Social Engagement in Later Life: The Role of Childhood Circumstances

Sarah Gibney[†], Mark E. McGovern[‡] and Erika Sabbath[*]

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[†] University College Dublin. Email: sarah.gibney@ucd.ie.
[‡] Corresponding Author. Harvard Center for Population and Development Studies. Email: mcgovern@hsph.harvard.edu. Tel: +1 857-600-8879. Address: 9 Bow Street, Cambridge, MA 02138, US.
[*] Harvard Center for Population and Development Studies. Email: esabbath@hsph.harvard.edu.

Abstract

Social relationships predict health and emotional wellbeing across the life course. However, it is not known whether gradients in social engagement in later life mirror the socio-economic and health gradients which are apparent in childhood. This study investigates the long-term impact of these childhood circumstances on adult social relationships. Using nationally representative data on older Europeans from the Survey of Health, Aging and Retirement in Europe (SHARE), we determine the extent to which aspects of current social engagement (as measured by the size and satisfaction with respondents' social networks and social activities undertaken) are predicted by childhood circumstances. The data allow us to distinguish between the associations that link alternative components of childhood circumstance (including health, socio-economic status, education and parental separation) with social engagement. Results confirm that there are diverse pathways linking early life conditions to later outcomes, and understanding the transmission of disadvantage across the life cycle is likely to require consideration of each of these. We show that the relevant mechanisms operate via both direct and indirect pathways. Social relationships in adulthood are partly determined by childhood characteristics, and these effects appear to be largely independent of the well-known relationship between childhood environment and other adult factors such as socio-economic status and health.

Keywords: Childhood Conditions, Social Engagement, Life Course Models, Socio-Economic Disadvantage

Word Count: 7,547

Introduction

There is an established body of research in social epidemiology linking both physical health and emotional wellbeing to social interactions (Berkman, 1984; Berkman and Syme, 1979; Ertel et al., 2009; Kawachi and Berkman, 2001). Social relationships are associated with health, and lack of social engagement carries health risks which are comparable to those attributable to smoking, alcohol consumption and lack of physical exercise in terms of their robustness and degree of association (Holt-Lunstad et al., 2010). These differences in social relationships are hypothesised to vary by socio-economic status (SES) (Taylor and Seeman, 2003).

Concurrently, there is a growing body of literature which links childhood circumstances and attributes to later life outcomes. Childhood and infant attributes, including socio-economic status (Cohen et al., 2010), mental health (Smith and Smith, 2010), physical health (Delaney et al., 2011) and cognitive and non-cognitive ability (Doyle et al., 2009), have all been linked to a variety of health and economic outcomes across the life course, though there are relatively few studies which examine each of these pathways simultaneously. Those that do, often consider aggregate effects by counting the number of disadvantages affecting each child (Dong et al., 2004).

Furthermore, adverse childhood environment, including low socio-economic status and poorer health, may predict the accumulation of social and economic capital across the life course, and early life psychological distress or abuse may be associated with relationship trajectories including union and family formation (Colman & Widom, 2004). Despite the likely importance of childhood effects in these domains, to date there have been surprisingly few empirical investigations, and there is therefore little existing evidence on how social relationships later in life are affected by childhood experience.

The purpose of this study is therefore to merge these existing, but separate, literatures. Three specific questions are addressed: firstly, what is the association between childhood

environment and social engagement in later life in terms of both direct and indirect effects; secondly, can we separately identify the correlated, but distinct, components of childhood conditions which affect these outcomes; and finally, what are the potential mechanisms through which these relationships operate?

The remainder of this paper is structured as follows. We provide an overview of our life cycle model and a summary of the existing literature on social relationships and wellbeing relationship. We then discuss the data and methodology, followed by presentation of results. We conclude the paper with a discussion of the findings and directions for future research.

Background

The importance of social engagement for older adults' health and wellbeing

Increasing attention is being paid to the factors that promote or undermine positive social relationships across the life course, given the strong evidence linking negative or absent social relationships to impaired physical health outcomes (House et al., 1988; Seeman and Crimmins, 2001). The absence of social ties is associated with mortality among older people, and stronger social ties have been found to reduce mortality among those who have pre-existing diagnosed conditions (Berkman and Syme, 1979). In a meta-analysis of the extent to which social relationships influence mortality risk, Holt-Lundstad et al. (2010) show that certain aspects of social relationships are more predictive of mortality than others. Namely, more complex measures of social integration have stronger associations with health outcomes than single, proxy measures such as living alone. Overall, they find a 50 per cent increased likelihood of survival for participants with stronger social relationships. The magnitude of this effect is larger than that of many behavioural and environmental risk factors, such as smoking or air pollution. Bearing these associations in mind, recent research has explored the mechanisms through which social relations are associated with health. Broadly speaking, these include behavioural pathways whereby social networks influence both positive and negative health behaviours; psychosocial explanations whereby health is

promoted via social support, personal control and symbolic meaning; and mental health (Umberson et al., 2010).

Existing literature linking childhood socioeconomic conditions with later-life outcomes

The impact of early childhood conditions on both physical and mental health and wellbeing in later life has been widely documented. Childhood health and socio-economic status have emerged as particularly influential; each exerts both direct and indirect effects on later-life health (Brandt et al., 2012). A number of recent papers have contributed to this topic in a European context, including examining the role of child health in determining adult health and behaviour (McGovern, 2012), the effects of early environment on changes in adult health (Hank et al., 2013), and the effects of exposure to World War 2 (Kesternich et al., 2014). Overall, these papers are consistent in finding substantial effects of childhood circumstance on adult outcomes. While this literature provides a strong basis for our hypotheses that childhood conditions may influence later-life social engagement, which is in turn a determinant of health, there is little research to date on how childhood conditions affect social engagement specifically. The present study is a point of departure for this issue.

Existing literature linking childhood conditions with later-life social engagement

There is a broad literature discussing the effects of social engagement on the welfare of older age groups, although very few to date take a life course perspective. A small number of existing papers have examined the effect of childhood SES on later psychological wellbeing (other than health and economic outcomes), such as depression (Gilman et al., 2002), and a bio-psycho-social indicator of successful aging (Brandt et al., 2012; Pruchno et al., 2010). Furthermore, there is dearth of literature examining the link between childhood factors and social relationships in later life. In our review we have only been able to locate one paper which does so (Beatty et al., 2011). In their study, lower childhood SES (measured by highest parental education) was associated with less

perceived social support in daily life, a less diverse social network, and more limited use of proactive coping strategies in adulthood among African Americans, regardless of adult SES, whereas comparable associations were not evidenced among Caucasian participants (Beatty et al. 2011). We build on this research by employing data on large nationally representative samples, with information on a variety of measures of childhood circumstance, not just education.

One of the dimensions of a successful ageing indicator employed by Brandt et al. (2012) and Hank (2011) is engagement in socially productive activities (participating in employment, voluntary activities, providing help to grandchildren, living with a partner, or participation in a sports or other type of club). Net of current adult health and socio-economic factors, Brandt et al. (2012) found a positive effect of childhood conditions (self-reported childhood health, higher parental SES, above average ability in mathematics and language and favourable living conditions) on the odds of fulfilling all criteria for the bio-psycho-social indicator of successful ageing adopted in their study. In contrast to this broad measure of productivity-based social engagement, our data allow us to directly measure both objective and subjective characteristics of the respondents' social networks. Similarly, we are able to differentiate between the aspects of childhood environment which affect later outcomes, which allows us to provide some insight into the pathways through which these effects operate.

Theoretical model: The role of childhood conditions across the life cycle

The main aim of this paper is to conceptualise and investigate the life cycle influence of early life conditions on social engagement (a key determinant of later-life health and wellbeing). As this relationship may be highly complex, we summarise these potential pathways in our analysis framework outlined in figure 1. We observe social engagement among adults, in addition to other current characteristics such as measures of health and SES, and path-dependent variables such as marital status or family size. We refer to these as "social resources," as to a certain extent they

reflect the social and familial capital accumulated across the life course. We observe similar information on respondents' childhood, including educational attainment and adverse events.

[FIGURE 1 HERE]

Figure 1 also illustrates why it is only possible to describe the association between early life environment and adult social engagement, rather than making causal inferences. Our main analysis considers the combination of direct (shown by the solid red arrows), and indirect (shown by the dashed arrows) pathways which link our exposures of interest to the outcomes. We consider each stage of the life cycle in turn. Firstly, initial endowments, such as in utero environment and parental attributes, have been shown to affect childhood health and education (Black et al., 2007), and are also likely to directly affect adult health and SES (Barker, 1990). Next, psychological factors in childhood, such as parental divorce, psychiatric illness, or substance abuse may affect social engagement directly through preferences or ability to engage in social contact (Wallerstein, 1991). Alternatively, there may be indirect effects through the impact of these social resources in childhood on relationship formation throughout adulthood (Wallerstein, 1991). Likewise, the effects of education, SES and health in early life may have a direct effect on social engagement, but are also known to affect SES and health in adulthood (Daly and Delaney, 2013; Harmon and Walker, 1995; Miller et al., 2011), and therefore this represents another potential indirect pathway affecting social engagement. Finally, there is a dual relationship between social engagement and other adult characteristics such as health and SES, such that both are likely to be affected by the other (Smith, 1999). For example, socialisation predicts health, but individuals in worse health are likely to be less able to socialise (Rose et al., 2008).

Childhood health is determined before social engagement in later life, therefore we can rule out reverse causality. In addition, we do not control for other adult characteristics in our main analysis because, as shown in figure 1, these are also outcomes of early life conditions. Despite the fact that we are able to rule out one form of potential bias, this approach still does not allow for a

causal interpretation. The various components of childhood environment are inter-related, and also likely to be co-determined by initial endowments, such as birth weight. Therefore, disentangling the causal effect of one on the other is problematic. However, we argue that it is still useful to adopt this approach for determining the extent to which social engagement in later life is predicted by different early life conditions, even if it is problematic to isolate which specific aspect of initial environment is the causal factor. Instead, we focus on providing the first empirical assessment of the association between different early life conditions and adult social engagement.

As the effects of early life conditions on adult socio-economic status and health are well-documented, it is important to establish whether the association between childhood characteristics and social engagement operate solely through these adult characteristics. Therefore, in a subsequent analysis we add controls for adult health and wellbeing characteristics in order to assess the potential pathways through which these effects operate. As these variables are endogenous, we do not expect this approach to support the identification of a causal pathway between early life environment and social engagement. However, this analysis should provide some preliminary indication as to whether the effects observed without these controls are due entirely to the relationship between initial environment and later health and SES, which are also likely to affect social relationships (Cutler and Lleras-Muney, 2010).

Methods

Data and sample

This study uses data from SHARE (Survey of Health, Ageing, and Retirement in Europe), a longitudinal cohort study consisting of nationally representative samples of adults over age 50 (Börsch-Supan et al., 2013). Data and questionnaires are publically available online from www.share-project.org. Wave 3 (SHARELIFE) contains information on respondents' childhood conditions (from birth up to and including age 16). This type of retrospective surveying has been show to lead to high

quality reports, even after retention intervals of several years (Belli, 1998), and in particular, these life history data have been shown to be a reliable measure of childhood environment (Haas and Bishop, 2010; Smith, 2009). This information is merged with the social networks and activities modules collected in wave 4. We also include respondents' socio-demographic and behavioural characteristics in the same wave. We also include all respondents who are present in both waves (approximately 19,000 individuals in total). The specific analytic sample size by country is illustrated in table A1 in the Appendix.

Measures

Independent variables: Childhood social circumstances

The key independent variables of interest are the indicators of childhood circumstance. We have included all measures present in the SHARE data which either theory or previous empirical evidence has indicated are associated with adult health and wellbeing. Each measure is now detailed in turn.

First, we construct an index of childhood socioeconomic status using principal components analysis based on reported parental occupation, rooms per capita, household facilities, and books in the household (Mazzonna, 2011). This approach has been previously adopted in research on SHARE (Kesternich et al., 2014; McGovern, 2012), and has been shown to be well correlated with aggregate indicators of economic status (Mazzonna, 2011). Our analysis reports the association with being in the top two SES tertiles (Kesternich et al., 2014).

Second, we consider self-reported childhood health due to the positive correlation between poor childood health and poor functional, chronic and physical health status in adult life (Huang et al., 2011). The variable is measured on a 5 point scale ranging from excellent to poor. For the analysis we dichotomise our measure into excellent or very good to support comparison with other exposures. The influence of poor childhood health on adult health may operate independently of

socio-economic status, or indirectly through this mechanism (Brandt et al., 2012). Net of parental income, education and social class, poor childhood health is associated with significantly worse adult health (Blackwell et al., 2001; Case et al., 2005; Haas, 2007). We expect the relationship between poor childhood health and adult social relationships to operate in a similar manner to the relationship between poor childhood health and adult health, i.e. through both direct and indirect pathways.

Third, we examine whether the respondents' parents were reported to have drank heavily or had mental health problems during childhood. Due to small numbers in each of these categories we combine them into a single indicator variable. Exposure to parental drinking has been associated with the manifestation of psychiatric symptoms and marital instability in adulthood (Greenfield et al., 1993). Therefore, we anticipate that exposure to parental drinking may negatively influence network size and satisfaction.

Fourth, we utilise the respondent's self-reported language and maths ability aged 10 as a measure of childhood cognition (Brandt et al., 2012; Deary et al., 2004). This variable is collected on a 5 point scale and refers to individuals' relative capabilities, ranging from much better than others to much worse than others. As before, we dichotomise our measure to indicate whether the respondent was better than average in order to facilitate comparisons with other covariates.

Finally, we include a variable capturing the presence of both parents in the household at age 10, which is constructed from reports of household membership. The literature demonstrates a negative relationship between marital dissolution and children's outcomes (Amato, 2001; Wallerstein, 1991); therefore we hypothesise a negative effect of this measure on social engagement.

In all of our analyses, we add a measure of educational attainment (reported years of schooling), which enables us to determine whether the effects of childhood circumstance operate

solely through education. We also consider childhood psychiatric illness and whether the child was fostered or placed in a children's home. However, there are relatively few respondents in these categories (less than 1% and 3% of the sample, respectively), and fostering could indicate buffering from a potentially negative household environment or experience. Therefore, we are careful with our interpretation of these measures.

Outcome: Social engagement in later life

Measurement of social networks can be either direct or indirect. Indirect measures have been employed in previous waves of SHARE, the English Longitudinal Study of Ageing (ELSA), and the Health and Retirement Survey (HRS). This requires profiling of a collection of ties or demographic proxies (Pescosolido, 2001), and the function of this social network is subsequently inferred (Litwin, 1996). This has been argued to provide an objective delineation of the social network phenomenon (Litwin et al., 2013). Conversely, direct measures constitute an investigation of who is important to the individual, and usually involves naming members of the network. This reflects the view that social networks are subjective phenomenon and serve a positive function only if they are perceived to be meaningful or important to the individual (Litwin et al., 2013).

The most recent methodological advances in direct measurement were incorporated into data collection for SHARE wave 4 with the inclusion of the name generator approach, which is augmented by additional measures of network closeness and satisfaction. These appraisals give a respondent-led indication of social network quality. Prior to this, quality was assumed via various proxy measures such as the presence of reciprocity in the provision of support (Wahrendorf et al., 2010), or the existence of a close confident (often a spouse). This measurement approach allows researchers to explicitly separate structural and functional aspects of social networks, and places network appraisal in the control of the respondent. The social network module in SHARE wave 4 builds on earlier applications of the name generator approach contained in the American General

Social Survey (Burt 1987; Burt and Guilarte 1986), the Longitudinal Aging Study Amsterdam (van Tilburg 1998), the National Social life, Health and Ageing Project (NSHAP) (Cornwell et al., 2008).

In addition to social network size and satisfaction, we consider two other social engagement outcome measures. Participation in activities has also been considered as part of social engagement, and has been linked to similar protective effects for health in later life (Bath and Deeg, 2005; Matz-Costa et al., 2012). As part of wave 4, respondents are asked to indicate (yes or no) if they participated in each of the following activities during the previous 12 months: voluntary or charity work, attendance at education or training, sports, social or other clubs, religious, political or community organisations, reading books, magazines and newspapers, and playing games. We derived a social participation score, ranging from 0 to 10, by summing the number of activities each respondent participated in. Individuals were then asked their satisfaction with these activities, or if they did not participate, their satisfaction with not engaging with any of these. We consider both satisfaction and the social participation score as outcomes.

In this way, our approach allows us to consider both objective and subjective measures of social engagement through measuring social network size and activity levels as well as network and participation satisfaction. Holt-Lundstad et al. (2010) find that complex measures of social relationships are most predictive of mortality. For example, social isolation does not necessarily equate to negative psychological wellbeing or poor health. The quality of the social network, perceived support and sense of belonging are all important to health and wellbeing and are not fully captured by objective social network measurement.

Analytic strategy

In order to investigate the extent to which early life environment predicts social engagement, we model each of the social relationship outcome variables as a function of childhood circumstance, and a set of country fixed effects which account for any factors which are common to respondents in

that particular country. We also control for an additional set of demographic variables (X_{ic}): gender, age and age squared. For illustrative purposes, this model is summarized below. Subscripts refer to the individual respondent i in country c, where μ_{ic} is the corresponding individual level error term:

$$
\begin{aligned}
&Social\ Engagement_{ic} \\
&\quad = Childhood\ SES_{ic} + Childhood\ Health_{ic} + Parents\ Drank/Mental\ Health_{ic} \\
&\quad + Childhood\ Language\ Ability_{ic} + Childhood\ Maths\ Ability_{ic} \\
&\quad + Childhood\ Psychiatric\ Illness_{ic} + Parents\ Present\ in\ HH_{ic} \\
&\quad + Fostered/Children's\ Home_{ic} + Education_{ic} + \beta X_{ic} + Country_c + \mu_{ic}
\end{aligned}
$$

We account for missing values on covariates using the multiple imputations procedure implemented by SHARE (Christelis, 2011).

Results

Descriptive statistics

The proportion of respondents in SHARE who are female is slightly higher than those who are male. In relation to self-reported measures of childhood circumstances, the greatest proportion of respondents reported having either very good or excellent health when they were young (33.2 per cent and 32.9 per cent respectively). A small proportion of respondents reported fair or poor childhood health (6.4 per cent and 2.4 per cent respectively). A large majority of respondents reported their early-life language ability as worse than average (63.9 per cent). A total of 10.5 per cent of respondents reported that their parents either drank heavily or experienced mental health difficulties. Almost all (97 per cent) of respondents were not fostered or placed in a children's home, 99 per cent report no psychiatric illness in childhood, and 88 per cent had both parents present in the household at age 10. The mean number of years of education was 10.24 (SD= 4.6) and the mean age of the sample in 2010 was 68.55 (SD= 9.5).

In older adulthood, mean network size in the sample was 2.5 people (SD 1.6). This low number may in part reflect the sampling strategy employed in SHARE, whereby the partner of the index (first) household respondent is also eligible to participate irrespective of age, which is associated with an overrepresentation of married or partnered couples in the sample. However, social network size is reported directly by the respondents rather than measured by the researcher based on other network information. Mean level of social network satisfaction was 8.33 (SD 1.4) on a scale of 0 (low) to 10 (high). On average, respondents participated in 2.2 activities (SD 1.6) in the previous 12 months, and were also largely satisfied with their participation (mean 8, SD 1.9) (see tables A2-A4 in the appendix for further details). For each of the outcomes of interest (network size and satisfaction, and number of activities and satisfaction with activities), we show the histogram of observed values in figure 2.

[FIGURE 2 HERE]

Results for Social Engagement

Table 1 presents regression results for each of our measures of social engagement. Being in the highest childhood SES tertile is consistently associated with positive social engagement, as is language ability at age 10. For example, being in the highest childhood SES tertile is associated with .08 extra satisfaction points, an extra .20 people in their social network, an extra .31 satisfaction points for activities, and an extra .24 activities. Being average or better at language in early life is associated with an additional .07 satisfaction points with the respondent's social network, and additional .13 people in their social network, an additional .14 satisfaction points with activities, and an additional .22 activities. Other childhood variables are less consistent; for example education is not associated with social network satisfaction, but is with the other outcomes. Good childhood health and the absence of psychiatric illness as a child are both associated with social network satisfaction and number of activities only. Effects of control variables are as expected. Network

satisfaction increases until age 60, and then it declines thereafter. Women report higher levels of social engagement than men for each outcome.

[TABLE 1 HERE]

Our model in Table 1 focused on establishing the combined direct and indirect effects on social engagement. However, it is important to determine whether these associations are due to the well-established relationship between early environment and adults SES and health. For example, if the association between childhood SES and social engagement in later life is solely due to the fact that those in lower childhood SES groups also have lower adult SES, then this would make little contribution to existing knowledge. Therefore, in table 2 we proceed by adding control variables for additional adult characteristics, with the goal of illuminating potential mechanisms through which effects of early life environment may operate. We describe how the total effect (coefficient sum) of the childhood variables is attenuated, and although these variables are endogenous, this approach should provide preliminary indication as to whether these are the relevant mechanisms (Cutler and Lleras-Muney, 2010).

[TABLE 2 HERE]

Focusing on network satisfaction, the first column of table 2 shows the base specification from table 1. To evaluate the magnitude of these effects, we present the total effect of childhood environment as measured by the sum of each of the seven indicator variables (health, SES, language and maths ability, parents drank heavily or had mental health issues, parents present in the household, and fostered/children's home). We do not include psychiatric illness as, although its effect is greater than that of all the others combined, there are relatively few numbers in this category, and its inclusion would only reiterate that the effects of childhood environment on social engagement only partly operate through adult characteristics.

Replicating the model in table 1, the total effect is .39; not having any of the adverse environments included in the model is associated with an additional .39 satisfaction points with the respondents' social network. Adding controls for adult SES, health and behavioural characteristics reduces the total effect of initial conditions by around a third, as does a model which separately controls for family characteristics and union formation. Finally, when we control for both, we find attenuation of around 50 per cent. As illustrated in table A5 in the appendix, the effects of childhood SES and language ability remain significant, even after controlling for these endogenous adult characteristics. Therefore, we conclude that there is evidence in favour of both the direct and indirect pathways illustrated in figure 1, as we find some attenuation of the childhood effects, but it is not complete.

Discussion

This paper contributes to the literatures on early life conditions and social engagement by evaluating the long-term impact of childhood conditions on objective and subjective attributes of social relationships in nationally representative samples of older Europeans. We merge life history data on childhood circumstance with a new and unique module which collected detailed information on respondents' social networks in the Survey of Health, Ageing and Retirement in Europe (SHARE). Our analysis allows us to differentiate between the distinct aspects of childhood conditions which may differentially affect social relationships and engagement in later life. We find consistent effects of early life conditions on both objective and subjective measures of social engagement, although for some aspects of childhood circumstance the effects differ according to the outcome used. Socio-economic status and language ability in childhood are related to all outcomes, while psychiatric illness has the largest effect in terms of magnitude.

A limitation of this analysis is that these findings are not intended to identify the causal effects of the childhood variables. Many aspects of childhood environment are likely to be correlated, including those not present in the data. For this reason, we are cautious about

interpreting our results without a more systematic investigation of causality. Nevertheless, we are able to demonstrate a robust association between social engagement and early life conditions, which we believe sets an agenda for future research, for example with a specific focus on causal inference.

Our results are consistent with the existing literature which examines contemporaneous effects of childhood circumstance on various adult outcomes. Poor childhood health has previously been linked to lower educational attainment, poorer health in adulthood, and lower SES in adulthood (Case et al., 2005). These adult outcomes are also predictive of lower social engagement; however these prior findings do not explain the association of early life conditions with relationship quality which is evidenced in this paper.

The direct relationship between childhood health and network satisfaction lends itself to the interaction of the theories of both health selection and socio-emotional selectivity (Carstensen, 1992; Lansford et al., 1998). Favourable health in childhood is predictive of adult health and longevity. It is therefore likely that the older respondents in the sample experienced more favourable health in childhood. According to socio-emotional selectivity theory, as people reach advanced age they narrow their social network size, concentrating on strong emotional bonds and therefore report increasing levels of network satisfaction (Lansford et al., 1998). This may explain the lack of a significant positive relationship between better childhood health and network size but instead, a relationship between better childhood health and network satisfaction. Further investigation of predictors of network satisfaction among those who are the oldest old in the sample may advance the understanding of a potential combined process of health selection and socio-emotional selectivity.

Language and maths ability are employed as indicators of childhood cognition, which we know from adults is important to an individual's sense of coherence; comprehension and problem-solving; and experiencing satisfaction in everyday life (Lundberg, 1997). Furthermore, a strong

relationship between sense of coherence and adult health has been evidenced (Lundberg, 1997). The relationship between general intelligence and emotional intelligence is likely to be complex, however language ability in particular may be a proxy for the latter (Mayer and Salovey, 1993).

Family environment has been shown to be central to both mental and physical health outcomes across the life course insofar as it can create vulnerabilities and/or interact with genetic endowment in children to produce disruption in psycho-social function (emotional processing and social competence) over time (Repetti et al., 2002). One aspect of this is marital dissolution (Amato, 2001; Wallerstein, 1991). However, in this study, parental problems are only significantly associated with network satisfaction. It may be the case that the identification of parental problems is not synonymous with negative childhood environment, or that distinguishing it from other correlated measures is difficult in these data. In this study, the level of exposure the respondent experienced to these problems and/or the consequences of these problems for family stability and wellbeing during their childhood are not known.

Although relatively few individuals report psychiatric illness in childhood, and we find no effect on two of our outcomes (social network size and satisfaction with activities), it is the single largest coefficient in the analysis. This suggests that, although rare, it is likely to be an important channel affecting later outcomes, a result which is consistent with previous literature on childhood mental health (Smith and Smith, 2010).

There is some evidence that part, but not all, of the effects on network satisfaction are mediated through adult characteristics. The role of adult health as a mediator in the relationship between childhood conditions and social network satisfaction is complex. Childhood health and adult health are highly correlated, and SES gradients childhood have been show to endure throughout adulthood (Case, 2005; Haas et al., 2011; Hayward and Gorman, 2004; Kuh and Wadsworth, 1993). The presence of reciprocity in a relationship has previously been indicated as underpinning relationship quality (McMunn et al., 2009; Wahrendorf, 2010). Those in poor health

are more likely to require increasing amounts of support and informal care from their network. At the same time, opportunities and capacity to reciprocate through similar means may diminish. Furthermore, the presence of a care-relationship within a social and indeed a family network can be stressful and negative. In this way, it may be that we are observing a relationship between poor health and network satisfaction over the life course.

Finally, the differential effect of aspects of childhood conditions is particularly interesting from a methodological standpoint. Some previous studies have controlled for childhood conditions via an index approach which gives equal weight to various, and distinctly different, experiences and circumstances. Our analysis shows that the long-run effects of different childhood conditions are not uniform. Other approaches have employed a proxy measure, for example using parental occupation or education or health in isolation as a single indicator of childhood conditions. While the different components of childhood health utilised in this study are highly correlated, we show that it is possible and important to distinguish between their effects. Their differential relationship with social network size and satisfaction reiterates the importance of evaluating a diverse range of childhood indicators if we are to truly understand the long arm of childhood.

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Figures and Tables

Figure 1 Summary of Pathways Linking Childhood Environment to Social Engagement

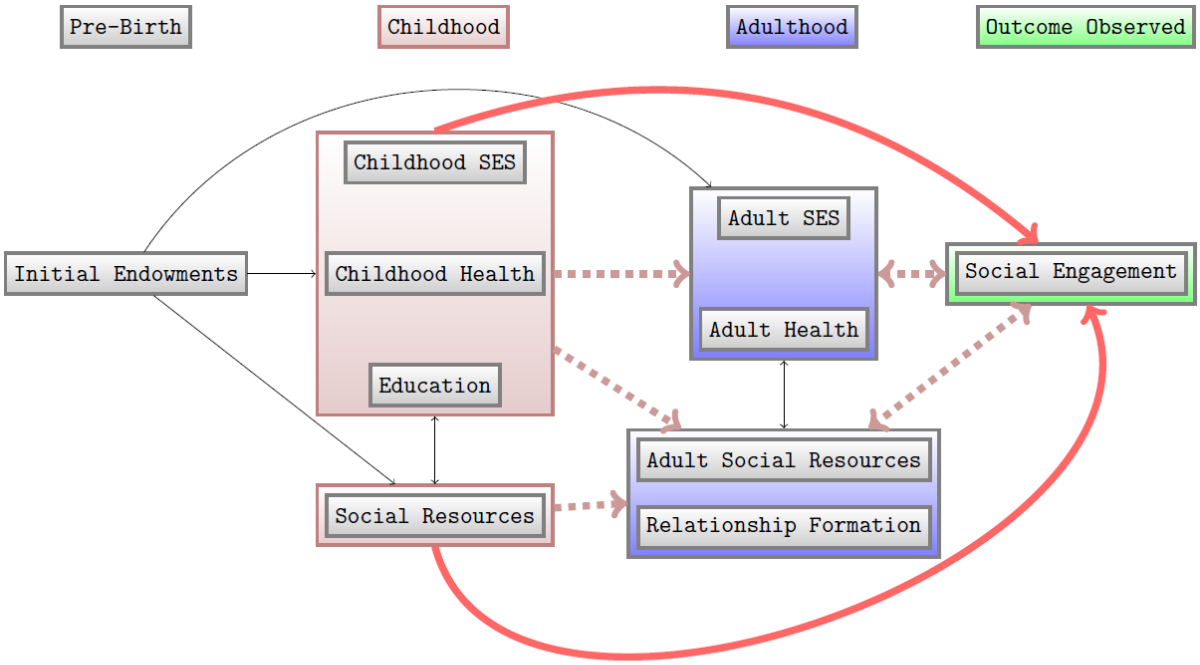
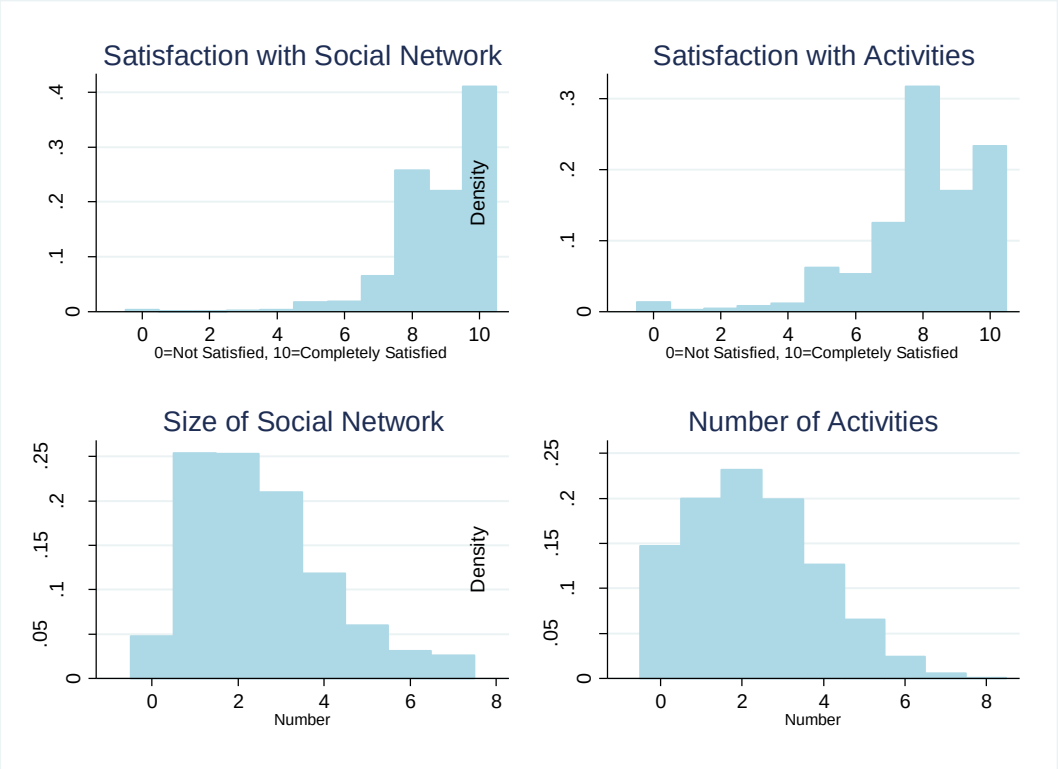


Figure 2 Historgram of Social Outcome Variables



Source: SHARE Wave 4

Table 1 Regression Results for Social Engagement

	OLS	OLS	OLS	OLS
	Social Network		Activities	
Variables	Satisfaction	Size	Satisfaction	Number
Childhood SES: Omitted - Lowest Tertile				
Middle SES Tertile	0.0603**	0.0841***	0.1334***	0.1561***
	(0.0268)	(0.0293)	(0.0262)	(0.0373)
Highest SES Tertile	0.0759***	0.1984***	0.3148***	0.2397***
	(0.0280)	(0.0315)	(0.0289)	(0.0360)
Good or Excellent Childhood Health	0.0806***	0.0408	-0.0288	0.1015***
	(0.0226)	(0.0252)	(0.0229)	(0.0301)
Average or Better at Language Age 10	0.0704**	0.1298***	0.1398***	0.2181***
	(0.0334)	(0.0346)	(0.0323)	(0.0456)
Average or Better at Maths Age 10	0.0445	0.0031	0.2932***	0.0798*
	(0.0330)	(0.0359)	(0.0316)	(0.0457)
No Parental Mental Health or Alcohol Problems	0.0470	-0.0744*	0.0075	0.1880***
	(0.0360)	(0.0393)	(0.0350)	(0.0496)
Both Parents Present in HH Age 10	0.0926**	-0.0056	0.0425	0.0032
	(0.0375)	(0.0384)	(0.0342)	(0.0469)
No Psychiatric Problems as a Child	0.4523***	0.0115	-0.0176	0.4616***
	(0.1322)	(0.1210)	(0.1235)	(0.1637)
Not Fostered or in Children's Home	-0.0252	-0.0266	-0.1156*	0.0136
	(0.0639)	(0.0722)	(0.0695)	(0.0806)
Years of Education	-0.0056**	0.0253***	0.0505***	0.0236***
	(0.0028)	(0.0032)	(0.0030)	(0.0036)
Female	0.0775***	0.4199***	0.2099***	0.0876***
	(0.0212)	(0.0240)	(0.0215)	(0.0284)
Age	0.0364**	0.0809***	0.1686***	0.1812***
	(0.0142)	(0.0154)	(0.0133)	(0.0205)
Age Squared	-0.0003***	-0.0007***	-0.0013***	-0.0013***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Country FE	Yes	Yes	Yes	Yes
Constant	7.3028***	-0.1745	-3.6736***	0.9347
	(0.5112)	(0.5657)	(0.5007)	(0.7394)
Observations	17,198	17,503	17,313	16,966

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note to table 1: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3. Country fixed effects are included but not shown in the table. Models use multiple imputation with 5 replications for missing values.

Table 2 Regression Results for Social Engagement Mechanisms

Variables	OLS Social Network Satisfaction			
	Base Controls	+ SES Behaviour and Health	+ Family and Relationships	+ All
Total Effect (Sum of Childhood Variables)	0.386	0.254	0.264	0.179
F Test P Value for Total Effect	0.000	0.000	0.000	0.024
Total Effect Attenuation as % of Base		34.20%	31.61%	53.63%
Table 3 Controls	Yes	Yes	Yes	Yes
Adult SES, Behaviour, Health	No	Yes	No	Yes
Family and Relationships	No	No	Yes	Yes
Observations	17,198	17,198	16,998	16,998

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note to table 2: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3. Country fixed effects are included but not shown in the table. Models use multiple imputation with 5 replications for missing values. The full table for all outcomes is presented as table A5 in the appendix.

Appendix

Table A1 SHARE Analysis Sample

Country	No.	%
Austria	616	3.2
Germany	1,416	7.5
Sweden	1,378	7.3
Netherlands	1,721	9.1
Spain	1,595	8.4
Italy	2,086	11
France	1,971	10.4
Denmark	1,763	9.3
Switzerland	1,129	6
Belgium	2,247	11.8
Czech Republic	1,359	7.2
Poland	1,685	8.9
Total	18,966	100

Note to table A 1: Sample size for individuals present in SHARE wave 3 and wave 4 is shown.

Table A2 Summary of Analysis Variables

Factor	Childhood	Adulthood	Outcomes
Health and Behaviour	Excellent/Very Good Health	Excellent/Very Good Health High Cognition Number of chronic diseases Mobility limitations Body mass index Ever Smoked More Than 2 Drinks a Day Physically Inactive	
Socioeconomic Status	SES Tertile	Current Job Situation Household Makes Ends Meet Income Tertile Wealth Tertile	
Education	Years of Education		
Social Resources	Better than Average at Language/Maths Parental Mental Health/Alcohol Difficulties Both Parents Present in Household Psychiatric Illness Fostered or In Children's Home	Marital Status Number of Children Number of Grandchildren	Satisfaction with Social Network Size of Social Network Satisfaction with Activities Number of Activities Network Emotional Closeness

Note to table A2: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3.

Table A1 Descriptive Statistics

Gender	No.	%
Male	7,974	43.7
Female	10,262	56.3
Total	18,236	100

Maths Ability Compared to Others Age 10	No.	%
Much better	2,029	10.8
Better	4,518	24
About the same	9,279	49.4
Worse	2,012	10.7
Much worse	478	2.5
N/A Did not go to school	485	2.6
Total	18,801	100

Childhood Health Status		
Don't know	11	0.1
Excellent	6,205	32.9
Very good	6,261	33.2
Good	4,652	24.6
Fair	1,215	6.4
Poor	449	2.4
Health varied a great deal	85	0.5
Total	18,878	100

Both Parents Present in HH Age 10		
No	2,115	11.4
Yes	16,405	88.6
Total	18,520	100

Language Ability Compared to Others Age 10	No.	%
Much better	1,989	10.6
Better	4,850	25.9
About the same	9,049	48.2
Worse	2,079	11.1
Much worse	305	1.6
N/A Did not go to school	485	2.6
Total	18,757	100

Parents Mental Health Difficulties/Drank		
No	16,863	89.5
Yes	1,977	10.5
Total	18,840	100

Childhood SES Index Tertile		
Lowest SES Tertile	6,252	34.1
Middle SES Tertile	5,944	32.5
Highest SES Tertile	6,120	33.4
Total	18,316	100

Not Fostered or in Children's Home		
No	606	3.2
Yes	18,277	96.8
Total	18,883	100

Had No Psychiatric Problems as a Child		
No	204	1.1
Yes	18,614	98.9
Total	18,818	100

	Median	Mean	SD	N
Age in 2010	67	68.55	9.5	18,236
SN emotional closeness - Average	3.2	3.1	0.9	17,993
Size of Social Network	2	2.53	1.6	18,236
Social Network Satisfaction	9	8.83	1.4	17,852
Activities in Last 12 Months	2	2.28	1.6	18,007
Satisfaction with Activities	8	7.99	1.9	17,604

Note to table A3: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3.

Table A4 Descriptive Statistics for Adult Variables

Excellent or Very Good SR Health	No.	%
No	14,495	76.4
Yes	4,471	23.6
Total	18,966	100
Ever smoked daily		
Missing	161	0.9
No	91	0.5
Yes	17,984	98.6
Total	18,236	100
> 2 glasses of alcohol everyday		
Missing	161	0.9
No	14,996	82.2
Yes	3,079	16.9
Total	18,236	100
Marital status		
Married, living with spouse	12,954	71
Registered partnership	238	1.3
Married, not living with spouse	209	1.1
Never married	882	4.8
Divorced	1,247	6.8
Widowed	2,706	14.8
Total	18,236	100
High Cognition Score		
No	7,251	39.8
Yes	10,985	60.2
Total	18,236	100
Household Net Worth Tertile		
Lowest Tertile	6,088	33.4
Second Tertile	6,101	33.5
Third Tertile	6,047	33.2
Total	18,236	100

Physical inactivity	No.	%
Missing	161	0.9
No	15,749	86.4
Yes	2,326	12.8
Total	18,236	100
Current job situation		
Missing	161	0.9
Retired	11,273	61.8
Employed or self-employed	3,648	20
Unemployed	368	2
Permanently sick or disabled	623	3.4
Homemaker	1,912	10.5
Other	251	1.4
Total	18,236	100
Household able to make ends meet		
Missing	161	0.9
With great difficulty	1,492	8.2
With some difficulty	4,289	23.5
Fairly easily	6,100	33.5
Easily	6,194	34
Total	18,236	100
Household Income Tertile		
Lowest Tertile	6,077	33.3
Second Tertile	6,057	33.2
Third Tertile	6,102	33.5
Total	18,236	100
Household Expenditure Tertile		
Lowest Tertile	6,264	34.3
Second Tertile	6,102	33.5
Third Tertile	5,870	32.2
Total	18,236	100

	Median	Mean	SD	N
Number of chronic diseases	1	1.64	1.4	18,236
Mobility limitations	1	1.68	2.4	18,236
Body mass index	26.2	26.82	4.5	18,236
Number of children	2	2.27	1.4	18,236
Number of grandchildren	2	3.05	3.2	18,236
SN emotional closeness - Average	3.2	3.1	0.9	17,993

Note to table A4: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3.

Table A5 Full Table with Adult Controls

	OLS	OLS	OLS	OLS
	Social Network		Activities	
Variables	Satisfaction	Size	Satisfaction	Number
Childhood Variables				
Childhood SES: Omitted - Lowest Tertile				
Middle SES Tertile	0.0466*	0.0525*	0.0583**	0.0978***
	(0.0246)	(0.0293)	(0.0259)	(0.0363)
Highest SES Tertile	0.0511**	0.1130***	0.1861***	0.1458***
	(0.0260)	(0.0319)	(0.0290)	(0.0359)
Good or Excellent Childhood Health	0.0062	-0.0080	-0.0851***	0.0147
	(0.0210)	(0.0253)	(0.0227)	(0.0295)
Better than average at language age 10	0.0481	0.1333***	0.0819**	0.1241***
	(0.0312)	(0.0344)	(0.0325)	(0.0449)
Better than average at maths age 10	0.0074	-0.0295	0.1884***	-0.0488
	(0.0308)	(0.0357)	(0.0319)	(0.0451)
Parents No Mental Health Problems/Drank	0.0133	-0.0822**	-0.0313	0.1112**
	(0.0323)	(0.0395)	(0.0351)	(0.0479)
Both Parents Present in HH Age 10	0.0989***	0.0005	0.0372	0.0014
	(0.0341)	(0.0389)	(0.0340)	(0.0452)
Had No Psychiatric Problems as a Child	0.2215**	-0.0971	-0.1674	0.1710
	(0.1036)	(0.1168)	(0.1171)	(0.1594)
Not Fostered or in Children's Home	-0.0578	-0.0527	-0.1314*	-0.0052
	(0.0572)	(0.0728)	(0.0692)	(0.0776)
Years of Education	-0.0055**	0.0168***	0.0309***	0.0075**
	(0.0027)	(0.0034)	(0.0030)	(0.0035)
Female	0.0545**	0.4289***	0.2611***	0.2114***
	(0.0213)	(0.0265)	(0.0240)	(0.0306)
Age	0.0225	0.0162	0.0974***	0.0729***
	(0.0143)	(0.0175)	(0.0150)	(0.0219)
Age Squared	-0.0001	-0.0001	-0.0007***	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Adult Health and Behaviour				
Excellent or Very Good Health	0.1489***	0.0798**	0.2538***	0.2642***
	(0.0223)	(0.0314)	(0.0284)	(0.0299)
High Cognition	0.0603***	0.1961***	0.4145***	0.2871***
	(0.0228)	(0.0276)	(0.0243)	(0.0323)
Number of chronic diseases	-0.0076	0.0691***	0.0454***	-0.0308**
	(0.0085)	(0.0097)	(0.0084)	(0.0124)
Mobility limitations	-0.0126**	0.0061	-0.0231***	-0.1078***
	(0.0063)	(0.0066)	(0.0056)	(0.0098)
Body mass index	0.0092***	-0.0056**	0.0038	0.0186***
	(0.0025)	(0.0027)	(0.0026)	(0.0035)
Ever Smoked - Yes	-0.0139	-0.0796	-0.3048*	-0.2840

	(0.1620)	(0.1824)	(0.1753)	(0.2044)
More Than 2 Drinks a Day - Yes	-0.0197	0.1026***	0.0463	0.0031
	(0.0254)	(0.0338)	(0.0290)	(0.0332)
Physically Inactive - Yes	-0.0785**	-0.3939***	-0.6030***	-0.6811***
	(0.0373)	(0.0378)	(0.0325)	(0.0608)
Adult SES				
Current Job Situation: Omitted=Retired				
Missing by design	-0.4339*	-0.5784***		
	(0.2417)	(0.2185)		
Employed or self-employed	0.0109	0.0100	-0.0590	-0.2344***
	(0.0306)	(0.0419)	(0.0375)	(0.0430)
Unemployed	-0.1319*	-0.0061	-0.0809	-0.2515**
	(0.0742)	(0.0856)	(0.0785)	(0.1056)
Permanently sick or disabled	0.1343**	-0.0211	-0.2339***	0.0264
	(0.0535)	(0.0700)	(0.0565)	(0.0941)
Homemaker	0.0418	-0.0137	-0.1304***	-0.1228**
	(0.0330)	(0.0447)	(0.0380)	(0.0516)
Other	-0.1277	0.0902	0.0114	0.1422
	(0.0934)	(0.1030)	(0.0889)	(0.1308)
HH Ends Meet: Omitted=Great difficulty				
With some difficulty	-0.0043	0.0407	0.0867**	0.3903***
	(0.0478)	(0.0455)	(0.0402)	(0.0749)
Fairly easily	0.0720	0.0680	0.1566***	0.5189***
	(0.0470)	(0.0470)	(0.0414)	(0.0740)
Easily	0.0900*	0.1125**	0.2813***	0.6088***
	(0.0492)	(0.0518)	(0.0454)	(0.0754)
Income Tertile: Omitted=First				
Second Tertile	0.0192	0.1714***	0.1367***	0.0429
	(0.0254)	(0.0315)	(0.0280)	(0.0372)
Third Tertile	0.0002	0.2406***	0.2058***	0.0505
	(0.0279)	(0.0375)	(0.0344)	(0.0428)
Expenditure Tertile: Omitted=First				
Second Tertile	-0.0181	-0.0077	0.0367	0.0267
	(0.0237)	(0.0324)	(0.0289)	(0.0335)
Third Tertile	-0.0318	0.0127	0.0500*	0.0740**
	(0.0249)	(0.0322)	(0.0297)	(0.0364)
Wealth Tertile: Omitted=First				
Second Tertile	0.0058	0.1069***	0.0907***	0.0628
	(0.0271)	(0.0358)	(0.0287)	(0.0419)
Third Tertile	-0.0303	0.2076***	0.2005***	0.0415
	(0.0269)	(0.0340)	(0.0303)	(0.0403)
Adult Social Resources				
Marital Status: Omitted=				
SN emotional closeness	0.6857***	0.2763***	0.0398***	0.1771***
	(0.0207)	(0.0129)	(0.0115)	(0.0187)

Registered partnership	0.0769	-0.0964	-0.1493*	-0.0387
	(0.0761)	(0.1025)	(0.0902)	(0.0902)
Married, not living with spouse	-0.0643	0.1331	0.1047	0.0110
	(0.0859)	(0.1133)	(0.1093)	(0.1201)
Never married	-0.0450	0.0967*	0.0767	-0.0945
	(0.0517)	(0.0583)	(0.0536)	(0.0712)
Divorced	-0.0617	0.1738***	0.0524	-0.0223
	(0.0426)	(0.0489)	(0.0470)	(0.0543)
Widowed	0.1022***	0.0874**	0.1490***	0.0407
	(0.0335)	(0.0379)	(0.0334)	(0.0479)
Number of children	-0.0110	0.0711***	0.0292***	-0.0101
	(0.0093)	(0.0125)	(0.0105)	(0.0136)
Number of grandchildren	0.0157***	0.0127**	0.0079	0.0041
	(0.0045)	(0.0056)	(0.0049)	(0.0067)
Constant	5.2287***	0.5833	-1.7810***	3.4843***
	(0.5495)	(0.6857)	(0.6038)	(0.8427)
Country Fixed Effects	Yes	Yes	Yes	Yes
Observations	16,644	16,882	16,701	16,410

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note to table A5: Outcome variables and controls are obtained from SHARE wave 4, and childhood indicators from SHARE wave 3. Country fixed effects are included but not shown in the table. Models use multiple imputation with 5 replications for missing values.