Physical abuse of children by stepfathers in Colombia

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Abstract

Evolutionary psychologists (e.g., Daly & Wilson, 2001, 2008) claim that stepparents perpetrate substantially more child physical abuse than genetic parents, and that they do so because they are less invested in genetically unrelated children. The objective of this study was to examine these claims by investigating whether, and why, fathers in a Colombian sample physically abused their stepchildren more than their genetic children. Fathers ($N = 86$) and their partners living in Bogotá were interviewed by Klevens, Bayón, and Sierra (2000). Half of the fathers had been reported to authorities for child physical abuse, the other half were matched controls. Secondary analysis was conducted of Klevens et al.'s data. Hypotheses from the evolutionary and ecological accounts of child maltreatment were tested using logistic and ordinal regression. Both the prevalence and the frequency of physical abuse by stepfathers were considerably greater than those of genetic fathers. Several indicators of adversity – including parental youth and experience of abuse, fathers' chronic stress, and mothers' poor communication with the child – were associated with both abuse and stepparenthood. Models including these variables indicated that they accounted for much of the stepfathers' higher rates of abuse. Consistent with the ecological account, much of the stepfathers' greater prevalence and frequency of abuse in this sample is likely to have resulted from confounding variables, rather than from the step relationship per se.

Keywords. Stepfathers; Child Physical Abuse; Evolutionary Psychology; Stressors; Intergenerational Transmission

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Daly and Wilson (e.g., 1985, 1988, 1996, 2008) have argued that stepchildren are at considerably greater risk for physical abuse than children who live with two genetic parents. For example, they reported that in Hamilton, Canada, stepchildren were approximately 40 times more likely to be abused. Regarding child homicide, US, Canadian and British data indicate that young stepchildren are up to 100 times more likely to be the victims (Daly & Wilson, 1994, 2008; Harris, Hilton, Rice, & Eke, 2007; Weekes-Shackelford & Shackelford, 2004). These and similar findings have led Daly and Wilson to claim that "Having a stepparent has turned out to be the single most powerful predictor of severe child maltreatment yet discovered" (1998, p. 441), a view echoed by, for example, Buss (2014) and Pinker (1997).

These researchers take an evolutionary perspective to account for this so-called "Cinderella effect": since natural selection favors investment in related offspring (Hamilton, 1964), parents seek to contribute to the well-being of, and selectively care for, genetic children more than for stepchildren. Daly and Wilson (2008) therefore hypothesized that "… abuse and exploitation would occur at higher rates in steprelationships than in genetic parent-child relationships, and that differences between family types would persist when possible confounds such as socio-economic status were controlled". (p. 385).

Archer (2013) reviewed the available evidence for evolutionary perspectives on family violence and compared the rates of child homicides and abuse by stepparents and genetic parents in 22 studies. He reported that all except one (Gelles & Harrop, 1991) indicated higher rates of violence by stepparents, and concluded that the evidence supported Daly and Wilson's evolutionary account.

However, some researchers have questioned whether stepchildren are in fact at greater risk (e.g., Adler-Baeder, 2006; Buller, 2005; Nobes & Smith, 2000; Temrin, Nordlund, & Sterner, 2004), while others have put forward alternative explanations of stepparents' overrepresentation among perpetrators

(e.g., Giles-Sims & Finkelhor, 1984; Malvaso, Delfabbro, Proeve, & Nobes, 2015; Nobes, Panagiotaki, & Russell Jonsson, 2019; Temrin, Nordlund, Rying, & Tullberg, 2011; Turner, Finkelhor, & Ormrod, 2007). For example, Temrin et al. reported higher rates of antisociality in Sweden among both stepparents and child homicide abusers, suggesting that this and other parental characteristics may be confounding variables. In addition, Turner et al. found that, in a sample of US families with children aged 10-17 years, family problems such as parent-child conflict, poor parental monitoring, and neighborhood violence accounted for the higher rates of abuse in stepfamilies. Considering the profound social and theoretical implications for our understanding of the etiology of abuse, it is vitally important that this debate is resolved. In this study our objective was to contribute to this debate by examining whether, and why, fathers in a Colombian sample were more likely to abuse their stepchildren, and to abuse them more frequently, than their genetic children. Specifically, we aimed to test the hypothesis that differences in genetic and step fathers' rates of abuse would persist when possible confounding variables were adjusted for (e.g., Daly & Wilson, 1985, 2001, 2008; Pinker, 1997; Weekes-Shackelford & Shackelford, 2004).

Daly and Wilson tested this hypothesis by investigating three potential confounds, in one study (Daly & Wilson, 1985). They reported that, although abused children were more likely to come from poor areas, similar proportions of stepfamilies lived in low- and high-income districts, which indicates that the high rates of abuse in stepfamilies do not occur for socioeconomic reasons. A second possible confound was family size. While there was a (U-shaped) association with abuse, average family size was no different in stepfamilies and genetic families, and so they concluded that this factor, too, cannot explain the increased rates of abuse in stepfamilies. The third was maternal age: although children born to younger mothers were more likely both to be abused and to have a stepfather, they found that maternal age accounted for only 13% of the increased risk of abuse to stepchildren. On these grounds, Daly and Wilson (1988, 2001, 2008) dismissed the possibility that Cinderella effects are "by-products of

other risk factors associated with stepparenthood" (2008, p. 386).

More recent studies (Alexandre, Nadanovsky, Moraes, & Reichenheim, 2010; Berger, Paxson, & Waldfogel, 2009; Stiffman, Schnitzer, Adam, Kruse, & Ewigman, 2002) tend to support this claim. However, Berger et al. found that adjusting for factors such as maternal mental health and risky behaviors reduced the difference in rates of abuse in families with and without stepparents. They comment that, "… despite our ability to account for a far wider range of covariates than has been possible in prior studies… our estimates may have been biased due to omitted variables" (p. 275).

According to ecological accounts of child maltreatment (Belsky, 1993; Cicchetti & Toth, 2016), there may be many such "omitted variables" that interact on several levels of analysis (Bronfenbrenner, 1979). Stressors and risks that have been found to be associated with child maltreatment include characteristics of the parent, child, family and the broader social context in which they are embedded (e.g., Cicchetti & Valentino, 2006; Sidebotham, Heron, & ALSPAC Study Team, 2006; Stith et al., 2009; Thornberry & Henry, 2013; Turner, Finkelhor, Hamby, & Shattuck, 2013).

For example, it is possible that the overrepresentation of stepfathers among the perpetrators of abuse results from men who suffered abuse as children being more likely both to be stepfathers and to abuse their children. The intergenerational transmission of maltreatment is well substantiated (e.g., Madigan et al., 2019; Thornberry & Henry, 2013), and numerous possible mechanisms have been proposed. For example, childhood maltreatment is associated with insecure and disorganized attachment, which in turn predict relationship difficulties with the victims' partners and children (DiLillo, Lewis, & Loreto-Colgan, 2007; Van Ijzendoorn, 1992).

Another possible explanation of stepfathers' increased rates of abuse that is consistent with the ecological account is that stress leads parents to maltreat their children, and that stepfathers experience more stress than genetic fathers (Giles-Sims & Finkelhor, 1984). Child maltreatment tends to occur when stressors outweigh supports or compensatory factors (e.g., Belsky, 1993;

Cicchetti & Valentino, 2006). These stressors take many forms, including negative life events, unemployment, poverty and debt, parental youth, poor education, child misbehavior, and conflictual relationships, and the compensatory factors include social support from partners, family, friends and colleagues, and the wider community (Cicchetti & Toth, 2016; Sidebotham et al., 2006; Stith et al., 2009; Turner et al., 2013; Whipple & Webster-Stratton, 1991). Compared with members of other families, those of stepfamilies tend to experience increased levels and varieties of stress, in particular because of the family transitions that occur when genetic parents' relationships break down and new relationships are formed (Amato, 2010; Hetherington, 1993). These transitions often involve changes of housing, employment and schooling, and can result in substantial deterioration in social support and family finances.

These mechanisms – which are by no means mutually exclusive – suggest that abused and / or stressed men are more likely to have disrupted relationships both with partners (and hence to become stepfathers) and with their children (and so to abuse them). To our knowledge, the roles of intergenerational transmission and stress in the etiology of child abuse by stepparents remain untested.

The Klevens, Bayón & Sierra (2000) study. Of the nine studies of child abuse reviewed by Archer (2013), the highest relative rates (41.1 and 42.1) were reported by Daly and Wilson (1981, 1985). The next highest was that from Klevens et al. (2000), according to which the odds ratio (OR) of the proportions of stepfathers among Colombian abusers and non-abusers was 10.3. Archer and Daly and Wilson (2001, 2008) interpreted the large overrepresentation of stepfathers among the abusers in this study to be strong evidence for the evolutionary account of family violence.

Klevens et al.'s participants were fathers and their partners living in Bogotá. Half of the fathers had been reported to authorities for child physical abuse, while the other half were matched controls from the same neighborhoods who had no record of abuse. Parents were interviewed about a

wide range of issues, including their histories, mental health, relationships and behaviors. The dataset therefore includes many variables that are essential for an understanding of child abuse (Belsky, 1993; Cicchetti & Valentino, 2006; Stith et al., 2009), yet, with few exceptions, are missing from other studies in this area.

The Klevens et al. study avoided some of the problems of inaccurate reporting, and of mis-identification of the perpetrator, since official records of abuse were confirmed by the perpetrators and their partners. Another of its strengths is the exclusive focus on child physical abuse: in contrast, many other studies (e.g., Berger et al., 2009; Daly & Wilson, 1985; Lightcap, Kurland, & Burgess, 1982) included other forms of maltreatment, especially sexual abuse, which are likely to be perpetrated and suffered by different individuals, for different reasons. Moreover, Klevens et al. is one of only three studies of the 22 reviewed by Archer (2013) that included both abusers and matched non-abusers from the same population. These, he points out, "will have produced the most reliable figures, since they avoid inconsistencies arising from the categorization of stepparents and the choice of the reference population." (p. 431).

The present study. The aim was to test whether Daly and Wilson's hypothesis that the "steprelationship *per se* is the relevant risk factor, rather than some correlate thereof" (2001, p. 288) is supported by Klevens et al.'s Colombian data: Daly and Wilson (2001, 2008) and Archer (2013) claim that these data strongly support the selectionist account, although they did not test for confounding variables. Our approach was to adjust for potentially confounding variables that might explain differences in rates of abuse by step and genetic fathers. We focused on the possible roles of low SES and education, family size, young parenthood, poor family relationships, and fathers' chronic stress (e.g., Cicchetti & Valentino, 2006; Giles-Sims & Finkelhor, 1984), and of intergenerational transmission (e.g., Madigan et al., 2019; Thornberry & Henry, 2013) in the explanation of the increased risk to stepchildren. The significance of these factors in the etiology of

child maltreatment in general is well substantiated in the literature, and is consistent with ecological accounts of family violence. However, their roles in the explanation of increased abuse specifically by stepfathers have so far received very little attention from either evolutionary or ecological theorists. If it were found that individual and family variables – such as parents' ages and their own experience of abuse, and father's stress resulting from, for example, life events and interpersonal conflict – separately or in combination accounted for much or all of the difference in rates of child abuse by genetic and step fathers, then the ecological account would be supported. Moreover, the relative influence of these variables would shed light on their roles in the etiology of abuse, both generally regarding all types of families, and more specifically in stepfamilies.

To address these issues, we conducted a secondary analysis of data from Klevens et al. (2000) and assessed the association between father type (genetic or step father) and child physical abuse when other factors were adjusted for. Since Klevens and colleagues interviewed parents about many issues, we were able to control for a wider range of potential confounds than in previous studies.

The first two hypotheses stemmed from the evolutionary theorists' empirical findings:

1. Stepfathers would be overrepresented among the perpetrators of abuse, and would abuse their children more frequently than genetic fathers

2. These disparities would persist when indicators of socioeconomic status (SES) – specifically family income and size, and parents' occupations and years of education – were controlled for

The remaining hypotheses stemmed from the ecological account, according to which individual- and family-level indicators of adversity (stressors) account for much child maltreatment. We predicted that the disparities in prevalence and rates of abuse by stepfathers and genetic fathers would be attenuated when the following variables were adjusted for:

3. Parents' ages, especially stepfathers' relative youth (Daly and Wilson, 1985, reported that mothers' youth explained some of the increased risk to stepchildren)

4. Parents' own experience of abuse when they were children (i.e., intergenerational transmission)

5. Fathers' chronic stress, including that resulting from negative life events and interpersonal conflict

6. The quality of family relationships, especially parental conflict and mother-child interaction (father-child interaction was not included in these analyses because father's abuse of the child is itself an aspect of this relationship)

Methods

Participants. Klevens et al. (2000) interviewed the genetic and step fathers and their female partners in 86 families living in Bogotá, Colombia. Of the fathers, 42 had been reported to authorities for physical child abuse, and 44 were matched controls from the same neighborhood.

The abusive fathers had been reported to, and recorded by, either the Office of Forensic Medicine – where reports were evaluated for legal purposes – or Family Welfare Offices, for physical abuse of the index child. The research protocol was submitted to these offices, which provided the list of abusive fathers and their contact information.

Initially, 86 abusive fathers were identified. These were approached personally or by telephone to establish whether they were willing to take part: 5.8% could not be located, 34.9% chose not to participate, and 4.6% were excluded owing to incomplete data. Two were excluded because the reports of abuse were not substantiated.

Children's injuries ranged from single bruises to third degree burns. The official records of abuse were confirmed by the perpetrators and their partners, and 79.1% admitted to violent episodes in addition to those for which they were reported.

Abusive fathers and non-abusive controls were matched according to where they lived, the age of the child and, if possible, the gender of the child. The controls were identified by visiting similarly located houses on the next block to that of each abusive father until an adult male was found who lived with, and described himself as the father of, a child aged within three years of the abused child. Of the 85 non-abusive fathers who were identified in this way, 45% refused to take part, and 3.5% were excluded owing to incomplete data. All participants were financially compensated for their time.

Measures and procedure. Semi-structured interviews were conducted in Spanish about the parents' histories and experiences, education and occupations, relationships, strategies and behaviors. The father's physical abuse of the child was recorded in terms of prevalence (never or ever) and of frequency, which was elicited by asking parents how often incidents that the researchers considered to be 'violent episodes' occurred. For descriptions of variables, and associations between them and a) the prevalence and b) frequency of child physical abuse, and c) father type (genetic father or stepfather), see Table 1 and Supplemental Material.

To maximize validity and reliability, all interviews were videotaped or audiotaped and transcribed verbatim. Interviewees were trained through role-play, practice interviewing, and by reviewing taped interviews. Each interviewed equal numbers of cases and controls. All videotapes and transcripts were reviewed and coded by two trained professionals, and a quarter were recoded by an independent judge, with whom agreement was 93% and 95%. In addition, for qualitative analyses, 40 were viewed or read twice by a team of psychiatrists, and 25 by an anthropologist.

Ethics approval was granted by the Universidad El Bosque's Institutional Review Board. For further information on the methods, see Klevens et al. (2000).

Data analysis. Hypothesis 1 was tested by comparing the relative prevalence (*never* or *ever*), and the relative frequency of abuse (*never* to *daily* on the 7-point scale), of abuse by genetic and step

fathers.

Subsequent analyses focused, first, on the associations between abuse (prevalence and frequency), father type (genetic or stepfather) and potentially confounding variables; and second, on the impact on the relative prevalence and frequency of abuse by genetic and fathers when these other variables were controlled for. For prevalence, five logistic regression models were generated, and for frequency, five ordinal regression models. In each case, the first model included father type alone, and the fifth all eight possible confounding variables referred to in the hypotheses.

Two steps were taken to counter problems resulting from the modest size of the sample. First, the number of cases included in each model was maximized by replacing the 19.7% of the data that was missing. Little's Missing Completely at Random (MCAR) test indicated that the missing values were randomly distributed ($\chi^2 = 344.9$, $df = 342$, $p = .45$). Pooled values were calculated from 40 imputations (cf. Graham, Olchowski, & Gilreath, 2007) using the regression method of multiple imputation in SPSS.

Second, variables were combined to reduce the number included in the models. For example, the mother's and father's ages (which were strongly correlated) were summed, as were the number of chronic stressors– such as negative life events and unstable relationships – reported by the father. We followed the rule of thumb of ten cases per predictor variable, although Vittinghoff and McCulloch (2006) found this to be overly conservative.[1]

Results

Hypothesis 1 was tested by comparing the prevalence and frequency of abuse by stepfathers and genetic fathers. Of the 42 fathers who had physically abused their children, 24 (57.1%) were genetic

[1] Vittinghoff and McCulloch conclude from their simulation study that "…systematic discounting of results, in particular statistically significant associations, from any model with 5–9 EPV [Events per Predictor Variable] does not appear to be justified." (p. 717).

fathers, and 18 (42.9%) were stepfathers. In contrast, 41 (93.2%) of the 44 fathers who had not abused their children were genetic fathers, and the remaining three were stepfathers (6.8%). The odds ratio of the prevalence of abuse (i.e., *never* or *ever*) by stepfathers compared with genetic fathers was therefore 10.25, $p < .001$ (Model 1, Table 3).

Stepfathers' mean frequency of abuse on the 7-point *never* to *daily* scale was 2.81, where 3 = 1-10 times per year, whereas genetic fathers' mean was 1.05, where 1 = once ever, $t(84) = 4.31$, $p < .001$. Ordinal regression showed an odds ratio of abuse of 6.44, $p < .001$ (Model 1, Table 4), indicating that stepfathers were more than six times as likely to be more frequent abusers than were genetic fathers.

Among the partners of genetic fathers, four were stepmothers. All four of these fathers had abused their (genetic) child, two only once, but the other two reported abuse at the maximum frequency of at least once per week (no fathers reported abusing daily). Only six of the other 82 fathers had abused so frequently.

Hypothesis 2 was that differences between step and genetic fathers' rates of abuse would persist when SES – family income and size, and parents' education and occupations – was adjusted for. In general this was found to be the case: there were no significant differences in the mean incomes or occupational status of genetic and stepfathers, nor of their partners, and the mean numbers of members of their families were almost identical. As Daly and Wilson (1985, 2001, 2008) argued, this indicates that these factors could not explain the increased risk to stepchildren. However, the genetic mothers in stepfamilies were less well educated, *M*s = 5.13 and 7.84 years, $t(64) = 2.89$, $p = .005$, than in families with genetic fathers, and the partners of abusive fathers were less well educated than partners of non-abusive fathers, *M*s = 5.92 and 8.38 years, $t(67) = 3.09$, $p = .003$. Stepfathers and abusive fathers had also attended school for fewer years than genetic and abusive fathers, although these differences – of 2 and 1.4 years, respectively – were not significant. When

these SES variables were included in logistic and ordinal regression models, the effect of father type was attenuated: for prevalence of abuse the odds ratio was reduced from 10.25 to 8.17, $p = .003$, and for frequency of abuse from 6.44 to 5.28, $p = .001$ (Model 2s, Tables 3 and 4).

Regarding Hypothesis 3, stepfathers were on average about 8 years younger than genetic fathers, $t(82) = 3.55$, $p = .001$, and abusive fathers were on average about 5 years younger, $t(85) = 2.63$, $p = .01$, than non-abusive fathers. The genetic mothers in stepfamilies were also about 5 years younger than in families with genetic fathers, $t(80) = 2.77$, $p = .007$, and mothers with abusive partners were about 2.5 years younger than those with non-abusive partners, although this difference was not significant.

Hypothesis 4 concerned the intergenerational transmission of abuse. Both the fathers', $r = .32$, $p = .003$, and the mothers', $r = .33$, $p = .003$, reports of having been victims of physical, verbal, emotional or sexual abuse predicted the fathers' frequency of physical abuse of the child. Although stepfathers were no more likely to have been physically abused than were genetic fathers, more reported having been victims of one or more types of abuse, $t(79) = 2.12$, $p = .037$. The stepfathers' partners had also suffered more types of abuse than had the partners of genetic fathers $t(76) = 3.28$, $p = .002$. All seven of the mothers who reported having been sexually abused as children were the partners of fathers who had abused their children, and five of these seven fathers were stepfathers.

The Model 3s in Tables 3 and 4 indicate that the differences in prevalence and frequency of abuse between genetic and step fathers were further reduced when the parents' ages and histories of abuse were adjusted for, ORs = 5.50 and 3.54 respectively, ps = .02. Hypotheses 3 and 4 were therefore supported.

Hypothesis 5 was that the association between father type and father's abuse would be attenuated when father's chronic stress was controlled for. The stepfathers reported considerably more financial problems, $t(83) = 2.22$, $p = .029$, and unstable relationships, $t(83) = 3.21$, $p = .002$,

and marginally more stressful life events, $t(84) = 1.79$, $p = .076$, than the genetic fathers. These variables and interpersonal conflict all predicted abuse, rs = .24 - .49. ps < .001 - .028. The Model 4s in Tables 3 and4 indicate a further slight reduction in the difference between step and genetic fathers' prevalence and frequency of abuse when father's stress was included, ORs = 5.05 and 2.86, and ps = .04 and .07, respectively. Regarding the frequency of abuse, father's chronic stress made a substantial impact even when father type, SES, and parents' ages and histories of abuse were adjusted for, OR = 0.69, $p = .003$.

Hypothesis 6 concerned father type, the quality of the mother's relationships with the father and the child, and their impact on the father's abuse of the child. Fighting between parents predicted father's abuse of children, $r = .39$, $p < .001$, as did abuse of the mother by the father, $r = .36$, $p = .001$. Mothers in stepfamilies fought with their partners, $t(80) = 2.80$, $p = .006$, and were abused by them, $t(81) = 3.34$, $p = .001$, considerably more than those in families with two genetic parents.

The partners of abusive fathers communicated relatively little with their genetic children: fathers' abuse was negatively correlated with mothers' practical communication, $r = -.38$, $p = .001$, and emotional communication, $r = -.47$, $p < .001$. Similarly, the partners of stepfathers communicated with their children less than did partners of genetic fathers: practical communication, $t(72) = 1.21$, $p = .03$; emotional communication, $t(71) = 2.89$, $p = .005$.

When these variables were included (Model 5s in Tables 3 and 4), the odds ratios of step vs. genetic fathers' abuse were again reduced, to 2.67, $p = .27$ (prevalence) and 1.18, $p = .79$ (frequency). These models explained 49% and 47% of the variance in abuse, respectively.

Abusive fathers had more negative perceptions of their children than non-abusive fathers, Ms = 5.00 vs. 2.10 characteristics, $t(85) = 4.29$, $p < .001$. They also used less positive discipline such as explaining and discussing, $t(87) = -2.27$, $p = .03$, and more negative discipline such as yelling and hitting, $t(87) = 3.62$, $p = .001$. Stepfathers had worse perceptions of their children than genetic

fathers, *M*s = 4.95 vs. 3.02 characteristics, $t(82) = -2.32$, $p = .023$, and they used less positive discipline, $t(83) = 2.48$, $p = .015$, though no more negative discipline. Father-child emotional communication was also much less frequent both when the father was abusive, $t(75) = 4.99$, $p < .001$, and when he was a stepfather $t(72) = 4.76$, $p < .001$. Father's abuse of the child is an aspect of poor father-child relationships, and so these variables were not included in further analyses.

Mothers who used more physical discipline had partners who abused their children more, $r = .31$, $p = .004$, and mothers who used more non-physical discipline had partners who abused their children less, $r = -.23$, $p = .028$. Partners of stepfathers used marginally more physical discipline than partners of genetic fathers, $t(84) = 1.67$, $p = .098$.

All five of the mothers who were described as having dependent personalities were partners of abusive men, and four of these five men were stepfathers; moreover, all three of the mothers with "other problems" were partners of abusive stepfathers. While these frequencies are too low to allow further analysis, they suggest that mothers' mental health is strongly associated with both father type and fathers' frequency of abuse.

Discussion

Evolutionary theorists (e.g., Archer, 2013; Daly & Wilson, 1996, 2008; Hilton, Harris, & Rice, 2015) have reported that abuse occurs more often in step relationships than in genetic parent-child relationships. In this study we analyzed data from Klevens et al. (2000) that have been cited in support of this claim (Archer, 2013; Daly & Wilson, 2001, 2008). Consistent with the first hypothesis, stepfathers were, indeed, substantially overrepresented among the abusers, and their rates of physical abuse were considerably higher than were genetic fathers'.

Daly and Wilson (e.g., 1985, 2008) and others (e.g., Pinker, 1997; Weekes-Shackelford & Shackelford, 2004) also claim that these differences persist when all possible confounding variables are controlled for. We tested this hypothesis by adjusting for potentially confounding variables in

Klevens et al.'s dataset that might partially or wholly explain the disparity in rates of abuse by step and genetic fathers.

In line with previous research (Alexandre et al., 2010; Daly & Wilson, 1985; Stiffman et al., 2002), no significant differences were found between the incomes, occupations and sizes of the families with and without stepfathers, although parents in stepfamilies, and abusers, tended to have had fewer years of education. Hypothesis 2 – that the discrepancies in abuse perpetrated by step and genetic fathers would persist when these measures of socioeconomic status (SES) were adjusted for – was therefore only partially supported. Parents in stepfamilies – particularly the mothers – were less well educated than those in families with two genetic parents, and these analyses indicate that this factor partially accounts for stepfathers' greater prevalence and frequency of abuse.

Several other indicators of adversity were associated with both abuse and stepparenthood. These included parents' youth, and their own experience of abuse as children (intergenerational transmission; Thornberry & Henry, 2013). When these predictors of abuse were controlled for by including them in the regression models, there were further reductions in the disparities between genetic and step fathers' prevalence and frequency of abuse. These analyses therefore provide support for both Hypotheses 3 and 4.

Abuse was also predicted by father's chronic stress – indicated in particular by his unstable relationships and interpersonal conflict – and stepfathers suffered considerably more stress than did genetic fathers. Consistent with Hypothesis 5 (and Giles-Sims and Finkelhor, 1984), the differences between step and genetic fathers' prevalence and frequency of abuse were further reduced when father's stress was controlled for. Its influence on the frequency of abuse was particularly strong.

Relationships both within stepfamilies, and within abusive families, were worse than in other families. The differences between prevalence and rates of abuse by stepfathers and genetic fathers were again substantially reduced when the quality of the genetic mother's relationship with the

father, and her communication with the child, were adjusted for. Hypothesis 6 was therefore also supported.

When all eight of the potentially confounding variables were adjusted for (Model 5s), fathers were approximately three times as likely to have abused a step child as a genetic child (OR = 2.94) a non-significant difference, $p = .18$. Moreover, stepchildren were only 1.36 times more likely to have been physically abused by their fathers more frequently than genetic children, a difference that did not approach significance.

The picture that emerges from this analysis is of the stepfathers in this Colombian sample frequently having violent relationships that stemmed from their childhoods and extended particularly to their children and partners, but also beyond the family. Seen in this light, abuse by stepfathers might be considered to be one aspect of their violence by and towards others, past and present. If so, then the violent stepfathers physically abused their stepchildren not because they were stepfathers, but because they were violent.

In addition, the abusive stepfathers in this sample were predominantly young men. This finding converges with that of Nobes et al. (2019) whose recent analysis of child homicides indicated that many perpetrators were young, casual and short-term partners of their victims' mothers. In fact, in that study, many of the perpetrators hardly knew the children and were therefore likely to have been misclassified as stepfathers. It is possible that this was also the case for at least some of the 'stepfathers' in the Klevens et al. study.

As well as these characteristics of the fathers in Klevens et al.'s (2000) data, the mothers' youth, poor education, childhood experience of abuse, and poor relationships with partners and children differentiated both abusers from non-abusers and stepfathers from genetic fathers. Importantly, these mothers were *genetic* parents, and so their influences cannot be explained by their lacking genetic relatedness. Similarly, genetic fathers with new partners (i.e., stepmothers of their

children) were overrepresented among the abusers: all four had abused their children, and two were very frequent abusers. These findings are therefore consistent with those of increased abuse by genetic mothers in step families (Alexandre et al., 2010; Sariola & Uutela, 1992), and with Adams et al.'s (2019) proposal that intimate partner violence mediates the link between mothers' childhood abuse and, a generation later, their own daughters being abused. They also support the ecological account of child maltreatment (Belsky, 1993; Cicchetti & Toth, 2016) because they indicate that abuse results from the intergenerational transmission of abuse (e.g., Madigan et al., 2019; Thornberry & Henry, 2013), and from characteristics of step*families* (i.e., that are applicable to genetic parents as well as to stepparents). These characteristics include the higher levels of conflict, stress and instability that result from poor parental and parent-child relationships in these families (Bray & Berger, 1993; Hetherington, 1993; Lewis & Kreider, 2015).

Arguably the strongest test of the Cinderella effect is to compare the rates of abuse by fathers who have both genetic and stepchildren. This approach obviates the need to take account of many potentially confounding variables – such as those examined here – because in each family the genetic and stepchildren have the same father, with (of course) the same age, education, income, history of abuse, and so on. A selectionist account would predict that fathers discriminate in favor of their genetic children, whereas an ecological account would predict that, all else being equal, genetic and stepchildren are equally at risk for abuse. Hilton, Harris, and Rice (2015) examined the records of 118 such men and found that 16 had abused their stepchildren, and 9 their genetic children. This indicates that fathers were approximately twice as likely to abuse their stepchildren as their genetic children. Although this difference is consistent with the Cinderella effect, it indicates that the size of the effect is actually much nearer the findings of this study than, for example, the odds ratio of 10.3 reported by Archer (2013) in his analysis of the same Klevens et al. (2000) data, the increased risk of abuse of over 40 times reported by Daly and Wilson (1981), and the increased risk of over 100 times

for child homicide reported by Daly and Wilson (2008).

Limitations. For several reasons we urge caution in the interpretation of these findings. First, while they generally support the ecological account, we cannot always be sure of the direction of causality between associated variables. For example, it is possible that, at least in some families, fathers' abuse caused, rather than resulted from, poor relationships between parents. If so, stepfathers' greater tendency to abuse (perhaps because they are genetically unrelated to their victims) would explain their also tending to have worse relationships with their partners. Similarly, stepfathers' greater stress might be partly caused by having stepchildren. Both these possibilities would be consistent with the evolutionary account. Indeed, both explanations of the associations between these proximal variables and fathers' abuse of children might be correct, in that, for example, fathers' poor relationships with their partners both result in, and result from, their abuse of the children.

On the other hand, it is clear from the extensive literature on the etiology of child maltreatment (e.g., Belsky, 1993; Cicchetti & Toth, 2016; Stith et al., 2009) that stressors such as conflictual relationships, negative life events and debt, cause abuse by all parents, regardless of genetic relatedness to the children. If – as seems likely – similar degrees of stressors in the two family types result in similar degrees of abuse, then genetic relatedness might be considered a predictor of abuse (because in general stepfamilies experience more of these stressors), but not an independent cause.

In addition, a father's (and his partner's) date of birth, education, or experience of abuse as a child all predate his becoming a stepfather, and so we can be confident of the direction of causality between these distal variables and fathers' abuse of their children. For example, stepfathers' relative youth might result in greater stress (perhaps owing to younger people tending to have fewer personal, social and financial resources), which in turn leads them to abuse their children more frequently; but

their higher rates of abuse could not cause these fathers to be younger, or less educated, or to have been abused more when they were children.

A second reason for caution is that, within the group of variables included in each model, there were likely inter-correlations that could pose issues for model fit and interpretation. For example, fathers who experienced high levels of stress were also more likely than others to have been abused when they were children, and older mothers tended to communicate more with their children than did young mothers. Entering correlated predictor variables into the same model inevitably reduces the apparent impact of each. However, on inspection, Variance Inflation Factor (VIF) values for all variables were below 1.7, indicating that multi-collinearity was unlikely to be impacting our models.

Third, the sample is limited to families in one South American city. Until more studies in other settings are conducted, we cannot be sure that the findings can be generalized to other populations (though see Alexandre et al., 2010; Nobes et al., 2019; Temrin et al., 2011; and Turner et al., 2007 for examples of such studies). A related point concerns possible cultural differences: as Klevens et al. (2000) point out, their recruitment "relied on the community's and institution's definitions of "abuse", [which] may also bias the findings and restrict the possibilities for generalization or extrapolation of the findings." (p. 330), and the same might apply to how terms such as "violent episodes" were interpreted by the interviewers. However, the team went to considerable lengths to ensure consistency and reliability, and were led by American researchers. In addition, they used the internationally-validated DSM-IV (American Psychiatric Association, 1994) criteria when exploring mental health issues and, when asking about disciplinary strategies – including abusive ones – they used a very similar approach, and examples (e.g., hits with belt; kicks or punches; ties or burns), to those of the Conflict Tactics Scale (Straus, 1979). It therefore seems unlikely that any differences in definitions would have a substantial impact on how the data should

be interpreted.

Although it is considerably richer than those used in most studies of abuse by stepparents, the Klevens et al. dataset includes only limited information on key aspects of the fathers' mental health and behavior (especially antisociality), and the children's behavior. In this way our study and findings resemble those of Berger et al. (2009), who also found that controlling for some factors reduced differences between families with and without stepparents, while acknowledging the possible roles of "omitted variables". A larger sample and the addition of these variables may well have provided a clearer picture of the causes of stepfathers' increased rates of abuse. For example, as Hilton et al. (2015) and Temrin et al. (2011) point out, characteristics such as impulsivity, irresponsibility and aggression that underlie antisocial behavior are also likely to result in unstable relationships and multiple intimate relationships that predict breakdowns in traditional families, and hence higher levels of stepparenthood (e.g., Krupp, Sewall, Lalumière, Sheriff, & Harris, 2012). Similarly, it is possible that the strong association between abuse and mother-child communication was mediated by characteristics of the child.

A possible weakness of the data concerns the status of the 'non-abusive' control fathers. The detection of child maltreatment is notoriously difficult, and there can be little doubt that official records tend to omit many cases of unidentified abuse (e.g., Hampton & Newberger, 1985; Krase, 2015). It is therefore possible that some of the putatively non-violent controls had actually physically abused their children. However, none of them had been reported to the authorities, and only one of the 44 controls reported having been violent towards their child, on only one occasion. In contrast, all of the 42 fathers who were described as abusive were identified by authorities and admitted to their violence, and 79.1% of them admitted to other violent incidents too, which indicates a general willingness among participants to report such incidents. This combination of official-, self- and partner-reports means that we can be confident that the distinction between abusers and non-abusers

is reasonably accurate.

Moreover, our analysis of the frequency of abuse by the father means that the statistical impact of a putatively non-violent control father who had actually abused his child is likely to be relatively slight. It seems reasonable to assume that, the more frequent the violence, the greater the chances of a father being reported to the authorities. A control father who had avoided detection by the authorities because he rarely used violence (and did not admit to it) would therefore be rated 0 on the 7-point scale and so would be treated statistically little differently from case fathers who also used violence rarely, but had been reported to the authorities for doing so (and admitted to it), and so were rated 1 or 2 on the scale. In contrast, they would be scored very differently from fathers who were frequently violent, and so were rated 5 or 6 on the scale.

Given these various limitations, we must restrict our interpretation of these findings to the following: First, much of the higher prevalence and frequency of abuse by stepfathers in this Colombian sample seems to occur because of confounding distal variables such as the stepfathers', and their partners', relative youth, poor education, and childhood experience of abuse. We cannot be certain that they *are* explained by these distal variables – this would require replication with large samples in a range of settings – but, especially when considered in the context of the extensive literature on the roles of these factors in the etiology of child maltreatment in all families, regardless of genetic relatedness (e.g., Belsky, 1993; Cicchetti & Toth, 2016; Madigan et al., 2019), we would argue that these variables at least partly explain the stepchildren's increased risk for abuse.

Similarly, both the stepfathers and the abusers in Klevens et al.'s (2000) sample experienced the proximal factors such as poor relationships and stress more than did other fathers. While we cannot be sure of what caused what (e.g., whether abuse caused or resulted from stress), the previous literature (e.g., Cicchetti & Valentino, 2006; Emery & Laumann-Billings, 1998; Stith et al., 2009) again strongly suggests that these and related factors partly or largely explain why the stepchildren

tended to be at greater risk.

Second, evolutionary theorists' claims (Archer, 2013; Daly & Wilson, 2001, 2008) that the Klevens et al. (2000) data strongly support their account are not upheld by the current analysis. Had these researchers controlled for possible confounding factors – of which there are many in the rich dataset – their conclusions might have been rather different. The stepfathers' lack of genetic relatedness to the children might actually independently explain little, and possibly none, of the increased risk to stepchildren in this sample.

And third, Daly and Wilson's (2008) hypothesis that "…differences between family types would persist when possible confounds such as socio-economic status were controlled" (p. 385), which has been frequently echoed by selectionist theorists (e.g., Pinker, 1997; Weekes-Shackelford & Shackelford, 2004), gained no support from this analysis of Klevens et al.'s (2000) dataset.

Research implications. Daly and Wilson (1985) dismissed the role of confounding variables on the grounds that only mother's age accounted for any (13%) of stepparents' increased rates of abuse. To a large extent they reduce the explanation of abuse by stepfathers to a single factor, namely the lack of genetic relatedness. In contrast, our findings support a multi-level, multi-factorial explanation, according to which abuse results from a complex set of interacting variables (Belsky, 1993; Cicchetti & Toth, 2016; Emery & Laumann-Billings, 1998; Stith et al., 2009). As with maternal age, each of these might independently account for relatively little of the variance in abuse, but in combination they explain substantially more. This is because stepfathers (and their partners) tend not only to be much younger than genetic fathers, but they are also less educated, *and* they are more likely to have been abused themselves, *and* they suffer higher levels of stress, *and* they have worse relationships with their partners.

Had Daly and Wilson examined other factors such as these, they might not have dismissed the possibility of alternative explanations of the Cinderella effect. A similar point applies to other

studies that tested for (relatively small numbers of) potentially confounding variables (e.g., Alexandre et al., 2010; Berger et al., 2009; Stiffman et al., 2002), and to the large majority of studies of the Cinderella effect reported and cited by evolutionary theorists (e.g., Archer, 2013; Daly & Wilson, 1998, 2008) that have not controlled for *any* confounding variables. Of course, the ecological and evolutionary accounts are not necessarily mutually exclusive, and genetic relatedness might be one of the many factors that explain child abuse by stepparents. However, the findings of this and other recent studies (Nobes et al., 2019; Temrin et al., 2011; Turner et al., 2007) indicate both the importance of considering possible confounding factors, and that the role of genetic relatedness in the etiology of abuse seems to be considerably less than Daly and Wilson and colleagues have claimed.

Prevention and policy implications. A message for policy and practice regarding the prevention of abuse is that the claims of previous researchers that the problem is primarily stepparenthood per se might not be correct. Whether or not there are stepchildren, practitioners should identify and support families that face indicators of adversity such as parental youth, poor education, stress and experience of abuse, and poor parental and parent-child relationships.

The data from this Colombian sample indicate that the high rates of physical abuse by stepfathers resulted at least partly from numerous factors, perhaps beginning with parents' experience of abuse when they were children, and its subsequent intergenerational transmission via stressors such as interpersonal conflict and unstable relationships. There seems also to be an important role for the genetic mothers in this process. If the stepfathers' lack of genetic relatedness to their children was one of the factors that contributed to their increased prevalence and frequency of abuse, it appears that its influence was considerably less than previous researchers (Archer, 2013; Daly & Wilson, 2001, 2008) have claimed.

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Table 1

Measures and Predictors Included in the Analyses

Variables	Definition and coding	*M*	*SD*
1 Prevalence of abuse	Never or ever		
2 Frequency of abuse	0 = never, 1 = once ever, 2 = < 1x per year, 3 = 1-10x per year, 4 = 1-10x per month, 5 = 1-3x per week, 6 = every day	1.48	1.79
3 Father type	Genetic or step		
4 Family income	Multiples of minimum wage	1.70	1.13
5 Family size	Number of household family members	5.24	1.85
6 Parents' education	Sum of mother's and father's years of schooling	14.60	6.41
7 Parents' occupations	Sum of mother's and father's status: 0 = unemployed, 1 = unstable, 2 = informal, 3 = unqualified, stable; 4 = qualified stable, 5 = business owner, 6 = professional	4.95	2.03
8 Parents' ages	Sum of mother's and father's years of age	68.24	16.44
9 Parents victims of abuse	Sum of parents' physical, verbal, psych & sexual abuse as children; all 0 = never, 1 = ever	1.84	1.87
10 Father's chronic stress	Sum of four stressors: Number of life events, 0-12. Interpersonal conflict, money problems, unstable relationships; all 0 = none, 1 = some, 2 = many	3.07	2.11
11 Parent conflict	Sum of fighting & abuse of mother. Fighting: 0 = never, 1 = rare, 2 = occasional, 3 = frequent. Abuse: physical, emotional, infidelity; all 0 = never, 1 = ever	1.69	2.02
12 Mother-child communication	Sum of practical & emotional communication; both 0 = none, 1 = a little; 2 = enough	2.79	0.96

Table 2

Pearson Correlations between Measures and Predictors of the Prevalence (Never / Ever) and Frequency (Never – Daily) of Physical Abuse of Children by Fathers

Variables	1	2	3	4	5	6	7	8	9	10	11
1 Prevalence of abuse											
2 Frequency of abuse	.84**										
3 Father type	.42**	.43**									
4 Family income	-.01	-.08	.04								
5 Family size	.03	.02	.01	-.05							
6 Parents' education	-.31**	-.26*	-.29**	.16	-.23†						
7 Parents' occupations	-.12	-.14	-.13	.50**	-.16	.41**					
8 Parents' ages	-.24*	-.22*	-.33**	-.02	.16	-.10	.10				
9 Parents victims of abuse	.28**	.37**	.27*	-.26*	-.05	-.25*	-.20†	-.17			
10 Father's chronic stress	.32**	.51**	.32**	-.13	-.03	-.15	-.05	-.36**	.43**		
11 Parent conflict	.34**	.38**	.33**	.22*	.12	-.30**	.00	-.08	.15	.38**	
12 Mother-child communication	-.30**	-.37**	-.27*	.24*	-.13	.22*	.28**	.00	-.08	-.02	.02

Note. Predictors are those included in the regression models, Tables 3 and 4

† $p < .10$. * $p < .05$. ** $p < .01$

Table 3

Logistic Regression Models of Father Type (Genetic or Step Father) and Other Predictors of the Prevalence (Never or Ever) of Physical Abuse of Children by Fathers

	Model 1					Model 2					Model 3					Model 4					Model 5				
	B	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*
Constant	-1.79	0.62	.004	0.17	0.05-0.57	-2.59	1.32	.05	0.08	0.01-1.00	-2.88	1.80	.11	0.06	0.00-1.92	-1.82	2.00	.36	0.16	0.00-8.10	-4.96	2.66	.06	0.01	0.00-1.31
Father type	2.33	0.67	.001	10.25	2.73-38.45	2.10	0.71	.003	8.17	2.05-32.56	1.71	0.75	.02	5.50	1.26-24.02	1.62	0.77	.04	5.05	1.12-22.73	0.98	0.88	.27	2.67	0.47-15.10
Family income						-0.07	0.27	.81	0.94	0.55-1.59	-0.11	0.28	.70	0.90	0.52-1.56	-0.12	0.29	.67	0.88	0.49-1.58	-0.20	0.37	.59	0.82	0.40-1.69
Family size						0.02	0.14	.92	1.02	0.77-1.34	-0.03	0.15	.86	0.98	0.73-1.30	-0.03	0.15	.85	0.97	0.73-1.30	0.05	0.17	.76	1.05	0.76-1.47
Parents' education						0.06	0.05	.19	1.06	0.97-1.17	0.07	0.05	.20	1.07	0.97-1.18	0.06	0.05	.24	1.06	0.96-1.12	0.07	0.06	.31	1.07	0.94-1.21
Parents' occupations						0.02	0.15	.90	1.02	0.76-1.37	-0.02	0.15	.89	0.98	0.73-1.32	-0.01	0.16	.97	0.99	0.73-1.35	-0.08	0.18	.67	0.93	0.65-1.32
Parents' ages											0.02	0.02	.23	1.02	0.99-1.06	0.01	0.02	.47	1.01	0.98-1.05	0.02	0.02	.30	1.02	0.98-1.07
Parents victims of abuse											-0.20	0.15	.20	0.82	0.61-1.11	-0.14	0.16	.38	0.87	0.64-1.19	-0.11	0.18	.53	0.89	0.62-1.27
Father's chronic stress																-0.18	0.15	.23	0.83	0.62-1.13	-0.15	0.19	.43	0.86	0.59-1.25
Mother-father conflict																					-0.30	0.18	.08	0.74	0.52-1.04
Mother-child communication																					1.15	0.40	.00	3.16	1.43-6.98
-2 log likelihood					102.84					99.17					95.01					93.37					79.63
R^2					.23					.28					.33					.35					.49

Table 4

Ordinal Regression Models of Father Type (Genetic or Step Father) and Other Predictors of the Frequency (Never – Daily) of Physical Abuse of Children by Fathers

	Model 1					Model 2					Model 3					Model 4					Model 5				
	B	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*	*B*	*S.E.*	*p*	*OR*	*95% CI*
Father type	1.86	.48	.000	6.44	2.49-16.60	1.66	0.52	.001	5.28	1.92-14.50	1.26	0.56	.02	3.54	1.18-10.60	1.05	0.57	.07	2.86	0.94	0.17	0.63	.79	1.18	0.34
Family income						0.04	0.23	.88	1.04	0.66-1.63	0.03	0.24	.89	1.03	0.60-1.56	-0.05	0.25	.85	0.95	0.59	-0.03	0.31	.91	0.97	0.53
Family size						0.01	0.12	.93	1.01	0.80-1.27	0.00	0.12	.99	1.00	0.79-1.27	0.00	0.12	.97	1.00	0.79	0.07	0.13	.56	1.08	0.84
Parents' education						0.04	0.04	.30	1.04	0.96-1.13	-0.04	0.04	.34	0.96	0.96-1.14	0.04	0.05	.34	1.04	0.96	0.03	0.05	.50	1.03	0.94
Parents' occupations						0.02	0.13	.85	1.02	0.80-1.31	0.01	0.13	.93	1.01	0.76-1.28	0.01	0.14	.92	1.01	0.78	-0.04	0.15	.77	0.96	0.72
Parents' ages											-0.01	0.02	.38	0.99	0.98-1.04	0.00	0.02	.90	1.00	0.97	0.00	0.02	.78	1.00	0.97
Parents victims of abuse											0.22	0.12	.07	1.25	0.63-1.02	-0.12	0.13	.35	0.89	0.69	-0.11	0.13	.40	0.89	0.69
Father's chronic stress																-0.38	0.13	.00	0.69	0.53	-0.34	0.14	.02	0.71	0.54
Mother-father conflict																					-0.27	0.13	.04	0.76	0.59
Mother-child communication																					1.08	0.29	.00	2.96	1.67
-2 log likelihood					40.87					243.70					239.63					227.60					213.27
R^2					.18					.20					.26					.34					.47