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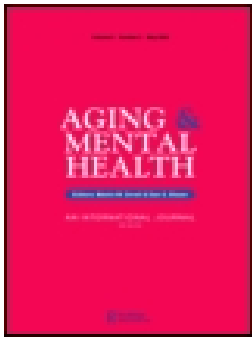
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Intergenerational contacts and depressive symptoms among older parents in Eastern Europe

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ABSTRACT

Objective: We investigate the association between parent-child contact frequency and changes in older parents' depressive symptoms in Bulgaria, Georgia and Russia. These are countries in which societal transformations may mean that psychological feelings of security engendered by having children in close contact may have particularly important implications for the mental health of older parents.

Methods: We analysed data from two waves of the Generation and Gender Surveys conducted three years apart and took account of relationships with more than one child. Analyses were performed using OLS regression models, adjusted for depressive symptoms at baseline.

Results: Among mothers increases in depressive symptoms were greater for those who lacked at least weekly contact with any child than for those with frequent contact with at least one child ($b = 0.64$; $p < 0.01$). Increases in depressive symptoms were associated with infrequent contacts with children, even after controlling for relationship quality ($b = 0.55$; $p < 0.05$). Among unpartnered fathers, less than weekly meetings with children were associated with increases in depressive symptoms.

Conclusions: Among mothers and unpartnered fathers changes in depressive symptoms varied by parent-child contact. The adverse effect of not having a partner on fathers' mental health was reduced, but not eliminated, by having frequent contacts with adult children.

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Depressive symptoms; intergenerational relationships; contact frequency; Eastern European countries

Introduction

Frequency of contact between older and younger generations is often considered a critical aspect of intergenerational solidarity, as well as a good indicator of the strength of parent-child relationships (Bengtson and Roberts, 1991; Lye, 1996; Silverstein & Bengtson, 1997). Frequent parent-child contact provides opportunities for companionship and sociability thus fostering individual integration in the family group. Social interactions may be directly related to positive psychological states, providing a sense of purpose, belonging, and a recognition of self-worth (Berkman, Glass, Brissette, & Seeman, 2000; Kawachi & Berkman, 2001) and previous cross-sectional studies indicate that frequent interactions with children are associated with lower risks of social isolation and depression among older parents (Antonucci, Ajrouch, & Janevic, 2003; Buber & Engelhardt, 2008; Djundeva, Mills, Wittek, & Steverink, 2015). Frequent meetings also enable family members to exchange various forms of help and care (Ward, Deane, & Spitze, 2014) and previous research has shown that parents who maintain more contact with their children are more likely to receive support in later life (Grundy & Read, 2012; Leopold, Raab, & Engelhardt, 2014). Interpersonal contacts constitute a 'latent network' of support that can be activated in times of need (Antonucci et al., 2003; Antonucci, Ajrouch, & Birditt, 2013; Riley & Riley, 1993) and the very existence of such a 'safety net' may promote feelings of reassurance among older parents whether or not they draw on it.

Although there are now many other means of communication, including telephone calls, email and social media, in-

person interactions may represent the most significant form of contact through which parents and children share experiences and activities that require the time, effort and skills of both generations (Tosi and Gähler, 2016; Treas & Gubernskaya, 2012; Van Gaalen, Dykstra, & Komter, 2010; Ward et al., 2014). Consistent with this, in a recent U.S. study, Teo et al. (2015) found that the frequency of in-person interactions with children was negatively associated with the development of depressive symptoms in older parents but other forms of contact appeared to have no protective effect. However, other studies have found that it is the quality, rather than the quantity, of contacts with children that is the most important influence on parental mental health, including on cognitive function and the risk of dementia (Fratiglioni & Wang, 2007; Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000; Seeman, Lusignolo, Albert, & Berkman, 2001). In line with this, Umberson (1992) and Umberson, Chen, House, Hopkins, and Slaten (1996) found in analysis of a U.S. dataset that depressive symptoms among parents were positively associated with parental feelings of dissatisfaction with the relationship with children but not with frequency of contact. Other studies have also reported that good quality intergenerational relationships have a positive effect on older parents' well-being (Merz, Schuengel, & Schulze, 2009) and a negative one on depressive symptoms (Koropecjy-Cox, 2002; Whitbeck, Hoyt, & Tyler, 2001).

Frequency of contacts between generations and quality of relationships are, of course, likely to be strongly associated with each other. Sharing common experiences and having

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frequent contacts with children tends to increase feelings of closeness and having a good relationship encourages the maintenance of frequent interactions later in life (Lawton, Silverstein, & Bengtson, 1994). However, frequent parent-child interactions offer the opportunity not only to share interests and opinions, but also to fight and disagree (Van Gaalen et al., 2010). Moreover, parents and children may maintain frequent contacts even when the quality of the relationship is low if they feel normatively obliged to keep in touch with one another (Van Gaalen & Dykstra, 2006). Conversely, even if frequency of face-to-face contact is constrained by time and spatial restrictions, the quality of relationships may be high (Kalmijn & Dykstra, 2006). This might apply, for example, in situations where children have to seek employment far from their parents, perhaps even in another country, but remain strongly affectively connected with their parents. In these circumstances, the level of affection and parent-child interactions only partly overlap and may be independently associated with parents' mental health.

In this study, we analyse how contact frequency between older parents and their adult children is associated with *changes* in older parents' symptoms of depression in Bulgaria, Georgia and Russia (Research question 1) taking account of relationship quality (Research question 2). These Eastern European countries represent an interesting case because since the collapse of the Soviet Union, extensive migration fluxes have increased the spatial separation between older parents and their adult children and have accelerated population ageing in Bulgaria, Georgia and rural areas of Russia (Botev, 2012; Castiglioni, Hărăguș, Faludi, & Hărăguș, 2016; Gavrilova & Gavrilo, 2009; Wolf, Raissian, & Grundy, 2015). Older parents who live far away from their children are less likely to meet them frequently and receive less support (Kalmijn & Dykstra, 2006; Shelton & Grundy, 2000). Expressed attitudes about familial responsibility for older relatives are generally stronger in Eastern than in Western European countries, particularly in Georgia (Daatland, Herlofson, & Lima, 2011; Wolf et al., 2015). Moreover, public support systems for older people have been eroded and are now generally weak (Keck, Hessel, & Saraceno, 2009). In contexts where people have strong expectations about filial support and alternative supports are lacking, older parents may experience feelings of abandonment or emotional distress if their adult children maintain few contacts with them (Heylen, Mortelmans, Hermans, & Boudiny, 2012). These feelings of loss may lead to the development of depressive symptoms in Eastern European older parents, who on average report having a higher propensity to feel depressed than their Western European counterparts (Grundy, van den Broek, & Keenan, 2017; Moor & Komter, 2012).

Contact frequency between parents and children may be especially important for those lacking a partner as many studies indicate that the unpartnered, especially the widowed, are more likely than the partnered to experience depressive symptoms in Western and Eastern European countries (Grundy et al., 2017; Moor & Komter, 2012; Van de Velde, Bracke, & Levecque, 2010). Unpartnered parents may be more likely to seek emotional support from their relationships with children, moderating the negative effect of living without a partner on their mental health symptoms (Bennett, Smith, & Hughes, 2005; Ha, Carr, Utz, & Nesse, 2006; Kawachi & Berkman, 2001). We analyse whether increases in depressive symptoms related to parent-child contact frequency are

greater for parents who lacked a partner than for those who live with a partner (Research question 3).

Whereas previous research has often focused on parental relationships with a marker child (e.g. Ha & Carr, 2005), we attempt to consider the whole family constellation. Parents who have more than one child may have both frequent and infrequent meetings simultaneously. Having few meetings with one child may matter less if other children maintain closer relationships.

One problem in trying to investigate associations between parent-child interactions and parental mental health is that the physical and mental health of parents may influence the frequency with which adult children see their parents. In order to reduce the effect of such reverse causation, we adopt a longitudinal study design and focus on *changes* in depressive symptoms, unlike many previous studies which have been cross-sectional (e.g. Buber & Engelhardt, 2008).

Methods

Data

We use data from the first two waves of the Gender and Generation Survey (GGS) conducted in 2004/2006 and 2007/2009. The time interval between the waves was three years for all countries. The GGS is a longitudinal survey of people aged 18–80 and includes detailed information about parent-adult child relationships, physical health and psychological symptoms. Data were collected by trained interviewers (Vikat et al., 2007).

The sample selected includes people aged 65–80 who lived in Bulgaria, Russia or Georgia and had at least one biological child alive at the time of the interview. Other Eastern European countries included in the GGS lacked information on key variables or only had one wave of data available. In the first wave, the response rate was 75% in Bulgaria, 72% in Georgia but only 45% for the Russian Federation (Fokkema, Kveder, Hiekel, Emery, & Liefbroer, 2016). The attrition rate between waves 1 and 2 was 28% in Bulgaria, 23% in Georgia and 33% in Russia (28% in total). We excluded those with missing information on depressive symptoms (0.7%) or on relationships with adult children (10%). The final sample includes 1,181 men and 1,990 women (weighted: 1,170 men and 1,986 women). Details on attrition and the longitudinal weights used in the analysis are provided in the analytical strategy section.

Measures

Depressive symptoms

Number of depressive symptoms was measured using a subscale of the Center for Epidemiological Studies Depression Scale (CES-D) based on seven items addressing the frequency of the following symptoms during the past week (0 = seldom or never, 1 = sometimes, 2 = often, 3 = most of the time): (1) I could not shake off the blues, (2) I felt depressed, (3) I felt my life had been a failure, (4) I felt fearful, (5) I felt lonely, (6) I had crying spells, (7) I felt sad. We computed an additive scale ranging from 0 to 21, and its Cronbach's alpha was equal to 0.90 in our sample. This shortened version of the CES-D depression scale has been used in several studies (e.g. Moor & Komter, 2012; Wolf et al., 2015).

Parent-child relationships

Two main independent variables were considered in the analysis relating to contact frequency and relationship quality with children. We created the variables about frequency of meetings and quality of relationships considering the two children with whom parents reported having the highest and the lowest level of face-to-face contact and relationship quality. Parents were asked about the number of face-to-face meetings with children over the course of a year. We recoded this into a categorical variable distinguishing those with: (1) at least weekly contact with all children; (2) at least weekly contact with one child and less than weekly with another; and (3) less than weekly contact with all children. Parents with only one child were treated as those having frequent or infrequent contact with all children. Contact frequency refers to the number of face-to-face encounters between parents and their adult children. Co-resident children were included in the group having at least weekly face-to-face interactions. Numerous studies have used the threshold of weekly meetings (e.g. Grundy & Read, 2012; Tomassini, Wolf, & Rosina, 2003), and others have found a positive association between less than weekly face-to-face contacts and parents' depressed mood (Buber & Engelhardt, 2008; Djundeva et al., 2015).

Relationship quality was captured with the question 'How satisfied are you with your relationship with [name]?' Respondents were asked to report the level of satisfaction with their relationship with each non-co-residing child on an eleven-point scale ranging from 0 (not at all satisfied) to 10 (completely satisfied). The degree of satisfaction with relationship with children was considered as an indicator of relationship quality, as has been done in other studies (Steinbach, 2013; Steinbach & Hank, 2016; Umberson, 1992). In line with previous research showing that parents tend to over-report relationship quality with children (Giarrusso, Feng, & Bengtson, 2004), we observed very high satisfaction scores. This may partly reflect social desirability bias with parents tending to present a positive picture of family ties and avoid mention of negative aspects of their relationship with their children (Aquilino, 1999). We used a cut-point of 9 to distinguish those reporting excellent relationships with all children (9 or 10) and those reporting less than excellent relationships with at least one child (from 0 to 8). Parents were not asked about their satisfaction with relationships with co-resident children, so those with at least one co-resident child were identified separately. Parents with one co-resident child and other non-co-resident children were included in the group having at least one co-resident child.

Other covariates

In line with previous research, we included controls for variables known to be associated with both parent-child relationships and depressive symptoms. Parents' characteristics measured at the first wave were: country of residence, age, educational level (primary = ISCED 0–2; secondary = ISCED 3–4; tertiary = ISCED 5–6), living with a partner, living in a rural area, number of children (from 1 to 4 or more), age of the youngest child, number of grandchildren (from 0 to 4 or more), having a chronic illness, reporting a need for care, and reporting economic strain (great difficulties making ends meet). Parents' need for care refers to need for regular help with personal care and so identifies those with more serious health limitations. Other dummy variables captured changes in health conditions (started to have chronic illnesses) and partnership (partner loss) over time. A linear regression power

analysis (Cohen, 1988) revealed that the sample size was large enough to include twenty one predictors in our multivariate models.

Analytical strategy

We first, present descriptive statistics for all variables used in the multivariable analyses. Pearson Chi-square tests and T-tests were performed to assess bivariate associations between parents' gender and categorical variables and continuous variables respectively. Second, we used Ordinary Least Squares regression models (OLS) with lagged dependent variable to examine the role of intergenerational contacts at wave 1 in predicting the number of depressive symptoms of older parents in wave 2. Controlling for the number of depressive symptoms at baseline (wave 1) enabled us to evaluate the contribution of intergenerational relations in explaining changes in older parents' depressive symptoms over a three years period. As noted previously, this strategy serves to reduce reverse causality bias (Johnson, 2005). We applied the Wald test to examine differences between coefficients within models and a likelihood-ratio test to compare model fits across nested models.

We present three sequential OLS models to address our three research questions. In Models 1 we analysed whether contact frequency was associated with changes in the number of parents' depressive symptoms net of other parental characteristics (Research question 1). In Model 2 we added relationship quality, as previous studies indicate that it may mediate the association between contact frequency and parents' depressive symptoms (Research question 2). In Model 3, interaction terms between contact frequency and living without a partner were included in the analysis in order to test the hypothesis that having frequent contact with children is especially important for those lacking a partner (Research question 3). We undertook all analyses separately for men and women because of known gender differences in family relationships and the importance of such relationships for mental health (Fuhrer, Stansfeld, Chemali, & Shipley, 1999; Gurina, Frolova, & Degryse, 2011; Kawachi & Berkman, 2001; Simon, 2002).

As mentioned previously, the attrition rate was quite high in GGS data. Preliminary analyses based on logistic regression models showed that the likelihood to drop out was higher for fathers than for mothers, for older than younger parents, and for those who reported more depressive symptoms and support needs at baseline. The probability of drop out was four percentage points higher for Russian than Bulgarian and Georgian parents. Attrition was not associated with the quality and quantity of parent-child relationships at baseline. To correct for the possible bias due to attrition and non-response, we used longitudinal (country-specific) weights provided in wave 2. These weights adjust the sample in terms of age, sex, household structure and region at baseline (Fokkema et al., 2016) and correct the estimates for attrition rates of population subgroups (Simard & Franklin, 2005).

Results

Descriptive results

Table 1 provides summary statistics for our sample. Compared to fathers, Mothers had on average higher depression scores

Table 1. Sample characteristics: Eastern European respondents who are present in both waves.

	Fathers		Mothers	
	Mean or %	N	Mean or %	N
<i>Dependent variable at wave 2:</i>				
Depression score at follow-up	3.1 (0.11)		5.1 (0.10)	
<i>Parent-child relationships at wave 1:</i>				
<i>Contact frequency</i>				
All at least weekly	42.6	498	49.4	982
At least weekly & less than weekly	31.0	363	29.7	589
All less than weekly	26.4	309	20.9	415
<i>Relationship quality</i>				
At least one co-resident	41.7	488	47.6	945
All excellent	37.8	442	34.0	676
At least one less than excellent	20.5	240	18.4	365
<i>Control variables at wave 1:</i>				
Depression score at baseline	2.4 (0.10)		4.4 (0.10)	
<i>Country</i>				
Bulgaria	37.3	437	33.4	664
Russia	25.6	299	35.3	700
Georgia	37.1	434	31.4	622
<i>Age</i>				
	70.6 (0.12)		70.4 (0.09)	
<i>Education</i>				
Primary	45.8	536	52.2	1,036
Secondary	33.6	393	30.7	611
Tertiary	20.6	241	17.1	339
Unpartnered	15.9	186	56.6	1,125
Living in a rural area	47.8	560	42.4	842
N. of children (1–4 or more)	2.1 (0.02)		2.0 (0.02)	
N. of grandchildren (0–4 or more)	2.8 (0.04)		2.8 (0.03)	
Chronic illness	50.1	586	65.6	1,303
Needs personal care	6.2	72	5.3	106
Great economic difficulties	32.0	374	39.7	789
<i>Time-varying variables:</i>				
Partner loss	5.4	63	7.1	141
Started to have chronic illness	22.6	262	18.4	364
Total	100.0	1,170	100.0	1,986

Note: contact frequency and relationship quality refers to meetings/relationships between parents and non-co-resident children. Standard deviation in parenthesis. Weighted results.

than fathers at both baseline and follow-up (t -test = -13.5 and -13.1 ; p -value < 0.001). For both fathers and mothers depressive symptoms tended to increase between the waves. Regarding parent-child relations, we observed a high level of in-person contacts that was partly due to a high proportion of parents living with at least one child. Over a third of fathers and mothers reported having excellent relationships with all children living outside the parental home, and we found no gender differences in relationship quality ($\text{Chi}^2 = 0.8$; p -value > 0.1).

Table 1 shows relevant gender differences in marital status and health conditions. Fewer fathers than mothers lived without a partner ($\text{Chi}^2 = 606.5$; p -value < 0.001). This reflects the very large sex differential in mortality in Eastern European countries where premature male mortality is particularly high. Almost eighty per cent of fathers and mothers who lived without a partner were widowed. Chronic illnesses were more widespread among women than among men ($\text{Chi}^2 = 92.2$; p -value < 0.001).

Although the analysis was performed on a pooled sample of countries, there were some differences between the three countries considered (Bulgaria, Georgia and Russia). Thirty-nine per cent of Georgian parents had at least weekly meetings with all children compared with 54% of parents in Russia and Bulgaria ($\text{Chi}^2 = 106.2$; p -value < 0.001). Differences in contact frequency were even larger when different living arrangements were taken into consideration. Sixty-seven per cent of Georgian parents lived with at least one child and only 6% of parents saw all non-co-resident children once a

week or more. In Russia and Bulgaria, thirty-eight per cent of parents had a co-resident child and about 25% of parents had at least weekly meetings with all non-co-resident children. In Georgia 54% of parents lived in rural areas compared with 30% in Russia ($\text{Chi}^2 = 123.1$; p -value < 0.001). Georgian and Russian parents reported on average a higher number of depressive symptoms at follow-up (4.6 and 4.4 respectively) than their Bulgarian (3.9) counterparts (t -test = -4.2 ; p -value < 0.001).

Intergenerational relationships and changes in parents' depressive symptoms

Table 2 presents results from linear regression models of changes in parents' depressive symptoms between the two waves under examination (2004/2006 and 2007/2009). Among older fathers (Model 1), changes in depressive symptoms were not associated with contact frequency at baseline. However, among older mothers number of depressive symptoms increased more for those who had less than weekly meetings with all their adult children, than for those who had at least weekly meetings (reference category). We also found significant differences between the coefficients related to having less than weekly meetings with all children and having at least weekly meetings with only one child (Wald test = 4.1, p -value = 0.04). Conversely, there were no differences between mothers who saw all their children frequently (reference category) and those who saw just one of them once a week or more. Thus, depressive symptoms increased more for mothers who saw all their children less than weekly than for the other two groups of mothers who met all or just one of them at least weekly.

In the first model, the increase in mothers' depressive symptoms associated with infrequent meetings with all children was equal to 0.70 symptoms on average. Other factors, such as partner loss, were associated with larger increases in number of symptoms (average increases of 3.1 symptoms). Living without a partner at baseline was associated with an average increase of 1.3 and 1.1 depressive symptoms for fathers and mothers respectively.

In Model 2 we added relationship quality to the analysis. Having less than excellent relationships with at least one adult child was associated with an average increase of 0.74 depressive symptoms in fathers. Among mothers, changes in depressive symptoms were not significantly associated with reported relationship quality. The coefficient related to less than weekly contacts between mothers and their adult children decreased (from 0.70 in Model 1 to 0.61 in Model 2) when the quality of relationships was included in the analysis. This change in coefficients suggests that the association between contact frequency and increases in mothers' depressive symptoms was only marginally mediated by relationship quality. Increases in mothers' depressive symptoms were associated with less than weekly face-to-face contacts with all children, even after accounting for relationship quality.

In Model 3 we examined whether the association between infrequent contacts and increases in depressive symptoms was stronger for unpartnered than for partnered parents. A likelihood-ratio test for nested models showed a better fit in Model 3 than in Model 2 for fathers (L -test = 11.5, p -value = 0.00), indicating that interaction terms explained a significant part of the variance in depressive symptoms at follow-up. Among partnered fathers, there was no association between

Table 2. Linear regression models (OLS) predicting fathers' and mothers' depressive symptoms at follow-up (three years later).

	Fathers						Mothers					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
<i>Control variables at wave 1:</i>												
Depression score at baseline	0.25**	(0.03)	0.24**	(0.03)	0.23**	(0.03)	0.35**	(0.02)	0.35**	(0.02)	0.35**	(0.02)
Country (ref. Bulgaria)												
Russia	0.57*	(0.27)	0.49+	(0.27)	0.51+	(0.27)	0.39+	(0.24)	0.38	(0.24)	0.38	(0.24)
Georgia	1.04**	(0.26)	0.98**	(0.27)	0.97**	(0.27)	0.62*	(0.25)	0.66*	(0.26)	0.66*	(0.26)
Age	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)	0.04+	(0.03)	0.04+	(0.03)	0.04	(0.03)
Education												
Secondary	-0.61*	(0.25)	-0.61*	(0.25)	-0.59*	(0.25)	-0.44+	(0.23)	-0.45+	(0.23)	-0.45+	(0.23)
Tertiary	-0.82**	(0.30)	-0.82**	(0.30)	-0.85**	(0.30)	-1.00**	(0.29)	-1.01**	(0.29)	-1.01**	(0.29)
Unpartnered	1.35**	(0.29)	1.28**	(0.29)	1.20**	(0.44)	1.11**	(0.21)	1.13**	(0.21)	1.00**	(0.29)
Living in rural area	0.21	(0.23)	0.20	(0.23)	0.23	(0.23)	0.10	(0.21)	0.10	(0.21)	0.11	(0.21)
N. of children	-0.09	(0.14)	-0.10	(0.14)	-0.10	(0.14)	-0.13	(0.14)	-0.13	(0.14)	-0.13	(0.14)
N. of grandchildren	-0.21*	(0.09)	-0.21*	(0.09)	-0.21*	(0.09)	-0.19*	(0.09)	-0.21*	(0.09)	-0.21*	(0.09)
Chronic illness	1.11**	(0.26)	1.11**	(0.26)	1.11**	(0.25)	0.77**	(0.27)	0.77**	(0.27)	0.77**	(0.27)
Needs personal care	1.87**	(0.46)	1.93**	(0.46)	1.92**	(0.46)	1.85**	(0.43)	1.85**	(0.43)	1.86**	(0.43)
Great economic difficulties	0.54*	(0.23)	0.47*	(0.23)	0.47*	(0.23)	0.86**	(0.20)	0.85**	(0.20)	0.84**	(0.20)
<i>Time-varying variables:</i>												
Partner loss	3.09**	(0.46)	3.08**	(0.46)	3.09**	(0.46)	2.35**	(0.39)	2.34**	(0.39)	2.33**	(0.39)
Started to have chronic illness	1.55**	(0.30)	1.52**	(0.30)	1.47**	(0.30)	0.77*	(0.32)	0.76*	(0.32)	0.76*	(0.32)
<i>Parent-child relationships at wave 1:</i>												
Contact frequency (ref. All at least weekly)												
At least weekly & less than weekly	0.01	(0.27)	0.01	(0.27)	0.16	(0.28)	0.11	(0.26)	0.10	(0.26)	-0.06	(0.36)
All less than weekly	0.42	(0.26)	0.27	(0.30)	0.05	(0.31)	0.70**	(0.25)	0.61*	(0.29)	0.49	(0.39)
Relationship quality (ref. All excellent)												
At least one co-resident			0.15	(0.27)	0.16	(0.27)			-0.14	(0.25)	-0.14	(0.25)
At least one less than excellent			0.74*	(0.29)	0.69*	(0.29)			0.05	(0.28)	0.05	(0.28)
Contact frequency * Unpartnered												
At least w. & less than w. *					-0.89	(0.65)					0.20	(0.50)
Unpartnered												
All less than weekly * Unpartnered					1.60*	(0.71)					0.29	(0.44)
Constant	-1.03	(1.87)	-1.00	(1.88)	-1.16	(1.87)	-0.73	(1.78)	-0.58	(1.80)	-0.47	(1.81)
Observations	1,170		1,170		1,170		1,986		1,986		1,986	
R-squared	0.22		0.23		0.23		0.22		0.22		0.22	

Note: ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$. Contact frequency refers to meetings between parents and adult children. Weighted results.

contact frequency and changes in depressive symptoms over time. Among unpartnered fathers, depressive symptoms increased more for those who had less than weekly meetings than for those who had frequent contacts with children. Although contact frequency had a protective role for unpartnered fathers, frequent meetings with children did not fully compensate for the increase in depressive symptoms related to the lack of a partner. Lacking a partner was associated with an average increase of 1.2 depressive symptoms for fathers who maintained at least weekly meetings with all children, while it was equal to 2.8 symptoms for those who met all children less than weekly. There were also differences between unpartnered fathers who met only one of their children less than once a week and those who had less than weekly meetings with all children (Wald test = 7.9, p -value = 0.01). Thus, similarly to what was observed for mothers, depressive symptoms increased less for unpartnered fathers who had frequent contacts with at least one of their children. Among older mothers (Table 2) there was no significant interaction between contact frequency and partnership status. The main effect of contact frequency became non-significant when we added the interaction term (in Model 3). This suggests that the association between having less than weekly contacts and increases in depressive symptoms was significant only among unpartnered mothers. Additional analyses (in Supplemental Material) show that the average association between less than weekly contacts and increases in depressive symptoms was mainly driven by unpartnered mothers but nevertheless interaction terms were not statistically significant.

Discussion

In this paper, we hypothesised that infrequent parent-child contacts might be associated with increases in parents' symptoms of depression. Older parents who have few interactions with adult children may perceive themselves as lacking a 'safety net' especially in settings where public support systems for older people are weak. The results show that depressive symptoms increased less for older mothers who met at least one child once a week or more than for those who had less than weekly face-to-face contacts with children. Increases in mothers' depressive symptoms were associated with infrequent contacts net of relationship quality. This result is consistent with some studies on Western Europe and the U.S. (Buber & Engelhardt, 2008; Teo et al., 2015) but is in contrast with others indicating that the effect of social relations on mental health is strongly mediated by their quality (Fratiglioni et al., 2000; Umberson, 1992; Umberson et al., 1996).

We hypothesised that contact frequency is particularly important for parents living without a partner. The findings revealed that increases in depressive symptoms were correlated with infrequent contacts among fathers lacking a partner. Intergenerational contacts between older parents and adult children were associated with increases in depressive symptoms at greater extent for unpartnered than for partnered fathers. This result is in line with previous research showing that relationships with adult children moderate the negative effect of living without a partner on mental health symptoms (Bennett et al., 2005; Ha et al., 2006). However,

having frequent meetings with adult children did not eliminate the negative effect of living without a partner on older people's mental health.

Unlike most previous studies examining parental relationships with a marker child, we analysed the whole family constellation which allowed us to identify parents who experienced frequent and infrequent contacts simultaneously. Among mothers and unpartnered fathers, having frequent and sporadic contacts with adult children simultaneously had a similar association with changes in parents' depressive symptoms as having frequent contacts with all children. Thus for those with more than one child frequent contact with one seems to prevail over infrequent contact with another. This result suggests that it is appropriate in research focusing on parental relationships with a marker child to consider the child with whom parents have the highest level of contact, as has often been done (Buber & Engelhardt, 2008).

There are some limitations of the study. We do not, in the results presented here, consider proximity of children and parents although some studies have reported some apparent benefits of either living with or close to a child on mental health of widowed parents (Ha & Carr, 2005; Van der Pers, Mulder, & Steverink, 2015) and those living in familialistic European countries (Aranda, 2015; Courtin & Avendano, 2016). However it is difficult to take account of both geographical proximity and frequency of contact in the same model due to multicollinearity and endogeneity (Glaser & Tomassini, 2000; Tomassini et al., 2003). In exploratory analysis we found that proximity between parents and their children was associated with variations in parents' depressive symptoms at baseline, but not with smaller increases in depressive symptoms.

In line with previous studies on GGS data, we used the reported level of satisfaction as an indicator of relationship quality (Steinbach, 2013; Steinbach & Hank, 2016). However, these findings may be affected by a social desirability bias, given that parents reported very high levels of satisfaction with their relationships with children. Results on relationship quality also exclude relationships with co-resident children as questions on this were not included in the GGS. A strategy used in some previous research to deal with this is to exclude co-resident adult children from the analysis. However, this may lead to incorrect interpretations in countries, such as Georgia, where more than half of older parents lived with at least one of their children.

A further limitation concerns unobserved characteristics, such as introversion and personality traits, that, may affect both the amount of contact with children and the occurrence of symptoms of depression in later life (Kawachi & Berkman, 2001). Nevertheless, time-constant individual characteristics may be less correlated to short-term changes in depressive symptoms, and we could assume that their effects were partly captured by parents' depressed mood at baseline.

Furthermore, missing values and selective attrition are serious issues in analyses of longitudinal data on older people. A sensitivity analysis with multiple imputation was employed to replace missing values in the two indicators of parent-child relationships, and the results remained similar to those presented in the text. Regarding attrition in panel data, the GGS provides information about death of respondents only in aggregate terms, and thus it was not possible to replace missing observations for subjects who dropped out for other reasons.

Despite these limitations, the findings presented here indicate that frequent parent-child is to some extent protective against increases in depressive symptoms in later life. In-person contacts between older parents and their children are likely to promote feelings of meaningful, belonging and social integration which are positively related to parents' mental health. From a policy perspective these findings suggest that facilitating and promoting intergenerational contacts might be beneficial and that studies to evaluate the effect of interventions designed to achieve this would be worthwhile.

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