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Grandparents look after biological, adopted and step-offspring: Findings from SHARE and GGS

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Abstract: Based on inclusive fitness theory, amounts of grandparental investment can be predicted to reflect the probability to share common genes with grandchildren. Adoption may represent a special case, however, yet grandparental investment in adoptive children has often been theoretically misconstrued and little investigated. Here, we study for the first time whether grandparental child care provision is unequally distributed between biological, adopted and step-offspring. Using the Survey of Health, Ageing and Retirement in Europe (SHARE) (n = 26,183 grandmother-adult child and 19,339 grandfather-adult child dyads) and Generations and Gender Surveys (GGS) (n = 15,168 adult child-grandmother and 12,193 adult child-grandfather dyads) and, we find that grandparents were less likely to provide care to step-grandchildren than to other types of grandchildren, but no significant difference in grandparental childcare channelled towards adopted and biological grandchildren. These findings were present in both datasets and for both grandmothers and grandfathers, after several potentially confounding factors were taken into account. The step-child disadvantage is in line with kin selection theory, while the congruent amounts of care provided towards of adopted and biological grandchildren is likely due to similar psychological attachment between the two groups, as well as to overcompensation and greater need in the case of adopted children. The study provides new evidence of how genetic relatedness and psychological attachment may shape kin investment in contemporary societies.

Key words: Adoption; child care; compensatory model; grandchildren; grandparents; inclusive fitness; psychological attachment

Introduction

Due to increases in life expectancy, health, and wealth, it is currently much more common for grandchildren to live simultaneously with their grandparents than in the past (Chapman et al., 2018; Leopold & Skopek, 2015; Margolis & Wright, 2017), and grandparents have more opportunities to provide care and other resources for their descendants. Grandparental investment, an extended version of parental investment (Trivers 1972), is defined as investment of various types of resources, such as care, protection and material support, into one grandoffspring, thereby detracting from investments in other potential recipients (Coall & Hertwig, 2010). Grandparental investments can be channelled towards grandchildren either directly or indirectly, via the grandchildren's parents. In the case of young children in high-income societies, grandparental investment is often measured by provision of child care (Euler, 2011), as we do also in the present study. Contemporary grandparents provide a significant amount of child care: for instance, in Europe 58% of grandmothers and 49% of grandfathers look after a grandchild at least occasionally (Hank & Buber, 2009). Grandparental child care is known to correlate with other types of grandparental investment as well as with perceived emotional closeness between family generations (Danielsbacka, et al., 2015) and it may have a beneficial impact on child wellbeing and development (Sear & Coall, 2011, but see Tanskanen & Danielsbacka, 2018).

An increasing number of scholars from different disciplines, including psychology, sociology and biology, have investigated factors associated with grandparental investment (see Tanskanen & Danielsbacka, 2019 for a recent review). These studies have shown that grandparental investments in grandchildren tend to vary according to assumed genetical relatedness, so that grandparents usually invest more in genetically more certain kin. For instance, grandparents invest less in their step-grandchildren, with whom they are not closely related at all, compared to biological grandchildren, with whom they share on average a fourth of their genes (e.g., Gray & Brogdon, 2017; Pashos et al., 2016). Child adoption, however, represents an intriguing case. Humans belong to the many primates who have the capacity to adopt, i.e., to attach to and raise a child which is not its own genetic offspring (Hrdy, 1999; Silk, 1990). Adoption can result in a carer-child bond with zero genetical relatedness and very high levels of kin investment. This has created some confusion and unwarranted assumptions regarding the role of genetic relatedness for family dynamics, as outlined below. Furthermore, empirical studies of investments in adoptive grandchildren in relation to biological and step-grandchildren are lacking, although they could advance the ongoing debate. In the present study, we compare for the first time differential grandparental investment in these three types of grandchildren, using two large-scale and cross-national datasets from high-income societies.

We refer to a child as “biological” if the child has not been adopted and is not a step-child. We also use terms ”non-adopted” or “birth child” as a synonyms to “biological”. Children here defined as biological have an assumed 50% of genes shared with their parents and approximately 25% with their grandparents. We use the term “adopted” to refer to a child who has been legally adopted, whether between unrelated families (e.g., international adoption), within a family (e.g., adoption by a step-parent) or between kin (e.g. adoption within an extended family). Hence adopted children can be genetically related to their adoptive parents and grandparents, although the majority of adopted children in contemporary high-income societies are not closely related to their adoptive parents (e.g. Ryadn et al., 2010).

It is important to note that grandparents can have adopted grandchildren or step-grandchildren in two ways: either an adopted child or a step-child has biological children (i.e., the middle-generation is adopted or step-related) or the grandparent has a biological child who has an adopted or a step-child (i.e., the youngest generation is adopted or step-related). With the aid of two large-scale and cross-national datasets, we are able to investigate grandparental investment in both of these cross-generational family constellations: grandparents’ adult children are adopted or step-children, and grandparents’ adult children have adopted or step-children.

Background

Inclusive fitness theory (Hamilton, 1964) predicts that individuals will prefer to invest in their closely related descendants compared to less related or unrelated ones. Indeed, two-generational studies of human parental investment in young children have consistently shown that parents tend to treat their step-children worse than their biological children (e.g., Daly & Wilson, 1985; 1988; Cherlin, 2008) and to provide more time and resources to biological compared to step-children (see Anderson, 2011 for a review). Because step-children are acquired via mating and join the family through the new spouse, investment in stepchildren may sometimes be more related to mating effort than to parental investment (Daly & Wilson, 1988), meaning that individuals may invest in their step-children because they wish to act as good spouses to their partners. Investments in a step-child is modified by several factors, including especially length of co-residence, strength of psychological attachment, and family resources (Rotkirch, 2018). Some step-children are eventually adopted by their step-parents.

Contemporary adoption typically happens between individuals who are not closely genetically related, and hence less genetically related to their immediate and extended family members than step-children are. A minority of adopted children are adopted by relatives, usually after having first been placed in foster care. For instance, in the US between 25% and 32% of children in foster care have been placed with relatives during the last decades (Ryan et al., 2010; Child Welfare Information Gateway, 2018) and around a fourth of children in foster care are subsequently adopted by relatives (Ryan et al., 2010).

This has led some evolutionary scholars to predict that among different child-parent bonds, adoptive children would receive least if any investment, since they tend to have the lowest genetical relatedness to their parents (e.g., Salmon 2005). This prediction has, in turn, led sociologists to argue that kin selection and evolutionary theory favour traditional "biological" families over "alternative" family forms, in which they include adoptive families (Hamilton et al., 2007). Hamilton and colleagues (2007) claim that possibly evolved parental attachment cues can "misfire", so that parents should invest equally in their biological, adopted and step-children.
Hence some sociologists see adoption as a case that questions the validity of genetical relatedness as an important factor in kin relations.

However, both of these claims ignore the role of psychological attachment and kin recognition for family relations. Psychological attachment between family members grows from co-residence in childhood as well as by other hormonal and social kin recognition cues related to parenting, familiarity and similarity (Hrdy, 1999; Lieberman et al., 2007). Such cues would in evolutionary history sufficiently often have reflected genetical relatedness in order to serve as its proxy; this does not mean that they always track actual genetical relatedness (Park et al., 2008), or that a created psychological attachment bond would change provided new information about actual genetical relatedness. This is why child adoption, especially early in life, often results in a strong family bond with similar levels of psychological attachment as to a birth child (Silk, 1990; Schnettler & Steinbach, 2011). Omitting gestation and lactation, the psychological parental attachment processes towards biological and adopted children are mostly similar to one another, indicating that there should not be substantial differences in the investment in biological and adopted descendants (Segal et al., 2015).

Accordingly, empirical studies have found that parental investment in adopted children usually does not differ from that parents make in biological children (Gibson, 2009; Hamilton et al., 2007; Segal et al., 2015). For instance, a recent nationwide US study of child maltreatment reported lower rates of abuse and of child neglect with two biological or adoptive parents compared to families with a step-parent (Finkelhor et al., 2014).

This indicates that once children have become their parents' "own", they are also treated as such. But in addition to strong psychological attachment, there are several other potential explanations for the equal parental treatment of adoptive children. First, in the minority of cases when adoption is implemented as within-family adoption, the adoptive parents are actually related to their adopted children (United Nations, 2009), which is likely foster attachments through kin cues related to psychological or physical resemblance (Park et al., 2008). For instance, if an individual adopts the child of his or her full sibling, the adoptive parent will on average be 25% related to the adopted child. Hence by adopting kin, adoptive parents can increase their genetical inclusive fitness (Hamilton, 1964). This evolutionary benefit may explain why we have evolved the capacity to adopt, since in the small-scale communities of our evolutionary past most adopted children would have been at least a distant relative (Volk, 2011).

Second, the investment in adoptive children can reflect their higher needs. Adopted children have often already experienced some type of stressful event in connection with their separation from their biological mothers and/or fathers, and may therefore have greater needs for parental support (Gibson, 2009). For instance, adoptive parents of children aged 3–11 years in the UK reported higher parenting stress than other parents did, and these difficulties were related to greater child difficulties, including problems related to attachment (Harris-Waller et al., 2016). However, a recent review found only few differences in attachment behaviours and feelings of security in parent-child relations of adopted individuals later in life compared to non-adopted individuals (Raby & Dozier, 2018), indicating that initial challenges to the parent-child attachment pattern are usually overcome.

Third, adoptive parents are typically unusually motivated and committed to parenting. They are often thoroughly screened and tested before being allowed to adopt. Adoptive parents are also eager to fulfill all the norms of good parenting due to possible social stigma related to their non-traditional family circumstance (Hamilton et al., 2007). As a consequence, compared to birth parents, adoptive parents may over-compensate their investment in children and invest in their genetically unrelated children at least similarly or even more than biological parents invest in their children. Finally, since adoption is usually a result of unwanted medical infertility (United Nations, 2009), it can fulfill the adoptive parents' wishes to have a child, and hence increase their psychological wellbeing providing a proximate if not an evolutionary benefit (Gibson, 2009; Volk, 2011).

What about grandparents? Although there are studies detecting parental investment in adopted children, to the best of our knowledge, no prior studies have compared grandparental investment in biological versus adopted children. Several studies have, however, compared grandparental investment in biological and step-grandchildren, detecting lower amounts of investment in step-grandchildren than in biological ones (e.g., Christensen & Smith, 2002; Eggebeen, 1992), as would be predicted based on kin investment theory. Two recent studies also found that investment by step-grandparents in grandchildren to be related to mating effort (Gray & Brogdon, 2017; Pashos et al., 2016), just like investment in step-children may be.

Probably the most comprehensive study about grandparental investment in biological and non-biological grandchildren was conducted by Coall and colleagues (2014). Using cross-national data from 11 European countries, they reported that biological grandparents are more likely to provide grandchild care than non-biological grandparents. The main limitation of the study was, however, that because of low number of adopted children the authors lumped adopted children and step-children who had children in the same category and treated them all as "non-biological". This analytical strategy ignores the differences in both psychological attachment processes and likelihood of genetical relatedness that distinguish adopted and step-children, as we have outlined above.

In contrast to Coall and colleagues (2014), we assume there are several good reasons to predict that grandparents treat adopted and biological grandchildren quite similarly. First, as discussed above most parents attach to their adopted children as strongly as to their biological children, and broadly similar processes can be expected concerning the child's grandparents. Second, although some factors such as physiological resemblance may diminish attachment and hence investment between adopted kin, other factors such as greater need and stronger motivation may lead both parents and grandparents to over-compensate their investment in adopted grandchildren (Hamilton et al., 2007; Gibson, 2009). Indeed, previous research has shown that grandparents tend to provide more support to grandchildren who have greater need for it (Tanskanen & Danielsbacka, 2019).

Present study

This study tests two hypotheses derived from kin selection, psychological attachment and compensation theories as discussed above. We use provision of grandchild care as a measure for grandparental investment. We predict that:

Hypothesis 1 (H1): Grandparents invest more in biological grandchildren than in step-grandchildren

Hypothesis 2 (H2): Grandparents invest equally in biological grandchildren as in adopted grandchildren

Materials and methods

Generations and Gender Surveys

Our first data are from the first wave of the Generation and Gender Surveys (GGS) from 9 countries, namely Bulgaria, Russia, France, Romania, Belgium, Austria, Lithuania, Poland and Czech Republic. The surveys were conducted between 2004 and 2011. The GGS provide large-scale, cross-national, and nationally representative surveys of individuals aged 18–79. The aim is to gather data on family and gender relations from both European and non-European countries (see Vikat et al., 2007 for the study design). The survey items include measures of social support, family structures, and socioeconomic characteristics. For this study we selected all participants who have at least one child not older than 14 years at the time of the survey. Only respondents whose mother and/or father (i.e., the grandchild's grandmother or grandfather) was still alive were included. These selections left us with data on 15,168 adult child-grandmother and 12,193 adult child-grandfather dyads in the sample.

The dependent variable is grandparental child care. In the GGS, all of the respondents who had children under age 14 in the household were asked: "Do you get regular help with child care from relatives or friends or other people for whom caring for children is not a job? From whom do you get this help?" The list of possible child care providers included respondents' mother and father (i.e., the grandchild's grandmother or grandfather), enabling us to measure grandparental child care. The frequency of investment was measured by asking how many times a year, month or week respondents' mothers or fathers have provided child care. These responses were classified to four categories: never (0), at least once a year (1), at least once a month (2), at least once a week (3). Because the GGS did not directly ask whether the participant's mother or father have provided child care, the number of grandparents who were reported to provide any child care tend to be under-estimated (Aassve et al., 2012). Although GGS data may for this reason not be the best source for estimating the total amount of grandparental child care, it still provides high-quality data for comparing child care between different groups, which is the main aim of the present study when we compare child care provision to biological, adopted and step-grandchildren.

The main independent variable measures whether the participants (i.e., the middle generation of adult children) have birth children, adopted children or step-children. From the grandparents' point of view this variable includes information whether the "grandchild set" (i.e., the set of children of a specific adult child) includes "biological children only" (1), "adopted children only" (2), or "step-children only" (3). Families with "biological and adopted children", "biological and step children" and "biological children, adopted children and step-children" were excluded because it was impossible to identify which type of child the grandparent actually looked after. Finally, to avoid unnecessary statistical noise, foster children were excluded from the sample because the GGS does not provide exact information how they are related to responding parents.

The grandparental childcare variable had four ordered categories without equal spacing between the categories (never, at least once a year, at least once a month, at least once a week) and the regression models were fitted with ordered logistic regression ('ologit' command in statistical software Stata; see Liu, 2009). We controlled for several potentially confounding variables, which have been shown to be associated with grandparental investment in prior studies (Tanskanen & Danielsbacka, 2019). The control variables are respondent's sex, age, financial condition (ranging from 1 = household manages financially with great difficulty to 6 = household manages financially very easily), marital status, number of children, age of youngest child, age of respondent's mother / father, time distance between respondent and mother / father in minutes and country. In addition, survey year was controlled for (Mean = 2006.5, SD = 2.39). Financial condition was treated as a continuous variable; however, sensitivity analyses treating it as a categorical variable provided similar results (not shown). Descriptive statistics related to GGS measures are provided in Table 1.

Survey of Health, Ageing and Retirement in Europe

The second data used in the present article was drawn from the Survey of Health, Ageing and Retirement in Europe (SHARE). The target population of SHARE consists of people aged 50 years or above who speak the official language of their country and who did not live abroad or in an institution during the fieldwork period. The aim of SHARE is to collect longitudinal data on the ageing process of Europeans. Here, we use the first (data collection in 2004 and 2005 (Börsch-Supan, 2018a; Börsch-Supan and Jürges, 2005)), second (2006 and 2007 (Börsch-Supan, 2018b; Börsch-Supan et al., 2008)), fourth (2011 and 2012 (Börsch-Supan, 2018c; Malter and Börsch-Supan, 2013)) and fifth (2013 (Börsch-Supan, 2018d; Malter and Börsch-Supan, 2015)) waves of data from 13 European countries, namely Austria, Germany, Sweden, the Netherlands, Spain, Italy, France, Denmark, Switzerland, Belgium, the Czech Republic, Slovenia and Estonia. (The third wave was a retrospective life history data collection wave, SHARELIFE, with different questionnaires and therefore excluded from the current study sample.)

We pooled all first-time respondents from SHARE waves 1, 2, 4 and 5 in the analytic sample to achieve larger sample size. Only those respondents who had at least one no more than 14-year-old grandchild were included. For the present study the sample was constructed so that observations are the original respondent's (the grandparent's) adult children, resulting in a total of 45,522 observations of the middle generation (with on average 2.9 children per respondent). These represent 26,183 grandmother-adult child and 19,339 grandfather-adult child dyads.

The dependent variable measures grandparental child care. In SHARE, all grandparents were first asked whether they had looked after their grandchildren during the last twelve months without the presence of the parents. After that it was asked how often grandparents have looked after their grandchildren. The alternatives were almost never (0), less often (than almost every month) (1), almost every month (2), almost every week (3) and almost daily (4). Grandparents were asked separately about providing child care to the children of each of their four oldest adult children.

The main independent variable measures relationship type between grandparents and adult children. This variable indicates whether grandparents' adult children are biological children (1), adopted children (2) or step-children (3). SHARE does not have data on the relatedness between adult children and their children (i.e., the grandchildren for grandparents). To avoid unnecessary statistical noise we again excluded foster children from the sample, as was done with the GGS sample.

Ordered logistic regression models were used as method. We again control for several potentially confounding variables, including respondent's age, financial condition (ranging from 1 = household manages financially with great difficulty to 4 = manages financially easily), health (ranging from 1 = no limited activities because of health to 3 = severely limited activities because of health), marital status, gender of adult child, age of adult child, age of the youngest child of adult child, geographical distance between respondent, adult child (ranging from 1 = living in same household to 9 = living more than 500 kilometers away) and country. Finally, we included survey year in the list of covariates (Mean = 2008.6, SD = 3.45). Financial condition, health and geographical distance were treated as continuous variables in the analyses. We also ran the analyses treating them as categorical variables with similar results (not shown here). Because our data is clustered in the way that a respondent (i.e., grandparent) may have grandchildren via several adult children, we used the statistical software Stata's cluster option to compute the standard errors. This method takes into account the nonindependence of grandparental child care reported by the same respondent. The descriptive statistics related to SHARE data can be found in Table 2.

Results

First, we investigate with GGS data whether grandparents provide differential amounts of child care towards their adult children who have biological, adopted or step-children. Table 3 shows that there is no statistically significant difference in the likelihood of child care provided by grandparents when grandchild sets include "adopted children only" or compared to the reference category "biological children only". However, sets including "step-children only" have significantly lower probability to receive grandparental child care than sets including "biological children only". The results were similar among grandmothers and grandfathers.

Table 3 also shows that several other factors are associated with grandparental child care. Both grandmothers and grandfathers are more likely to look after their daughters' children than their sons' children. Grandmothers and grandfathers are also more likely provide child care help when adult children have no spouse. As the financial condition of adult children improves, also the probability of grandparental child care increases. Both an increased number of grandchildren and an increased age of grandchildren are associated with decreased likelihood of child care provision. When the geographical distance increases, the likelihood of child care support provided by grandmothers and grandfathers decreases. Younger grandmothers are more likely to provide child care than older ones but there was no similar association with age among grandfathers.

Next, we investigate grandparental child care provided to biological, adopted and step-children using SHARE data. The findings are presented in Table 4. Grandmothers and grandfathers are as likely to look after their grandchildren via biological and adopted children, and no significant difference was detected in this regard. However, grandmothers and grandfathers are less likely to look after grandchildren via step-children than grandchildren via biological children.

Again, and as also presented in Table 4, several other factors are associated with grandparental child care. Decreased grandparental age, improved financial condition, improved health, the presence of a spouse and decreased geographical distance are all associated with increased likelihood to provide child care help among both grandmothers and grandfathers. Grandmothers and grandfathers are more likelhy to channel care towards their daughters' children compared to their sons' children, to those adult children who are working, and to those who have younger children. Finally, grandmothers have a higher likelihood to provide help for their younger adult children than older ones, while among grandfathers the association is only marginally significant.

Discussion

We have investigated grandparental child care channelled towards biological, adopted and step-grandchildren with two cross-national surveys. The two datasets used here allowed us to study grandparental behavior in two family situations, when the grandparents' adult children are biological, adopted or step-children (SHARE) and when grandparents' adult children's children are biological, adopted or step-children (GGS). With both datasets it was detected that grandmothers and grandfathers provide more child care to their biological than to their step-grandchildren.

These results refine and partly question those by Coall and colleagues (2014), who compared grandchild care provision only between biological grandparents and non-biological grandparents, lumping together step-children with adopted children.

Our findings are in line with inclusive fitness theory predicting that individuals are more inclined to invest time and resources in their closely related biologically kin compared to less related kin (Hamilton, 1964) and with previous studies of variations in parental investment (Anderson, 2011). The results are also in line with prior studies, which have found that grandparents invest more in biological than in step-grandchildren (e.g., Gray & Brogdon, 2017; Pashos et al., 2016).

As predicted, we found no significant difference in grandparental child care directed towards biological and adopted descendants. This was true for both grandmothers and grandfathers as well as among both datasets investigated in the present study.

The results predicted here contradict the predictions made by Salmon (2005), positing a straightforward relation between degree of genetical relatedness and parental investment, and challenged by Hamilton and colleagues (2007), positing no relation between degree of genetical relatedness and parental investment. In their two-generational study of parents and small children, the latter authors detected that parents invest equally in their biological and adopted children. They argued that this can be due to the fact that nepotistic efforts developed in the environment of evolutionary adaptiveness may "misfire" the kin selection mechanism of adoptive parents, which can lead adoptive parents to invest in adopted children similarly as they would in biological ones. If parental and grandparental attachment mechanisms towards biological and adopted children are similar, the misfire effect should also lead grandparents to invest more resources in adopted children than expected by genetical relatedness alone. This is exactly what we found in the present study.

However, Hamilton and colleagues (2007) also argued that because of the misfire effect individuals should lead kin to invest equally in biological and step-offspring. This was not the case in our study, or in other studies of both parental and grandparental investments. It seems that the argument by Hamilton and colleagues (2007) was based on ignorance of the fact that the family environment in adoptive parent and step-parent families could be substantially different. Adoptive children are acquired intentionally, meaning also that adoptive parents tend to be highly motivated to execute parental duties and responsibilities. In contrast, stepchildren are acquired via mating and they come with the new spouse, meaning that the investment in stepchildren may be more related to the mating effort than an involvement in stepchildren as such, especially if the step-parent does not arrive when the child is very young (Daly & Wilson, 1988). The importance of mating effort is not valid only in the case parents but also among grandparents, as prior studies have shown that the investments step-grandparents target towards their step-grandchildren appear to be related to mating effort (Gray & Brogdon, 2017; Pashos et al., 2016).

Overall, there appears to be a substantially different evolutionary logic, different proximate attachment processes, and different kin recognition cues behind the investment channelled towards adopted offspring and step-offspring. Future research should take this complexity into account when investigating how genetic relatedness shape kin investments.

Adopted children are often in a more vulnerable position than non-adopted children, and consequently in greater need of kin support (e.g., Gibson, 2009). Our findings indicate that grandparents invest equally in biological and adopted grandchildren, which may also reflect a tendency where the grandparents channel their investments in those descendants who need support the most. We know that parents can over-compensate the investment they make in their adopted children, for instance, in order to live up to social ideals of good parents (Hamilton et al., 2007; Segal et al., 2015). For the same reasons, grandparents may be willing to over-compensate their investment in adopted offspring, and such an effect could be one reason why we did not found significant differences in grandparental investment in biological versus adopted descendants. Our data does not allow us to distinguish between the different processes channelling investment decisions, and more research is needed in the various factors boosting grandparental investments in adopted grandchildren.

The present study is to the best of our knowledge the first to investigate grandparental investment distinguishing between step- and adopted children. It also has several additional strengths. Perhaps its biggest advantage is that we used two population-based and cross-national surveys from mostly European countries. When one uses population-based data to study kin investments in adoptive families it needs to be sufficiently large, because adoptions tend to be very scarce in contemporary societies and represented only a few percentages of the children in the surveys used here. Although the rates of adoptions may vary substantially between countries, it is estimated that even in countries with the largest number of adptions only less than 500 adoptions are executed to every 100,000 births (i.e., 0.5%) (United Nations, 2009). Moreover, large-scale surveys which gather information on both adoptive families and grandparental relations are rare. The GGS and SHARE datasets analysed here belong to this exceptional group of surveys. The GGS and SHARE also include information on several factors, which have been shown to associate with grandparental investment in prior studies, so that we were able to control for several potentially confounding variables. In line with previous research, we found regarding these controlling variables that grandparental investment tends to be larger among maternal kin, younger grandparents, with close geographical proximity, and with fewer grandchildren (Szydlik, 2016; Tanskanen & Danielsbacka, 2019). One interesting exception from previous findings was that in the GGS data, an improved financial situation of the grandchild's family was associated with more grandparental care, although other studies have found that grandparental child care provision often increases during duress (Tanskanen & Danielsbacka, 2019). This GGS result reported here can be speculated to reflect greater need for childcare as the household situation improves, for instance, due to loinger working hours of the child's parents, but would merit further exploration in future research.

Among the limitations of the present study is that grandparental investment was measured by only one variable, grandparental child care. Although it has been shown that different grandparental investment variables tend to correlate with one another (e.g., Pollet et al., 2009), it would be worthwhile to use other factors, such as contact frequency, emotional support, or financial transfers while investigating the effect of genetic relatedness on grandparental investment. This would also allow a better picture of grandparental investment patterns when the grandchildren are older. Another limitation is that due to the very low number of adoptees, it was impossible to study country-based differences in grandparental investment. Instead, we used a country fixed-effect approach and tried to detect a general investment pattern that would not associate with country-specific features. Future studies should, however, more carefully concentrate on the differences between countries.

A limitation of the GGS is that we were able to study grandparental child care towards "grandchild sets", but the data lack information about care provided to specific grandchildren. One of the limitations in the SHARE data is that it lacks information about the relatedness between adult children (i.e., middle-generation) and their children (i.e., youngest generation). Despite of these data limitations, GGS and SHARE provide unique information on grandparental investments towards adopted descendants that is rarely available in other studies, as stressed above.

The present study detected that grandparents invest more in their biological than step-grandchildren, as expected. Most importantly, however, we demonstrated for the first time that grandparental investment directed towards biological and adopted grandchildren is of similar magnitude. These findings provide new insights on the role of our evolved psychological mechanisms, which track cues for relatedness and shape family relations and kin investment behaviour in contemporary societies. To conclude, family and evolutionary studies need to avoid simplified assumptions about how actual genetic relatedness translates into social behaviour. There is no need to juxtapose genetical, psychological or sociological explanations when studying kin investment. The case of adoption illustrates how our capacity to adopt and attach to a child can create strong grandparent-grandchild bonds, which in contemporary societies can emerge without any genetical relatedness, yet belong to the biological repertoire of human family behaviours.

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Table 1. Descriptive statistics of GGS (% / mean)

	Grandmothers (i.e., mothers of respondent)		Grandfathers (i.e., fathers of respondent)	
	% / mean	SD	% / mean	SD
Respondent's child constellation (%)				
Biological children only	98.4		98.4	
Adopted children only	0.4		0.5	
Step-children only	1.2		1.1	
Respondent's sex				
Male	39.6		38.9	
Female	60.4		61.1	
Respondent's age (mean)	34.9	6.30	34.3	6.13
Respondent's financial condition (mean)	3.2	1.28	3.3	1.28
Respondent's marital situation (%)				
No spouse	9.0		8.4	
Having a spouse	91.0		91.6	
Respondent's number of children (mean)	1.8	0.85	1.8	0.81
Age of respondent's youngest child (mean)	5.8	4.08	5.4	4.03
Age of respondent's mother / father (mean)	60.6	8.34	61.9	8.24
Distance between respondent and mother / father (mean)	78.0	175.60	77.3	171.54

Notes. In GGS adult children report the grandparental childcare provided by their mothers and fathers; Grandmothers: n = 15,168; Grandfathers: n = 12,193.

Table 2. Descriptive statistics of SHARE (% / mean)

	Grandmothers		Grandfathers	
	% / mean	SD	% / mean	SD
Type of adult child who have children (%)				
Biological children	97.6		95.8	
Adopted children	0.4		0.5	
Step-children	2.0		3.6	
Respondent's age (mean)	63.9	7.91	66.0	7.87
Respondent's financial condition (mean)	2.7	0.72	2.8	0.98
Respondent's health (mean)	2.4	0.72	2.4	0.72
Respondent's marital situation (%)				
No spouse	38.7		16.7	
Having a spouse	61.3		83.3	
Adult children's gender (%)				
Male	48.1		48.5	
Female	51.9		51.5	
Adult children's age (mean)	37.8	6.52	37.2	6.41
Age of youngest child of adult child (mean)	6.1	4.22	5.8	4.15
Distance between respondent and adult child (mean)	4.8	1.76	4.9	1.74

Notes. In SHARE grandparents report how often they have looked after their adult children's children.
Grandmothers: n = 26,183; Grandfathers: n = 19,339.

Table 3. Grandparental childcare to grandchild sets including biological, adopted and step-grandchildren (country fixed effect)

	Grandmothers				Grandfathers			
			95% CIs				95% CIs	
	Coef	p	lower	upper	Coef	p	lower	upper
Respondent's child constellation								
Biological children only	ref				ref			
Adopted children only	-0.38	0.287	-1.09	0.32	-0.04	0.939	-1.08	1.00
Step-children only	-0.98	< 0.001	-1.53	-0.43	-1.45	0.043	-2.86	-0.04
Respondent's sex								
Male	ref				ref			
Female	0.36	< 0.001	0.27	0.45	0.12	0.126	-0.03	0.28
Respondent's age	-0.01	0.090	-0.02	0.002	0.002	0.875	-0.02	0.02
Respondent's financial condition	0.12	< 0.001	0.09	0.16	0.08	0.012	0.02	0.14
Respondent's marital situation								
No spouse	ref				ref			
Having a spouse	-0.70	< 0.001	-0.84	-0.56	-0.91	< 0.001	-1.13	-0.69
Respondent's number of children	-0.21	< 0.001	-0.27	-0.15	-0.18	0.001	-0.29	-0.08
Age of respondent's youngest child	-0.07	< 0.001	-0.08	-0.06	-0.05	< 0.001	-0.07	-0.02
Age of respondent's mother / father	-0.01	0.016	-0.02	-0.002	0.004	0.582	-0.01	0.02
Distance between respondent and mother / father	-0.01	< 0.001	-0.01	-0.01	-0.33	< 0.001	-0.37	-0.28

Notes. Results from GGS data. Grandmothers: n = 15,168; Grandfathers: n = 12,193.

Table 4. Grandparental childcare to biological, adopted and step-children's children (country fixed effect)

	Grandmothers				Grandfathers			
			95% CIs				95% CIs	
	Coef	p	lower	upper	Coef	p	lower	upper
Type of adult child who have children								
Biological children	ref				ref			
Adopted children	0.14	0.479	-0.25	0.53	0.05	0.757	-0.28	0.39
Step-children	-1.13	< 0.001	-1.33	-0.93	-0.23	0.003	-0.37	-0.08
Respondent's age	-0.02	< 0.001	-0.02	-0.01	-0.01	< 0.001	-0.02	-0.01
Respondent's financial condition	0.16	< 0.001	0.13	0.19	0.19	< 0.001	0.15	0.23
Respondent's health	0.20	< 0.001	0.16	0.24	0.17	< 0.001	0.12	0.22
Respondent's marital situation								
No spouse	ref				ref			
Having a spouse	0.19	< 0.001	0.14	0.25	0.94	< 0.001	0.85	1.04
Adult child's gender								
Male	ref				ref			
Female	0.49	< 0.001	0.44	0.54	0.46	< 0.001	0.40	0.52
Adult children's age	-0.01	< 0.001	-0.02	-0.01	-0.01	0.058	-0.02	0.0003
Age of youngest child of adult child	-0.08	< 0.001	-0.09	-0.07	-0.05	< 0.001	-0.06	-0.04
Distance between respondent and adult child	-0.43	< 0.001	-0.44	-0.41	-0.40	< 0.001	-0.42	-0.38

Notes. Results from SHARE data. Grandmothers: n = 26,183; Grandfathers: n = 19,339.