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Kin recognition and step-paternal investment: the effect of childhood co-residence duration

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Abstract

Evolutionarily relevant nepotistic kin investment requires reliable kin detection. Evolutionary scholars have argued that childhood co-residence is one of the most important indirect cues for kinship. While childhood co-residence duration has been found to correlate with kin investment in intragenerational studies (i.e., among siblings), intergenerational investigations considering the association between childhood co-residence duration and kin investment have been scarce. Here, we investigate whether the investment of biological and stepfathers is correlated with childhood co-residence duration. We used data from adolescents and adults (aged 17–19, 27–29, and 37–39 years) from the German Panel Analysis of Intimate Relationships and Family Dynamics (Pairfam), wave 2, collected in 2010–2011. Paternal investment was measured as financial and practical help, emotional support, intimacy, and emotional closeness. We found that while stepfathers invested less than biological fathers, both biological and stepfathers' investments increased with increased childhood co-residence duration in most measures. Financial help correlated with childhood co-residence in stepfathers but not in biological fathers who helped financially more than stepfathers regardless of childhood co-residence duration. Emotional support, intimacy, and emotional closeness were correlated with childhood co-residence in both biological fathers and stepfathers. Practical help did not correlate with co-residence in either father. Thus, our results partially support the hypothesis that childhood co-residence duration serves as a kin detection cue and directs intergenerational altruism.

Keywords: family, kin detection, paternal investment, kin investment, stepfather, parenting

1 Introduction

Both inbreeding avoidance (Bressan & Kramer, 2015) and nepotistic altruism (Hamilton, 1964) require kin detection. Individuals use various kin detection cues, which help determine the relatedness of a person. Such cues may not perfectly correspond to actual genetic relatedness, but might be "good enough" or might have been more accurate in the evolutionary past of our species. Such kin detection cues can be direct or indirect (Krupp et al., 2011). Direct cues can be further divided into self-referent (i.e., an individual compares themselves to an alleged relative) and other-referent (i.e., an individual uses information from an already recognized relative against which a person is compared) cues. Direct cues for kin detection include facial resemblance (Bressan & Kramer, 2015; Bressan & Zucchi, 2009) and smell (Brown and Eklund, 1994). However, in most cases, humans have to use indirect kin detection cues, which are available in our social environment. Arguably, one of the most important indirect cues for kin detection is duration of childhood co-residence (Lieberman et al., 2007).

Over a century ago, Westermarck (1901) claimed that co-residence during childhood provides a cue for genetic kinship. He argued that sexual aversion between individuals who have lived closely together in childhood has evolved because it helps avoid the harmful consequences of inbreeding. The most prominent evidence for the Westermarck hypothesis comes from anthropological research on sexual avoidance among genetically unrelated individuals who have been raised in "sibling-like" conditions. When unrelated children grow together in peer groups, childhood attachment often leads to sexual avoidance and disgust in later life (e.g., Lieberman, 2009; Lieberman & Lobel, 2012; Maryanski et al., 2012; Talmon, 1964; Wolf, 1993).

Importantly, the original Westermarck hypothesis was not restricted to *intra*generational bonds but also included *inter*generational family ties. In his book *History of Human Marriage*, Westermarck (1921, p. 194) stated that: "the normal want of inclination for sexual intercourse between persons who have been living closely together from the childhood of *one* or *both* of them is no doubt world-wide phenomenon." Although Westermarck himself considered the role of kin recognition in the case of marriage and sexual aversion rather than altruism and kin investment, the key theories of kin detection argue that the same cues for kin recognition should regulate both inbreeding avoidance and kin altruism (e.g., Billingsley et al., 2018; Lieberman

and Billingsley, 2016). Thus, close association in childhood should foster not only incest aversion but also kin altruism and investment (Lieberman et al., 2007).

In recent years, several studies have been conducted considering sibling altruism from a kin detection perspective (e.g., Bressan & Zucchi, 2009; Sznycer et al., 2016); however, *inter*generational studies considering the association between co-residence duration and kin investment have been scarce (see Anderson, Kaplan, Lam, et al., 1999; Anderson, Kaplan, & Lancaster, 1999; Hornstra et al., 2020). In this study, we investigated how duration of childhood co-residence between a child and a (step)father is associated with the investment of (step)fathers, and whether biological and stepfathers differ in their investment, in present day Germany. We operationalized kin investment using financial and practical help, emotional support, intimacy, and emotional closeness.

1.1. Step-paternal investment

Today, family arrangements have increasingly diversified in Europe compared to mid-20th century families; the number of families with stepfathers is increasing (Thomson, 2014). A similar, if not larger, variation in family arrangements may have existed in ancestral small-scale societies, as indicated by anthropological studies of contemporary hunter-gatherers (Bentley & Mace, 2009; Grey & Anderson, 2010) and historical populations (Pettay et al., 2020; Voland & Willführ, 2017). Moreover, the capacity to form stepfamilies is not a species-typical trait of humans but has also been observed in several birds (Rohwer, 1986; Rohwer et al., 1999) and primates (Smuts, 1985; Smuts & Gubernick, 1992).

When a man starts a union with a woman who has children, he becomes a stepfather (Gray & Anderson, 2010). Step fathering diverges from child adoption or fostering, where two adults together decide to become adoptive or foster parents before the child arrives. Stepchildren, in contrast, are already present at the beginning of the union of the mother and the incoming stepfather. Step fathering also diverges from non-paternity (i.e. man who is presuming to be child's father is not in fact the biological father) as stepfathers know that they are not related to their step-offspring. Although cues for paternity (e.g., facial resemblance) could be highly important drivers for the investment of biological fathers (Bressan & Kramer, 2015), these cues are rather irrelevant when the investment decisions of stepfathers are considered.

According to the life history theory, parental investment is defined as the allocation of any parental resource (e.g., time, energy, or nutrition) that benefits offspring but also incurs costs to the parent and their ability to invest in other (or future) offspring (Trivers, 1972). As predicted by kin selection theory, prior studies have shown that stepfathers tend to invest less than biological fathers (Anderson, Kaplan, & Lancaster, 1999; Flinn, 1988; Marlowe, 1999). However, stepfather investments are still important. For example, in historical populations, where having stepfather resulted from loss of biological father, a stepfather could potentially compensate in terms of family finances (Pettay et al., 2014, 2020; Willführ & Gagnon, 2013). In contemporary societies, stepfathers have shown to compensate for the absence of a biological parent by providing educational and socioeconomic stability (Erola & Jalovaara, 2017). Furthermore, relationships with stepfathers can continue into adulthood, and stepfathers might support their stepchildren even after they have left their childhood home (Hornstra et al., 2020; Klaus et al., 2012).

It has been assumed that step-paternal investment is highly dependent on childhood co-residence duration because close association during early age of the stepchildren can potentially increase step-parents' psychological attachment to them (Rotkirch, 2018). However, only a few studies have investigated whether and how co-residence duration shapes step-paternal investment. A study on Xhosa adolescents in South Africa found that childhood co-residence duration was an important predictor for stepfather investment on school expenditures (Anderson, Kaplan, Lam, et al., 1999). However, a study of New Mexican (US) men found no significant effect of co-residence duration on step-paternal investment on financial support (Anderson, Kaplan, & Lancaster, 1999). In the Netherlands, Hornstra et al. (2020) found that the longer the stepfather co-resided with the child in childhood, the closer the adult tie was, and there was more contact later in the child's life. While these studies correlated the duration of the relationship between stepfathers and stepchildren as a proximate mechanism for paternal investment, their limitation is that they did not test whether childhood co-residence duration differed between stepfathers and biological fathers.

Our study is among the first to examine whether the duration of childhood co-residence is related to the investment of both biological and stepfathers. We used data from the German Family Panel (Pairfam), which is an ideal dataset for this study as it offers information on both childhood household composition and intergenerational relationships (Huinink et al., 2011). We expect that kin detection mechanisms based on childhood co-residence should apply to

step-paternal investment. We predicted that the longer the co-residence duration with the stepchild, the higher the parental investment from the stepfather. Similarly, if co-residence duration directs investment through attachment, a similar pattern might direct the biological father's investment. However, since biological fathers are typically present at the time of the child's birth, attachment to the child should be stronger and investment higher; thus, among biological fathers, it could be less tied to the length of co-residency than among stepfathers (Lieberman et al., 2007).

2. Data and methods

2.1. Data

We used survey data from the Panel Analysis of Intimate Relationships and Family Dynamics (Pairfam), which offers information on intergenerational relations, childbearing, and several socio-ecological factors in Germany (Huinink et al., 2011). Pairfam provided longitudinal data on three birth cohorts born in 1971–1973, 1981–1983, and 1991–1993. We used wave 2 data conducted from 2010–2011, when the cohort members were aged approximately 17–19, 27–29, and 37–39 years; these data were used because questions related to childhood living arrangements and intergenerational relations were both recorded in this wave. The original sample of wave 2 consists of 9,069 individuals.

Given that we were measuring the relationship between the duration of co-residence during childhood (ages 0–18 years) and parental investment of stepfathers and biological fathers, respondents with adoptive parents were excluded (n = 50). We excluded observations from individuals with missing information on any model variables in the analyses, resulting sample of 6,129 individuals.

2.2. Measures

The dependent parental investment variables were intergenerational relation indicators such as: financial help, practical help, intimacy, emotional support, and emotional closeness. **Financial help** is a composite variable of consisting of mean of two variables (r=0.48). Participants were asked: 1) how often they received financial help from the parent in question during the past 12 months (ranging from never = 0 to very often = 4) and 2) how often they received gifts or money or valuables (more than 100 euros per gift) from the parent in question during the past 12 months (ranging from never = 0 to very often = 4). The other composite variable included

answers to questions of **intimacy with parents** (r=66). Participants were asked: 1) how often they told their parents about what they were thinking (ranging from never = 0 to always = 4) and 2) how often they shared secrets and private feelings with them (ranging from never = 0 to always = 4). **Practical help** was based on the question regarding how often the participant received help from the parent in question with shopping, housework, or yard work during the past 12 months (ranging from never = 0 to very often = 4). **Emotional support** was based on the question regarding how often the parent in question talked to the respondent about the respondent's worries and troubles during the past 12 months (ranging from never = 0 to very often = 4). **Emotional closeness** was based on the question regarding how close the respondent felt to the parent in question (ranging from not at all close = 0 to very close = 4).

The main independent variable was parental type: biological father or stepfather (mother's partner). Childhood co-residence duration with stepfather before age 18 was based on questions about living arrangements before the age of 18 years. We presumed that the last stepfather the respondent lived with during childhood would be the corresponding stepfather at the time of survey; hence, childhood co-residence duration was calculated as 18 years, or age of respondent if they were under 18, minus the age when the respondent started living with a stepfather. The range of co-residence duration for stepfathers ranged from 0 to 17 years. For biological fathers, length was calculated from the respondents' time of birth until the age of 18 years, until the father did not live with the respondent anymore, or the age at which the survey was taken if the respondent's age was under 18. The number of respondents who did not live with their biological father from birth or later during childhood was 269. We excluded those who did not live with their biological father from birth but lived with their father at some point(s) in later childhood, because their biological father was not present in early life as most fathers (32 individuals). Therefore, the range for co-residence duration for biological fathers ranged from 0 to 18 years (see Tables 1 and 2 for descriptive statistics). As we were interested in whether the length of childhood proximity was associated with parental investment differently in stepfathers and biological fathers, we included an interaction between the father type and childhood co-residence duration in the models.

Other variables included in the models were: gender (two levels: male and female), cohort (three levels: 1971–1973, 1981–1983, and 1991–1993), ethnicity (two levels: German and other), mother's education (two levels: higher and lower education), respondent's education (continuous: ranging from still enrolled to tertiary education), marital status (three levels: not married, married, and divorced/widowed), children (two levels: none, or one or more children),

whether parents separated before age 18 (two levels: no and yes), traveling distance to the residence of (step)father (continuous: ranging 0 = living in the same household to travel time takes three hours or more), and living with mother (two levels: no and yes). We also controlled whether the father was in a relationship with the respondent's mother; the biological father could be in either category, while stepfather, by definition, was the mother's current partner.

2.3. Data analyses

For the purpose of analysis, we reshaped the data into a long format, meaning that the observations were perspective of the respondent's biological or stepfather. The sample included approximately 6,651 observations, with some differences between sample sizes for each analysis due to missing values. Descriptive statistics for data in the long format are shown in Table 2.

All statistical analyses were performed using the Stata 16. We used linear regression to predict investment by the (step)father, and the results were visualized by calculating the predictive margins from the regression models. As the data are clustered within fathers (i.e., data include more than one observation from the same respondent), we used Stata's statistical software cluster option to compute the standard errors. We performed ordered logit regression models as a sensitivity analysis with similar results (not shown). To help interpret and visualize, we calculated the predictive margins from the regression models (Williams, 2012).

3. Results

3.1. Financial investment

The results showed that the relationship between the duration of childhood co-residence and financial investment (financial help and gifts) differed between biological and stepfathers (see Table 3 for details). Although stepfathers' investments increase with increasing childhood co-residence duration, biological fathers' investments do not depend on the duration of childhood co-residence (Figure 1).

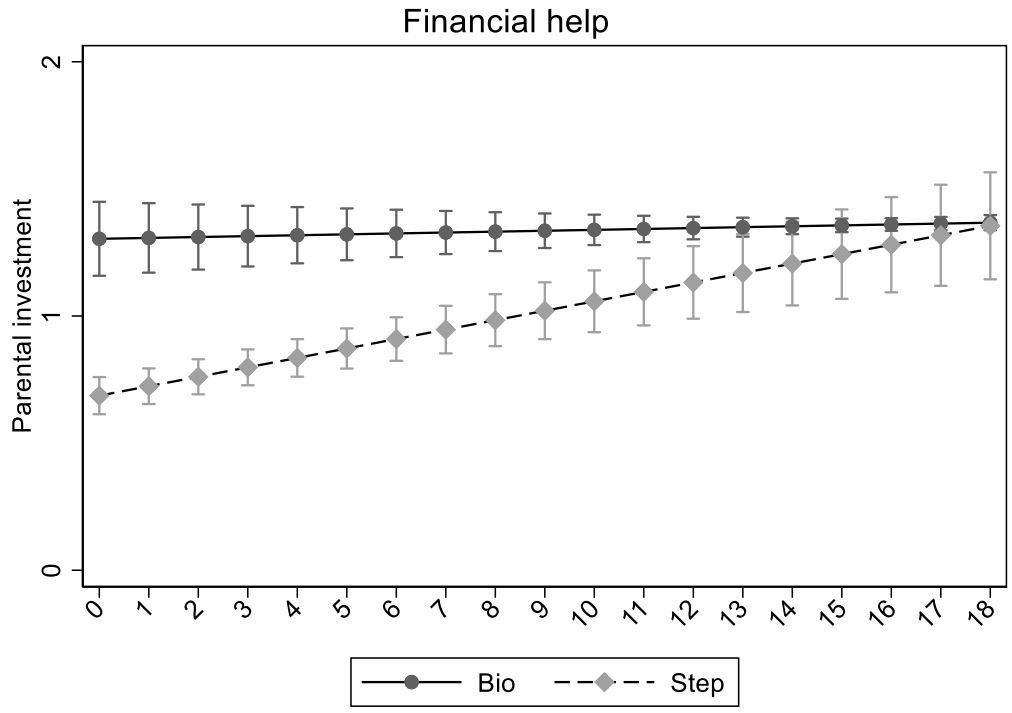

Figure 1. Association between childhood co-residence duration and financial investment provided by biological fathers (Bio) and stepfathers (Step). Predictive margins and 95% confidence intervals from regression model (see table 3 for statistical details)

The oldest cohort received less financial investment than the youngest cohort, possibly because the oldest cohort was 37–39 years old and were likely to be financially independent compared to the youngest cohort, that was 17–20 years old. Financial investment was higher if the father was in a relationship with the mother compared to a divorced father. Financial help was higher when respondent's mother had higher education, respondents were female, ethnicity was other than German, and respondents lived with their mothers. Longer traveling distance to the residence of biological fathers and stepfathers decreased financial investment. Overall, paternal investment was less if parents divorced during childhood.

3.2. Practical help

Stepfathers were less likely to provide practical help (e.g., help with housework, yard work, and shopping) than biological fathers. Childhood co-residence duration was not related to practical help, and this did not depend on parental type (Table 3, Figure 2). Longer traveling distance to the residence of biological fathers and stepfathers decreased help, whereas a father

who was in a relationship with the mother was related to increased practical help, as well as respondents' higher education.

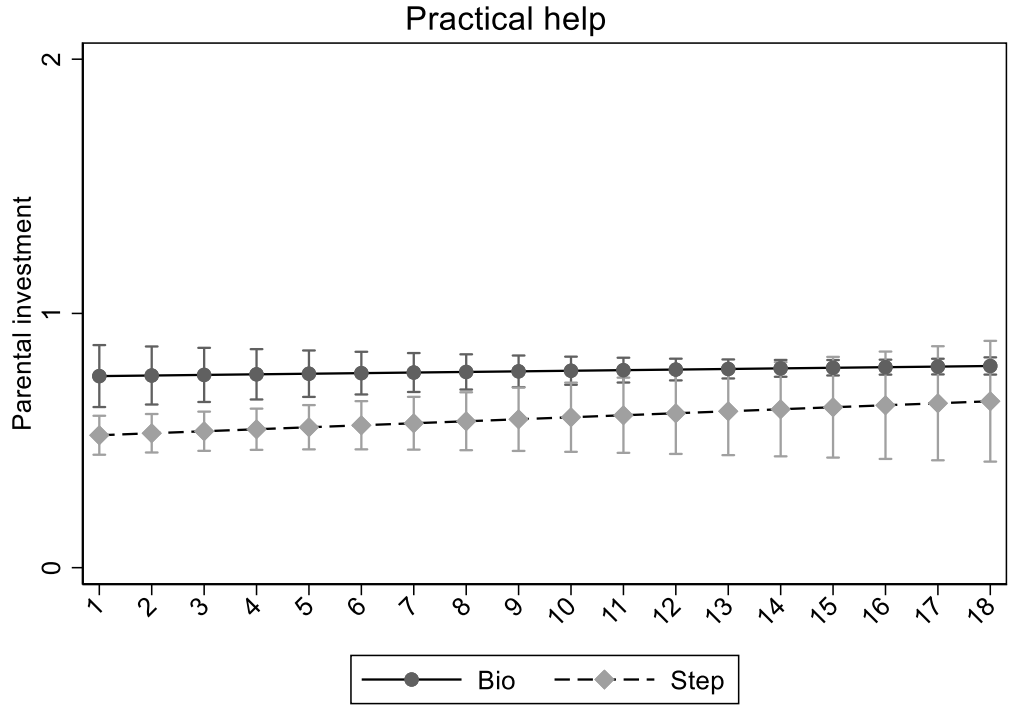

Figure 2. Association between childhood co-residence duration and practical help provided by biological fathers (Bio) and stepfathers (Step). Predictive margins and 95% confidence intervals from regression model (see table 3 for statistical details).

3.3. Emotional support

Childhood co-residence duration was positively related to the amount of emotional support received from both biological fathers and stepfathers. Overall, stepfathers' emotional support was lower than that of biological fathers (Table 3, Figure 3). Higher emotional support was also related to being female, having a mother with higher education, and the father being in relationship with the mother, whereas respondent having at least one child was associated with lower emotional support.

Figure 3. Association between childhood co-residence duration and emotional support provided by biological fathers (Bio) and stepfathers (Step). Predictive margins and 95% confidence intervals from regression model (see table 3 for statistical details).

3.4. Intimacy

The relationship with stepfathers was less intimate than with biological fathers. Childhood co-residence duration had a positive relationship with both biological fathers and stepfathers (see Table 3 and Figure 4). Being female, mother's higher education, being married, and father being in a relationship with the mother were all related to greater intimacy. Being a member of the oldest age cohort (compared to the youngest cohort), ethnicity other than German, longer traveling distance to the residence of biological fathers and stepfathers decreased, and having at least one child were associated with lower intimacy.

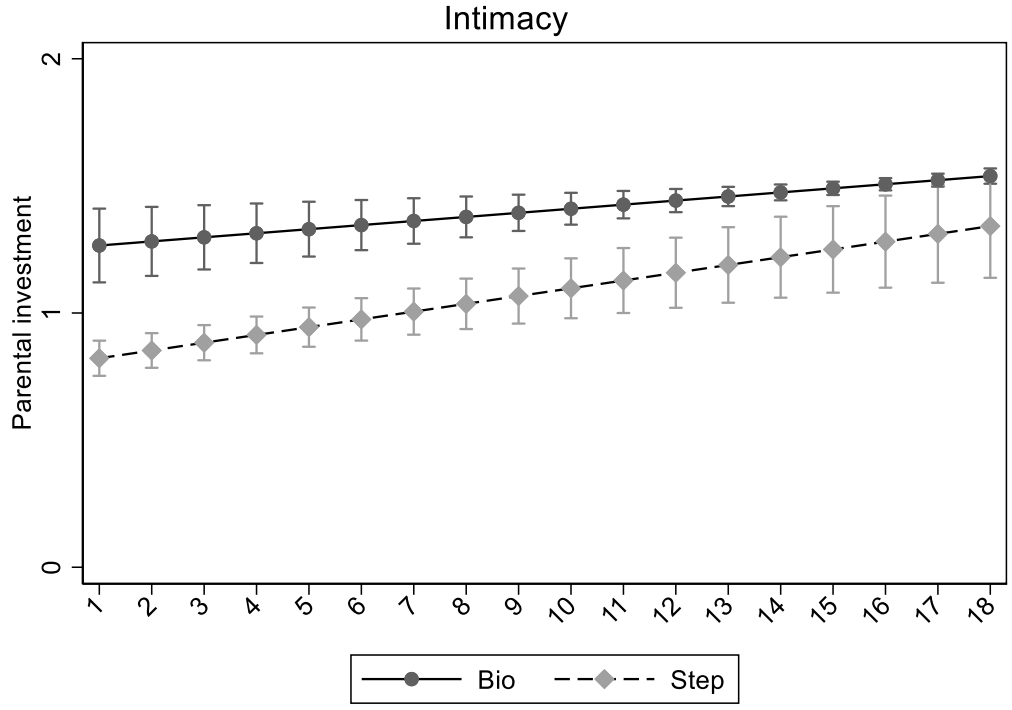

Figure 4. Association between childhood co-residence duration and intimacy between respondent and biological fathers (Bio) and stepfathers (Step). Predictive margins and 95% confidence intervals from regression model (see table 3 for statistical details).

3.5. Emotional closeness

Emotional closeness increased with childhood co-residency in both fathers (Table 3, Figure 5). Overall, respondents felt less close to stepfathers than biological fathers. Emotional closeness was also negatively correlated with respondents' education and traveling distance to the residence of both biological fathers and stepfathers, whereas fathers' relationships with mothers were associated with higher emotional closeness.

Figure 5. Association between childhood co-residence duration and emotional closeness between respondent and biological fathers (Bio) and stepfathers (Step). Predictive margins and 95% confidence intervals from regression model (see table 3 for statistical details).

Table 1. Descriptive statistics of respondents.

	No of obs.	%	Mean	SD
Respondents' age	6,129		25.17	8.34
Birth cohort				
1991–1993	2,774	45.26		
1981–1983	1,753	28.60		
1971–1973	1602	26.14		
Respondents' gender				
Male	2,988	48.75		
Female	3,141	51.25		
Respondents' ethnicity				
German native	4,893	79.83		
Other	1,236	20.17		
Respondents' education				
Currently enrolled	1,886	30.77		
Primary and lower secondary	625	10.2		
Upper secondary	1,868	30.48		
Post-secondary	653	10.65		
Tertiary	1,097	17.9		
Mothers' education				
Lower level education	4,852	79.16		
Higher level education	1,277	20.84		
Respondent lives with the mother				
No	3,069	50.07		
Yes	3,060	49.93		
Parents divorced during childhood				
No	5,054	82.46		
Yes	1,075	17.54		
Marriage status				
Never married	4,393	71.68		
Married	1,564	25.52		
Divorced	172	2.81		
Children				
No children	4,392	71.66		
One or more child	1,737	28.34		

Table 2. Descriptive statistics of long format data (observations).

	Biological father			Stepfather		
	n	%/mean	SD	n	%/mean	SD
Number of observations	5,644	84.85		1,007	15.15	
Childhood co-residence duration	5,644	16.38	3.64	1,007	3.10	4.85
Relationship with the mother						
Not in a relationship with the mother	1,207	18.14		-	-	
In a relationship with the mother	4,437	66.72		1,007	15.14	
Travel time to parent's dwelling						
Live in the same house	2,651	39.86		353	5.31	
Less than 10 minutes	852	12.81		133	2.00	
10–30 minutes	737	11.08		175	2.63	
30–60 minutes	413	6.21		126	1.89	
1–3 hours	404	6.07		95	1.43	
3 hours or more	587	8.82		125	1.88	

4. Discussion

In the current study, we aimed to investigate whether the duration of childhood co-residence is associated with paternal investment of stepfathers and biological fathers, as the extended Westermarck hypothesis predicts (Westermarck, 1901). Moreover, we examined whether biological fathers invest more than stepfathers, even when controlling for childhood co-residence. According to the extended Westermarck hypothesis, co-residence during childhood provides a cue for genetic kinship, which, in turn, directs parental investment. How the Westermarck effect directs altruistic behavior in intergenerational relations has not been studied before. In line with this prediction derived from the Westermarck hypothesis, our data from contemporary adolescents and adult Germans partially supported the hypothesis that duration of childhood co-residence was related to parental investment from both stepfathers and biological fathers. Thus, our results are in line with previous research, which found that the length of the parental investment period is related to the quality of (step)father–child relations (Hornstra et al., 2020) and financial investment (Anderson, Kaplan, Lam, et al., 1999; Anderson, Kaplan, & Lancaster, 1999). These results suggest that a longer co-residence

duration during childhood provides an opportunity for stepfathers to bond and build a relationship with the child, which leads to emotional closeness and parental help.

One strength of this study is the investigation of different forms of paternal investment—economic and practical help, and investment related to social/emotional support. Financial investment, including financial help and valuable gifts, was related to childhood co-residence duration differently in biological fathers and stepfathers. Although biological fathers' investment was roughly the same regardless of childhood co-residency duration, the stepfathers' financial investment correlated with childhood co-residence duration and was approximately at the same level as investment from biological fathers when they had co-resided with the respondent for approximately the entire childhood. According to the life history theory, parental investment, in any form, is cost (e.g., food and time) associated with raising an offspring, which reduces the parents' ability to produce or invest in other offspring (Trivers, 1974). Therefore, in light of this theory, financial investment might be the clearest measure of parental investment because money used for the offspring is the cost, which prevents it from being allocated elsewhere. For example, it has been suggested that child support given to children could potentially decrease the reproductive success of divorced fathers, although the results are inconclusive as paying child support can also function as an honest signal of parenting and can be attractive to women (Anderson, 2011). However, we did not find a statistically significant interaction between father type and childhood co-residence duration in other measures of parental investment (intimacy, emotional support, emotional closeness, and contact frequency); nevertheless, co-residency duration was positively correlated with the level of investment in both types of fathers, suggesting a similar mechanism. Practical help was the only form of investment that did not correlate with childhood co-residence duration. Overall, both types of fathers provided little practical help.

We also predicted that the investment of biological fathers would be higher than that of stepfathers, even when childhood co-residence is taken into account. This was true for every other form of investment except financial investment, in which case, the full co-residence time seems to remove the difference between biological and stepfather. Higher investment of biological fathers than stepfathers is in line with kin selection theory and previous studies (Anderson, 2012).

Emotional closeness is suggested to mediate investment (Korchmaros & Kenny, 2001). However, regardless of whether closeness is a mediator for investment or can be considered an investment, the extended Westermarck effect hypothesis predicts emotional closeness to correlate with childhood co-residence duration between (step)father and child. Our results suggest that even though emotional closeness with stepfathers was lower compared to biological fathers, closeness correlated positively with childhood co-residence duration, supporting the extended Westermarck hypothesis.

Fathers' relationship with the mothers was a statistically significant predictor of the level of investment in all the studied investment types. This is not surprising as many studies suggest that part of the paternal effort is directed to impress one's mate and can be a "relationship effort" (Anderson, Kaplan, & Lancaster, 1999; Rohwer et al., 1999). However, after controlling for fathers' relationship status with the mothers, we still found an effect of co-residence duration, which suggests that at least part of paternal investment is parental care resulting from emotional bonding with the child during childhood. However, our result regarding the relationship status with the mother applies only to biological fathers as stepfathers in this data were current partners with the mother. Unfortunately, we thus cannot confirm whether the child's relationship with the stepfather continues if the stepfather's relationship with the mother ends. Furthermore, women are typically more active in enforcing social bonds within families (Rosenthal, 1985), and this might partly explain why fathers' relationships with the mothers are important predictors of paternal investment.

A possible limitation of this study is that we cannot be sure that the last childhood co-residency before age 18 with the mother's partner corresponds to the partner mother had at the time of the survey. This might be a source of error, but due to the moderate sample size, this error is not likely to affect the findings. When comparing stepfathers with biological fathers, it is important to note that biological fathers co-resided with their children at least during the first year of life, and in this study's population, paternity certainty is high; therefore, biological fathers knew that the respondent was their kin. Considering this, it is even more surprising that childhood co-residence duration is related to the amount of investment from biological fathers in emotional response variables (emotional support, intimacy, and emotional closeness). Unfortunately, we could not control for (step)fathers' socioeconomic status. However, missing information on the socioeconomic status of (step)fathers is not detrimental to interpreting our results because while socioeconomic status is likely to relate to how much (step)fathers can

invest, especially financially, this should not affect the relationship between childhood co-residence and investment.

To the best of our knowledge, this study is the first to apply the Westermarck hypothesis to investigate intergenerational altruism. Only a few studies have investigated how co-residency duration affects stepfather-stepchild relations in different populations (Anderson, Kaplan, Lam, et al., 1999; Anderson, Kaplan, & Lancaster, 1999; Hornstra et al., 2020). Currently, the mechanisms by which men bond with children or choose to invest in them are not well known, while supporting good relationships within blended/mixed families is important for the well-being for all parties. Our results suggest that co-residence during childhood is a potential bonding mechanism between stepfather and stepchild. The stepfather-stepchild relationship that starts when the child is young takes form differently than the relationship that starts when a child is an adolescent or an adult; acknowledging this could help interpret family dynamics better. Future studies should explore whether childhood co-residence and step parental investment are related in different populations and contexts, and whether this relationship carries investment in the next generation, i.e., grandchildren.

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Table 3. Regression model analysis for financial help, practical help, emotional support, intimacy, and closeness.

	Financial Help			Practical help			Emotional support			Intimacy			Emotional closeness		
	n = 6,622			n = 6,549			n = 6,620			n=6,650			n = 6,643		
	β(SE)	SE	p-value	β	SE	p-value	β	SE	p-value	β	SE	p-value	β	SE	p-value
Father type (biological father)															
Stepfather	-0.62	0.08	<.0001	-0.24	0.07	<.01	-0.34	0.09	<.0001	-0.46	0.08	<.0001	-0.62	0.10	<.0001
Childhood co-residence duration	0.00	0.005	0.44	0.0	0.0	0.58	0.02	0.01	<.0001	0.02	0.005	<.01	0.02	0.01	<.0001
Father type* childhood co-residence duration	0.03	0.01	<.0001	0.01	0.01	0.53	0.005	0.01	0.60	0.01	0.01	0.08	0.01	0.01	0.19
Gender (male)															
Female	0.10	0.02	<.0001	0.03	0.03	0.23	0.25	0.03	<.0001	0.10	0.02	<.0001	0.004	0.03	0.86
Cohort (1991-1993)															
1981-1983	-0.62	0.05	<.0001	-0.08	0.06	0.20	-0.02	0.06	0.75	-0.01	0.05	0.79	0.072	0.06	0.20
1971-1973	-0.83	0.06	<.0001	-0.06	0.08	0.44	-0.07	0.07	0.32	-0.13	0.06	0.03	0.02	0.07	0.78
Distance (continuous)	-0.05	0.01	<.0001	-0.15	0.01	<.0001	-0.005	0.01	0.62	-0.02	0.01	0.03	-0.08	0.01	<.0001
Ethnicity (German)															
Other	0.07	0.03	0.02	0.04	0.03	0.25	-0.06	0.03	0.08	-0.07	0.03	0.02	-0.02	0.03	0.54
Mother education (lower level education)															
Higher level education	0.17	0.03	<.0001	-0.05	0.03	0.09	0.11	0.03	<.0001	0.08	0.03	<.01	-0.01	0.03	0.67
Marriage status (never married)															
Married	-0.13	0.04	<.01	0.06	0.05	0.22	0.06	0.05	0.17	0.10	0.04	<.01	0.05	0.05	0.33
Divorced	0.002	0.08	0.98	-0.08	0.08	0.29	-0.07	0.09	0.41	-0.02	0.08	0.80	-0.08	0.10	0.40
Education (continuous)	-0.0002	0.01	0.99	0.05	0.01	<.0001	0.01	0.01	0.705	-0.01	0.01	0.44	-0.05	0.01	<.01
Children (none=0)	-0.04	0.04	0.28	0.04	0.05	0.37	-0.16	0.05	<.0001	-0.13	0.04	<.01	-0.07	0.05	0.14
Respondent lives with mother	0.12	0.05	0.02	-0.02	0.06	0.71	0.05	0.05	0.32	0.02	0.05	0.69	-0.03	0.05	0.58
Parents divorced during childhood (none=0)	-0.15	0.04	<.01	-0.01	0.05	0.89	0.07	0.05	0.15	-0.01	0.04	0.88	-0.06	0.05	0.29
Father in relationship with mother (none=0)	0.29	0.04	<.0001	0.25	0.04	<.0001	0.25	0.04	<.0001	0.23	0.04	<.0001	0.43	0.05	<.0001
Constant	1.44	0.10	<.0001	0.70	0.10	<.0001	0.62	0.11	<.0001	1.09	0.10	<.0001	2.31	0.12	<.0001