Do Step- and Biological Grandparents Show Differences in Investment and Emotional Closeness With Their Grandchildren?

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Abstract

Human children are raised by a variety of caregivers including grandparents. A few studies have assessed potential differences in direct caregiving, financial expenditures, and emotional closeness between biological and step-grandparents. Drawing upon kin selection theory, we hypothesized that step-grandparents would provide less care and be less emotionally close to grandchildren than would biological grandparents. A sample of 341 heterosexual U.S. adults 25–35 years of age in a long-term partnership and with a biological child 5 years of age or younger were recruited via Amazon Mechanical Turk. Subjects provided sociodemographic information and answered questions about the dynamics between their own parent/stepparent and their own youngest biological child (hence, biological/step-grandparenting dynamics). Main analyses were restricted to within-subject comparisons. Results showed that biological grandmothers provided more direct childcare, financial expenditures, and had more emotionally close relationships with grandchildren than did step-grandmothers. Biological grandfathers provided less direct care and had less emotionally close relationships than step-grandfathers but did not exhibit differences in financial expenditures. Biological grandmothers provided more direct care, financial investment, and were more emotionally close to the referential grandchild than were biological grandfathers. Step-grandfathers were more emotionally close and more often played with grandchildren than step-grandmothers. These findings partially support kin selection theory. We discuss the relevance of factors such as competing demands on grandmothers’ investment in biological and step-grandchildren and grandfathering serving in part as mating effort. Sex differences in biological grandparenting also mirror those in parenting. We suggest directions for future research, including on grandfathers, particularly in patrilineal societies.

Keywords
grandparents, kin selection, grandmother, grandfather, cooperative breeding

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Human children are raised by a variety of caregivers, leading some scholars to characterize humans as cooperative breeders (Hrdy, 2009; Kramer, 2010). Hunter-gatherer studies show that a variety of caregivers supplement mothers’ direct childcare (Hewlett & Lamb, 2005; Meehan & Crittenden, 2016). Research in forager and horticultural societies suggests that human children require an estimated 13 million calories from others before reaching nutritional independence (Kaplan, Hill, Lancaster, & Hurtado, 2000). The slow pace of human development, combined with short interbirth intervals, contributes to a challenge of simultaneously caring for multiple dependent offspring. Whereas various evolutionary models address the phylogenetic and adaptive bases of shared human childcare (see Gray & Crittenden, 2014; Hublin, Neubauer, & Gunz, 2015; Kramer & Otárola-Castillo, 2015), grandmothers regularly serve important roles as allomaternal caregivers (Hawkes, 2003; Voland, Chasiotis, & Schiefenhövel, 2005).

In a review of 45 populations, Sear and Mace (2008) found that maternal grandmothers were positively associated with offspring survival in a majority of studies. By contrast, grandfathers were positively associated with child survival in only about 20% of cases, with paternal grandfathers exhibiting a negative effect on 25% of relevant cases. Whereas

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grandparents have an effect on child survival, the extent and direction of that impact is influenced by sex and lateral kinship status of the grandparent. Although a body of research addresses the impacts and patterned investment of biological grandparents, little has been done to elucidate the impacts and investment of step-grandparents. This study aims to address a gap in our understanding of grandparenting by testing hypotheses about potential differences in the direct caregiving, financial expenditures, and emotional closeness of biological and step-grandparents with their grandchildren. Moreover, the present study focuses on within-subject comparisons in biological and step-grandparenting, given that many between-subject differences in grandparenting may confound straightforward tests of hypotheses regarding the role of biological relatedness. We feature straightforward univariate within-subject analyses of a U.S. Amazon Mechanical Turk (MTurk) sample although many factors influence grandparenting.

Biological Grandparents

According to kin selection theory, individuals are more likely to invest in individuals to whom they are related (Hamilton, 1964). Put another way, the reproductive cost of helping an individual should be weighed against the reproductive benefit multiplied by the relatedness of the giver to the receiver of help. In brief, individuals should be more willing to invest, and in larger amounts, in individuals to whom they are more closely related, such as a grandchild, sister, or niece/nephew (Crittenden & Marlowe, 2008; Ivey, 2000; Sear & Coall, 2011). Grandparents can invest in grandchildren and indirectly increase their inclusive fitness or total genetic contribution to future generations. This offers a large potential benefit with simultaneous low cost because older individuals may no longer be able to have a child of their own or afford risks associated with having a child themselves. For example, Sear, Mace, and McGregor (2000) found that the presence of maternal grandmothers significantly reduced child mortality in rural Gambia, thus helping increase the grandmother’s inclusive fitness. Grandparental caregivers can also influence their inclusive fitness by reducing the interbirth intervals of daughters (and potentially grandchildren). Snopkowski and Sear (2013), using data from 1987 Thailand, found that living with either maternal or paternal grandparents decreased the time between marriage and first child, thus making more efficient use of a mother’s fertile period; however, subsequent pregnancies were not affected. This pattern is mirrored in a 19th century sample of Utah families: Families whose grandparents were still alive had shorter interbirth intervals than families whose grandparents were deceased (Christensen, 2009). A possible explanation for this pattern is that the presence of a grandparent may reduce the caloric burden on mothers, in turn shortening the period of lactational amenorrhea (Coall & Hertwig, 2010; Sear & Mace, 2008). However, whereas these examples seem to accord with kin selection theory, human allomotheral care is considerably facultative, with many factors other than relatedness influencing grandparental care (Coall & Hertwig, 2010; Snopkowski & Sear, 2016; Valeggia, 2009).

Many studies suggest matrilineal family members may invest more and have larger impacts on child survival than patrilineal family members (e.g., Euler & Michalski, 2007; Laham, Gonsalkorale, & von Hippel, 2005). For example, among Aka hunter gatherers, residential patterning influenced access and caregiving: Children living near maternal grandparents received more investment than children living near paternal grandparents (Meehan, 2005). In a Puerto Rican sample, women living within closer proximity to the maternal grandmother experienced lower risks of infant mortality, but this pattern was not the same for paternal grandparents (Scezza, 2011). Even in a patrilineally structured society—the Dogon of Mali—the survival of matrilineal grandparents was associated with lower rates of infant mortality (Strassmann & Garrard, 2011). In addressing the influence of parental sex on grandparental investment in a U.S. sample, Michalski and Shackelford (2005) found that grandparents invested more heavily in the grandchildren of daughters than the grandchildren of sons. They suggest contact frequencies as a possible explanation, as grandparents saw the children of their daughters more often than the children of their sons. Other interpretations of matrilateral biases have drawn on the inheritance of the X-chromosome (Fox, Johow, & Knapp, 2011; Rice, Gavrilets, & Friberg, 2010) and paternity uncertainty. Because all fathers are inherently less confident in their genetic relatedness to their offspring (paternity uncertainty, unlike maternity certainty), grandfather cannot be 100% sure of their relationship to both their immediate offspring and thus their grandchildren of either sex. Accordingly, paternal grandparents, particularly paternal grandfathers, may be less likely to provide resources in grandchildren whose relatedness to them is inherently less certain (e.g., Danielsbacka, Tanskanen, Jokela, & Rotkirch, 2011). This may also help explain why many studies find that grandmothers provide more care than grandfathers (Coall & Hertwig, 2010; Euler & Weitzel, 1996; Sear & Mace, 2008).

Two closely intertwined factors shaping grandparental care are proximity and residential patterning. As noted above, these may covary with other factors such as paternity certainty, making it difficult to isolate the effects of a specific variable. Snopkowski and Sear (2016) found that geographic closeness was connected to an increase in contact and that this increase in contact positively impacted helping behavior; in other words, grandparents who lived closer to grandchildren were able to provide more care because they had greater access. In a large Belgian sample, grandparental contact was mediated by residential arrangements: When children of divorced parents lived with their fathers, they more often had contact with their paternal grandparents; otherwise, trends indicated more contact with maternal grandparents (Jappens & Van Bavel, 2016). In a retrospective German sample, grandchildren reported increased emotional closeness to the same grandparents with whom they had greater interaction frequencies (Euler & Weitzel, 1996). On the other hand, a
U.S. sample indicated that grandparental emotional closeness to parents mediated grandparental closeness with grandchildren (Michalski & Shackelford, 2005). These studies suggest that proximity and parent–grandparent dynamics contribute to grandparental investment.

**Step-Grandparents**

Humans are often categorized as either serially monogamous or slightly polygynous (Fisher, 1989; Gray & Garcia, 2013). Whether after the dissolution of a relationship by separation or a partner’s death, repartnering helps provide the opportunity for stepparenting (Gray, Garcia, Crosier, & Fisher, 2015). However, little attention has been given to step-grandparents. There are many family structures, which may result in step-grandchildren. Pashos, Schwarz, and Bjorklund (2016) identify three types: stepparent of parent, parent of stepparent, and stepparent of stepparent. The remainder of this article will focus on one type: stepparent of parent.

A step-grandparent, just like a stepparent, is not directly genetically related to the step-grandchild. This observation recognizes the importance of relatedness (and kin selection) and also draws upon insights from a sizable body of research that has investigated predictors and consequences of stepfather involvement. Research by Daly and Wilson (1985, 1998) has shown children with at least one stepparent are more likely to experience abuse than children with two biological parents or children of single parents. A review of family violence finds that male stepfigures are regularly associated with increased risk of violence toward children but that other factors such as child’s age are also relevant (Archer, 2013). This same review article highlights the importance of within-subject analyses (like in the present article’s focus on grandparenting) to address the variety of potentially confounding factors that otherwise challenge straightforward tests of genetic relatedness and childcare. Fathers in a Trinidadian village were less argumentative with biological children than stepchildren and interacted more frequently with biological children (Flinn, 1988). The presence of stepmothers has been shown to have negative associations with child outcomes. For example, across sociodemographic groups, when children lived with a stepmother, they were less likely to receive proper health services such as yearly checkups or visits to the dentist (Case & Paxson, 2001). Negative child outcomes associated with stepmothering may have multiple pathways, such as a stepmother’s less emotional attachment to children, ambiguity over authority, or a child’s perception that a stepparent may be a barrier to his or her relationship with a biological parent.

Evolutionary theorists have proposed that the behaviors of a stepparent may be more fueled by mating effort, in other words, the stepparent cares for a stepchild in order to have access to a mate. Men who enter into a stepparent role may do so because the alternative may result in lack of a long-term mate and genetic offspring (Anderson, 2000). In support of this idea, men in Albuquerque invested more in the children of their current partner than the children of former partners, especially the stepchildren of former partners (Anderson, Kaplan, & Lancaster, 1999). In the Caribbean island of St. Kitts, among fathers residing with both biological and stepchildren, fathers reported lower emotional closeness with stepchildren but provided comparable resources to biological and stepchildren (Gray et al., 2015). Because step-grandparents are often past reproductive age, potential mating effort via care for step-grandchildren less often translates to reproductive benefits.

Is there any evidence of potential distinctions in step- and biological grandparenting? Several other studies looked at child outcomes according to household measures of relatedness, of which step-grandparenting was a part but not a specific focus (see Coall & Hertwig, 2010). A qualitative study of step-grandmothers indicated that step-grandmothers felt that their relationship with the child’s parents was a major factor in their emotional investment in step-grandchildren (Tisdale, 2003). In what may be the first direct quantitative assessment of comparisons in biological and step-grandparenting, researchers investigated almost 23,000 grandparents in 12 European countries (Coall, Hilbrand, & Hertwig, 2014). Here, biological grand-parents more often provided care (e.g., daily care to a grand-child) than did step-grandparents (Coall et al., 2014). Biological grandparents also lived closer to grandchildren than step-grandparents, although there were no sex differences in grandparental care (e.g., no differences between grandmothers and grandfathers). The authors note that, “[B]ecause we were unable to establish whether grandparents have both biological and non-biological children, we were not able to conduct within-family comparisons” (Coall et al., 2014, p. 9). Our methodological approach in the present article sought to directly address that limitation by focusing on within-subject comparisons in biological and step-grandparenting (and making comparisons with respect to a single referential grand-child). Another study investigated respondents’ childhood retrospective) reports of grandparental investment and perceived emotional closeness to grandparents in both Germany and the United States (Pashos, Schwarz, & Bjorklund, 2016). Respondents reported less investment by and less emotional closeness with step-grandparents than biological grandparents. Interestingly, biological grandmothers were more investing than biological grandfathers, whereas step-grandmothers were less investing than step-grandfathers (at least among step-grandparents partnered with a biological grandparent).

The present study has several notable merits. A few studies have investigated step-grandparent investment despite the involvement of many step-grandparents in blended families (Coall et al., 2014; Jappens & Van Bavel, 2016). Our study adds to this small literature. The analyses we feature here rely on within-subject contrasts (e.g., differences between grandparents who have both biological and step-grandchildren): These control for potential between-subject confounds and address the limitation highlighted by Coall, Hilbrand, and Hertwig’s (2014) study of European grandparenting. We include the distinct measures of direct caregiving, financial expenditure, and emotional closeness, given that these measures may or may not align with each other (e.g., financial expenditures
may be shaped by various factors besides emotional closeness). We test two hypotheses specifying that (1) step-grandmothers and (2) step-grandfathers will exhibit less involved relationships with grandchildren than biological grandparents. More specific predictions are that step-grandmothers will have lower (1a) measures of direct caregiving, (1b) financial expenditures, and (1c) lower emotional attachment than biological grandmothers. Similarly, we predict that step-grandfathers will have lower (2a) measures of direct caregiving, (2b) financial expenditures, and (2c) lower emotional attachment than biological grandfathers.

**Method**

**Sample**

Recruitment was conducted in the United States via an online crowdsourcing platform, Amazon MTurk, from June to July 2016. Participants were given $0.15 for completing a brief survey. Completion took, on average, 2.5 min. After agreeing to begin the survey, participants were directed to a Qualtrics-based survey where informed consent was obtained. Upon completion of the survey, participants were given a unique code, which then had to be entered into MTurk to receive their compensation. Consent to complete this study was obtained from the University of Nevada, Las Vegas Institutional Review Board (IRB).

The sample relied upon the parents of children with at least one living grandparent and with a youngest child 5 years of age or younger. Participants were restricted to those currently in a heterosexual romantic partnership and between 25 and 35 years of age. Participant sex was not restricted. Data from 873 surveys were obtained. Data from individuals who did not fit the inclusion criteria, incomplete surveys, second surveys from an IP address that had previously participated, and surveys with ambiguous answers such as “a lot” were removed. The primary cause for exclusion was the participant falling outside the required age range. The resulting sample size was 341 participants, although there were a few missing responses for a few items.

**Survey Items**

To assess grandparental investment, participants were asked to complete a survey. The survey followed a set presentation flow. All participants were asked basic demographic questions—if their parents had separated, if they had remarried, and questions concerning the biological grandmother and grandfather related to the parent participant; only participants that indicated they had a given stepparent were asked questions concerning that stepparent.

The following questions were asked in reference to each relevant grandparent, resulting in a maximum of four possible grandparents (biological grandmother, biological grandfather, step-grandmother, and step-grandfather). Two measures of direct grandparenting were obtained: “How often does your biological mother babysit or take care of your youngest child?” and “When your child and biological mother are near each other, how often does your biological mother engage in play activities with your child?” Both questions were answered using 5-point Likert-type scales ranging from never (1) to always/every time (5). Financial investment was assessed using two questions. One of these was, “In the past 12 months, how much financial assistance would you estimate your biological mother has given to you in hopes of providing for her grandchildren?” Any numerical answer was accepted. The second question was, “How often does your biological mother purchase clothes, shoes, or diapers for your youngest child?” Possible answers were never (1), rarely (2), sometimes (3), often (4), and always (5). Measures of emotional closeness between grandparents and parent as well as between grandparent and child were obtained using a 5-point Likert-type scale. Participants were asked “How emotionally close do you think you are to your biological mother?” and “How emotionally close is your youngest child to your biological mother (your child’s biological grandmother)?” Possible answers include Not at all (1), slightly (2), moderately (3), very (4), and extremely (5). To discern proximity between grandparents and grandchildren, participants were asked “How close do you live to your (biological mother, biological father, stepmother, and stepfather) via automobile (car, bus, ride share, etc.)?” Possible answers included I live with her (1), I live 10 min away from her (2), I live within an hour (3), I live in another city (4), and I live in another country (5).

**Statistical Method**

Analyses were run on SPSS, Version 23. Descriptive data are reported as medians, means (SD), and counts when appropriate. Univariate analyses were conducted using Wilcoxon rank-sum tests, which enable within-subject comparisons of grandparenting based on nonnormally distributed data with unequal variances. The z value was set to .05.

**Results**

**Basic Descriptive Data**

A sample of 341 participants met inclusion criteria. Participants were an average of 29.7 (3.1) years of age and reported an average of 1.7 (1.2) children. The average age of mothers was 56.1 (6.4) years, and the average age of fathers was 58.9 (6.7) years. Some 147 (43.1%) of subjects reported that their parents had separated. Of those whose parents separated, fathers (n = 86/144, 59.7%) were more likely to have remarried than mothers (n = 68/144, 47.2%).

**Testing Within-Subject Predictors of Grandparenting Dynamics**

Descriptive data for the measures of direct care, financial investment, and emotional closeness according to grandparenting status are reported in Table 1. Descriptive data for parent–grandparent geographic proximity and emotional closeness are
also provided for additional contextual information. These
descriptive data refer both to the full sample of biological and
step-grandparents and to the smaller number of participants
who had both a biological and step-grandparent and were thus
the focus of within-subject analyses. Results of Wilcoxon rank-
sum tests are provided in Table 2. These tests provide within-
subject assessments (of a given referential grandchild, as evalu-
ated by the grandchild’s parent) of contrasts in grandparenting
(e.g., biological vs. step-grandmothering). To test the first
hypothesis that step-grandparents will exhibit less involved
relationships than biological grandmothers, we found that
step-grandmothers provided less frequent direct caregiving,
fewer financial investments, and were reportedly less emotion-
ally close to the referential grandchild than were biological
grandparents. Thus, the first hypothesis was supported. To test
the second hypothesis that step-grandfathers will exhibit less
involved relationships than biological grandfathers, we found
that step-grandfathers provided more regular babysitting and
play and were more emotionally close to grandchildren than
were biological grandfathers but did not exhibit statistically
significant differences in estimated financial expenditures in
the past 12 months and marginally invested more in clothes,
shoes, and several other material expenses. Thus, the second
hypothesis was not supported.

We also ran Wilcoxon rank-sum tests of contrasts between
biological grandmothers and grandfathers. All key outcomes
differed significantly, with biological grandmothers providing
more regular care, more financial investment, and maintaining
more emotionally close relationships with grandchildren than
biological grandfathers. In parallel analyses comparing step-
grandmothers with step-grandfathers, step-grandfathers more
regularly played with and were emotionally close with grand-
children than step-grandmothers but showed no differences in
the regularity of play or financial investment. Thus, sex differ-
ences in grandparenting differ depending on whether compar-
isons are made between biological or step-grandparents.

Because residential proximity has been regularly identified
as a factor structuring grandparental involvement, we also ran
exploratory general linear regression models for each of the
dependent variables that included both step-/biological grand-
parenting status and residential proximity. Results of these
models are presented in Table 3. For contrasts between step-
and biological grandmothers, step/biological status remained a
significant predictor for each of the dependent variables; closer
proximity served as an additional predictor for most of these
same outcomes. For contrasts between step- and biological
grandfathers, the only outcome that differed according to

Table 1. Grandparenting Descriptive Data.

| Variable                              | BGM-F (n = 318) | BGF-F (n = 316) | BGM-S (n = 81) | BGF-S (n = 63) | SGM (n = 81) | SGF (n = 63) |
|---------------------------------------|-----------------|-----------------|----------------|----------------|--------------|--------------|
| Babysitting frequency                 | 2.8 (1.2)       | 2.2 (1.2)       | 2.8 (1.3)      | 1.6 (1.0)      | 1.8 (1.2)    | 2.2 (1.3)    |
| Play frequency                       | 3.9 (1.2)       | 3.2 (1.5)       | 3.8 (1.3)      | 2.6 (1.7)      | 2.5 (1.5)    | 3.1 (1.4)    |
| Purchase clothes, shoes, and so on   | 3.1 (1.1)       | 2.3 (1.2)       | 3.0 (1.3)      | 1.8 (1.2)      | 1.9 (1.3)    | 2.2 (1.3)    |
| Financial assistance (US$ in past 12 months) | 679 (1,589)   | 420 (1,309)     | 363 (1,180)    | 70 (182)       | 56 (136)     | 331 (1,433)  |
| Emotional closeness grandchild–grandparent | 3.3 (1.3)    | 2.8 (1.4)       | 3.1 (1.4)      | 2.0 (1.3)      | 2.1 (1.4)    | 2.8 (1.4)    |
| Emotional closeness parent–grandparent| 3.6 (1.2)       | 3.1 (1.3)       | 3.5 (1.2)      | 2.5 (1.4)      | 2.1 (1.3)    | 2.7 (1.2)    |
| Living proximity parent–grandparent   | 2.9 (1.1)       | 3.2 (1.1)       | 2.9 (1.2)      | 3.5 (1.2)      | 3.4 (1.1)    | 3.1 (1.1)    |

Note. Column labels refer to biological grandmothers (BGM), biological grandfathers (BGF), step-grandmothers (SGM), and step-grandfathers (SGF). Data refer to mean (SD). The full sample refers to all biological and step-grandparents, whereas the subsample refers to the smaller number of individuals with both a biological and step-grandparent.

Table 2. Tests (z Statistic) of Within-Subject Grandparenting Comparisons.

| Variable                              | BGM Versus SGM (n = 81) | BGF Versus SGF (n = 63) | BGM Versus BGF (n = 316) | SGM Versus SGF (n = 42) |
|---------------------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| Babysitting frequency                 | -5.16***                | -2.82**                 | -7.91***                 | -1.51                   |
| Play frequency                       | -5.07***                | -2.05*                  | -7.22***                 | -2.69**                 |
| Purchase clothes, shoes, and so on   | -4.92***                | -1.94                   | -8.39***                 | -0.95                   |
| Financial assistance (US$ in past 12 months) | -4.02***               | -0.565                  | -6.57***                 | -0.82                   |
| Emotional closeness grandchild–grandparent | -4.09***              | -3.432**                | -5.98***                 | -2.36**                 |
| Emotional closeness parent–grandparent| -6.11***                | -0.918                  | -6.25***                 | -2.46**                 |
| Living proximity parent–grandparent   | -3.00***                | -2.79**                 | -4.70***                 | -2.59*                  |

Note. Column labels refer to biological grandmothers (BGM), biological grandfathers (BGF), step-grandmothers (SGM), and step-grandfathers (SGF).

*p < .05; **p < .01; ***p < .001.
step/biological status was emotional closeness, with biological grandfathers characterized by lower emotional closeness with their grandchild. By contrast, living closer to one’s grandchild was positively related to each of the dependent variables (such as the frequency of play) with the exception of financial assistance. Thus, residential proximity helped structure patterns of grandparenting, and after inclusion of proximity in a multivariate model, there remained little difference between step- and biological grandfathers.

### Discussion

Findings from this study are among the first to test potential differences in grandparenting based on genetic relatedness. Results lend partial support to hypotheses derived from kin selection theory: Biological grandmothers providing more direct care and financial investment and showing more emotional closeness than step-grandmothers, whereas biological grandfathers provided less direct care and were less emotionally close and did not invest more financially in grandchildren compared with step-grandfathers. Moreover, biological grandmothers showed more direct caregiving, financial investment, and were reportedly more emotionally close to grandchildren than biological grandfathers, although this was not the case for step-grandparents, among whom step-grandfathers were more emotionally close and more regularly played with grandchildren than did step-grandmothers. We expand on these key empirical findings below. We also suggest that several key concepts aid interpretation of the findings: That biological grandmothers may be viewed as the primary drivers of patterns in this U.S. sample of young grandchildren; that trade-offs between a grandmother investing in her biological and stepchildren are relevant; and that grandparenting can be viewed, in part, as mating effort. The research design’s focus on step- and biological grandparents of young children of married parents contributes too: The subset of biological grandparents compared (in a within-subject design, referenced to a grandchild) to step-grandparents by definition is separated from the child’s other biological grandparent whose remarried partner (the step-grandparent) provides the comparison.

The distinctions between time, material resource, and emotional closeness between biological and step-grandmothers support the expectations of kin selection theory. These contrasts are also partially consistent with two previous reports that biological grandparenting provided more care than step-grandparents (Coall et al., 2014; Pashos et al., 2016). However, other factors may be relevant to those contrasts. These other studies involved a wider age range of grandchildren than the present study’s focus on grandchildren 5 years of age or younger (e.g., 14 years of age or younger in Coall et al., 2014). We suggest a focus on grandparenting of such young grandchildren may deepen the involvement of biological grandmothers and with attendant effects on other caregivers (as discussed below, including for biological and step-grandfathers). If a grandchild is already receiving care from his or her biological grandmother, she or he may need less additional care from a step-grandmother. If a grandmother was already devoting a great deal of time and resources to her biological grandchild, she might devote less time and resources to a step-grandchild. Our analyses relied upon within-subject contrasts, which would amplify such potential trade-offs in grandparenting. This methodological approach also differs from the two previous quantitative studies focused on potential differences in biological and step-grandparenting (Coall et al., 2014; Pashos et al., 2016). We also suggest that grandparents face steeper trade-offs (see below) in caring for biological and step-grandchildren than grandfathers. Moreover, the patterns of physical proximity and grandparent–parent relationship quality mirrored those differences in biological/step-grandmothering: Biological grandmothers lived closer to the referential grandchild and maintained more emotionally close ties with the grandchild’s parent. The social and emotional structures of grandparenting appear biased toward fostering biological over step-grandparenting dynamics. These findings are consistent with previous research highlighting the importance of proximity and parents as mediators of grandparent–grandchild dynamics.

Patterns in grandmothers’ direct care, financial expenditures, and emotional closeness aligned with each other (i.e., biological grandmothers higher on all three domains compared with step-grandmothers). However, among grandfathers, patterns in financial investment differed from direct care and emotional closeness. Whereas biological grandfathers engaged in less regular direct care and were less emotionally close with
their grandchildren compared to step-grandfathers, there were not clear differences in financial investment between biological and step-grandfathers. The findings that biological grandfathers provided less direct care and were less emotionally close with their grandchildren also ran opposite of expectations. One interpretation of this contrast among grandfathers is that different domains of caregiving can be distinct, with other factors supersedng emotional bases of relationships. In this case, financial investment may not always align with emotional closeness, a finding that has also been observed among some biological/stepfathering analyses (e.g., Gray & Brown, 2015).

The inclusion of residential proximity in exploratory analyses showed that proximity was a consistently stronger predictor of within-subject grandfathering than step/biological status. This, in turn, points to other social and structural factors that influence a man’s caregiving. It could be that step-grandfathering serves as mating effort, helping maintain a relationship with a step-grandchild’s mother (cf. Pashos et al., 2016). This interpretation also draws upon the previous interpretations of stepfathering as a form of mating effort (e.g., Anderson et al., 1999), even though many of the mates of step-grandfathers in the present study are likely postmenopausal (average age of female grandparents about 55 years) and thus male-mating effort rarely translates into reproductive success. Furthermore, descriptive data for the full sample of grandfathers (as shown in Table 1) suggest that biological grandfathers who are married to grandchildren’s biological grandparents maintain more emotionally close relationships, babysit more frequently, play more frequently, purchase more material items, and provide more financial assistance than biological grandfathers who are divorced from grandchildren’s remarried biological grandmothers (the subset of biological grandfathers in Table 1 who are also the focus of within-subject analyses). It may be that these different categories of biological grandfathers differ in unmeasured characteristics. It may also be that if a driving force of grandparenting in this U.S. sample is biological grandmothering, then whether biological grandfathers are still married to the biological grandmothers may account for these differences between types of biological grandfathers. Put another way, if alloparental caregiving of these young (5 years of age or younger) grandchildren most centrally involves their biological grandmothers, then those biological fathers who are divorced from those grandmothers become less involved than biological fathers still married to those grandmothers. In a related vein, divorced and remarried biological fathers provide less investment and less emotionally close relationships with their grandchildren because they are married to women whose own investment priorities are in her own descendant kin, also leading to living further away from his biological grandchildren and closer to her own.

A relevant consideration to interpreting the present study’s findings is thus sex differences in grandparenting. Whereas some studies frame sex differences in grandparenting as tied to paternity certainty, theory indicates that other factors, such as internal gestation, lactation, and demographic variables, are at play in generating sex-specific behavioral reproductive effort (e.g., Kokko & Jennions, 2008; Trivers, 1972). Just as mothers tend to spend more time in direct childcare and maintain more emotionally close relationships with children than fathers (e.g., Geary, 2010; Gray & Anderson, 2010; Hrdy, 2009), biological grandmothers engaged in more direct caregiving, had higher financial expenditure, and were emotionally close to their grandchildren than were biological grandfathers. Such sex differences in grandparenting are consistent with much previous research (e.g., studies cited in Coall & Hertwig, 2010 review), although not all studies (e.g., Coall et al., 2014). These sex differences in biological grandparenting also contrasted with step-grandparenting: Step-grandfathers were more emotionally close and more often played with grandchildren than step-grandmothers. We suggest that an interpretation of step-grandfathering as, in part, mating effort helps make sense of those patterns. Additionally, these patterns are consistent with the idea that step-/biograndfathering has less steep trade-offs than step-/biograndmothering. That step-grandfathers were more emotionally close and more often played with grandchildren than step-grandmothers is consistent with the idea that the deeper emotional, time and material investment of biological grandmothers than grandfathers results in less of those same allocations to their same step-grandchildren. We thus suggest that steeper female trade-offs in biological/step-grandmothering must be considered in addition to male-mating effort to account for the patterns of grandparenting.

The methods of the present study have a number of strengths. One of the strengths of MTurk samples is that participants tend to be more socioeconomically variable than undergraduate psychology subject pools, plus data on many adult subjects can be collected cheaply and efficiently (see Buhrmester, Kwang, & Gosling, 2011; Chandler & Shapiro, 2016). The focus of the present research on grandparenting also entailed recruiting parents of young children, with whom MTurk helps facilitate access. The fact that subjects reported their fathers to be several years older and to more often have remarried after separation than their mothers is consistent with the previous U.S. data on marital dynamics and thus provides some external validity to the present study data. Another strength of the methods is the focus on within-subject analyses (e.g., grandchild with both a biological and step-grandparent). This within-subject approach effectively controls for between-subject confounds.

Various limitations also apply, however. The design relied on parental assessments of grandparenting dynamics rather than questions or behavioral observations directly targeting grandparents and/or grandchildren. Little demographic information was obtained, which limits the ability to contextualize the findings (in light of a wider U.S. population or relative to global comparisons) or to examine the role of potentially moderating influences of parental gender, educational attainment, refined measures of household residence and proximity, grandparental health status, or other factors contributing to the patterns of grandparental investment (see Coall & Hertwig, 2010).
This study offers directions for future research. While we did not restrict or record the sex of parent, other research suggests that grandparenting dynamics vary cross culturally between matrilateral and patrilateral kin (e.g., grandparents on the mother’s vs. fathers’ side). In rural Greece and rural China, paternal grandparents provide more care than maternal grandparents (Kapitijn, Thomese, Liebfroer, & Silverstein, 2013; Pashos, 2000). Future research could investigate potential differences in biological and step-grandparenting in patrilineal, patrilocal communities. A wider array of grandparenting outcomes could also be assessed. While Canadian fostering services more often resulted in the placements of children with grandmothers than grandfathers (Perry, Daly, & Macfarlane, 2014), research might explore whether step-grandparents are differentially associated with child fostering success or other service-related outcomes such as child abuse or neglect. We suspect that grandmothers face trade-offs not just between investment in biological and step-grandchildren but also between investment in an ongoing romantic partnership (e.g., marriage) versus descendant kin; more attention to grandparenting relationship dynamics relative to grandparenting could be fruitful. The present study findings offer partial support for predictions born from kin selection theory, yet in a domain (biological vs. step-grandparenting) that has garnered little such attention.

Declaration of Conflicting Interests

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