



# Do human capital investments mediate the intergenerational transmission of domestic violence? <sup>☆</sup>

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## ABSTRACT

**Background:** Domestic violence is a major public health issue worldwide with detrimental consequences not only for its victims but also for the next generations. Despite an extensive literature documenting the persistent intergenerational transmission of domestic violence, few studies explore the mechanisms underlying this transmission.

**Methods:** We use data from the Cebu Longitudinal Health and Nutrition Survey implemented between 1984 and 2009 in the Philippines. These longitudinal data allow us to measure how much the *association* between witnessing parental violence during childhood and the experience of intimate partner violence in young adulthood is explained by different measures of human capital that occur up to young adulthood, including education and health outcomes, cognitive skills, and psychosocial traits.

**Results:** We find that these human capital measures explain 22 percent of the transmission of domestic violence. Our results indicate that depression at age 18 and cognitive ability at age 11 are the primary human capital channels.

**Conclusions:** Our findings suggest a potential role of interventions targeting these human capital investments in reducing the cycle of violence across generations, as such, it could expand the window of opportunity for effective interventions in developing countries.

## 1. Introduction

Domestic violence is a major public health problem worldwide and its costs are not limited to the physical and mental health of direct victims (World Health Organization, 2013). In fact, evidence from developed and developing countries documents a robust intergenerational transmission of domestic violence (e.g., Assaad et al., 2016; Friedemann-Sánchez & Lovatón, 2012; Pollak, 2004). Children who grow up in violent homes tend to have violent homes themselves as adults and often become victims of intimate partner violence (IPV).

The existence of such intergenerational transmission implies that policies aimed at reducing violence today could have multiplier effects by also decreasing violence in the next generation. This transmission has motivated the search for policies that could address IPV among couples today. Such policies include income transfers to women, access to schooling, employment, assets and wealth, access to credit, among other

strategies (Klugman et al., 2014). However, the evidence suggests that some of these efforts provide mixed results in reducing IPV (Buller et al., 2018; Bourey et al., 2015; Peterman et al., 2017; Peterman et al., 2018).

Our paper provides an alternative but complementary approach to the search for effective policies. We study the *mechanisms* that may underpin the intergenerational transmission of violence. We follow the existing literature, cited above, and focus on *correlational* evidence for the intergenerational transmission of IPV. However, understanding the factors behind this robust intergenerational correlation can elucidate *how* violence may transmit to the next generation rather than treating mechanisms as a “black box.” We investigate how much the *association* between witnessing parental violence during childhood and IPV experience as young adults is explained by different measures of human capital, defined as the stock of skills, traits, and knowledge that an individual possesses. Recognizing the multidimensionality and dynamics of human capital accumulation (Heckman, 2006; Strauss & Thomas,

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2008), we analyze the relative role of different forms of human capital in explaining the intergenerational transmission of domestic violence, including not only education and health outcomes but also cognitive skills and psychosocial traits.

We study the case of the Philippines, where IPV is prevalent and its intergenerational transmission is well documented (e.g., Fehringer & Hindin, 2009; Mandal & Hindin, 2015). We use rich longitudinal data that provide an opportunity to study the role of human capital as a mechanism explaining this transmission, and thus, build on evidence proposing assortative mating and the likelihood of leaving an abusive relationship as explanations for the intergenerational spillover (Pollak, 2004). Furthermore, we expand previous work on the role of human capital as a possible transmission mechanism (Widom & Wilson, 2015) by using measures beyond schooling as explained in our conceptual framework.

The data provide unique human capital measures from different points of the life course, that is, from birth to early adulthood. Specifically, we divide human capital measures into four categories: schooling, early childhood health, cognition, and psycho-social traits. For the latter, we use depression and locus of control (LOC), which represents individuals' beliefs or attitudes about the control they can exert over their own lives. An *internal* LOC constitutes the extent individuals feel that their life events result from their own actions and can be determined by their own skills and behavior. An *external* LOC is the extent that individuals feel that these events are beyond their control and are instead due to external factors such as fate, luck, or chance. To the best of our knowledge, our paper is the first to consider all those measures *jointly* and assess whether these different human capital elements can mediate the intergenerational transmission of violence.

## 2. Conceptual framework

Traditionally, economics views IPV as a function of the perpetrator's utility garnered through violence and of the victim's alternative options to staying in the relationship. Therefore, this perspective points to female employment opportunities, independent economic status, and divorce laws as factors that increase a woman's bargaining power and thus reduce violence within the household (e.g., Tauchen et al., 1991; Stevenson & Wolfers, 2006; Pollak, 2004). Indeed, evidence demonstrates that employment opportunities, welfare services, and cash transfers affect female exposure to IPV (e.g., Bobonis et al., 2013; Heath, 2014; Hidrobo & Fernald, 2013). According to this view, IPV may transmit across generations if childhood exposure to parental violence influences the formation of human capital dimensions associated with economic well-being in adulthood such as education, cognition, and health, which in turn might affect intrahousehold bargaining power.

Robust evidence indicates that IPV compromises parenting quality and ability in ways that may affect health, cognitive development, and schooling, all of which impact adult economic and labor outcomes and thus influence an individual's bargaining power and experience of IPV (Costa-Font & Ljung, 2018; Villa, 2017). Parental stress/depression can compromise parent's ability to invest in their children's mental, physical and educational well-being (e.g., Holt et al., 2008; Mangiavacchi & Piccoli, 2018). Childhood exposure to domestic violence is associated with depression, peer difficulties, problems adhering to school rules, skill formation, exhaustion, and absenteeism, making it more difficult to maintain consistent school attendance and performance. Conversely, parental violence may potentially improve schooling outcomes as school may be used to avoid home. Additionally, children with high self-esteem in non-home domains like school may focus more intensely on excelling in that domain allowing them to further avoid violence in their home (see Holt et al., 2008 for review). Finally, domestic violence is associated with a wide range of child health outcomes, including impaired growth (e.g., Martin, 2002).

In addition to the traditional human capital measures that influence economic independence, numerous psycho-social traits, such as self-

esteem, depression, and LOC, among others, are associated with IPV. For example, individuals with low self-esteem or depression may have greater feelings of entrapment in an abusive relationship, but women with high self-esteem are more likely to leave an abusive relationship (Kim & Gray, 2008). Depressive symptoms in adolescence are associated with a greater likelihood of IPV in adulthood (McLeod et al., 2016). LOC is associated with IPV; however, results are mixed. Some find that women in abusive relationships tend to have an external LOC (Clements et al., 2004; Harway & Hansen, 2004), while those in non-abusive relationships have a greater internal LOC (Suzuki et al., 2008). If parental violence exposure influences the formation of psycho-social traits associated with IPV in adulthood, these traits may also mediate its intergenerational transmission.

There are several ways that experiencing parental violence in childhood can interrupt normal developmental progress and thus influence psycho-social traits in adulthood. Parental violence can impede the sense of basic trust and security necessary for healthy emotional development (Levendosky et al., 2000). Consequently, children exposed to family dysfunction such as parental violence have higher levels of internalizing (depression, anxiety) and externalizing (physical aggression) behaviors (Evans et al., 2008). Some cite self-esteem and LOC as traits that can buffer children from the effects of parental violence and promote resiliency (Holt et al., 2008).

## 3. Data and methods

We employ the Cebu Longitudinal Health and Nutrition Survey (CLHNS), a rich longitudinal dataset from Cebu, the Philippines. The CLHNS follows a cohort of Filipino women who gave birth between May 1983 and April 1984 in randomly selected *barangays* (smallest administrative unit). Women were surveyed in their third trimester, at birth, and then every two months for their child's first 24 months of life. The mothers and children were subsequently surveyed in 1991, 1994, 1998, 2002, 2005, 2007, and 2009. The 2002 and 2005 rounds, when the children were approximately 19 and 22, include modules on their adult experience of IPV. These modules were dropped in the 2007 and 2009 rounds, so we excluded them from our analysis.

Since intimate partnership is required for experiencing IPV, we restrict the sample to the 477 children who were married/cohabitating when they were observed as young adults in their early twenties in 2005. Approximately 33% of the married/cohabitating sample experienced IPV in the last year, whereas only 0.007% of those never married or non-cohabitating did. Appendix Table A.6 reports average characteristics by marital/cohabitating status. While there are some average differences, exposure to parental violence does not differ between the two groups, either statistically or in magnitude. Therefore, growing up in a violent home does not influence selection into our working sample. Appendix A.3 addresses concerns about potential selection bias due to sample attrition.

For our outcome variable, we use 2005 information on five IPV indicators which ask whether, in the previous year, the spouse or partner of our index children threw something at them; pushed, grabbed, or shoved them; hit them (not with an object); hit them with something hard; and harmed them enough to require medical attention. Because there are multiple outcome measures, we aggregate them using the approach of Kling et al. (2007); we standardized each indicator and then took the average of these five standardized violence indicators to construct our IPV index. Higher index values indicate higher levels of IPV experienced by the respondent at approximately 22 years old.

In 2002, respondents were also asked whether they remember if their

parents/caretakers “slapped, kicked, or used other means like pushing or shoving to try and hurt the other physically when you were growing up?”. We use this question as our measure of parental violence. Appendix A.1 (Table A.3) addresses some concerns related to recall measurement error in this variable.<sup>1</sup>

The CLHNS includes common indicators for health and education, such as anthropometric measures and detailed modules on the children’s schooling. Additionally, the children took IQ, math, and English achievement tests at age eleven.

The 2002 round (when the children were approximately 18–19) also includes modules on the children’s psychological, social, and emotional well-being. Subjects were asked a series of questions regarding their mental well-being over the past four weeks. Using factor analysis on these questions, we construct a depression index and standardized it based on the data’s sample moments. The index children were additionally asked to agree or disagree with a series of statements regarding the control they felt over their own lives. We performed factor analysis on these questions to generate measures of locus of control (LOC). Appendix A.1 details the construction of the depression and LOC indices, summarizes their measurement questions, and reports estimated factor loadings (Tables A.1 and A.2).

Our methodology is analogous to Case and Paxson (2008), Vogl (2014), and LaFave and Thomas (2016), who use parsimonious OLS models to explore the sensitivity of the wage premium for adult height to the inclusion of possible mechanisms such as health status and occupational sorting. In our case, we focus on the sensitivity of the intergenerational transmission of IPV to the inclusion of a broad set of human capital measures with the following model:

$$V_i = \beta_o + \beta_1 PV_i + E'_i \beta_2 + C'_i \beta_3 + H'_i \beta_4 + D'_i \beta_5 + X'_i \beta_6 + \varepsilon_i$$

where  $V_i$  is the 2005 domestic violence index for young adult  $i$ .  $PV_i$  indicates whether the individual witnessed parental violence during childhood (binary). Thus,  $\beta_1$  captures the intergenerational transmission of domestic violence. In all models, vector  $X_i$ , controls for individual background characteristics including gender and mother’s baseline education and height.

We are specifically interested in how sensitive the coefficient  $\beta_1$  is to the inclusion of different measures of the individual’s human capital that occur up to young adulthood. First, we separately add each of the following measures: i)  $E_i$ , a vector of education outcomes, measured by highest grade attained (and its square) and completion of some high-school by age 15; ii)  $C_i$ , a vector of cognitive skills, measured by standardized test scores at age 11 for IQ and achievement tests in math and English; iii)  $H_i$ , a vector of early childhood health outcomes, measured by the natural log of birthweight, height-for-age z-score (HAZ) at age one and a dummy variable indicating whether individual  $i$  was born with a low birth weight (<2500 g); and iv)  $D_i$ , a vector of our depression and external and internal locus of control indices measured at age 18. Second, we evaluate how much the coefficient  $\beta_1$  changes when adding all these measures jointly as in Equation (1).

Isolating mechanisms with observational data requires strong assumptions. We therefore must interpret our findings with caution. If IPV transmits across generations partly through the human capital mediators we examine, then after conditioning on these mediators,  $\hat{\beta}_1$  will estimate the residual correlation that operates through any other pathway. However, this will not be true if there are intermediate confounders (i.e., variables affected by the “treatment” ( $PV_i$ )) that also affect the outcome and mediator of interest). Intermediate confounders create intermediate variable bias  $\hat{\beta}_1$ , introduced by including the

<sup>1</sup> In Appendix A.1, we also discuss the potential issues related to our parental domestic violence variable as we lacked the exact date when this domestic violence started and its intensity (or frequency). We argue that such issues are not a concern for our estimations.

mediators in the regression, in addition to the bias resulting from the endogeneity of  $PV_i$ .

Therefore, as a robustness check on the extent that intermediate variable bias could contaminate  $\hat{\beta}_1$ , we perform sequential g-estimation (Acharya et al., 2016), which largely partials out intermediate variable bias from  $\hat{\beta}_1$ . This produces nearly identical results as our main findings reported below, suggesting that intermediate variable bias is likely not a problem in our analysis. However, the sequential g-estimation does not address the potential endogeneity between  $V_i$  and  $PV_i$ , and thus, the  $\hat{\beta}_1$ ; estimated by either approach is still only correlational as in the current literature. Appendix B details sequential g-estimation and reports its corresponding results in Figure B.1.

#### 4. Results

Table A.5 reports descriptive statistics for our full working sample, and separately for individuals who did and did not witness parental violence as children. Approximately 40% of our sample is male. Sample children (mothers) completed 9 (6.6) years of education, on average. Average HAZ at age one is approximately -2.65 and 13.6% of the sample had low birth weight. Stratified by parental violence, on almost every dimension examined, these groups seem quite similar. The exception is that individuals from a violent home are much more likely to experience violence as adults and be more depressed at age 18. Approximately 43% of these individuals experienced physical violence as adults whereas only 25% of those with no memory of parental violence do. Sample individuals who witnessed parental violence also have a depression factor score that is almost 0.3 standard deviations (SD) higher than those who did not. Therefore, the experience of parental violence in childhood appears to strongly correlate with mental health at age 18 and the experience of IPV at age 22.

Table 1 reports our findings. In column 1, without conditioning on any mechanism, the correlation between parental violence and IPV is positive and statistically significant. Growing up in a violent home is associated with an increase in the adult IPV index by 0.165 SD. Conditioning on schooling or early life health (columns 2 and 3), does little to change the estimated intergenerational correlation with point estimates of 0.167 and 0.163 SD, respectively. Early life health also does not change the R-squared indicating it adds almost no information to the regression.

Conversely, adding our measures of age 11 cognitive ability and age 18 psycho-social traits reduce the violence transmission coefficient by 7% and 10%, respectively (columns 4 and 5) and more than doubles the R-squared. These reductions are largely driven by the inclusion of the IQ and depression variables. Finally, jointly controlling for all our human capital measures (column 6) substantially reduces the transmission coefficient from 0.165 to 0.128 SD and increases the R-squared by six-fold.

#### 5. Discussion and conclusions

Policies that reduce the levels of intimate partner violence today would have a long-lasting impact on future generations. Our paper contributes to the design of such policies by focusing on the mechanisms behind its intergenerational transmission.

Our estimates indicate that growing up in a violent home is associated with an increase in the adult IPV index by 0.165 SD, consistent with prior work in the Philippines (Fehringer & Hindin, 2009; Mandal & Hindin, 2015). We also find that including our human capital measures reduce this estimate by more than a fifth, indicating they may mediate this transmission. Specifically, we find that extended measures of human capital, such as cognition and depression, could play a role in this transmission compared to traditional measures (schooling and early health outcomes) that had little impact on estimated transmission. This is consistent with evidence on mental health as an important factor that promotes resiliency among children who experience domestic violence

**Table 1**  
Intergenerational transmission of domestic violence.

	Dependent variable: IPV as adult					
	(1)	(2)	(3)	(4)	(5)	(6)
Parental Violence	0.165*** (0.059)	0.167*** (0.059)	0.163*** (0.060)	0.153*** (0.059)	0.149** (0.060)	0.128** (0.060)
Had Some High School (age 15)		0.215** (0.094)				0.303*** (0.102)
Highest Grade Completed		0.031 (0.038)				-0.008 (0.040)
Highest Grade Completed Squared		-0.004 (0.003)				-0.001 (0.003)
Height-for-Age Z-score (age 1)			-0.029 (0.033)			-0.016 (0.033)
Height-for-Age Z-score (age 1) is missing			0.140 (0.196)			0.117 (0.185)
Birth Weight (gr.)			-0.079 (0.252)			-0.318 (0.240)
Birth Weight is missing			-0.376* (0.195)			-0.541** (0.267)
Born at Low Birth Weight			0.075 (0.127)			0.020 (0.120)
IQ Z-score at Age 11				0.111*** (0.042)		0.119*** (0.043)
Standardized Math Score (age 11)				-0.076 (0.056)		-0.045 (0.055)
Standardized English Score (age 11)				-0.081 (0.050)		-0.091* (0.052)
Internal LOC Z-score (age 11)					-0.059* (0.031)	-0.066** (0.032)
External LOC Z-score (age 18)					0.054* (0.031)	0.048 (0.032)
External LOC Z-score (age 18) is missing					0.122 (0.136)	0.125 (0.140)
Depression Z-score (age 18)					0.069** (0.032)	0.083*** (0.032)
N	473	473	473	474	476	473
Adjusted R-squared	0.012	0.023	0.010	0.031	0.035	0.065

Note: Robust standard errors in parenthesis. \*p < 0.10; \*\*p < 0.05; \*\*\*p < 0.01. All regressions include individual's gender and maternal schooling and height at baseline.

(Holt et al., 2008).

Interventions targeting these human capital investments hold potential for reducing the cycle of violence across generations, thus, expanding the window of opportunity for effective interventions in developing countries. Examples of these policies can be found in cognitive and noncognitive skill formation literature, which largely focuses on early childhood interventions (e.g., Andrew et al., 2018; Heckman, 2006), and recent work in identifying productivity gains to mental health interventions later in life (Heller et al., 2017).

Future research should address some of our analysis' limitations. First, work is needed to find exogenous sources of variation in IPV that could allow for estimates of an intergenerational transmission of violence beyond correlations. Second, datasets do not measure the intensity or type of domestic violence during childhood. Forthcoming longitudinal data collection efforts should improve this IPV measure and maximize efforts to reduce attrition, and thus, the potential associated selection bias. Finally, our findings are limited to the Philippines. Further research should use similar longitudinal data to validate our results in other contexts where domestic violence is prevalent, such as Latin American and African countries.

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**Availability of data and material**

Data used in the analysis for this project are publicly available

through the Cebu Longitudinal Health and Nutrition Survey run by the Carolina Population Center at the University of North Carolina.

**Code availability**

All source material, including Stata code, for the production of this manuscript can be made available.

**Authors' contributions**

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. Each author equally contributed to the production of the manuscript and is a co-lead author.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

**Declaration of competing interest**

We confirm that there are no known conflicts of interest or competing interests associated with this publication.

**Appendix A. Supplementary data**

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