

Why are stepfathers detrimental to child development? Exploring the effects of stepfathers on multiple child outcomes in the UK.

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Note: This paper is currently under review. Please contact first author for more information.

Extended Abstract

Background

Stepfathers presence has consistently been found to have detrimental effects on child outcomes in developed countries, with stepfathers being found to have negative effects on educational attainment^{1,2}, behavioural outcomes^{3,4}, and even physical growth^{5,6}. There are several possible reasons being such findings:

Firstly, stepfathers are not related to the children they may provide care for. From an evolutionary perspective, this means there is less of an incentive for stepfathers to provide direct investment (i.e., care giving) in their unrelated children⁷, leading to lower levels of direct investment. Indeed, this has been shown in several studies^{8,9}. Secondly, the quality of direct stepfather investment may be inferior compared to direct paternal investment; in that investment from stepfathers does not provide as much benefit to children than from fathers. Thirdly, stepfather presence has been found to predicted lower levels of direct maternal investment⁹. Therefore, stepfather presence may indirectly have adverse effects on child outcomes. Finally, stepfather presence itself could be a stressor for children.

At present, the processes behind the negative stepfather effects in developed countries are unclear, with most studies focusing on the *presence* of stepfathers without taking into account of direct investment levels. Therefore, in the current study, we address whether the negative effects of stepfather presence on multiple child outcomes can be explained by the lower levels of direct investment by mothers and/or stepfathers. Furthermore, we investigate whether there is a difference in the effectiveness of direct investment between fathers and stepfathers.

Data

We use data from the Avon Longitudinal Study of Parents and Children (ALSPAC), which is an ongoing longitudinal cohort survey based in and around Bristol in the west of England. The study began by recruiting pregnant women whose estimated delivery date fell between 1st April 1991 and 31st of December 1992. In total, 14,541 women were initially recruited, which resulted in 13,988 children being retained in the sample at age 1.

The final sample is restricted to children who had the same father or stepfather present in the household between the ages of 3 years 11 months and 7 years. This interval was chosen to maximise the number of stepfather households within the sample, but at the same time minimise the confounding effects of family disruption and single motherhood for stepfather present families. Note that many children in stepfather households are likely to have encountered stepfathers before the age of 3 years 11 months. Specifically regarding cohabitation, raw data available from previous waves indicate that 36.3% of children in stepfather households lived with their stepfather by age 2 years 9 months, and 15.6% by age 1 year 9 months. Furthermore, children from multiple births (i.e., twins, triplets etc.) were removed from the sample due to uncertainty with the interpretation of investment levels between the siblings. This left us with 246 stepfather households identified within 12895 households.

We investigate the effects of stepfather presence and direct investment on three child outcomes, height (cm), school test score and behavioural difficulty score at around age 7. Direct investment levels were measured through mother score and partner score, which is a combined score based on the mother-reported frequencies of various play and caretaking activities by the mother and her partner (i.e., father or stepfather). The height of children were clinically measured by ALSPAC staff (mean age of children = 7years). Test Scores are derived from the national Key Stage 1 assessments on Maths and English, taken by children ages 6 to 7 (mean age of children = 7years 4months). These scores ranged from 0 to 15. Behavioural difficulty scores were measured through Strength and Difficulties Questionnaires administered to the mother, with a potential maximum score of 40 points (mean age of children = 6years 9months)

Methods

Because of the relatively small cases with stepfathers, the missing information reduced sample of stepfathers to be too low to carry out any reliable analyses. Therefore, missing values were imputed using -mi impute chained- in

STATA SE 12. For height and school test score, we carried out normal linear regression models. For behavioural difficulty score, which followed a Poisson distribution, we carried out Poisson regression models.

For each of the three outcomes, we ran 5 models: The first, along with the controls, only included stepfather presence. This is analogous to most other papers exploring stepfather effects on child outcomes. To this base model, we added mother score, partner score, and mother and partner score. This controls for the associated differences in investment levels between father and stepfather presence. Finally, we added an interaction term between stepfather presence and partner score. This allows us to investigate whether direct investments from stepfathers differ in its effect on child outcomes from fathers.

Results

A two-sample t-test with unequal variances showed that there is a significant differences in partner scores between fathers (Mean±SD=6.79±1.48, N=6874) and stepfathers (Mean±SD=6.45±1.54, N=193) ($t_{202}=3.04$, $P=0.003$), where the mean of fathers are significantly larger than the mean of stepfathers ($P=0.001$) (Fig. 1). Furthermore, a two-sample t-test with unequal variances showed that there is a significant differences in the mother score between father presence (Mean±SD=8.25±0.94, N=6891) and stepfather presence (Mean±SD=8.07±1.08, N=202) ($t_{202}=2.29$, $P=0.023$), where the mean is significantly larger if fathers are present rather than stepfathers ($P=0.012$) (Fig. 21).

For height, we did not find a stepfather effect in that there was no statistically significant difference in children's height whether there was a father or a stepfather present in the household. This did not change whether mother score or partner score was added into the model. The interaction between stepfather presence and partner score was also not significant (Table 1).

For school test score, stepfather presence was initially a significant predictor, where stepfathers in the household predicted a lower test score by -0.5 points. This fell to -0.479 when controlling for mother score, although it retained significance at the $P=0.05$ level. The inclusion of partner score dropped the negative stepfather presence effect to a greater degree to -0.476, whereby stepfather presence was no longer a significant predictor of children's test scores at the $P=0.05$ level. The inclusion of both mother score and partner score in the same model further dropped the coefficient of stepfather presence to -0.469, and partner score was the only significant predictor of children's test score. The interaction between stepfather presence and partner score was not significant (Table 1). Overall, this suggests that the negative effect of stepfather presence on children's educational achievement is primarily driven by the lower direct investment levels provided by stepfathers compared to fathers, but the effects of direct investment do not differ whether it comes from the father or the stepfather.

For behavioural difficulty score, stepfather presence was a significant predictor, where it was associated with a 10.9% increase in behavioural difficulty scores of children if they had a stepfather in the household. Controlling for mother score did not alter this negative effect, whereby stepfather presence was still associated with an 11% increase in behavioural difficulty score. An inclusion of partner score reduced the negative effects of stepfather presence to a 10.1% increase in behavioural difficulty score, although stepfather presence still retained significance at the $P=0.01$ level. Including both mother score and partner score lowered the negative effects further to 9.3%, but again it remained significant at the $P=0.01$ level. An interaction between stepfather presence and partner score was significant, whereby the positive effect of partner score in reducing behavioural difficulty scores was not seen if the direct investments were provided by the stepfather (Table 1) (Fig. 3). Overall, this suggest that the negative effect of stepfather presence on children's socio-emotional development is driven by multiple factors, in that presence itself has a detrimental effect, combined with the reduction in paternal direct investment levels and the ineffectiveness of stepfather direct investments.

Discussion and Implications

Unlike previous studies, we did not find an effect of stepfathers on Height. However, we did find stepfather effects on school test score and behavioural difficulty score. Firstly, stepfather presence had a significant negative effect on children's educational achievement. However, this effect disappeared when partner investment levels were controlled for. Furthermore, there was no difference in the effect of partner score between fathers and stepfathers. This means that the negative stepfather effect on educational attainment is likely to do with the lower direct investment provided by stepfathers compared to fathers. This implies that any negative effect from stepfathers may be overcome if stepfathers are encouraged to engage more with their stepchildren. Indeed, one study has found that, whilst children from stepfather household do worse than father or single-mother households in terms of educational attainment, those with highly involved stepfathers did better¹⁰.

Secondly, stepfather presence was found to increase children's behavioural difficulty, and this effect was maintained even when mother and partner scores were added to the model. Furthermore, the effect of partner score was different between the father and the stepfather, in that investments by stepfathers seem to have no beneficial effect on children's behaviour. This means that the negative stepfather effect on behavioural difficulties is due to multiple factors: stepfather presence may be inherently stressful for children, the reduction or removal of paternal direct investment is detrimental, and that stepfather direct investment provides little benefit. Our results suggest that the negative stepfather effect on children's behaviour will be difficult to overcome even if stepfathers engaged more with their stepchildren.

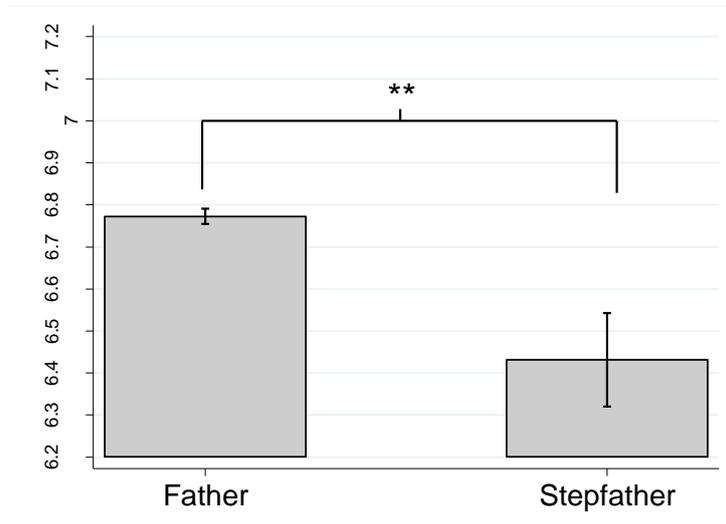


Fig. 1: Average partner score of fathers (N=6874) and stepfathers (N=193). The error bars demonstrate the 95% confidence intervals.

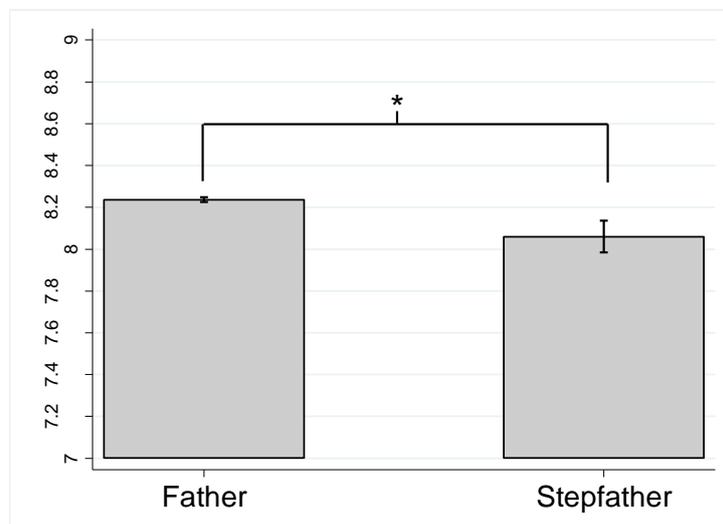


Fig. 2: Average mother score by father presence (N=6891) or stepfather presence (N=202). The error bars demonstrate the 95% confidence intervals.

	Presence		Mother Score		Partner Score		Both Scores		Interaction	
	B	SE	B	SE	B	SE	B	SE	B	SE
Height										
Stepfather (ref: Father)	0.369	0.415	0.374	0.416	0.378	0.416	0.379	0.416	0.272	0.421
Mother Score	-	-	0.033	0.058	-	-	0.008	0.062	0.008	0.062
Partner Score	-	-	-	-	0.059	0.043	0.058	0.045	0.071	0.045
Stepfather * Partner Score	-	-	-	-	-	-	-	-	-0.437	0.263
School Test Score										
Stepfather (ref: Father)	-0.500*	0.243	-0.479*	0.243	-0.476	0.244	-0.469	0.244	-0.458	0.251
Mother Score	-	-	0.114**	0.044	-	-	0.067	0.046	0.067	0.047
Partner Score	-	-	-	-	0.119***	0.029	0.107***	0.031	0.106***	0.031
Stepfather * Partner Score	-	-	-	-	-	-	-	-	0.046	0.195
	IRR	95%CI	IRR	95%CI	IRR	95%CI	IRR	95%CI	IRR	95%CI
BDS										
Stepfather (ref: Father)	1.109**	1.037, 1.187	1.110**	1.025, 1.173	1.101**	1.029, 1.178	1.093**	1.021, 1.169	1.107**	1.034, 1.184
Mother Score	-	-	0.923***	0.914, 0.931	-	-	0.939***	0.930, 0.948	0.939***	0.930, 0.948
Partner Score	-	-	-	-	0.950***	0.943, 0.956	0.959***	0.952, 0.965	0.957***	0.951, 0.964
Stepfather * Partner Score	-	-	-	-	-	-	-	-	1.049*	1.003, 1.097

[†] p≤0.055 *p≤0.05 **p≤0.01 ***p≤0.001

Table 1: Results of regression models on Height (cm), Test Score and Behavioural Difficulty Score. Controls include mother's age at birth of child[†], child's age at measurement occasion[†], mother's height^{†‡}, gestation length^{†‡}, birth length^{†‡}, sex of child, ethnicity of child, number of siblings, home ownership, income, financial difficulty, mother's employment, partner's employment and mother's education (results not shown). [†] indicates that controls were mean-centred, and [‡] indicates that the controls were only included in the *Height* analysis

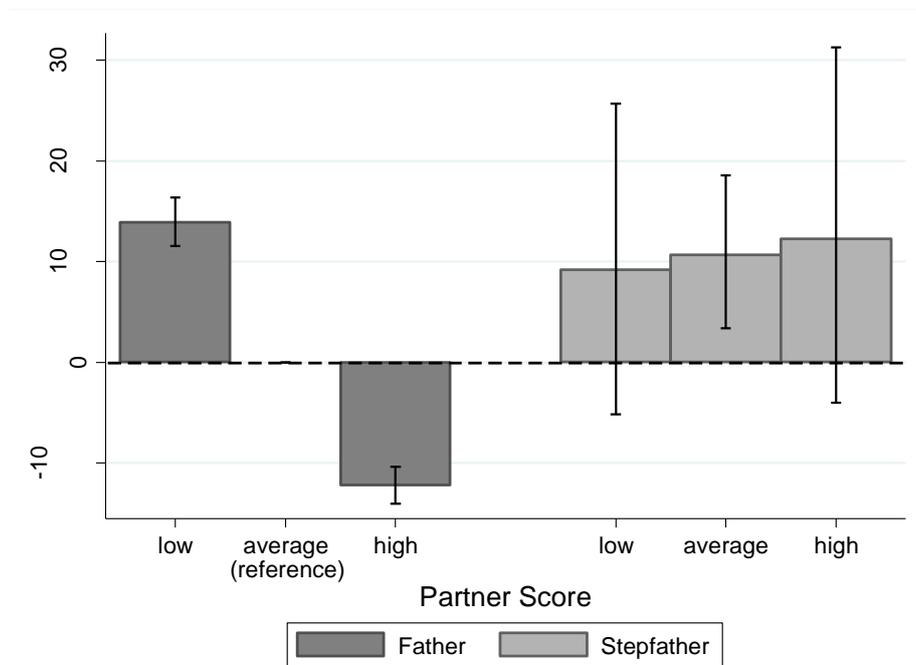


Fig. 3: Percentage Increase in Behavioural Difficulty Score by Partner Score, for Fathers and Stepfathers. The bar chart depicts the predicted % differences in behavioural difficulty score for low (-3), average (0) and high (3) partner scores, based on the Interaction Model. The error bars are 95% confidence intervals. Average partner score by fathers as the reference point of 0.

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