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ABHANDLUNGEN

Partnership Histories Shape the Grandparenting Happiness Bonus

Anna Rotkirch · Anna Hägglund · Antti O. Tanskanen · Mirkka Danielsbacka

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Abstract Evolutionary theory predicts that returns on investments in family relations will vary by sex and life stage and that there can be a trade-off between mating and (grand)parenting. Family sociology has shown that whereas couple relations are central to happiness in older age, the effects of grandparenting are more mixed and context dependent. Here, we merge these two perspectives and study how partnership histories over the life course relate to happiness among Europeans aged 50+ and whether grandparental investment moderates these associations. Of particular interest is whether there are signs of trade-offs, cumulative benefits, or compensatory benefits between the type of couple relations and grandparenting in postreproductive age.

Online Appendix: https://kzfss.uni-koeln.de/sites/kzfss/pdf/Rotkirch-et-al.pdf

✉ A. Rotkirch · A. O. Tanskanen · M. Danielsbacka
Population Research Institute, Väestöliitto—the Family Federation of Finland and University of Turku
Kalevankatu 16, P.O. Box 849, 00101 Helsinki, Finland
E-Mail: anna.rotkirch@vaestoliitto.fi

A. O. Tanskanen
E-Mail: antti.tanskanen@utu.fi

M. Danielsbacka
E-Mail: mirkka.danielsbacka@utu.fi

A. Rotkirch
Population Research Institute, Väestöliitto—The Family Federation of Finland
Kalevankatu 16, P.O. Box 849, 00101 Helsinki, Finland

A. Hägglund
INVEST Research Flagship Centre, University of Turku
20014 Turku, Finland
E-Mail: anna.hagglund@utu.fi

We employed the Survey of Health, Ageing and Retirement in Europe with data from 26 European countries and Israel for the years 2004–2020. The analyses distinguish between respondents who are in their first, second, or third union through marriage or cohabitation; are divorced; are widowed; are living apart from a partner; or are single. We investigated how quality of life and life satisfaction are associated with these seven types of partnership histories and whether the associations are moderated by grandparental status and provision of grandchild care.

Europeans with a partner, and especially those in their first union, were happier than those in other partnership groups, and grandparents were happier than individuals without grandchildren. Grandparental investment was associated with being happier in most partnership groups. The "grandparenting bonus" was greatest among unpartnered respondents, suggesting a compensatory effect. We found no signs of a cumulative effect, nor of costs to happiness from grandchild care.

Our results illustrate how reproductive strategies over the life course shape happiness returns to grandparenting. Being a grandparent and, especially, providing care for grandchildren may compensate for the lower happiness associated with the loss or lack of a partner.

Keywords Families · Couple relations · Marriage · Grandchildren · SHARE survey

Zusammenhang von Partnerschaftsverläufen und dem Glücksbonus durch Großelternschaft

Zusammenfassung Die Evolutionstheorie sagt voraus, dass die Erträge aus Investitionen in familiäre Beziehungen je nach Geschlecht und Lebensphase unterschiedlich ausfallen und es einen Trade-off zwischen Paarungsverhalten und (Groß-)Elternschaft geben kann. Die Familiensoziologie hat gezeigt, dass Paarbeziehungen zwar im höheren Alter zentral für das Glücksempfinden sind, die Auswirkungen der Großelternschaft darauf jedoch gemischter und kontextabhängiger sind. Hier verbinden wir diese beiden Perspektiven und untersuchen, wie Partnerschaftsverläufe im Lebensverlauf mit dem Glück von Europäern im Alter von 50+ zusammenhängen und inwiefern großelterliche Investitionen diese Zusammenhänge moderieren. Besonders interessiert uns, ob es Anzeichen für Trade-offs, kumulative oder kompensatorische Vorteile zwischen der Art der Paarbeziehungen und der Großelternschaft im postreproduktiven Alter gibt. Für die empirischen Analysen nutzen wir Daten des Survey of Health, Ageing and Retirement in Europe für 26 europäische Länder und für die Jahre 2004 bis 2020. Die Analysen unterscheiden zwischen Befragten, die in ihrer ersten, zweiten oder dritten Ehe oder Lebensgemeinschaft leben, geschieden, verwitwet, getrennt von ihrem Partner leben oder alleinstehend sind. Wir untersuchen, wie Lebensqualität und Lebenszufriedenheit mit diesen sieben Arten von Partnerschaftsverläufen zusammenhängen und ob die Zusammenhänge durch den Großelternstatus und die Betreuung von Enkelkindern moderiert werden. Unsere Ergebnisse zeigen, dass Europäer mit einem Partner, insbesondere diejenigen, die in ihrer ersten Partnerschaft leben, glücklicher als andere Partnerschaftsgruppen waren. Großeltern waren glücklicher als Personen ohne Enkelkinder. Großelterliche

Investitionen waren mit einem höheren Glücksniveau in allen Partnerschaftsgruppen verbunden, was auf einen additiven Effekt hinweist. Der „Großelternschaftsbonus“ war bei Befragten ohne Partnerschaft am größten, was auf einen kompensatorischen Effekt hinweist. Wir fanden weder Anzeichen für einen kumulativen Effekt noch für Kosten durch die Betreuung von Enkelkindern im Hinblick auf das Glücksempfinden. Unsere Ergebnisse zeigen, wie reproduktive Strategien im Lebensverlauf die Erträge des Wohlbefindens durch großelterliches Investment prägen. Die Großelternschaft kann das geringere Glücksempfinden, das mit dem Verlust oder Fehlen eines Partners verbunden ist, kompensieren.

Schlüsselwörter Familien · Paarbeziehungen · Ehe · Enkel · SHARE-Daten

1 Introduction

Europeans now spend almost half of their lives as postreproductive adults. Increases in longevity, health, and wealth have expanded the shared years older people can have with their family members, including grandchildren (Chapman et al. 2017), and have arguably enhanced the importance of grandparental investment (Coall and Hertwig 2010; Coall et al. 2018). There is also greater variation in the love lives and couple relationships of older people. On the one hand, spouses live together longer than before. In particular, the proportion of widows has decreased during the last decades in Europe. On the other hand, compared to previous generations, it is more common to have divorced, remarried, or stayed single, as well as to have started dating after turning 50 (Cherlin 2017; Bildtgård and Öberg 2017).

Evolutionary theory predicts that returns to investments in family relations will vary by sex and life stage, particularly in relation to fecundity. Humans typically have children until, at most, age 50, after which reproductive success can be enhanced through investment in close relatives such as adult children and grandchildren. Evolutionary studies have explored the postreproductive lifespan from a multitude of perspectives, including the evolution of menopause in women (Shanley and Kirkwood 2001), variations in grandparental investment (Coall and Hertwig 2010), generational transfers (Lee 2013), and effects of fertility on mortality (Helle et al. 2005). However, couple relations among individuals in the postreproductive stage of life remain little explored from the Darwinian perspective (Rotkirch 2024). Evolutionary theory is also rarely interested in the well-being effects of different family constellations, which, by contrast, is a main focus in family sociology.

The evolutionary sociology of intergenerational relations combines these two perspectives. Its growing body of work has adopted the concepts of trade-offs, reproductive strategies, and the importance of genetic relatedness from the evolutionary life history approach and combined them with the sociological interest in individual well-being and new family forms (Coall et al. 2018; Rotkirch 2018). Here, we study the impact of spousal and grandchild relations on well-being in later life. We explore how the partnership history of an individual relates to happiness in old age and how grandparental investment affects these associations. Of particular interest is whether there are signs of trade-offs, cumulative benefits, or compensatory benefits between

partnership history and grandparenting in postreproductive age, and whether such trends vary by sex.

1.1 Life History Theory and the Trade-Off Between Mating and Parenting

Life history theory assumes that individuals allocate resources into three main behaviours during the life course: mating, parenting, and somatic maintenance or one's own growth and learning (Hill and Kaplan 1999; Lummaa 2007). When different ways to allocate resources create variation in reproductive success, their underlying genetic basis can become subject to natural selection. Reproductive success is defined as the transmission of genes into next generations, typically through reproduction of oneself or close kin. The optimal resource allocation from the perspective of reproductive success varies with context. The individual's expected lifespan and resource access, such as the availability of food, partners, and social support, especially shape how resources are used during the life course.

One special form of natural selection is kin selection, which denotes the tendency of individuals to invest more in genetically close kin than in more distant kin or unrelated individuals, all other things being equal (Hamilton 1964). As a result, natural selection and kin selection have over hundreds of thousands of years created the human propensities to form and maintain family relations, encompassing long-lasting pair bonds and extensive investment in parenting and grandparenting.

Parental and, by extension, grandparental investment represents an evolved human disposition to channel resources into younger descendants (Trivers 1972; Coall and Hertwig 2010). They have shaped and continue to affect survival and reproduction in humans (Lahdenperä et al. 2004; Sear and Mace 2008; Sear and Coall 2011). The capacity for long-term romantic pair bonds is also a human universal. As the arguably first evolutionary sociologist Edward Westermarck put it, "[i]n the human race the relations of the sexes are, as a rule, of a more or less durable character" (Westermarck 1891; see also Roos 2008). Such bonds, based on sexual attraction and emotional attachment, are found among few other mammals but among most birds (Lukas and Clutton-Brock 2013). Crucially for our topic here, humans are arguably the only species with both grandparenting and durable pair bonds, lasting well into old age (Lummaa 2007).

Interestingly, longevity, long-term pair bonds, and prolonged parenting and grandparenting appear to be related to having large brains and intelligence (Hrdy 2009; Dunbar and Shultz 2007). The development of these traits may also have supported each other during our evolutionary history. For instance, generational transfers may have contributed to our exceptionally long postreproductive lifespan, and a long lifespan in turn can contribute to generational transfers (Carey and Judge 2001). The scientific discussion concerning the evolutionary origins of parent–child attachment, pair bonds, menopause, and grandparent–child attachment is ongoing (e.g., Fletcher et al. 2015). Relevant for our argument is that they belong to the species-typical emotional repertoire of humans.

We are deeply social animals, whose close family relations have a unique position in our social networks. Emotional attachment is the main psychological reason that humans have the capacity to live with a partner and to raise children and grandchil-

dren. It also serves as the proximate mechanism that originally evolved to increase reproductive success. From a Darwinian perspective, it makes sense for resources to flow from older generations to younger ones, and especially to individuals approaching or at prime reproductive age (Hughes 1988). The widespread, often spontaneous psychological dispositions of parents to help and assist their adult children and grandchildren likely evolved in order to underpin the ultimate goal of reproductive success (Lee 2013). Of course, not all family bonds include attachment and helping, nor does attachment exclude severe conflicts or other competing interests of the parties involved. Social norms, expectations, and socioeconomic benefits also add their part (Salmon and Shackeford 2014).

Resource allocations to different types of family relationships can create trade-offs. Classic examples from life history theory include trade-offs between one's own growth and reproduction, as well as trade-offs between investment in an existing child or partner versus future children or partners. The cost–benefit ratios from such trade-offs can also differ between the sexes. Due to differences in reproductive biology, males and females have evolved to favour partly distinct reproductive strategies, representing different solutions to investments in mating and parenting across the life course (Gangestad 2007). In mammals, males often favour more investment in mating compared to parenting than females do, but reproductive strategies are also highly context sensitive, especially so in humans. For instance, provision of human paternal care varies largely in relation to a host of individual and socioecological factors (Marlowe 2000; Brown et al. 2009).

Sex differences in reproductive strategies are predicted to be larger in societies with a distinct trade-off between mating and parenting, so that one behaviour actually excludes the other. By contrast, societies favouring monogamy, in which both males and females invest in one long-term partner and joint offspring, often exhibit smaller sex differences in reproductive strategies compared to societies with polygamous arrangements or to large proportions of unpartnered adults (Buckle et al. 1996; Schmitt 2015). In other words, sexual conflict is predicted to be weaker, and sexual cooperation more prevailing, in a socioecological context in which both men and women invest in their joint children and in which all adults can engage together in resource acquisition outside the household (Bird 1999; Low 2007). This is the situation for many adults living in contemporary Europe, where monogamy is common, and both parents usually contribute to the family economy and invest in children and grandchildren.

Behaviours that in evolutionary history were advantageous for reproductive success are often linked to (temporary) rewards in well-being. For instance, being sheltered, well-fed, and in loving relationships are states that favoured individual survival and reproduction in our ancestral past and tend to also make most people happy today. Of course, evolution is driven by reproductive success, which is morally blind and certainly not necessarily sensitive to individual well-being. Yet close family relations arguably often foster both reproductive success and personal well-being (Chapais 2011). At the very least, humans have not evolved to enjoy living all alone. When investing time, energy, and resources into family members results in company, pleasure, affection, and a sense of meaning, the returns to kin investment can fuel well-being and happiness. If, on the other hand, investment in

close kin is extensive—such as taking care of a dying spouse or being solely responsible for raising a young child—returns to investment can become overall negative for well-being. Feeling exhausted and unhappy may then serve as a signal to the individual to reduce the burden and withdraw investment into a family relation, and for others around him or her to feel empathy and provide more support (Rotkirch and Janhunen 2010).

2 Postreproductive Partnerships

Postreproductive couples can be defined in relation to female menopause and as adults aged 50+ years. Of course, some men do have more children of their own after that age with younger spouses, but they constitute a very small minority, which we ignore here. Although postreproductive couples do not by definition make babies, having a partner can bring additional resources, alternatively consume resources otherwise reserved for oneself or for investment in children or grandchildren. Trade-offs between mating effort and parenting effort can therefore extend into old age, although they are likely to be less severe. Sex differences in reproductive strategies are likely to be weaker in later life than in reproductive age (Carr et al. 2014), due to more similar ways of life in retirement and to diminishing sexual conflict in mating.

Living with a spouse is a central emotional and socioeconomic resource. A long-term and stable union is related to better health and to happiness, often especially for men (Dykstra and de Jong Gierveld 2004; Robards et al. 2012; Stone et al. 2013). By contrast, being without a partner or repartnering can be associated with lower levels of well-being (e.g., Kohler et al. 2005; Carr and Utz 2020). Both selection effects and contextual variation may underlie such correlations: For instance, repartnered and single individuals can score higher on some dimensions of psychological well-being such as a sense of personal autonomy (Hsu and Barrett 2020), and lifetime single women in Finland are just as happy as their partnered counterparts once socioeconomic factors are taken into account (Tambellini et al. in press). The type of union also matters. Compared to dating or cohabitation, formal marriage is typically associated with higher spousal commitment, longer duration of the relationship, and happiness (Buckle et al. 1996; Lee and Ono 2012). However, socioeconomic factors and cultural norms affect the effects of cohabitation compared to marriage on well-being in contemporary Europe (Perelli-Harris et al. 2019).

Previous evolutionary sociological studies have detected signs of a trade-off between investments in mating and grandparenting, especially for men: Partnership dissolution and remarriage can be associated with lower grandpaternal investment in the form of help with childcare, practical help, and financial support (Danielsbacka and Tanskanen 2016, 2018). Tensions over the use of household resources are especially likely to arise when the couple's interests in kin investment do not align, i.e., when stepfamily relations are involved (Tanskanen et al. 2020). This may be one reason why some widowed or divorced mothers prefer not to repartner, or prefer dating or cohabitation over formal marriage in older age (Gałęzewska et al. 2017; Bildtgård and Öberg 2017).

Repartnering can also and alternatively function as a form of ensuring parental and grandparental investment. A new partner may boost household resources, for instance by providing access to a boat or a summer cottage, which the extended family can enjoy. The partner of an elderly parent can also help descendants by relieving their burden of care and support (de Jong Gierveld 2002).

2.1 Grandparental Investment and Happiness

Grandparental investment refers to all investments grandparents make in their grandchildren, such as providing care, practical help, and emotional and financial support. Contemporary grandparents often invest considerable amounts of time and resources in their grandchildren, which in contemporary high-income societies can be especially helpful in times of crises (Coall and Hertwig 2010; Sadruddin et al. 2019). Grandparental investment is often measured as grandparental childcare, which is the case also in this research.

Rearing young children has varying effects on happiness in contemporary high-income societies. A host of studies have investigated how parental and grandparental investment can affect the physical and mental well-being of the person providing childcare. They report both negative effects—e.g., through resource depletion from stress or lack of respect (e.g., Park 2018)—and positive impact, e.g., through benefits of social interaction and an increased sense of meaning in life (e.g., Hank and Buber 2009; Park 2018). In addition, grandparental status in itself—being a grandparent compared to not having any grandchildren—may be linked to happiness (e.g., Powdthavee 2011), for instance through social status or a sense of accomplishment.

Overall, grandparenting tends to be associated with higher psychological well-being in high-income societies. It is warranted to talk about a "happiness bonus" that many, if not most, grandparents experience. Both becoming a grandparent (Sheppard and Monden 2019; Tanskanen et al. 2019) and looking after grandchildren (e.g., Hilbrand et al. 2017) contribute to grandparental happiness (for a recent review, see Danielsbacka et al. 2022; for a cross-sectional study with data from the Survey of Health, Ageing and Retirement in Europe [SHARE], see Arpino et al. 2018). The association with better grandparental mental and physical health varies with individual characteristics of the grandparents and the magnitude of their investment (Danielsbacka et al. 2022) and with characteristics of the grandchild (e.g., Di Gessa et al. 2020). There are also contextual variations in the effects on well-being of being a grandparent and providing grandparental care. In countries with frequent intensive grandparental care, not providing such care was associated with lower subjective well-being (Arpino et al. 2018).

Since happier and healthier individuals have more possibilities to be active grandparents, selection effects are likely to influence the cross-sectional associations between grandparenting and well-being. Longitudinal studies following changes in well-being among the same individuals over time have therefore not always detected a grandparenting bonus (Danielsbacka et al. 2019). Some studies suggest that changes in grandparental investment, such as an increase or decrease in grandchild care, are not always related to changes in grandparental well-being (e.g., Ates 2017; Danielsbacka et al. 2019). This may be due to the fact that some grandparents do

become measurably happier over time, while others do not: A previous longitudinal study with SHARE data found that only women who had a first grandchild via their adult daughter became significantly happier (Di Gessa et al. 2020).

Existing research on grandparental investment and happiness typically has used current marital status as a control variable (for a recent example with four marital status categories, see Arpino et al. 2018). Some recent studies have paid attention to the interaction between marital status and the grandparenting happiness bonus. A cross-sectional study of Chinese people in Hong Kong found that unpartnered individuals had better mental health when about to become grandparents compared to other married grandparents (Lai et al. 2021).

Existing research thus suggests that life after 50 may alter but not abolish the costs and benefits individuals face from investing in different kinds of family relationships, and the effects of such investments on well-being. The associations of partnership history over the life course, grandparental investment, and happiness have, to the best of our knowledge, not been studied together previously.

3 Research Question and Hypotheses

We study how different types of partnership histories relate to happiness in later life by grandparental status and grandparental investment, based on data from SHARE. Associations between grandparenting and well-being do not solely depend on having a partner or not, but can also vary with the type of partnerships formed throughout the life course (Peters and Liefbroer 1997; for previous studies of partnership histories using SHARE data, see Mäki et al. 2022; Tambellini et al. in press). In this study we are therefore interested in how partnership histories of older Europeans interact with grandparental investment.

Based on previous research, we first assume that in this data, *having a current partner will be associated with being happier* (*H 1a*). Happiness is measured as quality of life and life satisfaction. It is important to keep in mind that both of these associations may partly reflect selection effects. We further expect *additional benefits to well-being of having one lifetime partner* (*H 1b*). Hence, our first hypothesis is that:

H 1 Quality of life and life satisfaction at age 50+ are associated with partnership history.

H 1a Having a partner (through marriage, cohabitation, or living apart together [LAT]) is positively associated with quality of life and life satisfaction.

H 1b Having had one main partner in life is positively associated with quality of life and life satisfaction.

Our key research question concerns the interactions between grandparental investment and happiness in relation to the type of partnership history. Based on previous research, we assume that *having a grandchild will be positively associated*

with happiness. We then investigate whether *grandparental investment among grandparents is associated with costs or benefits to happiness.* Grandparental investment is measured as provision of grandchild care. We do not make assumptions about the direction of associations; although many studies have documented increased happiness among grandparents, providing grandparental care can also deplete resources more than it brings beneficial returns. We further assume that the *associations between grandparental investments and happiness will vary depending on partnership history*. Our second and main hypothesis is that:

H 2 Quality of life and life satisfaction at age 50+ are differently associated with grandparental status and investment, depending on partnership history, so that:

H 2a Being a grandparent is positively associated with happiness.

H 2b Higher grandparental investment is associated with happiness.

H 2c The association between grandparental investment and happiness varies by partnership history type.

Given the lack of previous studies about partnership history and grandparental investment, we make no specific predictions for how the association between grandparental investment and happiness will vary by relationship types beyond assuming variation (*H 2c*). If grandparental investment is both negatively and positively associated with happiness in different partnership history types, it can be interpreted as consequences of resource depletion or relationship conflicts and signs of *trade-offs* between investment in the couple relation and grandparenting. Based on previous research, we expect possible signs of trade-offs between mating and grandparenting to be more prevalent in partnership history types with more unions. If grandparental investment is positively associated with happiness, we will talk about a *"grandparenting bonus."* A positive association can further indicate either *cumulative relationship benefits* (if those happy in their partnership history type are even happier when caring for a grandchild) or *relationship compensation* (if those less happy in their partnership history type become more similarly happy with other partnership history types when caring for a grandchild).

4 Material and Methods

To explore how quality of life and life satisfaction vary by partnership history and grandparental investment, we use SHARE data from 26 European countries and Israel for the years 2004–2020. Specifically, we draw both on the retrospective Sharelife interviews, collected in waves 3 and 7, and the panel waves. The selected sample excludes respondents younger than 50 years. For each respondent, we use data from the most recent panel wave (Online Appendix Table 1), but results are not sensitive to the choice of wave (results available upon request).

Table 1 Descriptive statistics of key variables

		% or mean (SD)
Sex	Female	55.6
	Male	44.4
Age (mean)		70.0 (9.7)
Partnership history	First union (marriage or cohabitation)	62.0
	Second union	7.5
	Third union	2.3
	Living apart together	1.7
	Divorced	5.9
	Widow	15.6
	Single (never married, unpartnered)	5.0
Employment	Not employed	80.4
	Employed	19.6
Area	Big city	16.4
	Suburbs or outskirts of a big city	10.3
	Large town	16.4
	Small village	23.0
	Rural area or village	32.9
Grandchildren (*of biological or adopted children*)	No	33.5
	Yes	66.5
Look after grandchildren (*among those who have grandchildren, 100%*)	Does not look after	58.2
	Less often than every month	9.6
	Almost every month	8.9
	Almost every week	15.3
	Almost every day	8.0
Quality of life (mean)		37 (6.4)
Life satisfaction (mean)		7.7 (1.8)
N (overall)		72,970

Note: When a respondent had several grandchildren, we selected the grandchild whom the grandparent looked after the most. Source: Survey of Health, Ageing and Retirement in Europe

To gain a more comprehensive account of *partnership histories*, we use data from the retrospective Sharelife questionnaire (waves 3 and 7), which captures all marital, cohabiting, and other important romantic relationships throughout the relationship history. Based on these accounts, we differentiated between people currently in their first union, second union, or third union; living apart together (LAT); divorced; widowed (including those whose cohabiting partner died); and single. A similar typology was obtained using sequence analysis in the study conducted by Mäki et al. (2022). It is worth noting that we updated the relationship histories with partnership information from each subsequent wave after Sharelife. Overall, the partnership type variable captures essential parts of the entire adult life course, providing longitudinal depth and a longer time frame compared to measuring the current relationship status as captured in the panel waves of SHARE. With regard to our main research question, a longitudinal use of SHARE data is not warranted, since comparing changes over the last years and decades gives undue weight to

recent changes in partnership or grandparental status. With the exception of spousal loss, partnership transitions are rare among older adults and render the categories of analyses much smaller. However, we conducted a longitudinal sensitivity analysis, described in detail in the methods section below (Online Appendix Table 2).

Unions refer to registered marriage or cohabitation as reported by respondents. Note that we exclude all possible romantic and sexual partners other than partners recorded through cohabitation, marriage, or dating. We do not distinguish between cohabitation and marriage but focus on the life course trajectories of relationships to one or several partners. The vast majority of Europeans aged 50+ are or have been formally married at least once, and some would have cohabited with their spouse before marrying. *Living apart together (LAT)* refers to individuals who are in a noncohabiting relationship. Although the LAT group is small, we have included it in our analyses since representative and high-quality data of such relations is rare, and the proportion of older people in LAT relations is on the rise (Bildtgård and Öberg 2017). *Single* refers to individuals who were mostly single over the life course: They never married and do not currently cohabit or have a partner outside the household. Some of the people coded as single have cohabited previously. Separating previous cohabitators from those who had never married would have yielded too small groups for meaningful analyses. Respondents in a first, second, or third union and those currently having a partner but living apart are referred to as "currently having a partner."

Grandparental status and investment were coded into three categories, allowing us to take into account both grandparental status and investments: (i) *not having any grandchildren*, (ii) *no investment* (being a grandparent but not looking after a grandchild), and (iii) *grandparental investment* (being a grandparent and looking after a grandchild). In each panel wave, SHARE asks respondents whether they have taken care of the grandchildren from an adult child during the last 12 months and how frequent this care was. Respondents report care for grandchildren for each adult child separately. If respondents took care of several grandchildren, we chose the adult child whose grandchild(ren) the respondent looked after the most. We focused on care given to grandchildren of biological and adopted children but excluded possible (nonbiological) grandchildren of a spouse. Earlier research indicates that European grandparents do not differ in their investments to the children of their biological and adopted adult children, but they were less likely to provide care to the children of their adult stepchildren (Tanskanen et al. 2020). In supplementary analyses we further differentiated between taking care of grandchildren at least once a week *(intense care)* and once a month or less often (*not intense care*). Results were similar to those with the categorisation reported in the main results (Online Appendix part B, Appendix Fig. 1).

Our outcome variable is *happiness*, which was measured as *self-reported quality of life* (CASP12) and *life satisfaction*. The CASP-12 instrument used in SHARE is a reduced version of the CASP-19 and is a well-established measure of quality of life in older age. The CASP12 taps into life control, autonomy, self-realisation, and pleasure. Answers to 12 items are given in a Likert scale from "never" to "often," scored as 1–4 points with a maximum of 48 points, indicating the highest quality of life (Borrat-Besson et al. 2015). Life satisfaction was measured with a single

indicator asking about the respondents' degree of satisfaction with their life, ranging from 0 (least satisfied) to 10 (most satisfied).

Our analyses include a set of controls, namely health, employment, age at the interview, sex, education, area, and country. Health and employment capture some of the potential selection effects: Respondents in bad health may find it more difficult to provide grandchild care, while those who are employed have less free time to care for grandchildren than those not in employment. Health was included as activities of daily living (ADL).

To answer our research questions, linear regression models were estimated with interactions between partnership history type and grandparental investment. We further stratified analyses by sex; full regression models are found in Online Appendix Table A4. We also investigated whether our main associations vary by educational level, but found no notable patterns. The main text presents regression results by partnership history types as well as interactions between partnership history types and grandparental investment.

We conducted additional sensitivity analyses with a longitudinal setting. These concerned within-individual increases in grandchild care provision over time and their associations with partnership history types and happiness. The supplementary longitudinal analyses are related to research questions 2b and 2c and serve to further explore whether main results hold for changes in provided care over a shorter period; see Online Appendix part C and Fig. 2a, b.

Descriptive statistics are presented in Table 1 and show that in SHARE data, 56% of respondents were female, 70 years was the mean age, and approximately 20% were employed. The majority resided in a rural area or a village, and 43% lived in a large town, a big city, or its outskirts. Almost 70% lived in their first or second marriage or cohabitation, 2% lived in their third or subsequent union, 2% currently had a partner but lived apart, 6% were divorced (without a new partner), 16% had lost a partner (without a new partner), and 5% were categorised as mostly single (never married and not currently cohabiting or having a partner outside the household). The mean reported quality of life was 37 points of the maximum 48, and mean life satisfaction was 7.7 of a maximum of 10.

The majority of SHARE respondents were grandparents; around one third (34%) did not have grandchildren. Among grandparents, 58% reported not looking after any grandchild. Approximately 42% of all grandparents, corresponding to 28% of all respondents, looked after a grandchild at least sometimes (Table 1).

5 Grandparental Status and Grandparental Investment by Partnership History

We first present descriptive results for the associations between partnership history, grandparental status, and grandparental investment separately. Partnership history is associated with being a grandparent or not (Table 2). Respondents living in a first union and widows were most likely to be both a parent and a grandparent, whereas single respondents were the least likely to have had offspring. These associations were similar after controlling for age (Online Appendix Table 2).

Table 2 Grandparental status by partnership history, shown as percentage (*n*)

	1st union	2nd union	3+ union	LAT	Separated	Widowed	Single	% of respondents	*N*
No child or grandchild	7.0	9.2	12.9	20.1	9.0	8.2	69.9	11.0	8003
Child(ren), no grandchild	23.9	28.2	33.4	25.1	29.7	13.0	12.0	22.5	16,445
Grandchild(ren)	69.1	62.5	53.8	54.8	61.3	78.9	18.0	66.5	48,522
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	–
N	45,252	5497	1648	1261	4331	11,351	3630	–	72,970

Note: *LAT* living apart together. Source: Survey of Health, Ageing and Retirement in Europe: respondents with grandchildren of biological and adopted children

Table 3 Grandchild care by partnership history, shown as percentage

	1st union	2nd union	3+ union	Dating	Separated	Widowed	Single	% of respondents	*N*
No grandchild care	51.3	68.3	69.3	53.6	61.4	77.2	55.0	58.2	28,254
Less than monthly	10.5	10.0	10.5	15.3	11.0	5.5	9.3	9.6	4654
Almost every month	10.3	8.0	7.3	11.7	8.5	4.3	11.3	8.9	4337
Almost every week	18.2	10.2	10.3	16.2	13.6	7.7	18.5	15.3	7402
Almost every day	9.8	3.4	2.6	3.2	5.5	5.3	6.0	8.0	3875
Total (%)	100	100	100	100	100	100	100	100	–
N	31,248	3437	886	691	2655	8950	655	–	48,522

Note: When a respondent had several grandchildren, we selected the adult child whose child(ren) the grandparent looked after the most. *LAT* living apart together. Source: Survey of Health, Ageing and Retirement in Europe: respondents with grandchildren of biological and adopted children

Partnership history is correlated with provision of grandchild care (Table 3). Respondents living in their first union were most likely to provide daily or weekly grandchild care, whereas respondents living in their second or third union or who were widowed were less likely to provide any care at all. Again, results were similar after adjusting for age (Online Appendix Table 3).

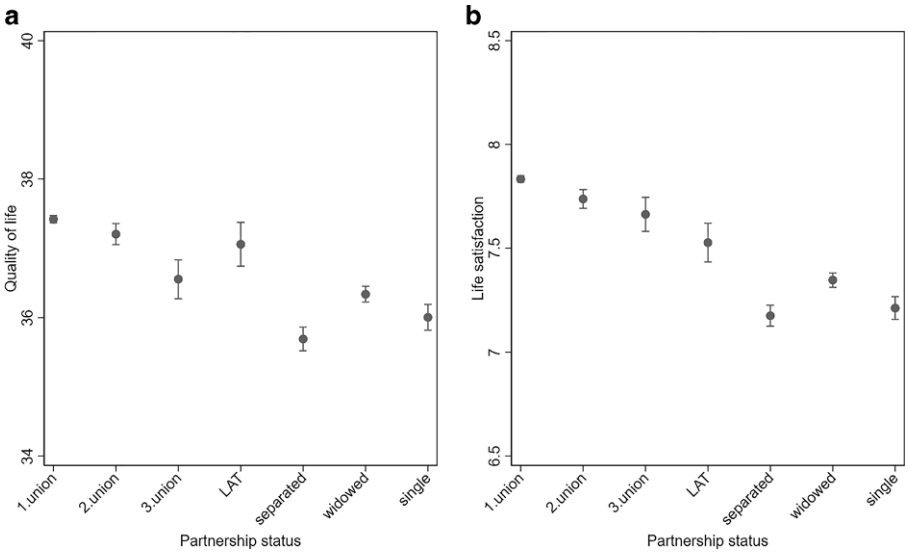

Fig. 1 Quality of life (**a**) and life satisfaction (**b**) by partnership history. Regression models control for age, sex, educational level, employment, health, area, and country. $N = 72{,}970$. *LAT* living apart together. Source: Survey of Health, Ageing and Retirement in Europe

6 Grandparental Investment, Partnership History, and Happiness

Next, we explore our research hypotheses through linear regressions, controlling for several sociodemographic background characteristics.

6.1 Partnership History and Happiness

Our first research question concerned the associations of happiness with current relationship status. As expected, currently partnered respondents reported significantly higher quality of life and life satisfaction than those living without a partner (Fig. 1a, b). Widowed, single, and, especially, separated respondents reported the lowest quality of life and life satisfaction. Furthermore, also as expected, people living in their first stable union were happier compared to other partnership history types. Although all differences between types of partnership history were not substantial, the overall trend appears similar for both happiness indicators. Separate analyses by sex revealed the same pattern for men and women for both indicators (not shown).

6.2 Partnership History, Grandparental Investment, and Happiness

Our second and main research question concerns how partnership history types are associated with grandparenting and happiness. Overall, Europeans aged 50+ report being somewhat happier if they are grandparents: The mean reported quality of life for grandparents was 37.22 (95% CI, 37.17–37.27), compared to 36.67 (95% CI,

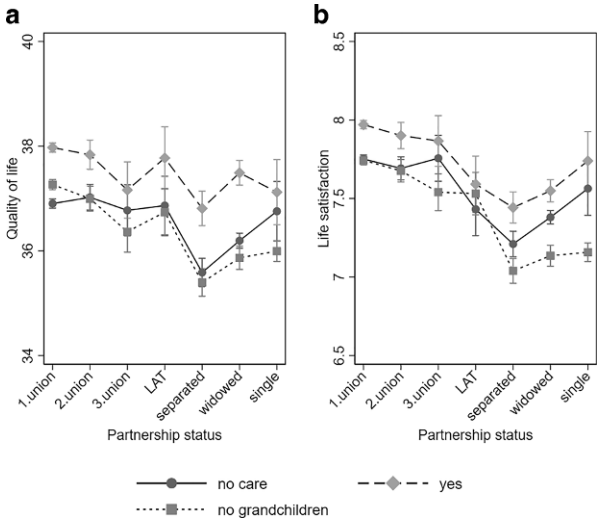

Fig. 2 Quality of life (**a**) and life satisfaction (**b**) by partnership history and grandparental status and investment, showing predicted means and 95% confidence intervals of linear regressions controlling for sex, age (respondents were aged 50+), employment, level of education, health, area, and country. When a respondent had several grandchildren, the adult child whose child(ren) which grandparent looked after the most was selected. $N = 72{,}970$. *LAT* living apart together. Source: Survey of Health, Ageing and Retirement in Europe data

36.60–36.74) for respondents who did not have any grandchildren. Regarding life satisfaction, the reported mean for grandparents was 7.73 (95% CI, 7.72–7.75), compared to 7.55 (95%, CI 7.53–7.56) for those who did not have any grandchildren. The regressions control for age, sex, education, employment, health, area, and country. When partnership histories were additionally controlled for, the happiness gap between grandparents and others remained but shrank by around one third. The associations were again similar for men and women. All associations were statistically significant ($p < 0.001$; results available upon request).

We next proceeded to compare differences in happiness by partnership history, studying both grandparental status and whether a grandparent provided any grandchild care. Results indicate that grandparental investment is often associated with both higher quality of life (Fig. 2a) and higher life satisfaction (Fig. 2b). The differences are statistically significant for all bigger partnership history groups, and the trend is similar for the smaller groups (those in a third union, a LAT relationship, or single).

Results suggest that the positive associations differ by partnership history. First, while providing grandparental care is clearly and positively associated with happiness among those in their first or second union, the gap in happiness between carer grandparents and those without grandchildren is larger among widows, separated, and singles. Put differently, unpartnered Europeans aged 50+ seem to profit more from taking care of grandchildren than by not being grandparents, compared to the same association among those in their first union (Online Appendix Table 4). This result likely points to the importance of grandchildren when one is not living with a partner. Separate analyses with another cutoff point for grandparental investment (comparing less than monthly care with at least monthly or more frequent grandchild care) yielded similar results (Online Appendix part B, Fig. 1a, b).

We also detect some differences between respondents with no grandchildren and those who are grandparents but do not provide any care. Grandparental status in it-

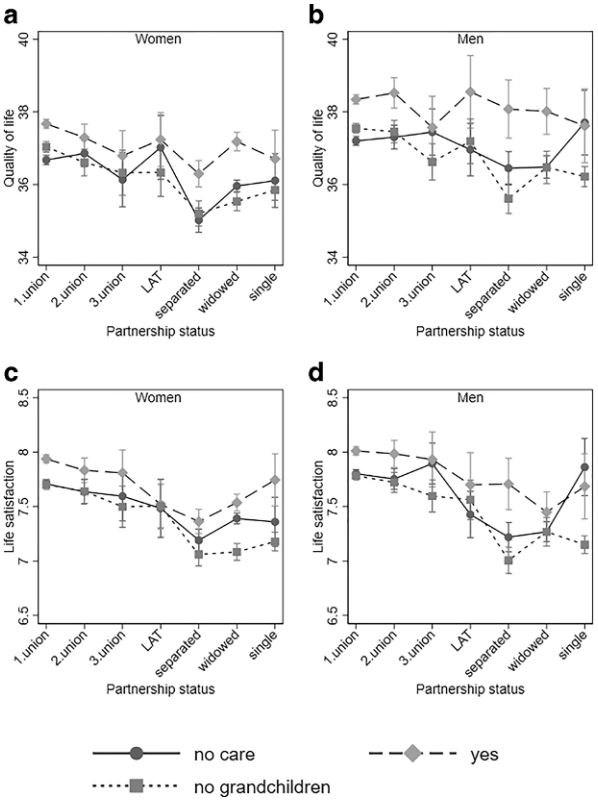

Fig. 3 **a–d** Quality of life and life satisfaction by partnership history, grandparental status and investment, and sex. Coefficients and 95% confidence intervals of linear regressions are shown for women (**a, c**; $N = 40{,}547$) and men (**b, d**; $N = 32{,}423$). Models control for age (respondents were aged 50+), level of education, employment, health, area, and country. When a respondent had several grandchildren, the adult child whose child(ren) the grandparent looked after the most was selected. *LAT* living apart together. Source: Survey of Health, Ageing and Retirement in Europe data

self, also without grandparental care, appears to be associated with more happiness among those with more fractured partnership histories: the widowed, separated individuals, those living in their third union, and single respondents (except regarding quality of life among the separated). However, it is worth noting that this happiness gap between respondents without grandchildren and those providing no grandparental care is not statistically significant for all combinations of trajectories and outcomes. Interestingly, among those in their first union, having no grandchildren was associated with higher reported quality of life compared to having grandchildren but not providing any care, perhaps due to causes preventing the grandparents from providing care. Among those in their second union, quality of life was similar among those who did not have grandchildren and those who did not provide any grandchild care. Similar levels of life satisfaction were also reported among respondents in their first or second union who did not have any grandchildren or provided no grandchild care.

Associations with partnership history, grandparenting, and happiness show few systematic differences between men and women (Fig. 3a–d). The strongest positive association between quality of life and grandparental investment is observed among separated or widowed respondents of both sexes (Fig. 3a, b), and the strongest association between life satisfaction and grandparental investment is observed among separated men (Fig. 3c, d). By contrast, respondents in their second or third union,

those in a LAT relationship, and widowed men (regarding life satisfaction) had the smallest or no increases in happiness in relation to grandparental care.

Finally, in a supplementary sensitivity analysis, we utilised the panel structure of SHARE data and further investigated how increases in grandparental care over time are associated with happiness (within individuals). We explored whether changes in happiness, prompted by the increase in grandparental care, differ by partnership history types (see Sect. C, supplementary analyses in the Online Appendix). Results of the asymmetric fixed-effects models (Allison 2019) indicate a pattern similar to that of our main analysis: Increases in grandparental caregiving are associated with a higher quality of life and life satisfaction, notably for those in their first or second union and those who are separated or widowed (Fig. 2a–d in the Online Appendix). The association seems to be more pronounced for women than for men. It is also worth noting that differences between partnership history types were not statistically significant at conventional levels ($p < 0.05$).

Taken together, our analyses indicate a grandparent happiness bonus for most partnership types. For reported quality of life, the grandparental happiness bonus is related to providing grandchild care and is often largest for those currently unpartnered (the separated, widowed, and lifetime singles). Regarding life satisfaction, grandparental status was for some groups as important for happiness as was providing grandchild care.

Women in a LAT relationship, men in their third union, and single men had the smallest or no happiness increase from grandparenting. For these partnership history groups, having a grandchild was associated with being happier whether care was provided or not; however, these groups were usually very small (e.g., few men with a predominantly single partnership history had grandchildren).

7 Conclusions and Discussion

Life history theory proposes that the benefits of various mating and parenting strategies will vary by age, sex, and socioecological context. Feeling happy can serve as a cue and incentive for the channelling of investments into close family relationships. Here we investigated associations between partnerships, grandparenting, and happiness. We were interested in happiness differences between different types of partnership history and whether emotional returns to grandparental investment would indicate trade-offs, cumulative benefits, or compensation, depending on partnership history type.

In societies in which men and women engage in resource acquisition together, and both paternal and maternal investment in children is extensive, having and raising children with one or only a few long-term partners can be a winning strategy with regard to reproductive success (Marlowe 2000; Buckle et al. 1996). We assumed that respondents still living in their first union would be happier than those who were in their subsequent unions, divorced, widowed, or in a relationship but living apart, or those who had been mostly single. Results confirmed our hypothesis. In particular, Europeans who had experienced relationship dissolution and did not have a new partner reported the lowest quality of life and were also least satisfied with their

lives. These results are in line with other studies indicating psychological benefits of continuous marriage among Europeans born after the Second World War (Carr and Utz 2020).

Based on the life history theory concept of trade-offs between mating and parenting, we expected both costs and benefits to happiness from grandparental investments. We detected mostly benefits, the magnitude of which varied by partnership history type and sex. Results in a similar direction were provided by an additional longitudinal within-person analysis.

The classic study introducing partnership histories into sociological life course research concluded that "it is difficult to compensate for the lack or loss of relationship-specific benefits of having a partner" (Peters and Liefbroer 1997). This study found signs of such a compensation through grandparenting. The "grandparent happiness bonus" was present for most partnership types in an additive way. It could furthermore even out initial differences in happiness, especially in quality of life, suggesting a compensatory effect. Specifically, our results suggest that the increase in happiness attached to grandparental caregiving was larger for unpartnered older Europeans than for those in stable unions. For instance, separated and widowed men who cared for their grandchildren reported as high a quality of life as men who still lived with their first partner.

Older Europeans in their first or second union were, as expected, happier and more likely to provide grandparental care. Having a lifelong partner often provides extra resources, which facilitate keeping in touch with adult children and their children, who usually are joint offspring. Being a grandparent plays a less decisive role for the overall happiness among individuals in stable partnerships. This result resonates with the relatively small impact of educational level on grandparental well-being effects detected in an earlier study using SHARE data (Arpino et al. 2018). When resource levels are high, the grandparenting bonus might be less tangible.

For Europeans living in their third union, those in a LAT relationship, or those who had been mostly single, the associations were in the same direction but more varied and rarely statistically significant, partly due to small sample sizes. Among single grandfathers, grandfathers living in their third union, and grandmothers in a LAT relationship, caring for grandchildren was not related to being more satisfied with life. This might reflect a mild trade-off between mating and (grand)parenting effort in the form of less investment and no extra returns in happiness to investment in grandchildren.

This study used variables that capture partnership history and the current partnership status, representing a methodological contribution to life course and life history studies. The SHARE respondents were aged 50+ and mostly still living in their first union, typically a marriage. Sixteen percent were widows, 5% were single, 10% lived in their second or third marriage or cohabitation, and 2% had a romantic partner they did not share a household with. Such partnership histories illustrate the predominance of traditional marriage as well as the pluralisation of different union types in Europe (Coleman 2013). Since LAT relationships constitute a very small proportion, their results must be taken with great caution. We still wanted to include this relationship type, due to its novelty and growing societal and cultural relevance (Bildtgård and Öberg 2017).

Few if any previous studies have investigated the potential trade-offs between mating and grandparenting later in life using detailed partnership history and large, high-quality data. Our results regarding compensatory effects are in line with a cross-sectional study of Chinese people in Hong Kong, which reported that unpartnered individuals had the greatest increases in mental health when about to become grandparents (Lai et al. 2021). Other studies have detected grandparenting bonuses for specific groups of grandparents in relation to grandparent and parent gender and the order of grandchildren (Di Gessa et al. 2020). In a similar way, we suggest that the magnitude of the grandparenting bonus varies by the type of partnership history a person has.

The evolutionary perspective provided by life history theory, although often focused on conflicts and trade-offs, does not exclude a win–win distribution and virtuous cycles (Carey and Judge 2001). The long-term pair bond is a prime example of this effect: Despite all the inherent conflicts between two partners who are usually not genetically related and have to cope with each other and each other's relatives for decades, many unions can be happy and productive (Borgerhoff Mulder and Rauch 2009; Buckle et al. 1996). In a similar vein, investment in grandchildren can be beneficial for both the grandchild and the grandparent. Loving and feeling loved, being engaged in a meaningful activity, and playing and moving around with children can contribute to the happiness stemming from grandparenting (Danielsbacka et al. 2022). Our results resonate with an earlier study showing how the number and quality of friendship ties can substitute for the support older people receive from adult children. Schnettler and Wöhler (2016) found that childless Germans in old age benefitted more strongly from friendship ties in terms of perceived social support than their peers with adult children. It is nevertheless crucial to keep in mind that unlike most friendships, grandparental investment can also be exhausting and detrimental to health and happiness. Grandparental depletion is more likely if grandparental responsibility is extensive and intensive, for instance when the grandparent is the primary caregiver (Hayslip and Kaminski 2005; Hank and Buber 2009). Further research is needed to understand whether depletion related to extensive grandparental investment is hidden in our data, since most European grandparents provide moderate care at most. It is also possible that grandparents who would face conflicts with a partner over grandparenting, or otherwise suffer in well-being from providing care to their grandchildren, abstain from doing so in the first place. Active grandparenting is easier to opt out from than investing in the partner you live together with. It is also noteworthy that levels of life satisfaction appeared to be higher due to grandparental status itself, without active care provision. This may stem from the social status of being a grandparent, selection effects we did not control for, or other forms of contact with or support to the grandchild(ren) that our investment variable did not capture.

We found few sex differences in our results. This result is partly surprising, given gender differences in reproductive and sexual strategies and in the effects of partnership transitions on grandpaternal versus grandmaternal investment (Danielsbacka and Tanskanen 2018). However, the supplementary, longitudinal analyses suggested that grandmothers might benefit somewhat more from grandchild care than grandfathers did. The results resonate with similar research on grandparental care provision

and subjective well-being (Carr et al. 2014; Arpino et al. 2018). They are also in line with predictions from evolutionary theory concerning sexual and reproductive strategies in predominantly monogamous societies (e.g., Bird 1999), particularly during a life stage when mating competition is less intense and one's own reproduction no longer possible.

Our results need to be interpreted with caution. Reverse causality is possible, for instance such that happiness is associated with more grandchild care or with partnership history. We should also keep in mind that grandfathers in their second or third union who do provide grandchild care may be a very select group. Previous studies have indicated that remarried Finnish men are likely to invest less in their grandchildren from their first union compared to other men and to women in the same situation (Danielsbacka and Tanskanen 2016, 2018). However, our analyses separated grandparental investment from grandparental status and found the clearest grandparental bonus to be associated with active provision of grandchild care. We also controlled for age, employment, country, and health, and conducted sensitivity analyses with regard to education and different degrees of grandparental investment. Furthermore, the supplementary longitudinal analyses compared changes in grandchild care over time for the same individuals and also detected signs of a positive association with increased care and being happier (although differences by partnership type were not statistically significant). These checks, together with the several other background controls, make us confident that our results are robust.

We hope our results will contribute to the integration of evolutionary and relationship science perspectives within family studies (Durante et al. 2016). They shed light on the interplay between mating and caring for offspring in postreproductive age and the possible trade-offs and benefits involved. Evolutionary research has been little interested in romantic partnerships during older, postfertile age, while family sociology has tended to bypass gendered reproductive strategies; a closer dialogue is now underway (Durante et al. 2016).

We conclude that partnership histories shape the happiness bonus derived from grandparenting. Both being a grandparent and providing grandchild care can enhance the lower levels of happiness associated with fractured or no partnership histories in old age. Policies of healthy ageing should support relationship quality among the elderly and possibilities to spend time with young children.

Supplementary Information The online version of this article (https://doi.org/10.1007/s11577-024-00971-1) contains supplementary material, which is available to authorized users.

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Declarations

Conflict of interest A. Rotkirch, A. Hägglund, A.O. Tanskanen, and M. Danielsbacka declare that they have no competing interests.

Ethical standards This study uses data from the Survey of Health, Ageing and Retirement research portal, which has received ethical approval and allows access to data for registered researchers. All authors have seen and approved the submitted manuscript. All authors commit to maintain integrity of research and rules of good scientific practice.

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Anna Rotkirch research professor, is a family demographer and Research Director of the Population Research Institute in Helsinki. Her area of expertise includes childbearing, couple relations, and intergenerational relations from an evolutionary social science perspective.

Anna Hägglund postdoctoral researcher at the University of Turku. Her research focuses on parenthood and occupational segregation and their relation to gender inequalities in the labor market.

Antti O. Tanskanen research professor at the Population Research Institute at Väestöliitto and a professor of social sciences at the University of Turku. His main research themes include family and extended kin relations, active ageing, volunteering, and charity, often with an evolutionary social science approach.

Mirkka Danielsbacka associate professor of sociology at the University of Turku and senior researcher at the Population Research Institute at Väestöliitto. Her research focuses on family and intergenerational relations, grandparenting, wellbeing of older people, and active ageing.