The effect of grandchild care on older people's cognitive functioning: Does it matter what grandparents and grandchildren do together?

Today, the lives of grandparents and those of their grandchildren overlap markedly in Western societies. As a consequence, grandparents play an active and supportive role within the family by taking care of grandchildren: Both in the United States and in Europe, about 50% of grandparents provide some type of child care to their grandchildren (see Glaser et al., 2010, for a review). In answer to the recognised increasingly vital support of grandparents to their families by looking after grandchildren, most of the recent quantitative literature in the field has focussed on the caregiving role of grandparents and its effects on grandparents' physical and mental health (Di Gessa et al., 2016; Glaser et al., 2013). A few studies have also investigated the consequences of grandchild care on grandparents' cognitive functioning. This outcome is of central importance. Closely linked to health, the process of cognitive aging presents many challenges for modern societies. To address this growing concern, researchers and policymakers are interested in the factors that can halt or slow the decline of cognitive functioning in later life. Within the active ageing framework, grandchild care has been shown to belong to those activities that help older people maintaining cognitive functioning throughout to old age.

Since Cattell's (1943) original categorization of cognitive abilities into two dimensions (namely, fluid and crystallized abilities), different terminology has been used in the field to distinguish several types of cognitive abilities. In general, two patterns of age–cognition relations are usually recognized (Salthouse, 2006). Measures representing efficiency or effectiveness of processing carried out at the time of assessment (e.g., working memory) tend to decline linearly from early adulthood. Measures with a large knowledge component, such as vocabulary, represent products of processing carried out in the past and tend to increase until people are in their 60s and then decline (see Salthouse, 2010, for a review). Crystallized/knowledge components of cognition are more easily subject to changes and to be affected by daily activities. On the other hand, fluid intelligence/working memory abilities are much more difficult to be improved or altered in older adults. For example, Gold et al. (1995) found support for a positive effect of an active lifestyle on crystallized intelligence and not on indicators of fluid intelligence. Following Arpino and Bordone (2014), we argue that grandchild care is a social activity with an intellectually stimulating component and may therefore be beneficial for grandparents' cognitive functioning. In particular, we expect grandchild care to affect crystallized components of cognition. In addition, we are interested in the role that the different activities done by grandparents with grandchildren have on grandparents' cognitive functioning. To the best of our knowledge, this is the first study to analyse the effects of grandchild care on grandparents' health, distinguishing the various activities that grandparents and grandchildren do together.

Data and methods

Our analyses are based on the English Longitudianl Study of Ageing (ELSA), a multidisciplinary longitudinal survey, representative of the noninstitutionalized population age 50 and over in England (Steptoe et al., 2013).

We use data from the latest wave (wave 8, fieldwork 2016-2017), with 8,445 total archived interviews. This is the only wave of ELSA that includes information on activities done with grandchildren. We also use the previous wave (wave 7) as baseline and restrict the analyses to respondents who were included in both waves. Similar to Arpino and Bordone (2014), we restricted our sample to women and men who had at least one child and who were ages 50–80 at the baseline; we excluded respondents who reported being permanently sick or disabled (at either wave). We expected to find that serious illness and disability decreases the probability of looking after grandchildren, because ill grandparents are less able (physically) to take care of grandchildren, and parents might prefer to leave their children with fit grandparents. For similar reasons, we excluded respondents who (at either wave) reported ever having been diagnosed as having had a stroke or with Parkinson's disease or cancer, because it is well known that stroke related, Parkinson's, and anti-cancer drugs negatively affect cognitive abilities (Engelhardt et al., 2010). We excluded from our sample grandparents who had coresident grandchildren because their roles and their burdens in terms of responsibility and time might be completely different and more difficult to identify than the roles and responsibilities of grandparents who looked after their grandchildren more or less frequently. We acknowledge that it would be interesting to treat primary caregiver, coresiding, and supplementary grandparents separately, rather than excluding the first two categories, but there were not enough cases in our data set to do so. As robustness checks, the analyses will be carried out also on the sample including respondents who had reported one or more illnesses and on the sample including coresidents.

Outliers for the outcome variables (i.e., values not lying within 2.5 standard deviations of the mean) and missing values in each of the variables used in the statistical analyses were other criteria for the exclusion of cases. The final sample was composed of 1,993 women and 1,430 men ages 50–80 who had at least one child at the baseline. The regression analyses will be carried out using both dependent variables with and without the outliers.

Cognitive functioning in ELSA wave 8 is measured using four tests: (a) verbal fluency, (b) immediate recall, (c) delayed recall and (d) numeracy. In the test of verbal fluency, respondents were asked to name as many animals as they could think of within 1minute. In the tests of recall, which measured working memory, the interviewer first read a list of 10 common words to the respondent and then asked the respondent to recall aloud as many words as possible from the list in any order (immediate recall). Up to 1 minute was allowed for recall. The test was repeated at the end of the cognitive function module but without the words being read again (delayed recall). Although knowledge plays a critical role in all cognitive tests (Hertzog, 2008), the delayed recall measure of cognitive performance mainly taps on recently stored information. Moreover, both recall measures involve learning new information (i.e., a list of objects to be repeated). For more details on the exact formulation of the questions, please refer to the questionnaire available at https://www.elsa-project.ac.uk/study-documentation. In our study, the crystallized/knowledge components of cognition were captured by the verbal fluency test, representing products of processing carried out in the past, but not by the other three tests that tapped fluid intelligence/working memory abilities. Therefore, we expect verbal fluency to be particularly affected by grandchild care.

The first independent variable of interest was whether the respondent provides grandchild care to any of their grandchildren. Second, we carry out a set of models where in turn one of

the following activities carried out by grandparents with their grandchildren are considered: Helped grandchild[ren] with their homework; Played with grandchild[ren] and/or took part in leisure activities with them; Had grandchild[ren] to stay overnight without parents; Looked after grandchild[ren] when they are ill; Prepared meals for the grandchild[ren]; Took the grandchild[ren] to, or collected them from nursery, playgroup or school; Just been around in case they needed anything. For the time being we considered only the first two activities ("homework" and "leisure" activities) because they are the activities with the strongest intellectual stimulation component. By the time of the conference we plan to add analyses considering also the other activities. All grandparenting related variables are measured in wave 8.

The choice of control variables was motivated by past evidence regarding the determinants of older adults' cognition and their provision of grandchild care, that is, potential confounding variables. We included controls for sociodemographic variables (age, education, marital status), activity status (employed; retired; other) and participation in social activities (a dummy variable that scores 1 if the respondent was involved almost daily in at least one social activity and 0 otherwise). All control variables were measured at the baseline wave (7). To reduce risk of reverse causality we included cognitive tests measured at the baseline among the control variables.

For each of the 4 measures of cognitive functioning we estimate 5 different linear regression models separately by gender. Model 1 only distinguishes between grandparents who provide grandchild care and the other grandparents. Model 2 distinguishes among grandchild care providers those who help and those who do not help their grandchildren with their homework. Model 3 further differentiates among those who help their grandchildren with their homework depending on the frequency of this involvement (frequent vs occasional). Models 4 and 5 are similar to models 2 and 3 but instead of considering homework we account for leisure activities. In all models the reference category is represented by grandparents who do not provide childcare.

Results and conclusion

Table 1 shows descriptive statistics for one of the cognitive tests in ELSA, immediate recall. In particular, it distinguishes the mean levels of cognitive functioning, by grandparenthood and by type and frequency of grandchild care.

We first notice that, among grandparents, those providing grandchild care have on average higher cognitive scores than those not providing grandchild care. Table 1 also shows that a more active engagement in grandchild care (e.g., doing leisure activities with grandchildren and helping them with homework are associated with higher cognitive functioning for grandparents than in case of just being around or having grandchildren staying overnight.

Additionally, once we consider the frequency of care provision, we find that in case of helping grandchildren with homework, the higher the frequency of engagement, the higher the grandparent's cognitive test score.

Table 2 presents results of the multivariate analyses. To produce a compact table the results from the 5 models are presented in the same column. Estimates for control variables are not shown but available upon request.

Results from Model 1 indicates that grandmothers who provide care to their grandchildren report, on average, significantly better results on the cognitive tests at follow-up than their noncarer grandmothers counterparts, even controlling for the same cognitive test measured at baseline. For grandfathers we only find a positive significant association of grandchild care with verbal fluency.

When we distinguish carer engaged in helping their grandchildren with homework and those who do not (model 2), we find that for grandmothers the positive effects of grandchild care on cognition are confirmed as before for both groups, with the exception of numeracy for which we detect a significant effect only if grandmothers help their grandchildren doing homeworks. However, the effects tend to be stronger for grandmothers engaged in helping their grandchildren doing homework (note that, apart for numeracy, the differences between the two groups are statistically significant only in the case of verbal fluency). For grandfathers, we find that the positive effect on verbal fluency is confirmed for both groups and being engaged in "doing homework" has a positive effect also on immediate recall.

When we further account for the frequency of involvement in the homework activity (model 3), the pattern of results is not clear: frequent engagement is not always associated with a stronger effect on cognition; for grandfathers, only an occasional involvement is positively associated with verbal fluency and immediate recall.

When we consider leisure activities instead of homework (models 4 and 5) results are similar. One worth mentioning difference concerns the fact that frequent involvement in leisure activities with grandchildren consistently tends to be associated with stronger positive associations with cognition, when these are statistically significant. The only exception is found for men for whom immediate recall is positively associated with leisure activities when these are occasional.

All in all, our results indicate that grandchild care has positive effects on grandparents' cognitive functioning. This is especially true for grandmothers who benefit on all four tests considered. When grandparents help their grandchildren with their homework or if they are engaged in leisure activities, the positive effects on cognition tend to be stronger, especially on verbal fluency. Results on the frequency of engagement are not consistent across the models and outcomes and deserve additional analyses.

We plan to complete all analyses, including robustness checks, by the time of EPC 2020.

Table 1. Average cognitive scores (Test: Immediate recall), by type and frequency of grandchild care – all sample

	Any	**Frequently**	**Occasionally**	**Rarely**	**N**
Not a grandparent	6.68				1,215
No care provided	5.88				1,353
Care provided by type					
Just been around	6.44	6.40	6.52	6.54	1,422
Helped with homework	6.50	6.56	6.49	6.45	940
Cared when sick	6.51	6.24	6.49	6.64	843

Leisure activities	6.51	6.48	6.51	6.65	1,939
Prepared meals	6.48	6.44	6.56	6.34	1,821
Collected from nursery	6.49	6.39	6.60	6.48	1,312
Stayed overnight	6.44	6.36	6.49	6.38	1,566

Source: Own calculations on data from ELSA, wave 8.

Table 2. Linear regression models for the four cognitive tests at follow-up (wave 8), by gender.

	Verbal		Numeracy		Immediate recall		Delayed recall	
	M	F	M	F	M	F	M	F
Model 1								
grandchild care	0.69**	1.64***	-0.03	0.20**	0.07	0.15**	0.07	0.35***
	(0.28)	(0.26)	(0.09)	(0.09)	(0.08)	(0.07)	(0.09)	(0.08)
Model 2								
gc - no homework	0.51*	1.44***	-0.06	0.15	0.01	0.14*	0.09	0.33***
	(0.31)	(0.28)	(0.09)	(0.09)	(0.08)	(0.07)	(0.09)	(0.09)
gc - homework	1.09***	2.00***	0.03	0.29***	0.21**	0.19**	0.02	0.37***
	(0.38)	(0.32)	(0.12)	(0.11)	(0.10)	(0.09)	(0.12)	(0.10)
Model 3								
gc - no homework	0.52*	1.44***	-0.06	0.15	0.01	0.14*	0.09	0.33***
	(0.31)	(0.28)	(0.09)	(0.09)	(0.08)	(0.07)	(0.09)	(0.09)
gc - homework rare	1.63***	2.01***	-0.02	0.28**	0.24**	0.15	0.03	0.41***
	(0.44)	(0.37)	(0.13)	(0.12)	(0.12)	(0.10)	(0.14)	(0.12)
gc - homework freq	-0.07	1.98***	0.14	0.32**	0.15	0.25**	-0.02	0.31**
	(0.59)	(0.44)	(0.18)	(0.15)	(0.16)	(0.12)	(0.18)	(0.14)
Model 4								
gc - no leisure	0.55	1.59***	0.01	0.15	0.03	0.06	0.10	0.21*
	(0.42)	(0.36)	(0.13)	(0.12)	(0.11)	(0.09)	(0.13)	(0.12)
gc - leisure	0.74**	1.66***	-0.05	0.22**	0.09	0.19***	0.05	0.40***
	(0.30)	(0.28)	(0.09)	(0.09)	(0.08)	(0.07)	(0.09)	(0.09)
Model 5								
gc - no leisure	0.55	1.59***	0.01	0.15	0.03	0.06	0.10	0.22*
	(0.42)	(0.36)	(0.13)	(0.12)	(0.11)	(0.09)	(0.13)	(0.12)
gc - leisure rare	0.71**	1.54***	0.03	0.15	0.16*	0.17*	0.11	0.33***
	(0.36)	(0.33)	(0.11)	(0.11)	(0.10)	(0.09)	(0.11)	(0.11)
gc - leisure freq	0.78**	1.76***	-0.13	0.26**	0.00	0.21**	-0.00	0.46***
	(0.37)	(0.31)	(0.11)	(0.11)	(0.10)	(0.08)	(0.11)	(0.10)
N	1,430	1,993	1,430	1,993	1,430	1,993	1,430	1,993

Note: all control variables listed in the text are considered in all models, including cognitive tests at the baseline (wave 7).

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