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9 mediations were conducted to estimate the effect of the four mediators in the relation between
10
11 WIPV and IPV-V and IPV-P, using the product of coefficients method (28). The product of
12
13 coefficients method involves the multiplication of regression coefficients for the regression of
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15 the mediator on the independent variable (a-path) and for the regression of the outcome on the
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17 mediator (b-path) with the independent variable included in the model (c-path), and with a*b
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19 considered the mediated effect. An effect size, representing proportion of variance explained
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21 by the mediated effect, can be calculated by dividing the amount of variance in the outcome
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23 explained by the mediated effect by the total amount of variance in the outcome explained by
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25 both the mediator and the independent variable. For the serial mediation analysis the total
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27 effect of X on Y is equal to the direct effect of X plus the sum of the two specific indirect
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29 effects of the two mediators. All mediation effects were estimated in Process using a
30
31 maximum likelihood estimator and 10.000 bootstrap draws to obtain confidence intervals for
32
33 the indirect effect. All mediation models were evaluated using multiple indices of model fit: a
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35 non-significant chi-square statistic, comparative fit index (CFI) values greater than 0.95, and
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37 standardized root mean square residual (SRMR) values less than 0.08 (29).
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43 **3. Results**

44 **3.1 Descriptive Analysis**

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46 Among the subsample of individuals who were married or co-habiting (N=2,120), 52% was
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48 female, with most (71%) aged between 26 to 59 years (mean age 41 years; SD=15) and an
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50 average monthly income of £125.00 (R\$766.00, equivalent to 1.3 minimum monthly wage in
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52 Brazil at the time of the survey - 2012). More than half (53.2%) reported having completed
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54 primary school and 10.2% had a college or an university degree (data available on request).
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3 Thirteen percent reported having witnessed parental violence at some point of their
4 childhood (Table 1), and just over half of them were also victims of physical aggression
5 during their childhood (56.3%). Among individuals who reported being victims of physical
6 aggression as a child, about one third also witnessed parental physical violence (32.2% - data
7 available on request). The prevalence rate of being a victim of intimate partner violence (IPV)
8 was over three times higher among those who witnessed IPV during childhood compared to
9 the general population (16.6 vs 6% - Table 1). Those who WIPV were nearly four times more
10 likely to become a victim of IPV in adulthood (OR 3.9; 95%CI 2.42-6.23). The prevalence of
11 being a perpetrator of IPV increased from 4.1% to 7.3% among the ones prematurely exposed
12 to IPV compared to the whole sample, but this difference was not significant in these
13 preliminary analyses (Table 1). All variables associated with being involved in IPV studied
14 were positively associated with witnessing IPV as a child. Over one third of the individuals
15 who witnessed IPV had indication of depressive disorder. Those who WIPV were more likely
16 use cocaine and had an alcohol use disorder, and although started drinking at a younger age,
17 this difference was not significant (Table 1).
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36 **TABLE 1 HERE**

37 38 **3.2 Preliminary Analysis**

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40 Four multivariate analysis models were performed to explore the association between
41 witnessing IPV as a child and currently being involved in IPV as a victim or as a perpetrator.
42 As seen in table 2, the first model was adjusted by the sociodemographic variables only, and
43 WIPV was associated with being a victim of IPV, with no significant association with being a
44 perpetrator of IPV. The same was found in the other three adjustments, included in the model:
45 depression (CES-D items), alcohol consumption (doses drunk in a typical day) and cocaine
46 use in the last year. Witnessing IPV predicted being a victim of IPV in all models tested, with
47 odds ratios reaching 3.65 (2.25-5.94), when controlled for cocaine use. Witnessing IPV was
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not associated with becoming a perpetrator in marital/co-habiting relationships in adult life.

All models were also adjusted for being a victim of physical violence as a child.

TABLE 2 HERE

3.3 Conditional Model

Several hypotheses were tested to define the conditional pathways between witnessing IPV as a child and being involved with IPV as a victim or a perpetrator in adult life. Amidst several attempts, the Parallel Multiple Mediator (PMM) Model was chosen, as it allows many causal effects operating through multiple mechanisms simultaneously (30, 31), presenting coefficients for all direct and indirect paths tested with low p values, even though the R square value was considered low (30%). The PMM Model proposed was used to test only the outcome of being a victim of IPV, as being a perpetrator of IPV was not statistically associated with WIPV in the preliminary analysis. The model tested four possible mediators: depressive symptoms (total score accounting for the presence and intensity of symptoms), alcohol consumption (number of drinks ingested in a typical day), age of drinking initiation and frequency of cocaine use as mediators in the association between the predictor X: Witnessing Interpersonal Partner Violence (WIPV) and the outcome Y: Being a Victim of IPV.

3.3.1 IPV as a Victim:

As seen in figure 1, the analysis demonstrated that being a victim of IPV (IPV-V) is directly predicted by witnessing IPV during childhood ($p=0.0071$). Among all the combinations of possible indirect effects of WIPV on IPV-V considering the effects of the four mediators tested, only three pathways were significant. All valid models had in their path of depressive symptoms (DS):

Path 1: WIPV – DS – IPV-V;

Path 2: WIPV – DS – ALCOHOL CONSUMPTION – IPV-V;

Path 3: WIPV – DS – DRINKING INITIATION - COCAINE USE – IPV-V;

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3 Path 4: WIPV – DS – DRINKING INITIATION - COCAINE USE - IPV-V.
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6 **Fig 1 here**
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10 **4. Discussion**

11 There is a large body of evidence describing the long term consequences of early life
12 exposure to violence (32, 33), its association with substance use and mental health disorders
13 (9, 12), and with being involved with Intimate Partner Violence (IPV) later in life, which has
14 been referred to as intergenerational transmission of IPV (2, 7, 14, 16, 34). However, the
15 assumption that the consequences of direct childhood exposure to personal violence
16 foreshadows the effect of being a witness of parental violence might be a fallacy. We tested
17 the hypothesis that witnessing IPV can independently lead to harmful consequences
18 regardless of suffering violence. Our results suggest that being a victim of direct violence
19 (physical violence, as assessed here) and witnessing parental violence do not necessarily
20 overlap, and that witnessing IPV is independently associated with being a victim of IPV later
21 in life. However, perpetration of IPV in adulthood was not predicted by witnessing IPV when
22 controlling for having suffered direct violence as a child (which is a significant predictor of
23 both, victimization and perpetration; data not presented in this manuscript). Based on a
24 nationally representative sample, our findings demonstrated that over 10% of Brazilians
25 witnessed parental violence during childhood, but half of them were not exposed to direct
26 physical violence. On the other hand, within participants who referred being victims of
27 physical violence (over 20% of the population), less than one third have also witnessed
28 parental violence. These rates are similar to the ones found by Song and colleagues using a
29 representative sample of household residents in South Korea (2), and reported in China,
30 Philipines and other countries (35, 36), suggesting that this pattern of domestic violence might
31 be cross-culturally consistent. The present study arises from the premise that, eventhough
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3 being a victim of physical violence and witnessing parental violence as a child are highly
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5 associated, and probably share the same underlying factors, the victims' profile might be
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7 distinct, and therefore, its associated factors and long term consequences should be studied
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9 separately.

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11 The preliminary analysis showed that witnessing IPV as a child increased in nearly four times
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13 the chances of becoming a victim of IPV in adult life, when in a relationship, with nearly two
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15 in ten individuals reporting IPV, compared to 6% among the general population. The
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17 multivariate analysis suggested that these individuals are also twice more likely to present
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19 depressive disorder and over three times more likely to use cocaine as adults. Being exposed
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21 to parental violence also doubled the chances to develop alcohol use disorders and reduced
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23 the age of drinking initiation. Witnessing IPV predicted being a victim of IPV adjusting by
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25 gender, age, education and socioeconomic status. This association remained significant when
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27 also adjusting it for depressive disorder, cocaine and alcohol use. More importantly, the
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29 association remained significant when adjusting for being a victim of physical violence as a
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31 child. The preliminary analysis also showed that WIPV did not predict being a perpetrator of
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33 violence considering only the sociodemographic adjustment or including depression and
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35 substance use as adjustments.

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37 Based on the findings from the preliminary analysis, the conditional model was performed to
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39 estimate the direct and indirect effects of WIPV on IPV Victimization, testing the role of
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41 depression, alcohol use, age of drinking initiation and cocaine use as possible mediators. The
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43 Parallel Multiple Mediator (PMM) model demonstrated that witnessing parental violence as a
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45 child has a direct effect on becoming a victim of interpersonal partner violence. The PMM
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47 model showed that this association is mediated by symptoms of depression and that this
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49 relationship occurs independently from being a victim of physical violence as a child. There is
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51 an extensive body of evidence showing that being exposed to adverse events during childhood
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3 is linked with the development of mood disorders (12, 32, 37). Even though this result is in
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5 agreement with previous studies, Contrary to our hypothesis, earlier drinking initiation,
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7 alcohol consumption and cocaine use were did not mediate the association between WIPV in
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9 pathways that did not consider depression. This finding suggests that differing from direct
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11 exposure to violence as a child, the experience of witnessing parental violence might not
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13 activate the HPA stress axys at levels that can lead to permanent physiological changes that
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15 are responsible for the increased vulnerability to develop drug use disorders(37, 38). We
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17 suggest that the experience of witnessing parental violence can increase the chances of being
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19 a victim of IPV possibly more via social learning (39) than via its impact in physiological
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21 mechanisms. However, all the indirect pathways between the predictor and the outcome that
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23 involves the combination between one of the drug use variables (alcohol consumption, age of
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25 drinking initiation and cocaine use) and the variable depressive symptoms were significant.
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29 Such result is consistent with the extensive body of evicence showing the high association
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31 between misuse of substances and mood disorders (40, 41).
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34 **5. Conclusions**

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36 Based on our findings we suggest that witnessing parental violence during childhood can
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38 increase the chances of being a victim of intimate partner violence as an adult, regardless of
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40 being directly exposed to violence as a child. This study also demonstrated that this
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42 association is not replicated when analysing being a perpetrator of IPV. The association
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44 between witnessing parental violence and being a victim of IPV is mediated by depressive
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46 symptoms, and when they are present, the consumption of alcohol and cocaine can play a role
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48 mediating this relationship.
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52 Intergenerational transmission of IPV can in part explain the staggering high rates of domestic
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54 violence in Brazil, childhood maltreatment and IPV alike. Immediate prevention actions are
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of foremost importance. Our findings should provide the evidence needed to focus prevention strategies where they are needed the most: the victims of premature adverse experiences.

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Table 1: Prevalence rates of IPV, alcohol abuse and depressive disorders in the whole sample and within individuals exposed to IPV during childhood in the general household population living in Brazil (N=2,120).

	Whole Sample % [95% CI]	Witnessed IPV % ; OR[95% CI]*
	100	13.0
Childhood Maltreatment	20.9 [18.22-23.75]	57.6 ; 6.0[4.70-7.60]
IPV Victim	6.0 [4.90-7.31]	16.6 ; 3.9[2.42-6.23]
IPV Perpetrator	4.1 [3.13-5.45]	7.3 ; 1.6[0.78-3.33]
Depressive Disorder	23.0 [19.89-26.51]	35.5 ; 2.4[1.86-3.05]
Cocaine use	1.1 [0.64-1.73]	3.4 ; 3.9[1.93-7.69]
Alcohol Use Disorder	9.9 [8.24-11.75]	14.3 ; 2.0[1.45-2.85]
	Mean ± SE	Mean ± SE; IRR [95%CI]**
Age of alcohol use onset	17.4 ± 5.5	16.2 ± 5.7 ; 0.94[0.90-0.97]

*Logistic Regression, adjusted by sociodemographic characteristics (sex, age, income, education)

** Poisson regression, adjusted by sociodemographic characteristics (sex, age, income, education)

Table 2: Associations between witnessing parental violence as a child and IPV in the general household population living in Brazil (N=2,120).

	Model 1 OR[95%CI]	Model 2 OR[95%CI]	Model 3 OR[95%CI]	Model 4 OR[95%CI]
IPV Victim	3.1 [2.29-6.02] p = 0.00	2.9 [1.74-4.78] p = 0.00	3.3 [1.76-6.34] p = 0.00	3.7 [2.25-5.94] p = 0.00
IPV Perpetrator	1.6 [0.76-3.22] p = 0.23	1.3 [0.63-2.82] p = 0.46	1.7 [0.66-4.57] p = 0.26	1.5 [0.74-3.19] p = 0.24

Multivariate Logistic Regression

M1: Adjustment for sociodemographics (sex, age, income, education) + childhood physical violence

M2: Adjustment for sociodemographics + childhood physical violence + depressive disorder

M3: Adjustment for sociodemographics + childhood physical violence + alcohol consumption

M4: Adjustment for sociodemographics + childhood physical violence + cocaine use

Figure 1: Conditional model statistical diagram for witnessing intimate partner violence during childhood.

