TITLE

Grandparental childcare and subjective well-being: The role of activities and reasons for care.

INTRODUCTION

Social engagement is generally linked with positive health outcomes, including better health as well as survival (Berkman et al., 2000). In later life, one key activity that many older people engage in is grandchild care. For instance, in Europe 58% grandmothers and 49% grandfathers provided regular or occasional care to a grandchild in the last year (Hank and Buber, 2009); in China 58% of grandparents look after grandchildren (Ko and Hank, 2013). In Italy, 20% of grandchildren aged 0–13 are looked after by grandparents almost daily when their parents are at work (Zamberletti et al., 2018). Also, a quarter of pre-school children in the U.S were regularly cared for by grandparents in 2011 (Laughlin, 2013), and in South Korea 62% of working mothers report childcare provided by the child's grandmother (Lee and Bauer, 2010). In England, more than 50% of grandparents look after grandchildren, with around a quarter looking after a grandchild 2 or more days a week (Anonymous et al., 2020). Moreover, in England grandparental childcare is socio-economically patterned in that financially worse-off grandparents are more likely to provide grandchild care almost daily, with the more highly educated looking after grandchildren less frequently (Anonymous et al., 2022). This suggests that the socio-economically disadvantaged are more likely to rely on grandparents as a primary source of childcare, which is likely to have important implications for well-being.

Numerous studies investigate the impact of grandchild care on grandparents' health and well-being in different societal contexts (ranging from Chile to the U.S., Europe, and China). While prior studies focusing mostly on custodial or primary grandparents in the U.S. report negative health consequences (Danielsbacka et al., 2022; Kelley et al., 2021), more recent research investigating secondary grandparental childcare (that is complementary to parental

care) finds a more mixed range of health consequences (Danielsbacka et al., 2022; Kim et al., 2016). As detailed below, the effect of grandchild care on grandparents' health is quite complex and depends on several factors including the i) intensity level and hours of care provided; ii) analytical strategy used; and iii) regional/cultural context and grandparents' socio-demographic characteristics; and iv) health measure considered (Bordone and Arpino, 2016, 2022; Chen and Liu, 2012; Anonymous et al., 2016a, b; Grundy et al., 2012; Anonymous et al. 2018; Tsai et al., 2013). An important limitation is that most studies rely on relatively simplistic assessments of grandparent care via questions on co-residency or custodial status, frequency of contact, or estimates of the number of hours spent in broad "caregiving" activities (Anonymous et al., 2018; Kamnuansilpa and Wongthanavasu, 2005). Knowing what grandparents do when they are with their grandchildren, as well as why they provide care for them, may better help to explain both the mechanisms (and specific activities) through which grandchild care may be beneficial or detrimental for grandparents' health and well-being. In addition, the analytical strategy used also affects the results (Bordone and Arpino, 2016, 2022). For instance, positive associations between grandchild care and grandparents' health and well-being are often based on analyses capturing variations between people that overlook the so-called grandparenting selection bias (i.e., that healthier grandparents are more likely to provide grandchild care to begin with). Evidence is also emerging on how gender, residential status, socioeconomic characteristics, and the health measure considered influence both the activities grandparents undertake with their grandchildren and their frequency, and their reasons for grandchild care (Anonymous et al., 2022; Anonymous et al., 2020; Dunifon et al., 2020). However, to our knowledge, studies that provide more nuanced information on grandparent-grandchild interactions and motivations for care are rarely linked to health outcomes (except for Dunifon et al. 2020 and Hale et al. 2021).

Thus, our study adds to the existing literature by examining whether, and to what extent, the way grandparents enact their roles as care providers (i.e., the activities undertaken and the reasons for care) relates to their subjective well-being. Employing the nationally representative English Longitudinal Study of Ageing (ELSA) we use hybrid (between-within) regression models to separate the between- and within-individual effects of grandparental childcare using unique data on activities and reasons for care on grandparents' well-being to better identify which associations may be due to uncontrolled selection effects. New and robust evidence can help scholars to better disentangle the relationship between grandchild care and subjective well-being among grandparents by pointing to potential mechanisms linking this form of social engagement with well-being in later life.

BACKGROUND

Most studies investigating the link between grandchild care and health find caring for grandchildren to have both positive and negative effects. Role enhancement theory suggests that occupying multiple roles may provide individuals with a sense of usefulness and competence, enhancing control and reinforcing meaning in later life (Moen et al., 1995; Sieber, 1974). Thus, grandparents caring for their grandchildren may benefit from the emotional rewards and gratification stemming from this activity, and a sense of belonging, attachment, and usefulness, which in turn may enhance health and life satisfaction (Grinstead et al., 2003). Moreover, it is plausible that grandparents providing childcare have stronger social ties with both grandchildren and their parents and are, therefore, likely to benefit from greater emotional, instrumental, and social family support (Hayslip Jr et al., 2015). This may in turn act to buffer the potential negative effects of care and have a direct positive impact on well-being by promoting healthy behaviours (Hayslip Jr et al., 2015). Looking after grandchildren may also lead to grandparents maintaining or increasing their levels of physical activity and health

behaviours, which in turn are associated with better physical health and well-being (Holmes and Joseph, 2011; Vermote et al., 2023).

Providing grandchild care, however, may also be demanding both physically and emotionally. Role strain theory postulates that multiple roles are associated with poor health outcomes because of the psychological and physical stressors caused by demanding and potentially competing role responsibilities (Goode, 1960; Sieber, 1974). For instance, if an individual's obligations exceed their physical and psychological capacity to cope, this situation may cause an increase in stress and physical demands, which in turn may be detrimental for health. This problem may exist for those grandparents who act as primary carers or who provide full-time or intensive care for their grandchildren.

Empirical evidence: Grandchild care activities and health and well-being

The relationship between grandparental childcare and well-being has been extensively investigated in recent years, both in different societal contexts (e.g., U.S., Europe, and Asia) and using different operationalisations of grandchild care, ranging from grandparents being occasional or daily care providers to being the sole custodians of their grandchildren. For example, a recent systematic review of studies in the United States comparing the mental health of grandparents providing custodial care to those not engaged in grandparenting activities concludes that custodial grandparenting negatively influences mental health (Kelley et al., 2021). In contrast, another systematic review looking at the impact of supplementary or secondary care finds several studies showing positive influences of grandparenting particularly on mental well-being but notes that more research is needed to understand the influence of supplementary caregiving in a wide range of contexts (Kim et al., 2016).

Studies also have increasingly exploited longitudinal datasets that can shed more light on, and control for, potential selection effects (Danielsbacka et al., 2022; Kelley et al., 2021; Kim et al., 2016). Particularly when secondary grandchild care is considered, studies generally

show either some beneficial or no major widespread health effects (Danielsbacka et al., 2022; Anonymous et al., 2016a, b; Kelley et al., 2021; Kim et al., 2016). However, it is increasingly acknowledged that whether grandparents provide care to their grandchild is determined by their initial health status (Yoo and Russell, 2020). Indeed, more recent longitudinal studies use methods such as fixed-effects models or instrumental variables (IV) that are better able to account for endogeneity in the context of grandparenting and health (Ates, 2017; Bordone and Arpino, 2022; Chen and Liu, 2012; Choi and Zhang, 2021; Danielsbacka et al., 2019; Ku et al., 2012; Notter, 2022; Wang et al., 2022; Zeng et al., 2021). However, even using these techniques, findings of the well-being effects of grandparental childcare remain mixed. For example, Chen and Liu (2012) using six waves from the China Health and Nutrition Survey and growth curve models with propensity score weighting to account for non-random selection into grandparental care, find a negative effect of higher levels of grandchild care on grandparent self-reported health trajectories (Chen and Liu, 2012). However, Wang et al. (2022) using fixed effect models employing three waves from the China Health and Retirement Longitudinal Survey (CHARLS), mostly find no effect of grandchild care on various measures of grandparents' subjective well-being - apart from a positive effect of moderate-intensity grandchild care on grandparent cognitive function (Wang et al., 2022). These findings are like the ones found for Europe (Ates, 2017; Bordone and Arpino, 2022; Danielsbacka et al., 2019). For instance, using German longitudinal data, Ates (2017) finds no within-person health effects of supplementary childcare (defined as looking after or supervising other people's children, e.g. grandchildren or the children of siblings, neighbours, friends or acquittances). Similarly, using longitudinal data from the Survey of Health, Ageing, and Retirement in Europe (SHARE) and considering grandchild care frequency as a continuous variable, Danielsbacka et al. (2019) find that changes in childcare provision are generally not associated with corresponding changes in physical and mental health. However, other studies that also use fixed effects

models find positive health effects. For instance, exploiting longitudinal data from the Health and Retirement Survey in the U.S., Notter (2022) concludes that grandparents providing non-residential care (of less than 500 hours) experience an increase in mental health (as captured by the Center for Epidemiologic Studies-Depression scale) whereas the opposite holds for grandparents living in skipped generations. Similarly, Ku et al. (2012), combining fixed effects with an IV approach using longitudinal data from Taiwan, find positive effects of grandchild care on self-rated health, depressive symptoms, and mobility limitations (Ku et al., 2012). Similarly, using three waves of CHARLS, Choi et al. (2021) find that skipped-generation household grandparenting (defined as grandparents who live with grandchildren, but not with adult children) is associated with lower levels of depressive symptoms in comparison to grandparents who do not provide care, but not compared to other types of grandparental care (e.g., full-time non-coresidential grandparenting) (Choi and Zhang, 2021). Also drawing on data from the same study, and using generalised propensity score matching to control for selection bias into grandparental childcare along with multilevel modelling, Zeng et al. (2021) find that providing moderate intensity care (defined as 24–44 hrs weekly) is associated with decreased mobility limitations and depressive symptoms, as well as better cognition, with some indication that providing more hours of grandchild care per week has no positive health effects (Zeng et al., 2021).

A key limitation of this literature is that most studies rely on relatively simplistic assessments of grandparent care via questions on co-residency or frequency of care that lack details on the periodicity and intensity of care as well as on the activities undertaken with grandchildren or the reasons for providing such care (Anonymous et al., 2018). Knowing what grandparents do when they are with their grandchildren as well as why they provide care for them may help to explain when grandchild care may be beneficial for grandparents' well-being. However, thus far, studies that provide more nuanced information on grandparent-grandchild

interactions and on motivations for care have rarely been linked to health and well-being outcomes (Dunifon et al., 2020; Hale et al., 2021). Few recent exceptions are Dunifon et al. (2020) and Hale et al. (2021) which consider the associations between a range of activities that grandparents undertake with their grandchildren (from eating a meal, to leisure time and playing games, to helping with schoolwork) and health and well-being. Using diary data from the American Time Use Study, Dunifon et al. (2020) find that grandparents, particularly if living in three-generational households, report higher levels of happiness when engaging in activities with their grandchildren compared to spending time alone or with other people (Dunifon et al., 2020). However, the authors did not find any specific activity type (housework, care for others, work, errands, eating meals, or leisure time) to be associated with higher levels of subjective well-being. Using a convenience sample of 79 grandparents in Northern Sri Lanka and a sum score of engagement in a range of ten activities, Hale et al. 2021 find that the more activities grandparents engaged in with their grandchildren and the more frequently, the lower their levels of distress although the authors do not investigate the precise types of activities that are linked with higher mental health scores (Hale et al., 2021). However, both studies are cross-sectional and suffer from the usual issue of reverse causality, i.e., that the observed differences reported may simply reflect variations in grandparent profiles, with those looking after grandchildren more likely to be in better health to begin with. Also, the two studies fail to investigate the relationship between the activities undertaken for/with grandchildren and health at a population level, given that one study by design, restricts the analyses to a sub-sample of co-residential grandparents (to account for grandparents' characteristics), and the other is based on a convenience sample. To our knowledge, no studies have considered the reasons for grandchild care as a potential factor that may account for the differential health impact of grandparental childcare, although feelings of obligations and duty, as well as motivations for

care, are often mentioned as potential explanations for current findings (Danielsbacka et al., 2022; Kelley et al., 2021; Kim et al., 2016).

Thus, our study contributes to a key knowledge gap in this area by examining whether, and to what extent, the way grandparents enact their roles as care providers (i.e., the activities undertaken and the reasons for care) relate to their subjective well-being at a population level. We use novel data from the latest two available waves of the nationally representative English Longitudinal Study of Ageing (ELSA). Moreover, in line with most recent studies that account for endogeneity in the context of grandparenting and health and well-being, we also present a series of analyses that investigate this issue using hybrid models, that can control for an individual's time-invariant attributes. Using these models will shed light on the extent to which potential associations might be due to uncontrolled selection effects.

METHOD

Study population

We base our study on ELSA, an ongoing multidisciplinary longitudinal biennial survey of individuals aged 50 and over (Banks et al., 2024; Steptoe et al. 2012). In the first wave collected in 2002/03, around 12,000 respondents were recruited to provide a representative sample of the population aged 50 and over living in private households in England (household response rate was 70%). More details of the survey's sampling frame, methodology, and questionnaires are reported elsewhere (https:// www.elsa-project.ac.uk). Data are drawn from the eighth and ninth wave of the study, collected in 2016/17 and 2018/19 respectively, as these are the only waves of ELSA which contain the module on grandparenting and questions on activities and reasons for grandchild care provision. Analyses are restricted to respondents with at least one grandchild under the age of 16.

Outcome variables

Our key subjective well-being outcomes are quality of life and depressive symptoms. Subjective quality of life (QoL) is evaluated using the CASP-19 scale which is specifically designed for individuals in later life (Hyde et al., 2003). CASP-19 contains 19 Likert-scaled questions measuring older people's control and autonomy as well as self-realization through pleasurable activities. The possible range of CASP-12 scores is from 0 to 57, with higher scores indicating greater well-being (Hyde et al., 2003). We also consider depressive symptoms as captured by an abbreviated version of the validated Centre for Epidemiologic Studies Depression (CES-D) Scale. The scale includes 8 binary (no/yes) questions that ask whether respondents experience any depressive symptoms, such as feeling sad or having restless sleep, in the week prior to interview with higher scores indicating more elevated symptoms. As in previous studies, we reverse-coded positive indicators (felt happy, enjoyed life) and summed negative indicators (restless sleep, etc.) to create an overall measure. In line with convention, we classified respondents who report four or more depressive symptoms on the CES-D scale as having elevated depressive symptoms (Van Dam and Earleywine, 2011).

Grandchild care activities and reasons for care

Grandparents who report looking after grandchildren are asked to provide information on the activities undertaken with and for grandchildren. The activities include having grandchildren stay overnight; caring for them when sick; preparing meals for them; taking them to (or collecting them from) nursery or school; helping them with homework; playing with them and/or taking part in leisure activities. For each of the activities selected, grandparents are then asked if they are involved frequently, occasionally, or rarely. To better capture the extent of engagement, we categorise tasks performed frequently versus those done less often or not selected at all.

Nevertheless, the categories frequently, occasionally, or rarely are open to interpretation. Thus, to better quantify the intensity of engagement in a task, we create a new measure combining the frequency of involvement in an activity with the frequency of grandparental care. The latter measure is derived from a question asking all grandparents whether they have looked after any grandchildren without their parents being present in the 12 months prior to the interview. Those who report looking after grandchildren are then asked a battery of questions on the periodicity of care (i.e., weekdays, weekends, school holidays, throughout the year, or difficult to say). Given that most grandparents report looking after grandchildren throughout the year, in line with Anonymous et al. (2022), we construct five categories which are broadly similar to the options available for this periodicity of grandparental childcare: (i) between 4 and 7 days a week; (ii) 2 to 3 days a week; (iii) 1 day a week; (iv) a few days a month; (v) less often than once a month or only on holidays. Respondents who select other periodicities of care are categorised to their closest match: for instance, if someone reports care 'every other weekend' they are classified as providing care 'a few days a month'. If they select '4 to 5 days' on weekdays, they are relabelled as providing grandchild care between 4 and 7 days a week. For those who select 2 or more periodicities of care, we consider their highest frequency of grandchild care. The new combined indicator has three categories: (i) no grandchild care (the reference group); (ii) frequently engaging in the activity and grandparental care 2-7 days week; and (iii) not frequently engaging in the activity regardless of days spent on grandchild care.

Grandparents who provide grandchild care are also asked to report the main reasons for looking after grandchildren. These include: to give his/her/their parents a break; so his/her/ their parents can go out in the evening; to help his/her/their parents go out to work; to help out financially; to help them develop as people; it makes me feel engaged with young people; our family prefers family care; and it is difficult for me to refuse. Given that respondents can report

all the reasons that apply to them, we create separate binary indicators, with 1 indicating whether the reason was mentioned and 0 otherwise.

Other covariates

We control for a wide range of potential covariates related to demographic, socio-economic, and family characteristics that previous studies identified as being associated with grandparental well-being and grandchild care (Bordone and Arpino, 2016; Danielsbacka et al.; Anonymous et al., 2016a, b; Wang et al., 2022). Thus, all analyses are adjusted for gender, age at interview (centred), ADL/IADL limitations, employment status, highest educational level achieved, equivalised household wealth, partnership status, volunteering, number of children, number of grandchildren, and age of youngest grandchild.

Statistical analyses

We use linear regression models when considering CASP-19, and linear probability models (LPM) to estimate results for the dichotomous CESD measure given our emphasis on higher levels of depressive symptoms. First, we carry out pooled regression models, adjusting the standard errors to account for repeated individual measures. We use predictive margins (PM) to present the mean predicted values of our subjective well-being outcomes by activity and reason for care when other variables are held constant. Second, exploiting the panel dimension of ELSA, we run longitudinal analyses using hybrid (i.e., between-within) linear regression and LPM. A distinct advantage of the hybrid model is that we can differentiate between-person effects (i.e., variations across grandparents) from within-person effects (i.e., variations among the same grandparents over time). Another advantage is that like random effects models, hybrid models can include time invariant characteristics.

RESULTS

Descriptive results

Table 1 presents the descriptive characteristics of the pooled sample across waves 8 and 9 based on person-year observations. This shows that out of all records in the data, 66% of grandparents indicate that they are looking after a grandchild, with around a quarter still in paid work and taking part in volunteering activities. Overall, close to 60% of observations show that grandparents have a youngest grandchild aged 6 or under. Table 1 also indicates that for grandparents providing grandchild care the most engaged in activity with the highest frequency involves hands-on activities with cooking for grandchildren and/or dropping them off or picking them up after school/nursery (around 15% of grandparents). This is closely followed by engagement in leisure activities and just being around (12% and 11% respectively). As to the reasons for grandchild care, out of all the observations in which grandchild care is provided, around three-quarters state that they want to help parents (by giving them a break or so that they can go out in the evenings), closely followed by 70% of grandparents indicating that they want to help financially or help the parents go to work.

Pooled regression analyses

Figures 1 and 2 present the predictive margins (PM) from the fully adjusted pooled linear regression models (Supplementary Tables 1-3 report the full results). In the figures, the PM can be interpreted as the mean predicted value of CASP-19 or the probability of elevated depressive symptoms for each activity frequency (or reason for grandchild care) if all grandparents report that activity frequency (or reason for grandchild care) when other characteristics are held constant. Overall, Figure 1a shows that the mean predicted values of CASP-19 are significantly higher among grandparents engaging in grandchild care activities (regardless of frequency) compared to those grandparents who do not provide care. For example, the mean predicted value of CASP-19 is 37.7 for grandparents frequently engaging in helping their grandchildren with homework (95%CI 37.10, 38.20) compared to 36.12

(95%CI 35.85, 36.39) for those not providing grandchild care. Similarly, Figure 2a shows that the mean predicted probability of reporting elevated depressive symptoms is generally lower for grandparents undertaking grandchild care activities (regardless of the frequency) compared to grandparents not taking part in any of the grandchild care activities. For instance, the predicted probability of having elevated depressive symptoms is 10% (95%CI 8.00, 11.39) for grandparents who frequently engage in hands-on activities (i.e., cooking or school/nursery pick up or drop off) in comparison to 15% (95%CI 13.57, 16.42) among grandparents not providing grandchild care.

Figure 1b shows the PM of CASP-19 by reasons given for grandparental childcare restricted to those grandparents who provide care. Broadly, the mean predicted value of CASP-19 is higher for grandparents who gave one of the stated reasons for care except for those who said it was because it was difficult to refuse, which shows a lower mean predicted value. Similarly, Figure 2b mostly shows that the predicted probability of reporting elevated depressive symptoms is lower among grandparents who give one of the reasons for grandchild care compared to grandparents who do not give one of these reasons (once again, except for "grandchild care being difficult to refuse" where there is a higher probability of having elevated depressive symptoms in line with the finding for CASP-19 noted above).

Longitudinal analyses

Tables 2 and 3 present the results of the linear and linear probability hybrid (or between-within) models for CASP-19 and elevated depressive symptoms respectively (full model results are in Supplementary Tables 4-5). The regression coefficients show that for both subjective well-being outcomes, engaging in grandchild care activities regardless of frequency is associated with beneficial outcomes. For example, Table 2 shows significant increases in CASP-19 scores between grandparents for those undertaking caring for ($\beta = 1.10$, $p < 0.01$), hands-on activities ($\beta = 1.48$, $p < 0.001$), engaging in leisure activities ($\beta = 1.56$, $p < 0.001$),

helping with homework (β = 1.93, p<0.001) and just being around (β = 1.59, p<0.001). In contrast, although within-grandparent effects are largely not significant (except for within-person effects of intrapersonal increases in frequently engaging in caring for activities) the effects are all negative (Table 2). Likewise, Table 3 shows that frequent engagement in these activities is associated with a significant percentage point decrease in the probability of reporting elevated depressive symptoms between grandparents but an intrapersonal increase in frequent activity engagement is associated with a positive percentage point (although non-significant) increase in the probability of elevated depressive symptoms within the same grandparents. However, the impact of less frequent engagement in grandchild care activities (or intrapersonal changes in engaging in the activity but less frequently) is associated with a percentage point decrease in the probability of reporting elevated depressive symptoms but is only significant between grandparents.

Tables 2 and 3 also shows results from the analogous correlated random-effects model. In this model, the coefficients for the within-person effects are identical to those in the hybrid model (and are the same as those fit by a standard fixed effect model). However, the correlated random-effects model provides a coefficient that tells us if there is a statistically significant difference between the within- and between-cluster effects. Table 2 shows that the between-cluster effects are significantly different from the within-cluster effects for all grandchild care activities regardless of frequency (and largely regardless of subjective well-being outcome). These results generally suggest that the beneficial effects of grandparental childcare on our measures of subjective well-being are largely due to differences between grandparents as differences within the same grandparents over time show a mostly detrimental (although largely non-significant) impact on subjective well-being.

Table 4 shows the results from the hybrid and correlated random effects models considering the impact of reasons for grandparental care among grandparents who provide

grandchild care on our two subjective well-being outcomes (full model results are in Supplementary Table 6). If the reason given for grandchild care is to give the parents a break or so that they can go out in the evening (i.e., help parents), we find this to be associated with a significant increase in the CASP-19 score between grandparents (and a significant percentage point decrease in the probability of reporting elevated depressive symptoms), but an intrapersonal change in reporting this reason leads to a (non-significant) decrease in CASP-19 score (and a significant increase in the percentage point probability of elevated depressive symptoms among the same grandparents over time). The analogous correlated-random effects model shows significant differences between the within- and between-grandparent effects for both outcomes. If the reason is to provide economic help (i.e., help financially or help parents go to work) this is associated with a significant percentage point decrease in the probability of reporting elevated depressive symptoms between grandparents, whereas those grandparents who newly report this reason show a positive (although not significant) percentage point increase in the probability of reporting elevated depressive symptoms (with a corresponding marginally significant difference between within- and between-grandparent effects). If the grandchild care is to help their grandchildren develop as people or to feel engaged with young people (i.e., emotional help), we find between- and within-grandparent effects to be significantly positively associated with an increase in CASP-19 score (but no effects on the probability of elevated symptoms). If the reason is because there is a preference for family care there are no statistically significant differences between the within- and between grandparent effects. However, when grandparents provide grandchild care because it is difficult to refuse, we find a detrimental impact on subjective well-being both between and within-persons (although the within-effect is not significant) with the correlated random effects model showing no significant difference between the within- and between—grandparent effects.

Sensitivity analyses

We test the robustness of our results to alternative estimation strategies and specifications. First, we run all our results both for the pooled regression and hybrid models with balanced data; our results remain consistent with those in our main models. Second, we test the robustness of our results to an alternative estimation model; namely given the binary indicator for elevated depressive symptoms we use a logit model in our pooled analyses and a logit hybrid model in our panel analyses. Once again our results remain consistent with those in our main models. Finally, we recognise that our approach cannot fully eliminate health-related confounding. To further address this issue, we ran additional panel analyses (using linear and logit hybrid models as appropriate for the outcome) restricting our sample to those who were not in the bottom quartile for CASP-19 in wave 7 (and those who did not report elevated depressive symptoms in wave 7). Our results of the associations between frequency of grandparental activities and reasons for care on subjective well-being in subsequent waves are once again consistent with those in our main models.

DISCUSSION

Grandparents play an important role in family life, particularly those looking after grandchildren, thus it is critical to understand the impact on well-being. Unlike earlier studies, we use a unique suite of questions to examine whether, and to what extent, the way grandparents enact their roles as care providers and their motivations for care influence both quality of life and depressive symptoms in a nationally representative sample. Like more recent research, our analytical approach (using hybrid or between-within regression models) enables us to capture more causal effects by distinguishing between within- and between-person effects. Like existing literature, our analyses show that the positive relationship between grandparental activities (and reasons for care) and subjective well-being is mostly due to

variations between grandparents rather than changes among the same grandparents over time (Ates, 2017; Bordone and Arpino, 2022; Danielsbacka et al., 2019). Our study also provides some indication that individual detrimental changes in well-being are associated with increases in the frequency of caring particularly when the activity involves grandchildren ill/overnight stay or caring for them when sick. Similarly, when intrapersonal changes in reasons for providing grandchild care involve giving parents a break so they can go out in the evening, we find an increase in elevated depressive symptoms for the same grandparents over time. In contrast, if the reason is to help grandchildren develop as people, or to feel engaged with young people, we find a beneficial association both within and between grandparents when looking at quality of life. When grandparents provide grandchild care because it is difficult to refuse, we find a negative association with well-being between- and within-grandparents.

Our study's findings show that knowing what grandparents do when they are with their grandchildren helps to better explain the mechanisms (through which activities) are beneficial or detrimental to grandparental well-being. This may explain why we find negative effects on well-being from intrapersonal changes in contrast to recent work showing mixed results while also using a causal analytical approach. Our findings also suggest that when such commitments are imposed on grandparents (i.e., difficult to refuse) rather than chosen by them, this has detrimental consequences for well-being (Anonymous et al., 2018). Also, our findings add further support to research suggesting detrimental impacts on well-being of more intensive grandparental involvement (Danielsbacka et al., 2022; Kelley et al., 2021; Kim et al., 2016).

Our study shows the importance of collecting more detailed information on grandchild care. Despite this, data on grandparental involvement in family life in societies around the world remains limited. For example, the measures of grandparenting collected in the Survey of Health Ageing and Retirement in Europe (or other comparative surveys) are relatively broad: we know whether grandparents have looked after a grandchild and if so, generally how much

time is spent on this activity. However, unlike in ELSA, in most surveys we do not know about the periodicity of such care, that is when in the year the childcare occurred (e.g. during school terms, the holidays or throughout the whole year), the frequency of such care (e.g. 1 day or more days per week), or the amount of care (number of hours) provided during these specific periods. More precise information on the extent and amount of, and attitudes toward, grandparental involvement is critical for considering the implications of grandparent care for well-being, as our study has shown. In addition, in most surveys (unlike in ELSA) we know little about what grandparents do when they look after grandchildren (e.g. take them to and from school, etc.), why they do so (e.g. to help financially, etc.), and their reasons for, or attitudes toward, providing such care. Moreover, to our knowledge, no nationally representative survey collects information about perceptions of the quality of grandparent-grandchild relationships. Collecting information on what grandparents do with their grandchildren, why they do it, when they do it, how often they do it, and the quality of their relationship would enable a better understanding of the consequences of engaging in grandchild care on grandparental well-being in diverse settings. It would also permit a better understanding of heterogeneity in grandparental involvement in family life and its consequences for well-being: an understudied area.

Our study has several limitations. First, ELSA does not collect detailed information about the childcare provided to each grandchild but asks a more generic question related all grandchildren and 'all the time' spent looking after them. While in our analyses we control for grandchild characteristics (e.g., age of youngest grandchild) we do not know if that is the grandchild grandparents had in mind when answering the questions about activities and reasons for care. Therefore, to better understand the mechanisms underlying the causal relationship between grandchild care and well-being more information on the recipient of care is needed. Second, ELSA does not provide information on which adult child the grandchild care is being

provided for. This is important as intergenerational decision-making is generally related to the opportunities and resources of multiple generations and parents' marital, financial, and employment circumstances are likely to be important determinants of grandparental well-being (Lowenstein et al., 2007). Third, we also do not know about the quality of the intergenerational relationship between the grandparents and their adult children which is also likely to impact grandparents' well-being (Lai et al., 2019; Merz et al., 2009; Moorman and Stokes, 2016). Last, we have only two time periods which is not likely to be enough time in which to detect significant within-person variation. This may be why we see a negative but non-significant impact of intrapersonal changes of more intensive grandparental activities and reasons for care on subjective well-being.

Conclusion

Despite these limitations, our study shows the importance of distinguishing within-from between-effects as we find that the positive relationship between grandparental activities and reasons for care and well-being is largely due to variations between grandparents rather than changes among the same grandparents over time, in line with other studies that have used similar approaches (Ates, 2017; Bordone and Arpino, 2022; Danielsbacka et al., 2019). However, in contrast to earlier studies, our findings suggest that individual detrimental changes in well-being are associated with increases in the frequency of grandchild care activities particularly when the activity involves taking care of grandchildren when ill or having grandchildren stay overnight, and when there is an intrapersonal change in the reason for providing grandchild care to giving parents a break or so that they can go out in the evening. Overall, our findings highlight the importance of more detailed information on grandparent-grandchild-interactions and motivations for care for examining health and well-being outcomes.

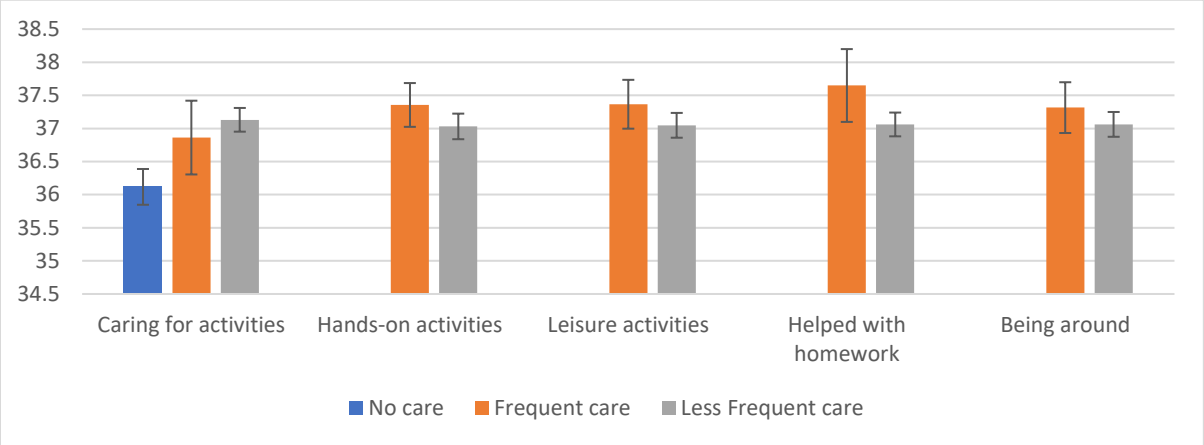
Table 1. Descriptive statistics of grandparents

Sociodemographic & health characteristics	Total no.	No. of persons	Mean	Between SD	Within SD
Gender – Female	8238	4964	56.62	(0.50)	
Mean Age (SD)	8238	4964	68.78	(8.28)	(0.95)
Mean ADL/IADL Limitations (SD)	8238	4964	0.73	(1.78)	(0.60)
In paid work	2007	1382	24.36	(0.42)	(0.13)
Retired or in other occupation	5510	3475	66.89	(0.45)	(0.16)
Other	721	575	8.75	(0.26)	(0.12)
High Educational Qualification	1532	955	18.84	(0.38)	(0.09)
Middle Educational Qualification	3831	2421	47.12	(0.49)	(0.12)
Low Educational Qualification	2768	1850	34.04	(0.46)	(0.13)
Highest wealth quartile	1988	1389	24.36	(0.40)	(0.17)
2nd wealth quartile	2079	1583	25.47	(0.39)	(0.21)
3rd wealth quartile	1933	1506	23.69	(0.38)	(0.20)
Lowest wealth quartile	2161	1579	26.48	(0.42)	(0.16)
Not partnered/partnered	5827	3520	29.25	(0.45)	(0.07)
Not volunteering	1993	1375	75.80	(0.39)	(0.17)
Children's & Grandchildren's characteristics					
Mean number of children (SD)	8238	4964	2.57	(1.38)	(0.29)
Mean number of grandchildren (SD)	8238	4964	4.69	(4.25)	(0.52)
Age youngest grandchild: 0-2	2855	2207	34.66	(0.43)	(0.23)
Age youngest grandchild: 3-5	1924	1677	23.36	(0.34)	(0.26)
Age youngest grandchild: 6-15	3459	2378	41.99	(0.46)	(0.19)
Care for grandchild	5400	3440	65.55	(0.45)	(0.19)
Frequency of activities (includes 2838 did not provide grandparent care)					
Caring for activities (cared when ill or had them stay overnight without parents)					
Frequently engage in activity & provide care 2-7 days a week	545	462	6.63	(0.21)	(0.13)
Not frequently engage in activity	4840	3233	58.86	(0.45)	(0.23)
Hands-on activities (cooking or school/nursery pick-up or drop off)					
Frequently engage in activity & provide care 2-7 days a week	1262	967	15.35	(0.32)	(0.17)
Not frequently engage in activity	4123	2893	50.14	(0.45)	(0.24)
Leisure activities					

Frequently engage in activity & provide care 2-7 days a week	999	796	12.15	(0.29)	(0.16)
Not frequently engage in activity	4386	3027	53.34	(0.45)	(0.24)
Helped with homework					
Frequently engage in activity & provide care 2-7 days a week	419	355	5.10	(0.18)	(0.12)
Not frequently engage in activity	4966	3310	60.39	(0.45)	(0.22)
Being around					
Frequently engage in activity & provide care 2-7 days a week	932	761	11.33	(0.27)	(0.17)
Not frequently engage in activity	4453	3074	54.15	(0.45)	(0.24)
Reasons (restricted to 5,440 person observations, 3440 people who provide care)					
Help for parents (give them break or so they can go out in evening)	4141	2842	76.69	(0.39)	(0.22)
Economic help (help out financially or help parents go to work)	3748	2568	69.41	(0.43)	(0.21)
Emotional help (help grandchildren develop as people or feeling engaged with young people)	2852	2091	52.81	(0.45)	(0.25)
Preference for family care	1293	1055	23.94	(0.37)	(0.22)
It is difficult to refuse	952	766	17.63	(0.33)	(0.19)
Subjective well-being					
Mean CASP-19	7551	4653	36.78	(5.55)	(2.37)
Mean CESD	8224	4960	1.34	(1.72)	(0.73)
Elevated depressive symptoms	8224	823	12.16	(0.30)	(0.15)

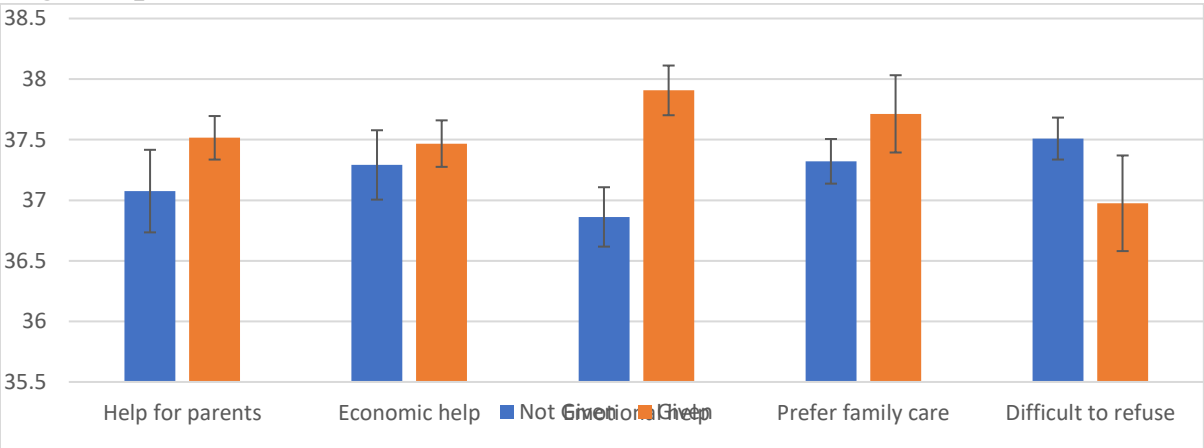
Notes: Table based on 8,238 person-year observations from 4,964 people in unbalanced panel data across waves 8 and 9. Total no. = Number of total person observations; No. of person = number of unique grandparents; SD = standard deviation.

Figure 1a: Predictive margins (and 95% CIs) of CASP-19 by frequency of grandparent activities, N=7,374



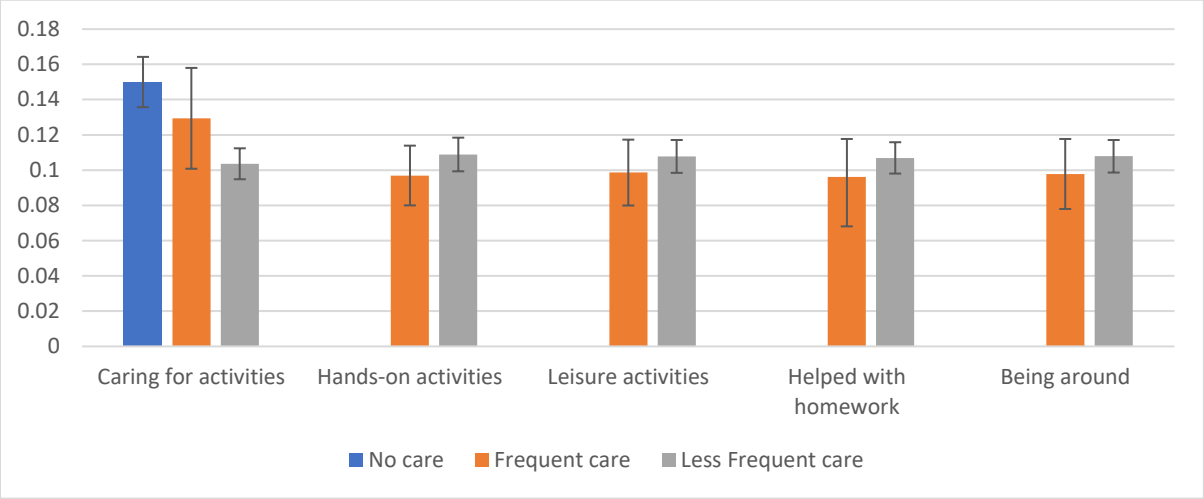
Notes: Results adjusted for gender, centred age, number of children, number of grandchildren, age of youngest grandchild, partnered, employment status, education, volunteering, household equivalised wealth, IADL and ADL limitations. Source: ELSA, Pooled Waves 8 and 9 standard errors adjusted for clustering within individuals. Analyses restricted to grandparents.

Figure 1b: Predictive margins (and 95% CIs) of CASP-19 by reasons for grandparent childcare, N=4,945



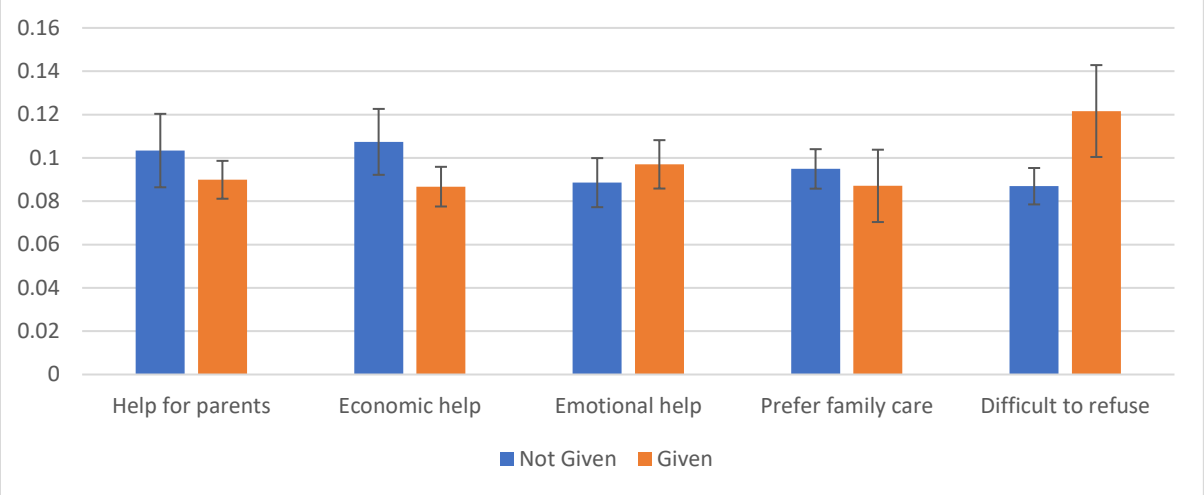
Notes: Results adjusted for gender, centred age, number of children, number of grandchildren, age of youngest grandchild, partnered, employment status, education, volunteering, household equivalised wealth, IADL and ADL limitations. Source: ELSA, Pooled Waves 8 and 9 standard errors adjusted for clustering within the individuals. Analyses restricted to grandparents who reported grandchild care.

Figure 2a: Predictive margins (and 95% CIs) of elevated depressive symptoms by frequency of grandchild care activities, N = 8,024



Notes: Results adjusted for gender, centred age, number of children, number of grandchildren, age of youngest grandchild, partnered, employment status, education, volunteering, household equivalised wealth, IADL and ADL limitations. Source: ELSA, Pooled Waves 8 and 9 standard errors adjusted for clustering within individuals. Analyses restricted to grandparents.

Figure 2b: Predictive margins (and 95% CIs) of elevated depressive symptoms by reasons for grandparental childcare, N=5,278



Notes: Results adjusted for gender, centred age, number of children, number of grandchildren, age of youngest grandchild, partnered, employment status, education, volunteering, household equivalised wealth, IADL and ADL limitations. Source: ELSA, Pooled Waves 8 and 9 standard errors adjusted for clustering within the individuals. Analyses restricted to grandparents who reported grandchild care.

Table 2. Between and within associations between grandparent care activities and CASP-19
Results from linear hybrid and correlated random effects models (N=7374)– **β [CI]**

	'Caring for' activities (when ill & stayovers) β [CI]		**Hands on activities (Cooking & school pick-up/ drop-off) β [CI]**		**Leisure activities β [CI]**		**Help with homework β [CI]**		**Being around β [CI]**	
	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model
Frequency of activity										
					Frequently engage in activity & provide care 2-7 days a week					
Within grandparents	-0.99* [-1.82,-0.17]	-0.99* [-1.82,-0.17]	-0.06 [-0.73,0.62]	-0.06 [-0.73,0.62]	-0.27 [-0.97,0.44]	-0.27 [-0.97,0.44]	-0.10 [-0.96,0.75]	-0.10 [-0.96,0.75]	-0.46 [-1.16,0.23]	-0.46 [-1.16,0.23]
Between grandparents	1.10** [0.37,1.83]		1.48*** [0.97,2.00]		1.56*** [1.00,2.12]		1.93*** [1.10,2.76]		1.59*** [1.01,2.17]	
Difference between-within		2.09*** [0.10,3.19]		1.54*** [0.69, 2.38]		1.82*** [0.92,2.73]		2.03*** [0.84,3.22]		2.05*** [1.15,2.95]
					Not frequently engage in activity					
Within grandparents	-0.01 [-0.49,0.47]	-0.01 [-0.49,0.47]	-0.05 [-0.53,0.43]	-0.05 [-0.53,0.43]	-0.04 [-0.52,0.44]	-0.04 [-0.52,0.44]	-0.05 [-0.53,0.43]	-0.05 [-0.53,0.43]	-0.01 [-0.50,0.47]	-0.01 [-0.50,0.47]
Between grandparents	1.30*** [0.93,1.66]		1.21*** [0.84,1.59]		1.21*** [0.84,1.59]		1.23*** [0.86,1.59]		1.21*** [0.84,1.58]	
Difference between-within		1.30*** [0.7,1.90]		1.27*** [0.66, 1.88]		1.25*** [0.65,1.86]		1.28*** [0 .68,1.88]		1.22*** [0.62,1.83]
Constant	37.85*** [37.03,38.47]	37.75*** [37.03,38.47]	37.78*** [37.05,38.50]	37.78*** [37.05,38.50]	37.77*** [37.05,38.49]	37.77*** [37.05,38.49]	37.78*** [37.06,38.50]	37.78*** [37.06,38.50]	37.78*** [37.06,38.51]	37.78*** [37.06,38.51]

Results adjusted for gender, centred age, IADL and/or ADL limitations, employment status, education, household equivalised wealth, partnered, volunteering, number of children, number of grandchildren, age of youngest grandchild, survey year. Source: ELSA, Waves 8 & 9. 95% confidence intervals in brackets
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Between and within associations between grandparent care activities and elevated depressive symptoms. Results from linear probability hybrid and correlated random effects models – **β (SE)**

	'Caring for' activities (when ill & stayovers) β (SE)		**Hands on activities (Cooking & school pick-up/ drop-off) β (SE)**		**Leisure activities β (SE)**		**Help with homework β (SE)**		**Being around β (SE)**	
	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model
Frequency of activity										
				Frequently engage in activity & provide care 2-7 days a week						
Within grandparents	0.03 [-0.02,0.08]	0.03 [-0.02,0.08]	0.01 [-0.03,0.05]	0.01 [-0.03,0.05]	0.00 [-0.04,0.05]	0.00 [-0.04,0.05]	0.02 [-0.03,0.07]	0.02 [-0.03,0.07]	-0.01 [-0.06,0.03]	-0.01 [-0.06,0.03]
Between grandparents	-0.03^{+} [-0.07,0.00]		-0.07*** [-0.09,-0.04]		-0.06*** [-0.09,-0.03]		-0.08*** [-0.12,-0.03]		-0.06*** [-0.09,-0.03]	
Difference between-within		-0.06* [-0.13, -0.00]		-0.08** [-0.12,-0.03]		-0.07* [-0.12,-0.02]		-0.09** [-0.16,-0.03]		-0.04^{+} [-0.10,0.01]
				Not engage in activity frequently						
Within grandparents	- 0.02 [-0.05,0.01]	-0.018 (0.014)	-0.02 [-0.05,0.01]	-0.019 (0.014)	-0.02 [-0.05,0.01]	-0.02 [-0.05,0.01]	-0.02 [-0.04,0.01]	-0.02 [-0.04,0.01]	-0.02 [-0.04,0.01]	
Between grandparents	-0.05*** [-0.07,-0.03]		-0.04*** [-0.06,-0.03]		-0.05*** [-0.07,-0.03]		-0.05*** [-0.07,-0.03])		-0.05*** [-0.07,-0.03]	
Difference between-within		-0.03* [-0.07,-0.00]		-0.03 [-0.06,0.01]		-0.03 [-0.06,0.00]		-0.03^{+} [-0.07,0.00]		-0.03^{+} (0.017)
Constant	-0.00 [-0.04,0.03]	-0.00 [-0.04,0.03]	-0.01 [-0.05,0.03]	-0.01 [-0.05,0.03]	-0.01 [-0.04,0.03]	-0.01 [-0.04,0.03]	-0.01 [-0.04,0.03]	-0.01 [-0.04,0.03]	-0.01 [-0.04,0.03]	-0.01 [-0.04,0.03]

Results adjusted for gender, centred age, IADL and/or ADL limitations, employment status, education, household equivalised wealth, partnered, volunteering, number of children, number of grandchildren, age of youngest grandchild, survey year. Source: ELSA, Waves 8 & 9. 95% confidence intervals in brackets $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. Between and within associations between frequent childcare activities, CASP-19 and elevated depressive symptoms among grandparents who provided grandchild care
Results from linear and linear probability hybrid and correlated random effects models – β [CI]

	Subjective Well-being			
	CASP-19		**Elevated depressive symptoms**	
Reasons for looking after grandchildren	Hybrid Model	Correlated random-effects model	Hybrid Model	Correlated random-effects model
Help for parents (give them break or so they can go out in the evening)				
Within grandparents	-0.09 (0.244) [-0.57,0.39]	-0.09 (0.244) [-0.57,0.39]	0.03* [0.00,0.06]	0.03* [0.00,0.06]
Between grandparents	0.64*** [0.18,1.09]		-0.03** [-0.05,-0.01]	
Difference		0.72* [0.06,1.39]		-0.06*** [-0.10 ,-0.02]
Economic help (help out financially or help parents go to work)				
Within grandparents	0.20 [-0.29,0.68]	0.20 [-0.29,0.68]	0.01 [-0.02,0.04]	0.01 [-0.02,0.04]
Between grandparents	0.14 [-0.27,0.55]		-0.03** [-0.05,-0.01]	
Difference		-0.06		-0.04+ [-0.07,0.00]
Emotional help (help grandchildren develop as people or feeling engaged with young		[-0.69,0.58]		
Within grandparents	0.36+ [-0.07,0.78]	0.36+ [-0.07,0.78]	0.01 [-0.02,0.03]	0.007 (0.013)
Between grandparents	1.26*** [0.86,1.66]		0.01 [-0.01,0.03]	
Difference		0.90** [0.32,1.48]		0.00 [-0.03,0.04]

Preference for family care				
Within grandparents	0.04 [-0.44,0.52]	0.04 [-0.44,0.52]	0.01 [-0.02,0.03]	0.01 [-0.02,0.03]
Between grandparents	0.41+ [-0.07,0.89]		-0.01 [-0.03,0.01]	
Difference		0.38 [-0.30,1.06]		-0.01 [-0.05,0.02]
It is difficult to refuse				
Within grandparents	-0.25 [-0.80,0.30]	-0.25 [-0.80,0.30]	0.02 [-0.01,0.05]	0.02 [-0.01,0.05]
Between grandparents	-0.74** [-1.26,-0.23]		0.04** [0.01,0.06]	
Difference		-0.50 (0.384)		0.02 [-0.02,0.06]
Constant	37.43*** [36.53,38.34]	37.43*** [36.53,38.34]		
N (Level 2)	4,945	4,945	5,278	5,278
N (Level 1)	3,207	3,207	3,375	3,375

95% confidence intervals in brackets

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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