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ARTICLE

The partner in the plate: the association between changes in partnership status and protein consumption among older people in Europe

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Abstract

Experiencing a change in partnership status at older ages might have detrimental effects on an individual's habits, including eating behaviours. Prior studies presented evidence that widowhood is related to altered diets with a decrease in the amount of protein consumed, which is considered to be an important risk factor of frailty among older people. Using data from Waves 4–8 of the Survey of Health, Ageing and Retirement in Europe (N = 134,313), we investigate the association between stability and changes in partnership status and changes in the frequency of protein consumption at older ages. We also explore the potential moderating role played by changes in economic resources. Having never been married, being divorced and being widowed were significantly associated with a lower frequency of protein consumption among both men and women. The transition to widowhood was significantly associated with a reduction in the frequency of protein consumption, while this same association was not found in the transition to divorce. Subjective evaluation of economic resources did not moderate the relationship between changes in partnership status and frequency of protein consumption. In short, changes in eating behaviours after having experienced the loss of a partner due to widowhood might contribute to accounting for health differentials between those ageing alone and those with a partner.

Keywords: ageing; partnership; eating behaviours; Europe; longitudinal analyses

Introduction

Although ageing without a partner has recently received considerable attention for its consequences for an individual's health and wellbeing (Djundeva *et al.*, 2019; Smith and Victor, 2019; Quashie *et al.*, 2021), the channels through which the absence of kin might affect an individual's outcomes are still under-researched. The loss of a spouse in older ages, as a result of death, separation or divorce, might have detrimental effects on an individual's health by, for example, affecting

daily-life habits, including eating behaviours (Vesnaver *et al.*, 2016). Indeed, the quantity and type of food consumed appears to be strongly influenced by social context (Higgs, 2015) and – although based on small samples and mainly qualitative research – a body of literature examining also young adults has presented convincing evidence that widowhood is associated with altered diets and eating behaviours (Heuberger and Wong, 2014; Vesnaver *et al.*, 2016).

The benefits that accrue from being in a couple in older ages have been mainly accounted for in relation to two theoretical concepts: the spousal resources/support model and social control theory. However, little is known about the relationship between stability/changes in marital status and modifications in protein consumption (frequency) in older ages, a behaviour deemed to be a significant risk factor for the development of frailty among older people (Haider *et al.*, 2020). To the best of our knowledge, few quantitative studies using longitudinal data have been conducted to date to address this relationship. In general, previous studies have focused on widowhood to the exclusion of other partnership statuses (such as divorce/separation or never having been in a couple). Thus, our objective here is to contribute to the existing literature by addressing the following research questions:

RQ1a: Do respondents living stably without a partner[1] (*i.e.* never-married, divorced and widowed) consume proteins less frequently than those living in a couple (in-couple)?
RQ1b: Do individuals whose status shifts from being in-couple to living without a partner (non in-couple) report a greater reduction in the frequency of protein consumption than that reported by both in-couple and long-standing single respondents?
RQ2: Does the subjective evaluation of economic resources (or changes in that evaluation) moderate the association between the status shift from in-couple to non in-couple and the frequency of protein consumption?

Our study contributes to the extant literature by using – as far as we can determine, for the first time in relation to this research question – a large representative longitudinal sample of Europeans aged 50+. More specifically, we use data from Waves 4–8 (W4–W8) of the Survey of Health, Ageing and Retirement in Europe (SHARE) and estimate longitudinal models that are better able to account for possible selection and reverse causality issues than has been the case in related studies published previously.

Background

The importance of protein consumption at older ages

Low protein consumption appears to be a particularly risky behaviour among older adults. Indeed, late-life protein inadequacies can contribute to frailty (Machón *et al.*, 2018) by increasing the loss of physical strength (Hanach *et al.*, 2019), impacting disability trajectories (Mendonça *et al.*, 2019) and elevating the risk of chronic diseases (McLean *et al.*, 2016). Various studies have recently reported that frail individuals present an insufficient consumption of protein (*e.g.* Machón *et al.*, 2018), while those who consume appropriate amounts present a significantly lower risk for presenting exhaustion, weight loss, slowness, weakness and low

activity (Haider *et al.*, 2020). This suggests that increasing protein consumption at older ages should improve muscle health and prevent the development of sarcopenia (Wolfe, 2012), while it might also help maintain energy balance and, thus, reduce the risk of under-nutrition.

Partnership status and eating behaviours

Numerous studies report definite advantages of living in-couple for several life-related dimensions including social participation (Bolano and Arpino, 2020), and better physical health (Grundy and Tomassini, 2010), psychological health (Stokes and Moorman, 2018) and wellbeing (Solé-Auró and Cortina, 2019), although being in a domestic partnership might be associated with a selection-effect given that individuals in better health present a greater probability of getting married (Braithwaite and Holt-Lunstad, 2017). Marital relationships tend to become even more salient with ageing (Thomas *et al.*, 2017) since other social relationships are often lost as a result of geographic relocation or death (Liu *et al.*, 2016). Married individuals tend to be less engaged in risky behaviours and are more likely to seek recommended medical treatment (Van Jaarsveld *et al.*, 2006). In the specific case of eating behaviours, living in a couple seems to be particularly relevant in establishing correct conduct since food behaviour is the result of a complex negotiation about what and how much we eat (Vesnaver *et al.*, 2015). Moreover, it has been found that individuals in a couple adhere to a healthy diet (Meltzer *et al.*, 2013).

As discussed above, two main theories have been formulated in accounting for the health-related benefits of being in-couple. According to the first of these, the spousal resource/support model, being in-couple is associated with a greater availability of social, emotional, instrumental and economic support (Umberson *et al.*, 2013) and healthier eating behaviours (Choi *et al.*, 2020). Thus, a partner can be a source of social engagement by motivating individuals to cook and eat healthily (Choi *et al.*, 2020), while a partner can also provide instrumental and economic support, including help with shopping and cooking (Sidenvall *et al.*, 2001; Salehi *et al.*, 2010; Conklin *et al.*, 2014). Consistent with this theory, research has shown that being widowed is associated with a lower frequency and variety of food consumed (Conklin *et al.*, 2014). The second theory, that of social control, argues that intimate family relationships can better provide control of healthy behaviours by indirectly affecting the internalisation of norms for such behaviours, and by directly providing informal sanctions for deviating from healthy behaviours (Umberson *et al.*, 2010*b*). Thus, having a partner may lead to a significantly better regulation of eating behaviours, as a result of spousal control (Umberson *et al.*, 2010*a*). This means that losing a partner might lead to a loss of social control, since the partner constitutes an important source of supervision and care ensuring the adoption of heathy behaviours (Umberson *et al.*, 2010*b*, 2016).

Finally, empirical research has also shown that depression and a lack of motivation to eat might explain a deterioration in the eating habits of older individuals not in a partnership. Indeed, standard mealtimes may increase feelings of loneliness, given the painful memories of this activity previously shared with a former partner, and result in a change in appetite due to a negative emotional status and depression (Johnson, 2002). The widowhood effect in terms of increased

depressive symptoms is widely reported in the literature (Peña-Longobardo *et al.*, 2021; Yu *et al.*, 2021), with no difference by gender and region (Schmitz, 2021). Indeed, drawing on longitudinal data from different European regions, Schmitz (2021) found no empirical support for the hypothesised stronger effects of widowhood on the mental health of women living in Southern and Western Europe.

Gender differences

While women tend to receive more financial benefits from living in-couple, men tend to receive greater support for, and more regulation of, their health behaviours that, directly or indirectly, improve their health (Revenson *et al.*, 2016). However, studies conducted to date do not consistently provide evidence as to whether being in-couple has a differential impact on the variety and quantity of food consumed by men and women. However, men and women appear to have very different habits as regards protein consumption, with men typically reporting a higher daily protein intake (*see e.g.* Schütz and Franzese, 2018). In general, though, a reduction in protein consumption is likely with ageing, with recent evidence showing that more than a third of older men and 41 per cent of older women do not consume enough protein (Baum *et al.*, 2016; Wolfe, 2012).

Yet, older women are more likely to be economically vulnerable and to report greater financial hardships than men (Lyon and Colquhoun, 1999; Denton *et al.*, 2004), affecting their ability to buy food (Sidenvall *et al.*, 2001), especially as regards meat products, an outcome that has been shown to be influenced by income availability (*see e.g.* Maguire and Monsivais, 2015). Additionally, older men living without a partner may be at a higher risk than women living without a partner of having an inadequate diet (Davis *et al.*, 1990) as the former are more likely to be dependent on others for food-related decision-making and largely unprepared for food cooking, particularly those belonging to older cohorts (Moss *et al.*, 2007; Vesnaver *et al.*, 2015). In addition, studies have shown that men are generally less motivated to cook when living alone as they might be less skilled than women (Bennett *et al.*, 2003).

Finally, although previous studies on fruit and vegetable consumption have shown that men fare worse than women as regards the negative associations between non-partnered individuals and healthy eating behaviours (Conklin *et al.*, 2014; Choi *et al.*, 2020), we expect a greater influence of changes in their partnership status on the frequency of protein consumption of women.

Methods

Study population

The data were drawn from SHARE, a multi-disciplinary longitudinal survey, representative of the non-institutionalised population aged 50 and above (Börsch-Supan *et al.*, 2005).

The analytic longitudinal sample is composed of data from W4 (2011), W5 (2013), W6 (2015), W7 (2017) and W8 (2019) waves of SHARE,[2] including 19 European countries that participated in at least two waves.[3] We use information from W4–W7 to measure independent variables (baseline wave) and information from W5–W8 (follow-up wave) as our outcome variables.[4] We excluded the first

two waves because they did not collect information about eating behaviours and the third wave because it comprises largely retrospective information about the respondents. In the model devised here, we control for the difference between the baseline and follow-up waves in months.

We restricted the analytic sample to women and men aged 50 and over.[5]

Measures

Dependent variable

The frequency of protein consumption by European older adults was measured using three questions as to how often (*i.e.* every day; 3–6 times a week; twice a week; once a week; less than once a week) respondents usually eat: (a) meat, fish or chicken; (b) eggs and legumes; and (c) dairy products. Although alternative operationalisations were considered (*see* the Robustness Checks section), these measures were equalised to their corresponding weekly frequency (*i.e.* 7, 5, 2, 1 and 0), standardised and used to compute a principal component analysis to obtain a continuous index. More specifically, we considered the first component extracted, which was the only one with an eigenvalue greater than 1.

Explanatory variable

The main independent variable is a measure identifying changes or stability in partnership status. We used information on marital status collected at the baseline (W4 or W5 or W6 or W7) and at the follow-up (W5 or W6 or W7 or W8) to assess any changes over time. We coded the partnership variable as follows: remaining in-couple (married or co-habitant at the baseline and at the follow-up); remaining never married; from divorced to divorced (this includes separated); from widowed to widowed; from in-couple to divorced (married or co-habitant at the baseline and divorced/separated at the follow-up); from in-couple to widowed (married or co-habitant at the baseline and widowed at the follow-up). Respondents moving from never married/divorced/separated or widowed to in-couple were excluded as they represented about 0.44 per cent (women) and 0.53 per cent (men) of the initial sample.

Control variables

We controlled for a set of socio-demographic variables including a measure of the respondents' employment status (being in paid work; retired; other) – where 'other' includes being unemployed, permanently sick or disabled, homemaker or other; a measure of the highest educational qualification attained re-coded into three categories according to the International Standard Classification of Education (where low educational level is defined as below secondary education; high educational level refers to a university education or above); and a measure assessing whether respondents live in a rural or urban area (Alcañiz *et al.*, 2020). We also included age and age squared as continuous variables to account for the non-linear relationship between age and changes in eating behaviours and continuous variables for the number of children and grandchildren. As a robustness check (*see* Table S1 in the online supplementary material), we incorporated a further six measures of health and health behaviours that the literature suggests are likely to be associated with the outcome (Gregório *et al.*, 2017). Specifically, we included

in the model: smoking cigarettes (being a current smoker *versus* being a former/never-smoker); physical activity (being vigorously active *versus* not being vigorously active); self-reports of doctor-diagnosed long-standing illness such as heart disease, hypertension, stroke or cancer (recoded as having no conditions; one condition; two or more conditions), a self-report measure of perceived general health (good or excellent *versus* fair, poor or very poor); Euro-D scale for depression (counting the number of self-reported depressive symptoms out of a maximum of 12); and a measure of obesity recoded into four categories based on the Body Mass Index (below 18.5 – underweight; 18.5–24.9 – normal; 25–29.9 – overweight; 30 and above – obese). The time distance between waves was controlled in months.

Moderator variable

A perceived measure of being financially vulnerable was used to address the economic status of the respondents. Specifically, they were asked whether the household is able to make ends meet (fairly easily or easily *versus* with some difficulty or great difficulty). As we sought to determine whether the respondent's ability to make ends meet had changed over time, the variable was recoded as follows: from easily to easily; from with difficulty to easily; from with difficulty to with difficulty; from easily to with difficulty.

Statistical analyses

Descriptive analyses were conducted to explore the distribution of the analytic sample's main characteristics. We used conditional change multiple regression models to examine associations between stability/changes in partnership status and changes in the frequency of protein consumption at the follow-up, controlling for protein consumption at the baseline as well as for the baseline covariates described above. Indeed, in this way (*see also* Di Gessa *et al.*, 2020), the regression coefficients indicate how the explanatory variable is associated with changes in the frequency with which respondents consume proteins at the follow-up, given that the respondents' eating behaviour at the baseline is controlled for (Twisk, 2007).

We carried out two separate analyses to investigate our research questions specifically as outlined above. The first (Model 1) examines the relationship between experiencing a change in partnership status and a change in the frequency of protein consumption to test whether compared with in-couple respondents: (a) non in-couple respondents and those who did not change their partnership status report a decrease in the frequency with which they consume proteins (RQ1a; Model 1); and (b) those moving from being in-couple to being non in-couple report an even greater decrease in the amount of protein regularly consumed (RQ1b; Model 1). The second analysis repeats Model 1 but focuses specifically on the consumption of meat, chicken and fish, given that they are more likely to be affected by economic resources (RQ2; Model 2). Model 2 introduces an interaction term capturing whether or not respondents report experiencing a change in the difficulty of making ends meet in different scenarios.

The analyses were conducted separately for men and women to identify any gender differences.

Results

Descriptive statistics

Table 1 shows the summary statistics for the main variables. A slight difference is observed in the types of protein regularly consumed by gender, with male consumption being more frequent, especially of meat, chicken and fish. In the case of the main independent variable, our summary statistics show that the prevalence of respondents living in a stable couple across waves was about 79 per cent for men and 60 per cent for women. About 5–6 per cent of both men and women reported never having been married, whereas there was a slightly higher prevalence of women reporting themselves as being long-standing divorced. A substantial difference is observed in the prevalence of long-standing widowhood, with women being almost four times more likely to record this status than men. As for changes in partnership status, our descriptive statistics show a small percentage of both men and women getting divorced between waves and a slightly higher percentage of women (about 3.5%) reporting becoming widows (*versus* about 1.7% of men).

To address RQ1, Table 2 shows the results from the linear regression models investigating the association between stability/changes in partnership status and changes in the frequency of proteins regularly consumed controlling for socio-economic and demographic characteristics.

For men and women alike, we detected a more marked reduction in the frequency of protein consumption in individuals living without a partner and whose partnership status did not change, on the one hand, than in individuals in-couple and whose partnership status did not change, on the other. Indeed, males and females whose partnership status did not change from never married, divorced and widowed at the outset present a significant reduction in the frequency of their protein consumption. This outcome being slightly higher in magnitude for the long-standing divorced. More specifically, we observe that, on average, remaining divorced is associated with a reduction in regular protein consumption in both women and men, while the reduction in those who never married was relatively higher among women. Among those who remained widowed, this reduction in frequency of protein consumption was similar, with a relatively stronger effect among women ($\beta = -0.082$; $p < 0.01$) than on men ($\beta = -0.065$; $p < 0.01$). Turning to examine the impact of changes in partnership status, only women who got divorced between the observed time-points were more likely to reduce the frequency of their protein consumption. Finally, the transition to widowhood was associated with a decrease in the frequency of protein consumption among both women and men ($p < 0.01$). These results are very stable when health-related covariates are included (*see* Table S1 in the online supplementary material), indicating that the effect is robust to the inclusion of potential mediators.

To address RQ2, Table 3 reports the conditional change in eating meat-related protein for women and men with the inclusion of an interaction term between changes in partnership status and changes in subjective financial conditions.

Some of the interactions are statistically significant but none is associated with a change in partnership status ($p > 0.05$). This means that even if the experiencing of a worsening in own economic situation was negatively associated with the frequency of protein consumption, it did not significantly moderate the relationship between moving to a non in-couple status and the outcome.

Table 1. Summary statistics for the outcome and explanatory variables by gender

	Percentages	
Dependent variable:	Women	Men
Mean (SD) protein intake (principal component analysis):	−0.027 (1.14)	0.036 (1.13)
Types of protein intake		
Meat, chicken or fish (at least 3–6 times per week)	79.41	83.57
Legumes or eggs (at least 3–6 times per week)	37.21	38.86
Dairy products (at least 3–6 times per week)	87.22	84.12
Main independent variable:		
Changes in partnership:		
From in couple to in couple	60.50	78.84
From never married to never married	5.03	6.14
From divorced to divorced	9.83	6.93
From widowed to widowed	20.89	5.97
From in couple to divorced	0.26	0.34
From in couple to widowed	3.50	1.77
Moderator variable:		
Household able to make ends meet:		
From easily to easily	52.73	58.54
From with difficulty to easily	12.05	11.20
From with difficulty to with difficulty	25.47	21.49
From easily to with difficulty	9.75	8.77

Notes: N = 134,313. Missing moderator values were imputed using the multiple imputation technique. Dependent variables were estimated at the baseline. Independent and moderator variables were constructed as changing variables between the baseline and follow-up.
Source: Survey of Health, Ageing and Retirement in Europe (SHARE) 2011 (Wave 4), 2013 (Wave 5), 2015 (Wave 6), 2017 (Wave 7) and 2019 (Wave 8).

Robustness checks

A number of checks were conducted to test the robustness of our main findings in Model 1. In addition to incorporating a set of covariates related to health conditions at the baseline (*see* Table S1 in the online supplementary material), we repeated the analyses using binary measures of each type of protein. The results were broadly similar to our main findings (*see* Tables S1 and S2 in the online supplementary material). We then replicated the models by excluding the outcome at the baseline so as to check for the possible underestimation of the main explanatory variable effects due to differences in the initial frequency of protein consumption. These findings (available upon request) point to an even stronger effect for the long-standing never married, divorced and widowed, suggesting a partial wash-out effect as the conditions of status stability had an impact on the outcome at baseline.

Table 2. Ordinary least squares regression coefficients for the conditional change model of eating proteins at follow-up

	Model 1: All proteins	
Variables	Women	Men
	β values (SE)	
Changes in partnership (Ref. From in couple to in couple:		
From never married to never married	−0.124*** (0.0172)	−0.0744*** (0.0193)
From divorced to divorced	−0.110*** (0.0120)	−0.102*** (0.0156)
From widowed to widowed	−0.0823*** (0.00924)	−0.0657*** (0.0162)
From in couple to divorced	−0.177** (0.0814)	−0.0274 (0.0596)
From in couple to widowed	−0.132*** (0.0195)	−0.115*** (0.0292)
Y at the baseline ($t-1$)	0.589*** (0.00393)	0.582*** (0.00446)

Notes: N = 134,313. SE: robust standard errors. Ref.: reference category. The model controls for: age, age^2, number of children, number of grandchildren, rural *versus* urban area of residence, country dummy variables, education, working status and financial vulnerability. Authors' own calculations. Results stratified by gender. Controls are measured at the baseline ($t-1$). Standardised outcome variable.
Source: Survey of Health, Ageing and Retirement in Europe (SHARE) 2011 (Wave 4), 2013 (Wave 5), 2015 (Wave 6), 2017 (Wave 7) and 2019 (Wave 8).
Significance levels: ** $p < 0.05$, *** $p < 0.01$.

Table 3. Ordinary least squares regression coefficients for the conditional change model of eating meat-related proteins at follow-up with an interaction term (financial vulnerability)

	Model 2: Meat, chicken or fish	
Variables	Women	Men
		β values (SE)
Changes in partnership (Ref. From in couple to in couple:		
From never married to never married	−0.0991*** (0.0211)	−0.0269 (0.0233)
From divorced to divorced	−0.127*** (0.0168)	−0.0655*** (0.0193)
From widowed to widowed	−0.0846*** (0.0125)	−0.0637*** (0.0200)
From in couple to divorced	−0.259** (0.109)	−0.0550 (0.0776)
From in couple to widowed	−0.146*** (0.0274)	−0.123*** (0.0415)
Household able to make ends meet (Ref. From easily to easily):		
From with difficulty to easily	−0.0259** (0.0131)	0.00198 (0.0135)
From with difficulty to with difficulty	−0.0811*** (0.0115)	−0.0483*** (0.0119)
From easily to with difficulty	−0.0265* (0.0144)	−0.0218 (0.0152)
From never married to never married × From with difficulty to easily	−0.0732 (0.0527)	−0.110** (0.0491)

(*Continued*)

Table 3. (*Continued.*)

	Model 2: Meat, chicken or fish	
Variables	Women	Men
From never married to never married × From with difficulty to with difficulty	−0.0276 (0.0379)	−0.136*** (0.0441)
From never married to never married × From easily to with difficulty	−0.0914* (0.0507)	−0.0410 (0.0530)
From divorced to divorced × From with difficulty to easily	0.0758** (0.0356)	−0.0523 (0.0504)
From divorced to divorced × From with difficulty to with difficulty	0.0181 (0.0281)	−0.0858** (0.0393)
From divorced to divorced × From easily to with difficulty	0.0479 (0.0411)	−0.121** (0.0563)
From widowed to widowed × From with difficulty to easily	0.0262 (0.0258)	−0.0204 (0.0559)
From widowed to widowed × From with difficulty to with difficulty	0.0161 (0.0202)	−0.0260 (0.0463)
From widowed to widowed × From easily to with difficulty	−0.00778 (0.0296)	0.0468 (0.0621)
From in couple to divorced × From with difficulty to easily	0.147 (0.301)	0.330* (0.188)
From in couple to divorced × From with difficulty to with difficulty	0.266 (0.178)	−0.0962 (0.170)
From in couple to divorced × From easily to with difficulty	−0.0114 (0.240)	0.0842 (0.151)
From in couple to widowed × From with difficulty to easily	0.0507 (0.0606)	−0.0160 (0.0783)
From in couple to widowed × From with difficulty to with difficulty	0.00498 (0.0480)	−0.0283 (0.0779)
From in couple to widowed × From easily to with difficulty	0.0610 (0.0576)	0.0449 (0.0989)
Y at the baseline ($t-1$)	0.590*** (0.00394)	0.582*** (0.00446)

Notes: N = 134,313. SE: robust standard errors. Ref.: reference category. The model controls for: age, age^2, number of children, number of grandchildren, rural *versus* urban area of residence, country dummy variables, education, working status and financial vulnerability. Authors' own calculations. Results stratified by gender. Controls are measured at the baseline ($t-1$). Standardised outcome variable.
Source: Survey of Health, Ageing and Retirement in Europe (SHARE) 2011 (Wave 4), 2013 (Wave 5), 2015 (Wave 6), 2017 (Wave 7) and 2019 (Wave 8).
Significance levels: * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Discussion

Malnutrition is a significant public health problem in European countries, affecting older individuals above all (Leij-Halfwerk *et al.*, 2019). However, the channels via which an individual's health and wellbeing are affected by ageing, especially with or without a partner, are still under-researched. Moreover, undergoing a change in partnership status appears to have significant consequences for an individual's

daily-life habits, including a reduction in the frequency with which older people consume the proteins that are fundamental to protect them from such risks as sarcopenia and disability.

Our findings have shown that individuals ageing without a partner report a significantly greater reduction in the frequency with which they consume proteins compared to those living in-couple, regardless of gender. This result, which provides a response to RQ1a, suggests that both older men and women living alone run a higher risk of having a diet poor in protein.

Changes in partnership status in older ages significantly reduced the frequency of protein consumption only in the case of individuals who had been widowed (RQ1b). Spousal loss is one of the most traumatic events an individual can experience and, since mealtime may serve as a reminder of shared activities with the spouse, widows are likely to report poorer appetite, meal skipping, and poorer diet quality and variety (Johnson, 2002). Here, we found that women who were long-standing widows consistently presented a reduction in their frequency of protein consumption. In line with the main prevailing theories, one of the advantages of being in-couple is the supposed greater availability of economic resources. Our results provide some support for this idea, as is suggested by the negative association between increasing subjective economic vulnerability and overall protein consumption among never married women and among long-standing divorced men. However, no significant effects have been found in relation to the role of financial vulnerability among those who underwent a change in their partnership status (RQ2). The effect of widowhood on the frequency of protein consumption among women could be due to changes in food-related roles and habits. Some qualitative studies have shown, mostly in relation to women, that cooking shared meals in a marriage may be a marital obligation and that this commitment to sharing food also means having to negotiate eating patterns (Vesnaver *et al.*, 2016). Thus, reducing the frequency of protein consumption may also be a result of the newly acquired opportunity to eat according to one's own personal preferences (Quandt *et al.*, 2000). While we control for depressive symptoms, a lack of interest in eating or the absence of motivation might contribute to explaining the deterioration in the eating behaviour of widowed women. In the case of men, eating patterns are likely to be directly related to the loss of supervision or care leading to the adoption of unhealthy behaviours (Umberson *et al.*, 2010*b*, 2016).

Strengths and limitations

This study seeks to contribute to the literature by providing quantitative evidence based on a large representative longitudinal sample of European individuals aged 50+. Indeed, extant evidence mainly derives from qualitative research or quantitative studies conducted with small samples. More specifically, our study contributes by, first, extending the group of individuals ageing without a partner to the divorced and never married using longitudinal European data; and, second, by testing a possible mechanism that might contribute to accounting for the reduction in protein consumption.

Various limitations should be recognised. First, the measurement of the frequency of protein consumption relies on a self-report measure and does not provide a precise amount of grams consumed per day. Second, although a

robustness check has been undertaken, the high prevalence of missing data for the variable capturing the date of divorce/widowhood (15%) meant we were unable to make additional differentiations between the long-standing divorced and widowed. Indeed, the SHARE data do not allow us to differentiate clearly the effects of widowhood and/or divorce from the effects of the circumstances surrounding partner loss, such as the marital conflicts or health problems that may precede the loss of a partner. Further studies need to address these specific aspects. Third, in this study we have only been able to consider average frequency of protein consumption but not whether or how frequently the respondent eats with other persons (such as family members, friends or care-giver).

This study should serve to motivate further research that can help shed light on the specific role of partnership status and changes in that status on eating behaviours, in general, and on protein intake, in particular, among older people. Indeed, low-frequency protein consumption is a key modifiable risk factor for multiple chronic diseases and, as such, many national and international policies recognise the importance of ensuring individuals obtain an adequate intake of protein so as to reduce inequalities in the frailty of older individuals. In short, polices need to allocate the resources required to meet the changing social and contextual needs of older people.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S0144686X22001040.

Data. This paper uses data from SHARE Waves 4, 5, 6, 7 and 8 (DOIs: 10.6103/SHARE.w4.800, 10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800), *see* Börsch-Supan *et al.* (2013) for methodological details. The SHARE data collection has been funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA No. 211909, SHARE-LEAP: GA No. 227822, SHARE M4: GA No. 261982), Horizon 2020 (SHARE-DEV3: GA No. 676536, SERISS: GA No. 654221), and by DG Employment, Social Affairs and Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the US National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (*see* www.share-project.org).

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Ethical standards. Ethical approval is not required.

Notes

1 Our study focuses on older individuals who have a partner and who live stably with that partner, given that those respondents who have a partner but do not live with that partner are residual in number (1% of the sample).

2 For methodological details on the SHARE dataset, *see* Börsch-Supan *et al.* (2005, 2013) (*also see* www.share-project.org).

3 Namely Austria, Germany, Sweden, The Netherlands, Spain, Italy, France, Denmark, Croatia, Greece, Hungary, Switzerland, Belgium, Czech Republic, Poland, Luxembourg, Portugal, Slovenia and Estonia.

4 Changes could occur between Waves 4 and 5; Waves 5 and 6; Waves 6 and 7; Waves 7 and 8; Waves 4 and 6; Waves 4 and 7; Waves 4 and 8; Waves 5 and 7; and Waves 5 and 8.

5 Variables with missing information included being financially vulnerable (0.7%), living in urban areas (4.86%), depression (2.4%) and Body Mass Index (3.3%).

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