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## Economic hardship and intimate partner violence: An analysis of perpetrators in Germany

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### Abstract

**Objective:** Based on the family stress model, we examine whether respondents are more likely to perpetrate physical IPV when experiencing economic hardship and pressure.

**Background:** Research has demonstrated an association of intimate partner violence (IPV) and economic factors. However, as the bulk of studies is limited to the female victim's perspective, the picture remains incomplete; factors driving gender-specific effects and perpetration rates have thus far been overlooked.

**Method:** Using data from a large sample of individuals from the German Family Panel *pairfam*, which covers the period between 2009 and 2019, we employ pooled logistic regression models (n=6,661 individuals with 21,321 observations). Given the rich data source, we are able to control for a number of possible confounding effects. To correct for sample selection, we use calibrated design weights.

**Results:** Our analyses show that IPV perpetration is associated with poverty and economic pressure among women, but not men. When accounting for confounding factors such as the Big 5 personality traits and childhood experiences, these associations become insignificant. For men, unemployment is linked to IPV perpetration, but only when personality traits and childhood experiences are not accounted for.

**Conclusion:** Results imply that the association between adverse economic conditions and IPV perpetration is mainly due to unobserved heterogeneity. Thus, physical IPV perpetration is not primarily caused by the distress of financial strain, but rather by underlying factors such as personality traits and adverse childhood experiences, which are associated with both socioeconomic status, economic pressure, and aggressive behavior in intimate relationships.

**Key words:** physical abuse, perpetration, economic pressure, poverty, family stress model



## 1. Introduction

Intimate partner violence (IPV) is a major public health issue worldwide with high individual and social costs (García-Moreno et al., 2015; World Health Organization [WHO], 2012). Experiencing IPV is a reality for a considerable number of couples across the globe (Diogo Costa et al., 2015; European Union Agency for Fundamental Rights [FRA], 2014). In Germany, 25% of women between the ages of 16 and 85 have experienced sexual or physical violence at the hand of their current or past partner(s) at least once (BMFSFJ, 2008).

Previous research has focused on determining factors that influence the risk of IPV in order to delineate patterns with which to suggest preventive strategies. Still, mechanisms are not yet fully understood, suggesting a complex and dynamic interplay of individual, relational, and socio-cultural factors (Abramsky et al., 2011; Capaldi et al., 2012; B. M. Costa et al., 2015; Hardesty & Ogolsky, 2020).

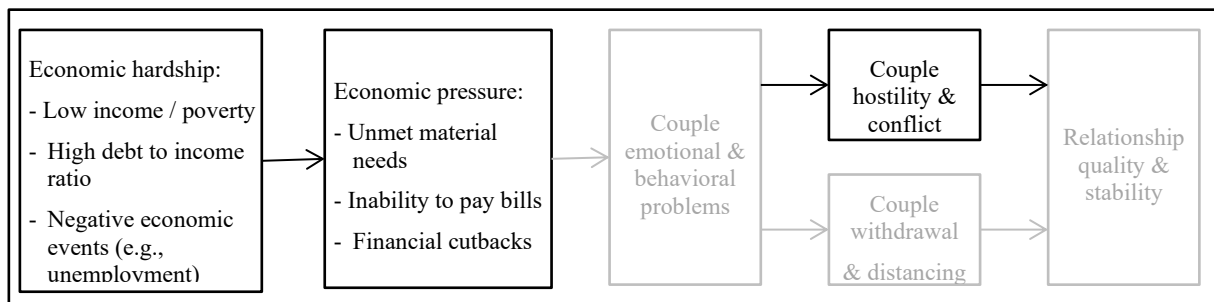
One aspect that has attracted scholarly research is the link between economic factors and IPV. Studies have found associations between higher rates of IPV and lower socio-economic status, neighborhood disadvantage, and lower socio-economic status during childhood and adolescence (Beyer et al., 2015; D. Costa et al., 2016; Golden et al., 2013; Reichel, 2017; Yakubovich et al., 2018). However, it remains unclear whether these are true causal effects, as most existing empirical studies have methodological weaknesses due to a lack of available data. Many studies simultaneously include a large number of factors in their analysis models so that no clear estimand (Lundberg et al., 2021) can be identified. In contrast, most research with a narrow focus on the association between some economic factor(s) and IPV include only a limited number of potentially confounding variables (Benson et al., 2003), which risks spurious correlation due to unobserved heterogeneity. In both cases, the causal effect of economic hardship on IPV is not clearly identified. Moreover, while theoretical arguments state that low socio-economic status and, in particular, financial hardship increase the risk of IPV *perpetration* due to distress affecting the perpetrator's mental health, most previous empirical research has concentrated on IPV *victimization*, so that direct tests of the theoretical arguments are precluded. Finally, many studies draw on small, regionally limited or convenience samples rather than random population samples.

The present study examines the associations of economic hardship (measured in terms of poverty and both partners' unemployment) and, as a mediating mechanism, subjective economic pressure with physical IPV perpetration while addressing these weaknesses in the existing literature. First, we concentrate on IPV perpetration rather than the victim's perspective to analyze economic hardship and stress as causes for violent behavior based on the family stress model (Conger et al., 1990; see also Conger et al., 1999; Conger et al., 2010). This is important, as perpetration data provides first-hand insights to offenders and their backgrounds. Second, by using data from the large-scale German Family Panel pairfam (Brüderl, Drobnič, et al., 2021) we are able to account for a number of potentially confounding factors. We thereby reduce (though not eliminate) bias due to unobserved heterogeneity, which is often a weakness of cross-sectional studies with limited information on confounding factors (Brüderl & Ludwig, 2015). Third, in contrast to the large number of studies limited to female victims and their male partners (e.g., Gracia & Merlo, 2016; Heise & Kotsadam, 2015; Jewkes, 2002; Reichel, 2017; Yakubovich et al., 2018; for Germany, see BMFSFJ, 2008; Ebert & Steinert, 2021), we investigate both male and female perpetrators as evidence suggests that, at least in less severe cases, female IPV perpetration and bidirectional violence are common phenomena (D. Costa et al., 2016; Hardesty & Ogolsky, 2020). Finally, while the bulk of studies uses data from the U.S.A. (see, for example, the meta-analysis by Yakubovich et al. (2018) on risk factors using 60 prospective longitudinal studies covering 48 studies from the US and none from Germany), the present analysis suggest whether associations found for the U.S. context can be applied to other countries such as Germany with different socio-cultural contexts and social welfare systems (Schmiedeberg & Bozoyan, 2021).

## 2. Theoretical framework

The main association between adverse economic conditions and IPV is assumed to occur via stress and frustration, as explained by the family stress model (Conger et al., 1990; see also Conger et al., 1999; Conger et al., 2010) and illustrated in Figure 1. Although the family stress model was originally developed to explain changes in relationship quality and stability, it can also be applied to IPV as an extreme form of relational conflict.

Figure 1: The family stress model



Note: Arrows indicate causal mechanisms. The present study tests only the elements marked in black. Figure based on Conger et al., 2010.

Based on the stress model by Lazarus and Folkman (1984) and Berkowitz' (1989) reformulation of the frustration-aggression hypothesis, the family stress model posits that economic hardship and, as its consequence, economic pressure cause emotional distress and behavioral problems, which may then decrease warm and supportive behaviors and lead to withdrawal, hostility, and conflict between partners.

Most research based on the family stress model focuses on relationship quality and stability rather than IPV (for reviews, see Conger et al., 2010; Falconier & Epstein, 2011). Nevertheless, as IPV can be regarded as an exacerbated form of couple hostility and conflict, the mechanisms can also be applied to the association between economic hardship and IPV (Copp et al., 2016). In this vein, research has found IPV to be linked to mental health issues such as depression (Kim & Capaldi, 2004; C. Spencer et al., 2019) and substance abuse (Ames et al., 2013; Foran & O'Leary, 2008). Note that the present study does not consider the proposed mediating path of emotional and behavioral issues but concentrates on the main effect of economic hardship and the mediating role of economic pressure on IPV perpetration.

Several studies have found associations between financial strain and both the perpetration and experience of physical violence. Fox et al. (2002), using data from the U.S. National Survey of Families and Households from 1988 and 1994, find that both objective and subjective aspects of economic well-being play a role in IPV perpetration. Golden et al. (2013) report an association between economic hardship and an increased risk of IPV experience among mothers of young children in the U.S. Fragile Families and Child Well-being Study. Lucero et al. (2016) use longitudinal data from the same study to assess whether changes in economic conditions affect IPV victimization and report a link between IPV and economic hardship. Schwab-Reese et al. (2016) find an association between financial stressors and IPV perpetration in data from the fourth wave of the U.S. National Longitudinal Study of Adolescent to Adult Health. Ahmadabadi et al. (2020) find an elevated risk of IPV experience for both men and women in low-income families in an Australian sample from the Mater University of Queensland Study of Pregnancy. However, differences in socioeconomic deprivation regarding IPV may be contingent on social context. For instance, Hammett et al. (2022) report higher IPV perpetration and victimization among individuals living in disadvantaged areas only if stress due to the COVID-19 pandemic was low. Hammett et al. (2021) find only small main effects of socioeconomic factors on IPV, but a moderating effect on the relationship between psychological and physical IPV perpetration among men. Moreover, results are mixed regarding the effects of economic policies targeted toward low-income families, such as minimum wage and income tax credits, on women's IPV experience (Edmonds et al., 2021; R. A. Spencer et al., 2020).

However, as the existing studies consider only a limited number of confounding factors, it remains unclear whether the effects are causal or due to unobserved heterogeneity. While basic confounding variables such as education and family status are included in most analyses, previous research has not considered factors such as personality traits and experiences in the family of origin, which are the focus of the present study.

## 2.1 Gender differences

Although differences between male and female IPV perpetration, in particular regarding the severity of transgressions, are well-documented, and women's and men's experiences of IPV might be regarded as "clearly different phenomena" (Hardesty & Ogolsky, 2020), there is no definitive answer to the question of

whether gender moderates the relationship between economic factors and IPV perpetration. Feelings of frustration and powerlessness caused by economic adversity may cause men to engage in IPV more than women (Cano & Vivian, 2001; Fox et al., 2002). This is in line with studies suggesting that while women more often exhibit verbal and indirect forms of aggression, men tend to engage in physical forms of aggression in times of distress (Archer, 2004; Björkqvist, 1994). In addition, due to traditional gender role expectations, financial concerns arising in times of economic hardship may be more distressing for men than for women, and thus result more often in IPV (Copp et al., 2016).

Due to social expectations regarding masculine identity, men may perceive economic hardship as a threat to their masculinity, leading them to engage in aggressive behavior as an expression of power (Courtenay, 2000; Jewkes, 2002). Hence, the relationship between economic hardship, economic pressure, and physical IPV perpetration may be stronger for men than for women, but empirical evidence is mixed. For instance, neither Schwab-Reese et al. (2016) nor Copp et al. (2016) find gender differences in the link between economic factors and IPV. However, more general research indicates that lower socioeconomic status is linked to an increased risk of developing externalizing problems more so for men than for women (Korous et al., 2018). In particular, male unemployment as a specific aspect of economic hardship may be linked to male IPV perpetration, as reported in previous studies (Fox et al., 2002). However, as many studies limit their focus to male perpetration and female victimization, comprehensive evidence regarding gender-specific effects is scarce (Fox et al., 2002; Golden et al., 2013; Lucero et al., 2016).

## 2.2 *Effects of personality and childhood experiences*

Personality traits and childhood experiences have been shown to play a role in IPV perpetration. Genetic and epigenetic factors (Chester & DeWall, 2018) as well as personality traits have been found to explain IPV and aggressive behavior in general (Baúto et al., 2021; Sijtsema et al., 2014; Ulloa et al., 2016). In particular, agreeableness and neuroticism have been reported as drivers of IPV (Carton & Egan, 2017; Hines & Saudino, 2008; Kaighobadi et al., 2009).

Based on theories of social learning and intergenerational transmission, research has investigated whether exposure to violence in the family of origin impacts IPV perpetration or victimization. Results indicate an association between experiencing violence as a child and IPV experience in adulthood (e.g., Jung et al., 2019; Thulin et al., 2021; Whitfield et al., 2003; for a review, see Capaldi et al., 2012). Moreover, particular parenting styles were found to influence later aggression and IPV perpetration (Capaldi et al., 2012).

These personality traits and childhood experiences may act as confounding factors, as there is evidence that they are associated not only with IPV, but also with economic adversity (Bird, 2013; Gelissen & Graaf, 2006; Metzler et al., 2017; Viinikainen et al., 2010; Viinikainen & Kokko, 2012). For example, using data from the Dutch Family Survey, Gelissen and Graaf (2006) find that extraversion and emotional stability are positive related to men's earnings, while openness to experience has a negative effect after controlling for sociological variables. Among women, emotional stability was positively related to attained income. Viinikainen and Kokko (2012) find a higher openness to be associated with increased cumulative unemployment. With respect to childhood experiences, Metzler et al. (2017) report that early adversity negatively affects adult education, employment, and poverty status.

## 3. **Data and sample selection**

The present analyses are based on six waves of the Germany Family Panel pairfam, Release 12.0 (Brüderl, Drobnič, et al., 2021), a multidisciplinary, nationwide panel survey focusing on partnership and family dynamics. Randomly sampled respondents from three birth cohorts (1991-93, 1981-83, 1971-73) were interviewed annually since 2008. The present analysis is based on the base sample of 12,402 respondents (age range: 15-48 years), while the additional East German subsample ("DemoDiff") and a refreshment sample added in 2018 are excluded due to differences in the survey program leading to missing variables.

Respondents were interviewed face-to-face (via computer-assisted personal interview) with self-administered sections (computer-assisted self-interview) for sensitive topics. A detailed description of the conceptual framework of the study is included in Huinink et al. (2011); for methodological details, see

Brüderl, Schmiedeberg, et al. (2021). The pairfam study was approved by the ethics committee of the Faculty of Management, Economics, and Social Sciences of the University of Cologne (reference number: 19016KH).

The analysis is restricted to waves 2, 3, 5, 7, 9, and 11, as the relevant variables are only available in these waves. The analytical sample consists of 12,288 observations from female and 9,033 observations from male respondents who reported having a partner at the time of the interview. Observations with missing values were excluded from the analysis sample ( $n=3,030$  of 24,351 observations) with the exception of household income, which had a high share of missing values (15.9%, i.e. 3,388 of 21,321 observations that responded “don’t know” or “no answer”). Given the small number of IPV events recorded in the data, we did not want to lose these observations. Moreover, missing values for household income occur especially at the tail ends of the distribution rather than randomly (Antoni et al., 2019; Riphahn & Serfling, 2005). Therefore, these cases were maintained and marked by an additional category for missing income data. Excluding cases with missing income data does not substantively change the results presented here (see Robustness Checks).

## 4. Operationalization

### 4.1 Outcome variable

Respondents were asked in the self-administered section whether they had experienced physical aggression in their current intimate relationship with the following question: “Were there any arguments between you and your partner during which either of you used physical force?” Until wave 3, the question referred to the period of time since the previous interview (approximately one year). As of wave 5, a time span of two years was considered for relationships which had already existed at the time of the previous interview. For relationships that had lasted less than one year at the time of the interview, the question referred to the time since the beginning of the relationship (pairfam Group, 2021a, 2021b). Response categories were the following: “Yes, due to me”, “Yes, due to my partner”, “Yes, due to my partner and me equally”, “No”, “Don’t know”, “I don’t want to answer that”. We combined the answers “Yes, due to me” and “Yes, due to my partner and me equally” to represent the value 1 for the dichotomous dependent variable *IPV perpetration*, with “Yes, due to my partner” and “No” representing the reference category with the value 0.

### 4.2 Main explanatory variables

**Economic hardship.** We capture economic hardship through poverty status and unemployment referring to the time span covered by the IPV question (i.e., one or two years). *Poverty status* is based on respondents’ net household equivalence income calculated according to the OECD-modified equivalence scale (Hagenaars, Vos, & Zaidi, 1994). Poverty is defined using the regional poverty line: less than 60% of the median income of the federal state in the respective year provided by official statistics (Statistisches Bundesamt [destatis], 2021). Federal state level instead of national level data were used to account for regional differences in income levels. Respondents were categorized as “low income” if their income was below the regional poverty line at least once in the time span covered by the outcome variable. The reference category consists of respondents whose income remained above this threshold throughout the respective period. The missing category indicates whether household income data was missing at least once in this time span (and never below the regional poverty line).

*Unemployment* is captured by a dichotomous variable indicating whether the respondent was unemployed (or retired) during the time span considered. We additionally controlled for the partner’s unemployment (as a potential confounding factor) using the same operationalization.

**Economic pressure.** An additive index for *economic pressure* was constructed using two items ranging from 1 to 5 (Thönnissen et al., 2021). Items for respondents cohabiting with their partner were worded as follows: “We often have to forego something because we have to watch our budget.” and “We are mostly short of money.” For respondents living alone, the items read: “I often have to forego something because I have to watch my budget” and “I am mostly short of money”. In order to adequately considering the time span measured by the outcome variable, the average values over time  $t-1$  and  $t-2$  (i.e., one or two years

before the current interview) and time  $t$  (when the IPV question was asked) was used. This scale shows good internal consistency (Cronbach's alpha of 0.89). Economic pressure is included in the models as a mediating variable between economic hardship and IPV, as is stated in the family stress model (see Figure 1).

### 4.3 Theoretically-informed confounding factors

**Personality traits.** This analysis includes the Big 5 personality traits measured in waves 2, 6, and 10 to account for the potentially confounding effects of neuroticism, extraversion, agreeableness, conscientiousness, and openness. Each dimension represents four items (exception: five items for openness. For the precise wording of the items, see Thönnissen et al., 2021), resulting in index values from 1 (low) to 5 (high). Responses from wave 2 are used for waves 2-5, while responses from wave 6 are used for waves 7 and 9, and answers from wave 10 for wave 11. If data from one wave was missing, the information closest to this wave was used.

**Childhood experiences.** Positive childhood experiences are operationalized using the item "How would you assess your childhood overall?", asked in wave 2. Answers range from 0 ("Not at all happy") to 10 ("Very happy").

### 4.4 Basic confounding factors

The following confounding variables are included in all models: both partners' age and level of education, relationship status (cohabitation and marital status), relationship type (same-sex vs. opposite-sex), children in the household, and current pregnancy. The age variable is dichotomized with a threshold of 21 years, as research suggests that IPV is especially prevalent among young adults (Johnson et al., 2015). Our sample includes both same-sex and opposite-sex couples. While there might be level differences between same-sex and opposite-sex couples (Rollè et al., 2018), we do not assume that the theoretical mechanisms of IPV perpetration differ between opposite-sex and same-sex partnerships.

As the time span in the IPV variable was changed from roughly one year in waves 2 and 3 to two years as of wave 5, we also include a binary variable (called *interval*) to indicate the period considered. To capture time trends and effects of panel participation, we include a continuous variable measuring panel wave (ranging from 2-11).

The operationalization of all variables is summarized in Table A1 of the [Appendix](#).

## 5. Analytical approach

Although the data are longitudinal, we pool data from the waves included and apply pooled cross-sectional models (thus ignoring the panel structure of the data, as explained e.g. by Giesselmann & Windzio, 2012), as the limited number of cases of IPV reported per wave precludes longitudinal models. To account for repeated measurements of the same relationships in several waves, models with robust standard errors are clustered around partners' ID number. Given the binary outcome variable, we estimate pooled logistic regression models; in light of the skewed distribution of the dependent variable *IPV perpetration*, logistic regression yields more precise estimates than linear probability models (Long, 1997). As comparisons between nested models are problematic due to scaling effects and mediation effects, we employ the Karlson-Holm-Breen (KHB) method (Breen et al., 2013; Kohler et al., 2011).

To correct for sample selection, we use the calibrated design weight *cdweight* provided by the pairfam Group (for details see Wetzal et al., 2021). All analyses are conducted separately for female and male respondents using the Stata 16 software (StataCorp, 2019).

We examine the association between economic hardship and pressure and IPV in three steps using a hierarchical model structure: First, we include only economic hardship measured by poverty and unemployment (including both variables in the same model); second, we add economic pressure and test mediation with the KHB method; and third, we additionally control for the confounding variables of interest (i.e., the Big 5 personality traits and childhood experiences). We account for education, relationship status, children, and pregnancy, age, interval, and panel waves in all models.

## 6. Results

### 6.1 Descriptive results

Table 1 presents descriptive results. Figures are given for men and women who did or did not report IPV perpetration, respectively. Additionally, values for the total sample are listed in the last column. In sum, the data contain 21,321 observations for 8,302 relationships reported by 6,661 individuals. Note that the number of relationships exceeds the number of respondents, as some respondents report more than one relationship over the course of the survey, and the number of observations exceeds the number of relationships due to the panel design.

IPV perpetration is more often reported by women, but the difference is not significant: a proportion of 1.62% for female respondents (199 out of 12,288 observations) and 1.47% for male respondents (133 out of 9,033 observations). In the majority of cases reporting IPV perpetration, physical force was used by both partners. This is true for both women (75% of cases) and men (68%). When interpreting the results presented here, it is crucial to consider that only a minority of perpetrations are unilateral acts by only one partner.

Both aspects of economic hardship (i.e., poverty status and unemployment) differ between women who used physical force and those who did not: For those who did not engage in IPV, 20% are categorized as “low income” and 7% were unemployed. In contrast, 37% of female IPV perpetrators had an income below the poverty line and 14% were unemployed. Economic pressure also was higher for female perpetrators than for women who did not engage in IPV: On a 5-point scale, the difference is approximately 0.5 scale points.

Further, female IPV perpetrators more often had unemployed partners (16% vs. 8%). Results of the control variables are largely in line with existing literature: As compared to women who did not engage in IPV, female IPV perpetrators and their partners had lower levels of education, were younger, and (likely due to younger age) were less often married. Remarkably, this group showed higher rates of pregnancy. These women scored higher on the neuroticism scale, lower on agreeableness, and reported a less happy childhood.

A slightly different picture is revealed for men: While male IPV perpetrators were more often unemployed than those who did not engage in IPV (10% vs. 6%), the poverty rate is quite evenly distributed with around 17% in both groups. They also show no differences with regard to economic pressure (2.4 vs. 2.6 points on the 5-point scale). As in the female sample, male IPV perpetrators had slightly lower education levels, were younger, and were less often married compared to their less physically aggressive counterparts. Furthermore, they also scored higher on neuroticism, lower on agreeableness, and reported a less happy childhood.

### 6.2 Estimation results

Table 2 presents the estimation results of pooled logit regression models for women (models 1-3) and men (models 4-6) separately. Odds ratios (OR) are presented for easier interpretation. Note that Table 2 presents only the main findings, excluding coefficients of the basic confounding factors used in all models. For complete results, see Table A2 in the [Appendix](#).

Models 1 and 4 show the estimators of economic hardship (i.e., poverty and unemployment) without the mediating factor of economic pressure for women and men, respectively. For women, we find no significant effect of unemployment on IPV perpetration (Model 1: OR = 1.627,  $p = 0.187$ ), but a strong relationship between poverty and engaging in IPV. The odds of using physical force are almost twice as large for women who are categorized as low income (Model 1: OR = 1.786,  $p = 0.007$ ) compared to those who live above the poverty line. For men, the association between poverty and IPV is not significant (Model 4: OR = 0.674,  $p = 0.266$ ), but unemployment appears to play a major role: Unemployment increases the odds of men using force by a factor of 2.4 (Model 4: OR = 2.427,  $p = 0.029$ ). The difference between men and women regarding the effect of poverty is significant. This can only be seen in the interacted model in Table A3 in the [Appendix](#), where the interaction effect of gender and poverty is significant at the 5% level.



Table 1: Descriptive results by gender and reported IPV perpetration

|  | Women,<br>no IPV | Women,<br>IPV    | Men,<br>no IPV   | Men,<br>IPV      | Total            |
|--|------------------|------------------|------------------|------------------|------------------|
| <b>Poverty status</b>                      |                  |                  |                  |                  |                  |
| Low income (at least once)                 | 0.206            | 0.372            | 0.168            | 0.165            | 0.192            |
| Income constantly $\geq$ 60% of median     | 0.631            | 0.462            | 0.679            | 0.639            | 0.649            |
| Income missing                             | 0.163            | 0.166            | 0.153            | 0.195            | 0.159            |
| <b>Economic pressure (range: 1-5)</b>      | 2.499<br>(1.078) | 3.002<br>(1.271) | 2.431<br>(1.056) | 2.637<br>(1.009) | 2.476<br>(1.072) |
| <b>Unemployment</b>                        |                  |                  |                  |                  |                  |
| Respondent unemployed                      | 0.065            | 0.136            | 0.058            | 0.098            | 0.063            |
| Partner unemployed                         | 0.076            | 0.156            | 0.064            | 0.068            | 0.071            |
| <b>School education</b>                    |                  |                  |                  |                  |                  |
| Respondent low or intermediate education   | 0.505            | 0.648            | 0.509            | 0.571            | 0.508            |
| Partner low or intermediate education      | 0.642            | 0.739            | 0.622            | 0.654            | 0.635            |
| <b>Relationship status</b>                 |                  |                  |                  |                  |                  |
| Cohabiting                                 | 0.744            | 0.724            | 0.708            | 0.662            | 0.728            |
| Married                                    | 0.535            | 0.437            | 0.494            | 0.353            | 0.516            |
| Same-sex couple                            | 0.010            | 0.015            | 0.012            | 0.008            | 0.011            |
| <b>Children &amp; pregnancy</b>            |                  |                  |                  |                  |                  |
| Child(ren) in household                    | 0.595            | 0.538            | 0.497            | 0.474            | 0.553            |
| Pregnant/expecting child                   | 0.086            | 0.131            | 0.108            | 0.068            | 0.095            |
| <b>Age</b>                                 |                  |                  |                  |                  |                  |
| Respondent younger than 21                 | 0.132            | 0.226            | 0.126            | 0.218            | 0.131            |
| Partner younger than 21                    | 0.085            | 0.136            | 0.159            | 0.286            | 0.118            |
| <b>Big 5 (range: 1-5)</b>                  |                  |                  |                  |                  |                  |
| Neuroticism                                | 2.825<br>(0.798) | 3.344<br>(0.796) | 2.472<br>(0.733) | 2.741<br>(0.708) | 2.682<br>(0.793) |
| Extraversion                               | 3.663<br>(0.801) | 3.541<br>(0.869) | 3.489<br>(0.804) | 3.602<br>(0.764) | 3.589<br>(0.807) |
| Agreeableness                              | 3.366<br>(0.705) | 2.970<br>(0.736) | 3.209<br>(0.695) | 2.925<br>(0.629) | 3.294<br>(0.706) |
| Conscientiousness                          | 3.917<br>(0.608) | 3.685<br>(0.740) | 3.763<br>(0.645) | 3.586<br>(0.688) | 3.849<br>(0.631) |
| Openness                                   | 3.685<br>(0.694) | 3.784<br>(0.763) | 3.576<br>(0.678) | 3.604<br>(0.730) | 3.640<br>(0.690) |
| <b>Childhood experiences (range: 0-10)</b> |                  |                  |                  |                  |                  |
| Positive childhood experiences             | 8.126<br>(1.857) | 6.990<br>(2.490) | 8.126<br>(1.674) | 7.376<br>(2.102) | 8.111<br>(1.796) |
| <b>Interval and panel waves</b>            |                  |                  |                  |                  |                  |
| Covered interval of IPV of 2 years         | 0.604            | 0.497            | 0.612            | 0.579            | 0.606            |
| Wave 2                                     | 0.194            | 0.251            | 0.186            | 0.211            | 0.191            |
| Wave 3                                     | 0.202            | 0.251            | 0.203            | 0.211            | 0.203            |
| Wave 5                                     | 0.181            | 0.176            | 0.184            | 0.211            | 0.182            |
| Wave 7                                     | 0.157            | 0.146            | 0.155            | 0.180            | 0.156            |
| Wave 9                                     | 0.140            | 0.091            | 0.143            | 0.113            | 0.141            |
| Wave 11                                    | 0.126            | 0.085            | 0.128            | 0.075            | 0.126            |
| NObservations                              | 12,089           | 199              | 8,900            | 133              | 21,321           |
| NRelationships                             | 4,599            | 152              | 3,607            | 104              | 8,302            |
| NRespondents                               | 3,673            | 147              | 2,943            | 103              | 6,661            |

Notes: Means and standard deviations (in parentheses, only for metric variables); for categorical variables means can be interpreted as percentages.

Table 2: Results of logit estimation (OR)

|  | Women              |                    |                     | Men               |                   |                     |
|--|--------------------|--------------------|---------------------|-------------------|-------------------|---------------------|
|  | (1)                | (2)                | (3)                 | (4)               | (5)               | (6)                 |
| <b>Poverty status (ref.: income constantly <math>\geq</math> 60% of median)</b>                                |                    |                    |                     |                   |                   |                     |
| Low income (at least once)   | 1.786**<br>(0.385) | 1.498<br>(0.325)   | 1.475<br>(0.331)    | 0.674<br>(0.239)  | 0.606<br>(0.223)  | 0.641<br>(0.239)    |
| Income missing   | 0.992<br>(0.251)   | 0.989<br>(0.251)   | 1.065<br>(0.274)    | 1.080<br>(0.307)  | 1.090<br>(0.309)  | 1.147<br>(0.327)    |
| <b>Unemployment</b>  |                    |                    |                     |                   |                   |                     |
| Respondent unemployed  | 1.627<br>(0.600)   | 1.482<br>(0.537)   | 1.269<br>(0.430)    | 2.427*<br>(0.985) | 2.288*<br>(0.927) | 1.912<br>(0.773)    |
| Partner unemployed   | 0.943<br>(0.334)   | 0.876<br>(0.291)   | 0.777<br>(0.238)    | 0.576<br>(0.293)  | 0.549<br>(0.276)  | 0.447<br>(0.232)    |
| <b>Economic pressure (range: 1-5)</b>  |                    |                    |                     |                   |                   |                     |
| Economic pressure  |                    | 1.337**<br>(0.145) | 1.183<br>(0.128)    |                   | 1.164<br>(0.123)  | 1.008<br>(0.115)    |
| <b>Big 5 (range: 1-5)</b>  |                    |                    |                     |                   |                   |                     |
| Neuroticism  |                    |                    | 1.442**<br>(0.193)  |                   |                   | 1.478*<br>(0.224)   |
| Extraversion   |                    |                    | 1.279<br>(0.182)    |                   |                   | 1.457*<br>(0.224)   |
| Agreeableness  |                    |                    | 0.589***<br>(0.077) |                   |                   | 0.574***<br>(0.080) |
| Conscientiousness  |                    |                    | 0.692*<br>(0.124)   |                   |                   | 0.683*<br>(0.113)   |
| Openness   |                    |                    | 1.121<br>(0.186)    |                   |                   | 1.050<br>(0.215)    |
| <b>Childhood experiences (range: 0-10)</b>   |                    |                    |                     |                   |                   |                     |
| Positive childhood experiences   |                    |                    | 0.841***<br>(0.044) |                   |                   | 0.815***<br>(0.046) |
| Controlled for education, relationship status, children and pregnancy, age under 21, interval, and panel waves |                    |                    |                     |                   |                   |                     |
|  | yes                | yes                | yes                 | yes               | yes               | yes                 |
| NObservations  | 12,288             | 12,288             | 12,288              | 9,033             | 9,033             | 9,033               |
| NRelationships   | 4,652              | 4,652              | 4,652               | 3,650             | 3,650             | 3,650               |
| NRespondents   | 3,696              | 3,696              | 3,696               | 2,965             | 2,965             | 2,965               |
| Pseudo R <sup>2</sup>  | 0.032              | 0.041              | 0.097               | 0.032             | 0.034             | 0.089               |

Notes: Exponentiated coefficients (odds ratios); cluster-robust standard errors in parentheses. Significance: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . The category "income missing" indicates respondents never categorized as "low income" with the household income variable missing at least once. The complete models are shown in Table A2 in the [Appendix](#).

The relationship between economic hardship and IPV diminishes when economic pressure is added to the model in a subsequent step. The odds ratio decreases from 1.8 to 1.5 (Model 2: OR = 1.498,  $p = 0.063$ ) and is no longer significant. Economic pressure shows a positive relationship with engaging in violence for women, increasing the odds of IPV perpetration by a factor of 1.3 (Model 2: OR = 1.337,  $p = 0.007$ ), while unemployment remains not significant (Model 2: OR = 1.482,  $p = 0.277$ ).

For men, the relationship between unemployment and IPV is only partly explained by economic pressure, as it remains significant on a 5%-level. Thus, the odds of unemployed men using violence against their partner increases compared to those who are employed by a factor of 2.3 (Model 5: OR = 2.288,  $p = 0.041$ ). The association between poverty and IPV perpetration remains negative and not significant (Model 5: OR = 0.606,  $p = 0.174$ ). Economic pressure shows no association with engaging in IPV for men, but the interaction term with gender is not significant, indicating that gender does not moderate this association (see Table A3 in the [Appendix](#) for the interacted model).

Following the Karlson-Holm-Breen (KHB) method, we test economic pressure as a mediator of the effect of poverty in the female, and of the effect of unemployment in the male sample. Due to the rescaling of coefficients in the logistic regression, the effects of economic hardship and unemployment presented in Table 2 cannot be compared directly across the nested models. Applying the KHB approach, Table 3 shows how the effects of poverty (in the female sample) and unemployment (in the male sample) change when economic pressure is included in the models as a mediating factor. The inclusion of economic pressure attenuates the effect of poverty for women by approximately 30% (from OR = 1.794 to OR = 1.498). The difference between these effects is statistically significant and, thus, provides evidence of statistical mediation through economic pressure (OR = 1.198,  $p < 0.01$ ). For men, we find no statistically significant mediation of economic pressure with respect to unemployment.

Table 3: Effect of poverty and unemployment on IPV perpetration assessing the mediating role of economic pressure

|   | Women: Effect of poverty<br>Model 1 vs. 2 in Table 2<br>(w/o Big 5 & childhood) | Men: Effect of unemployment<br>Model 4 vs. 5 in Table 2<br>(w/o Big 5 & childhood) |
|---|---|--|
| Reduced model (total effect)            | 1.794**<br>(0.383)  | 2.435*<br>(0.992)  |
| Full model (direct effect)              | 1.498<br>(0.325)  | 2.288*<br>(0.927)  |
| Difference (indirect effect; mediation) | 1.198**<br>(0.082)  | 1.064<br>(0.047)   |
| Mediation percentage                    | 30.92**   | 7.01   |
| NObservations                           | 12,288  | 9,033  |

Notes: Exponentiated coefficients (odds ratios); cluster-robust standard errors in parentheses. Significance: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

In the last step of our analysis, we control for the Big 5 personality traits and childhood experiences as two theory-driven confounding factors (see Models 3 and 6 of Table 2). Including these six variables in the regression models leads to a null effect of poverty and economic pressure for women. The odds of economic pressure diminish from 1.34 to 1.18 (Model 3: OR = 1.183,  $p = 0.120$ ) and lose significance. In contrast, three out of five personality traits show an impact on IPV perpetration among women: For a unit change in neuroticism, the odds of engaging in IPV increase by 44% (Model 3: OR = 1.442,  $p = 0.006$ ), and for a unit change in agreeableness and conscientiousness, the odds decrease by 41% (Model 3: OR = 0.589,  $p = 0.000$ ) and 31% (Model 3: OR = 0.692,  $p = 0.040$ ), respectively. Likewise, negative childhood experiences are significantly associated with engaging in IPV for women: For a unit change in the variable indicating positive childhood experiences, the odds of IPV perpetration decrease by 16% (Model 3: OR = 0.841,  $p = 0.001$ ).

For men, poverty and economic pressure are not associated with IPV perpetration even in the first models, and adding the Big 5 and childhood experiences does not alter this result. The odds of unemployment, however, are reduced from 2.3 to 1.9 (Model 6: OR = 1.912,  $p = 0.109$ ) and lose significance. Gender differences in all these variables are not significant (see Table A3 in the [Appendix](#) for the interacted model), but personality traits do play a major role in explaining IPV perpetration for men. For a unit change in neuroticism and extraversion, the odds indicate a significant increase in IPV perpetration by a factor of 1.5 (Model 6; neuroticism: OR = 1.478,  $p = 0.010$ , extraversion: OR = 1.457,  $p = 0.014$ ). In contrast, a unit change in agreeableness and conscientiousness significantly decreases the probability of men engaging in IPV, indicated by 43% and 32% (Model 6; agreeableness: OR = 0.574,  $p = 0.000$ , conscientiousness: OR = 0.683,  $p = 0.021$ ), respectively. For each additional point on the childhood happiness scale, the probability to engage in IPV decreases by 18% (Model 6: OR = 0.815,  $p = 0.000$ ). Effects are very similar to those found in the model for women, and the interacted model (Table A3 in the [Appendix](#)) indicates that gender does not significantly moderate these associations.

## 7. Robustness checks

We run a number of additional analyses to test the robustness of these results. First, we include personality and childhood experiences separately to investigate how this alters the effects of economic hardship and pressure. Table A4 in the [Appendix](#) shows that for women, the mediating role of economic pressure holds if only one of the two theory-driven confounding factors is included. Second, we exclude all cases with missing household income (see Table A5 in the [Appendix](#)). As mentioned above, this step reduces the sample considerably, but the main results are not impacted. Third, we use only unemployment and economic pressure (without poverty status) as indicators of the economic situation (Table A6 in the [Appendix](#)). The only difference is that the effect of own unemployment for men is not significant from the beginning. To test the effect of the theory-driven confounding factors on the mediation of economic pressure, we estimated models including personality traits and childhood experiences without economic pressure (see Table A7 in the [Appendix](#)). While results remain unchanged for men, they differ slightly for women as in this model the effect of poverty remains significant. Thus, the relationship between poverty and IPV perpetration vanishes only if economic pressure as well as personality traits and childhood experiences are controlled for.

## 8. Discussion

The present study examines the role of adverse economic conditions on IPV perpetration while considering potential sources of heterogeneity. Results suggest associations of economic hardship and pressure with physical IPV, but these appear to be due to unobserved heterogeneity rather than being causal. We find a relationship between poverty and IPV perpetration for women that is mediated by economic pressure; however, this mediated association does not hold if personality traits and childhood experiences are controlled for. For men, we find an association of IPV perpetration with unemployment, which is no longer significant once personality traits and childhood experiences are considered. A relationship between IPV and poverty and economic pressure is not found among men.

These results suggest that the association between economic adversity and IPV is more driven by selectivity than by an actual causal influence. This may indicate that when it comes to physical IPV as a severe form of family conflict, the effects of economic factors as predicted by the family stress model do not play a causal role. The family stress model would predict a causal influence of economic hardship on IPV perpetration, mediated by economic pressure and the partners' emotional and behavioral problems. While we do find these associations (as well as the mediation as far as considered in our analysis), in line with existing literature, our results indicate that they are due to the confounding effects of perpetrators' personality and experiences in the family of origin. These factors are not considered in the family stress model, as economic hardship is treated as an exogenous factor rather than focusing on economic adversity as a consequence of both partners' prior life course decisions and resources.

Nevertheless, the question remains as to why the adversity-IPV link does not persist over and above selection effects. We see two possible explanations for this: First, it may be that the German welfare system, which buffers adverse economic conditions, also breaks the link between economic adversity and IPV. This would be in line with similar findings concerning parenting (Schmiedeberg & Bozoyan, 2021). Social benefits such as housing allowance and an inclusive health insurance cover basic needs and, thus, may reduce distress caused by poverty and unemployment, which is assumed as the underlying mechanism for behavior problems and couple conflict in the family stress model. Hence, cross-national research will be valuable to investigate the moderating role of social welfare systems in the association between economic adversity and IPV.

Second, it is well known that socio-cultural factors such as intergenerational transmission of aggressive behavior, social norms, and substance abuse play a role in IPV perpetration (Clark et al., 2018; Eckhardt et al., 2015; Kimber et al., 2018). Some of these factors may also hamper economic prosperity, leading to a coincidence of economic adversity and IPV. Our results regarding personality traits and childhood experience can be interpreted in this vein.

Further, it is not unexpected that the effect of unemployment is found only for men, as male partners continue to carry the main responsibility for the economic well-being of the household (Copp et al., 2016). Unemployment is not only associated with a loss of income, but also with decreased mental well-being

(Brand, 2015). As we account for financial factors by including variables measuring poverty and economic pressure, the unemployment effect found may be driven by these psychological mechanisms. Unemployment may thus play a larger role for male than for female IPV perpetration, as it affects men's mental well-being more negatively than women in societies with an emphasis on male breadwinning (Strandh et al., 2013).

The present analysis has a number of strengths. It is based on a large-scale, multi-purpose study of a nationwide random sample of young and middle-aged (15–48-year-old) individuals in Germany. Therefore, an adequate number of respondents of different socio-economic subgroups were analyzed, and results can be generalized to the German population of this age. In addition, the inclusion of personality traits and childhood experiences allows us to account for bias induced by these often unobserved variables. A further advantage of the sample is that non-cohabiting, cohabiting, and married couples were included. This is important for a comprehensive picture of the relationship between economic factors and IPV perpetration, as non-cohabiting couple relationships are rather common in the younger age groups included in this analysis (Liefbroer et al., 2015).

Nevertheless, this study is not without limitations. First, the survey question concerning IPV is rather general and may therefore have caused a certain level of noise. Research has shown that more detailed questions are better able to elicit accurate responses to questions concerning IPV in surveys. Then again, single-item questions may reduce respondent burden and the wording of the item was non-threatening, which might reduce underreporting (Hamby, 2005). Still, the item precludes a differentiated analysis of different forms of IPV and, together with the small number of observations of IPV, does not enable us to analyze the different dynamics in unilateral and bilateral IPV. Second, as in all studies using survey-based data with self-reported IPV perpetration, we may face the problem of underreporting. As our main aim was not to report IPV prevalence, underreporting could be seen as a minor issue given it is random. However, gender-specific under- and overreporting, for instance, may occur (Emery, 2010). Moreover, IPV reporting may be biased by the same factors as poverty reporting. If, for example, shame or dishonesty influences whether a respondent concealed both IPV and poverty, our results would be biased. On a related note: The German Family Panel pairfam may be biased toward happier families due to selective participation of respondents with intact intimate relationships (Kalmijn, 2021), which may lead to an underestimation of both poverty and IPV. Further, the measurement of the confounding variable *childhood experience* is only a weak proxy for suffering from violent behavior and neglect during childhood, as not every reason for an unhappy childhood is associated with violent behavior. Nevertheless, this should only lead to more conservative results as the relationship between childhood experience and violence should be weakened. Finally, to identify causal relationships, a longitudinal within-person (i.e., fixed effects, FE) approach (Brüderl & Ludwig, 2015) would be required. However, this was not possible in the present study due to the small number of reported cases of IPV perpetration. FE models have lower statistical power than cross-sectional models, leading to a greater risk of type II error in particular if the number of cases with variation in dependent and independent variables over time is low (Collischon & Eberl, 2020). Moreover, as in FE models only within effects are estimated based on cases with within variation in treatment status (here: economic hardship), results cannot be generalized to the whole population (Brüderl & Ludwig, 2015, p. 34) and effects of rarely changing variables may be underestimated (Bell & Jones, 2015). In particular, couples permanently living in adverse economic situations are not considered in FE models, whereas these cases are considered in pooled regression, as applied in this study.

Taken together, our findings do not provide strong support for the causal relationship of economic hardship and pressure with IPV, at least concerning young and middle-aged couples in Germany. Instead, social and psychological individual factors are found to explain the relationship between economic adversity and both male and female IPV perpetration. As this was not the focus of the present analysis, no conclusions regarding the broader link between SES in general and IPV can be made from the results.

Further research into the interplay between economic factors and IPV perpetration and the underlying common causes is needed to adequately identify intervention mechanisms aimed at preventing domestic aggression and violence. Longitudinal analyses are needed to capture time-varying influence factors while holding time-constant confounders such as education, experiences with prior intimate relationships and in the family of origin, and personality traits constant. Moreover, dyadic analyses including both partners' characteristics would be promising to investigate the interplay of both partners' resources in different social and economic conditions. Both were not possible in the present analysis due to data limitations. In particular, future research should investigate the effectiveness of prevention and intervention strategies, as

pure financial support may be a less effective buffer than the family stress model implies. If negative experiences in the family of origin are truly one of the triggers of IPV as well as a risk factor for economic adversity, a promising intervention strategy may be to provide financial, social, and psychological assistance to children and adolescents in disadvantaged families in order to break the link between childhood adversity and later IPV.

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## Data availability statement

This study uses data from the German Family Panel (pairfam): ZA5678 Data file Version 12.0.0. Available from the GESIS Data Archive, Cologne. doi: 10.4232/pairfam.5678.12.0.0.

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## Information in German

### Deutscher Titel

Wirtschaftliche Schwierigkeiten und Gewalt in der Partnerschaft: Eine Analyse von Tätern und Täterinnen in Deutschland

### Zusammenfassung

**Fragestellung:** Auf Basis des Family-Stress-Modells untersuchen wir, ob Personen in einer Partnerschaft eher physische Gewalt ausüben, wenn sie in wirtschaftlich schwierigen Situationen leben.

**Hintergrund:** Dass ein Zusammenhang zwischen Gewalt in der Partnerschaft und wirtschaftlichen Faktoren besteht, wurde in der Literatur häufig gezeigt. Da jedoch der Großteil der Studien auf die Perspektive der (meist weiblichen) Opfer beschränkt ist, bestehen weiterhin Wissenslücken, insbesondere zu möglichen geschlechtsspezifischen Einflussfaktoren auf die Täterschaft.

**Methode:** Wir nutzen Daten des Beziehungs- und Familienpanels *pairfam* und untersuchen eine große Stichprobe aus den Jahren 2009 bis 2019 von in Deutschland lebenden Personen ( $n=6.661$  Individuen mit insgesamt 21.321 Beobachtungen). Für die Analyse werden gepoolte multivariable logistische Regressionsmodelle unter Kontrolle einer Vielzahl potenziell konfundierender Variablen geschätzt. Selektion wird mit Hilfe von Kalibrierungs- und Designgewichten korrigiert.

**Ergebnisse:** Unsere Analysen zeigen, dass die Ausübung physischer Gewalt in Partnerschaften mit Armut und ökonomischem Druck zusammenhängt. Dies gilt allerdings nur für Täterinnen, nicht aber für Täter. Sobald konfundierende Faktoren wie die Persönlichkeit (gemessen mit den Big 5) und Kindheitserfahrungen in den Modellen berücksichtigt werden, verlieren diese Zusammenhänge ihre statistische Signifikanz. Bei Männern finden wir eine Korrelation zwischen Arbeitslosigkeit und Partnerschaftsgewalt, doch auch dies nur wenn Persönlichkeit und Kindheitserfahrungen nicht im Modell kontrolliert werden.

**Schlussfolgerung:** Unsere Ergebnisse legen nahe, dass der Zusammenhang zwischen wirtschaftlichen Schwierigkeiten und Täterschaft durch unbeobachtete Heterogenität begründet ist. Physische Gewalt in Partnerschaften wird damit nicht primär durch den Stress hervorgerufen, der durch wirtschaftliche Schwierigkeiten entsteht, sondern eher durch Faktoren wie Persönlichkeit oder negative Erlebnisse in der Kindheit, die sich sowohl auf den sozioökonomischen Status und die wirtschaftliche Situation auswirken können als auch aggressives Verhalten in der Partnerschaft teilweise bedingen.

**Schlagwörter:** physische Gewalt, Täterschaft, wirtschaftlicher Druck, Armut, Family-Stress-Modell

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