

Family Trajectories and Loneliness in Later Life in the UK

Maria Sironi, University of Padova, Department of Statistical Sciences

maria.sironi@unipd.it

Elisa Tambellini, University of Turku

elisa.tambellini@utu.fi

Bruno Arpino, University of Padova, Department of Statistical Sciences

bruno.arpino@unipd.it

Abstract

Loneliness poses significant health risks for older adults, comparable to smoking and obesity. While research has examined concurrent factors like partnership status and health conditions, few studies adopt a life course perspective to understand how the timing and sequencing of family transitions shape loneliness in later life. This study addresses this gap by examining how partnership and parenthood trajectories relate to loneliness among older adults in the UK. Our analyses use prospective cohort data, which allow us to measure variables – including early-life confounders – at multiple phases of the life course, rather than relying on retrospective (and potentially biased) recall. Specifically, using cohort data from the National Child Development Study, we analyze adults born in 1958, employing sequence and cluster analysis to identify family typologies, and regression models to assess associations between these trajectories and loneliness outcomes at ages 61-66. By examining the cumulative interplay of family-life experiences, this research provides novel insights into how the timing and sequencing of family transitions influence emotional well-being in older age, showing that those following less standard trajectories are at higher risk of perceiving loneliness.

Introduction

Loneliness has emerged as a pressing public health issue, with the World Health Organization (2021) emphasizing that high-quality social relationships are essential for psychological resilience and physical health. Loneliness is commonly defined as a subjective and negative emotional experience that arises when an individual perceives their social relationships as inadequate in either quantity or quality (Perlman & Peplau, 1981; de Jong Gierveld et al., 2006).

Although loneliness can occur at any stage of life, its prevalence tends to increase with age (Dykstra, van Tilburg, & de Jong Gierveld, 2005; Perissinotto et al., 2012). Older adults across many countries frequently report higher levels of loneliness compared to younger populations (Barreto et al., 2021; Hawkey et al., 2022; Surkalim et al., 2022; Nicolaisen & Thorsen, 2017). A large body of research has examined factors that contribute to loneliness in later life, focusing mainly on concurrent circumstances—such as partnership status, living arrangements, health limitations, or socioeconomic conditions (Pinquart & Sørensen, 2001; Cohen-Mansfeld et al., 2016; De Koning et al., 2017)—or on the short-term impact of major life events like bereavement or divorce (Dahlberg et al., 2015; Peters & Liefbroer, 1997).

However, most studies treat these life events in isolation, overlooking their cumulative, interconnected nature over the life course. Life course theory suggests that emotional well-being in later life is shaped not only by whether key family events—such as entering a partnership or becoming a parent—occur, but also by the timing and sequencing of these events. In addition, life course trajectories can have lasting implications for social integration and support networks. The diversification of family structures over recent decades, driven by the second demographic transition (Lesthaeghe, 2014; Härkönen, 2014; Jalovaara et al., 2019), has introduced greater variation in both the occurrence and timing of partnership and parenthood experiences. Investigating loneliness is particularly important, as persistent feelings of loneliness have been linked to health risks comparable to those associated with smoking, obesity, and physical inactivity (Holt-Lunstad et al., 2015). A growing body of research has documented the negative consequences of loneliness across multiple domains of health. Psychologically, loneliness is strongly associated with depression, anxiety, low self-esteem, and increased stress (Cacioppo & Hawkey, 2009; de Jong Gierveld, van Tilburg, & Dykstra, 2006). Cognitively, it has been linked to accelerated cognitive decline and a higher risk of dementia in older adults (Donovan et al., 2017). Physiologically, loneliness is associated with dysregulated immune function, elevated blood pressure, poor sleep quality, and increased risk of cardiovascular disease (Hawkey & Cacioppo, 2010; Steptoe et al., 2013).

Despite its importance, little is known about how complex and evolving life trajectories combine to influence loneliness in later life. This study addresses this gap by adopting a life course perspective to examine how the timing, sequencing, and long-term patterns of partnership and parenthood transitions over adulthood are associated with loneliness in later life. Drawing on data from the National Child Development Study, we focus on adults born in 1958 and use sequence and cluster analysis to identify common family-life trajectories that capture both the occurrence and timing of these events. We then apply linear and logistic regression models to assess how these trajectories relate to loneliness when they are between 61 and 66 years old. By moving beyond cross-sectional snapshots or single-event analyses, this study provides new insights into how the timing and cumulative interplay of family-life experiences shape emotional well-being in older age.

Theoretical Framework: Life Course Theory

Life course theory serves as the primary analytical framework for this study, offering a comprehensive perspective on how previous life circumstances, social structures, and the timing of life transitions shape individual outcomes over time (Ben-Shlomo & Kuh, 2002; Hutchison, 2011; Sakkeus et al., 2023). According to this theory, individual development unfolds through a sequence of interconnected stages and events, with earlier experiences influencing later outcomes through multiple pathways, including access to material resources and psychosocial development.

A central principle of life course theory is cumulative advantage and disadvantage, which posits that both advantages and disadvantages tend to build upon themselves throughout life (Dannefer, 2003). Empirical evidence suggests that cumulative disadvantage often plays a more significant role than cumulative advantage in shaping long-term outcomes (Mäki et al., 2022; Pampel & Rogers, 2004; Ferraro et al., 2009). These accumulations can occur not only across time but also across domains, meaning that disadvantages in one area—such as unstable relationships—may compound disadvantages in other areas, including health or social capital (Bernardi, Huinink, & Settersten, 2019)

While structural factors are important, the theory also acknowledges human agency: individuals actively respond to and shape their life circumstances rather than being purely passive subjects of external forces. Moreover, life trajectories are always embedded in historical time, with cohort and period effects influencing the meaning and consequences of life events as social policies, economic conditions, and cultural norms evolve (Hutchison, 2011).

Family relationships—including those with intimate partners, spouses, and children—represent some of the most enduring and emotionally significant social bonds throughout the life course (Antonucci et al. 2014). These ties provide companionship, emotional support, and a sense of identity and belonging (Dunbar, 2018; Ormel et al., 1999; Roberts et al., 2009). Among these, the relationship with a long-term partner or spouse is often cited as the most important social connection in adulthood (Helliwell & Putnam, 2004). Stable marital unions are consistently associated with higher well-being, partly due to their emotional support and partly because of the normative roles and social recognition that marriage provides (Mäki et al., 2022; Dush & Amato, 2005). The dissolution of intimate relationships has been shown to increase loneliness. However, the extent of this effect depends on several moderating factors, including the timing of the event and the availability of other sources of social support (Van Tilburg et al., 2015; Peters & Liebroer, 1997).

Life course theory further highlights the importance of timing, sequence, and context in understanding life outcomes. The age at which transitions occur, their order in relation to other life events, and the broader societal conditions of the time all influence their impact on individuals. The age at which individuals marry, divorce, or have children, the sequence in which these events unfold, and the length of time spent in each family state all shape whether these experiences are perceived as normative or disruptive (Hutchison, 2011). Transitions occurring outside socially expected timeframes may challenge age-related norms, potentially increasing loneliness or social stigma (Dykstra & Keizer, 2009; Fokkema et al., 2012; Koropecj-Cox, Pienta, & Brown, 2007). However, the relationship between the timing of family events and loneliness remains complex, with findings in the literature often inconclusive or context dependent.

Literature Review

Partnership Histories and Loneliness

Marriage and partnership generally provide significant psychological benefits, with empirical research consistently demonstrating that partnered individuals report lower levels of both loneliness and depression compared to those who are single, divorced, or widowed (Tambellini, 2024; Zhang & Hayward, 2001). Many empirical studies offer strong support for the idea that loneliness is lower among the partnered or married (de Jong Gierveld & Van Tilburg, 2006; Dykstra & Keizer, 2009; Fokkema et al., 2012; Hansen & Slagsvold, 2015; Sundström et al., 2009). Dykstra and de Jong Gierveld (2004) argue that it is not just the lack of a confidant that makes the unmarried lonelier, but

that marriage also promotes engagement in partner-related activities, enlarging one's network and facilitating the formation of emotional and social bonds (Zoutewelle-Terovan & Liefbroer, 2018). Union dissolution, in contrast, is associated with heightened risks of loneliness. Divorced individuals generally report higher loneliness levels compared to those who are continuously married (Van Tilburg et al., 2015). In the aftermath of divorce, several factors contribute to elevated loneliness, including reduced financial resources, declining health, and the absence of trusted confidants. While time can lessen the impact of divorce on loneliness, with intensity tending to decline as more time passes since the last union dissolution (Peters & Liefbroer, 1997), the effects are not easily erased. Even those who eventually remarry often report higher levels of loneliness compared to individuals who have never divorced, suggesting that the consequences of relationship breakdowns can be long-lasting (Van Tilburg et al., 2015). However, the impact of divorce is not uniform across all life stages. Högnäs (2020) found that loneliness is most pronounced among individuals who experience divorce before midlife, suggesting that the life stage at which relationship dissolution occurs plays a crucial moderating role.

Regarding the timing of life events, social support theories argue that individuals whose life transitions do not conform to the “ideal” timeline do not benefit from immediate peer support and need to invest additional individual resources to compensate for the resulting shortage (Wrosch & Freund, 2001). Given the centrality of partnership in many societal contexts, individuals who do not enter a partnership may be stigmatized for “transgressing” such norms (Thornton & Young-DeMarco, 2001). It may be considered that a person who goes against social customs has not adapted to society and that person may therefore be socially excluded. Social sanctioning may also be applied to individuals who are “off-time” in terms of family formation. With regard to stigma effects, some studies found that stigmatization occurs for both singleness and childlessness (Byrne, 2000; Houseknecht, 1977). However, the long-term consequences of stigmatization remain unclear (Zoutewelle-Terovan & Liefbroer, 2018).

Parenthood and Loneliness

The relationship between parenthood and loneliness remains considerably more complex and less conclusive than the effects of partnership transitions. Theories on intergenerational relationships emphasize the vital role of family connections, particularly bonds with children, in providing essential support that promotes health and wellbeing across the life course, especially in older age (Dykstra, 2015; Wolff & Kasper, 2006). Parent–child ties are seen as a primary source of emotional

closeness and practical assistance, both of which are central to social and psychological wellbeing (Bengtson et al., 2000). Parenthood may reduce loneliness through several mechanisms. Having children can increase opportunities for companionship and provide a sense of reliable support in times of need (Grundy & Read, 2012; Tosi & Grundy, 2018). Parenthood is also seen as a social facilitator, and research has shown that the social networks of childless individuals are smaller (Dykstra, 2006), although they tend to have more friends (Mair 2019). Consistent with this view, parents—especially mothers—often report lower loneliness than non-parents (De Jong Gierveld et al., 2009; Van den Broek, 2017).

This framework has frequently led to the assumption that having adult children is crucial for older adults' wellbeing, positioning childlessness as a disadvantage. Childless older individuals are often portrayed as being at higher risk of social isolation and loneliness (Koropecj-Cox & Call, 2007; Dykstra & Hagestad, 2007a, 2007b). Some studies show that childless and never-married individuals are lonelier in later-life (Dykstra & Keizer, 2009; Fokkema et al., 2012; Koropecj-Cox, 1998; Zoutewelle-Terovan & Liefbroer, 2018).

However, critics, particularly from feminist perspectives, argue that these assumptions overlook the importance of non-kin networks, prioritize the number of relationships over their quality, and rely on outdated ideals that elevate the nuclear family while disregarding changing social norms around voluntary childlessness and diverse family forms (Bures et al., 2009; Kreyenfeld & Konietzka, 2017; Lynch et al., 2018). Empirical studies have also questioned these claims, particularly regarding subjective wellbeing outcomes like loneliness. Although findings are sometimes mixed (Iecovich et al., 2004; van Tilburg et al., 2004; Vozikaki et al., 2018; Zoutewelle-Terovan & Liefbroer, 2018), many comparisons between childless adults and parents reveal little evidence that being childless significantly harms wellbeing or increases loneliness (Kendig et al., 2007; Koropecj-Cox et al., 2007; Bures et al., 2009; Hansen et al., 2009; Vikström et al., 2011). Several studies report no clear link between parental status and loneliness regardless of marital status or gender (Hansen et al., 2009; Zhang & Hayward, 2001). This has led some researchers to propose that, in modern contexts, childlessness may no longer carry substantial disadvantages for loneliness or other aspects of wellbeing in later life (Koropecj-Cox et al., 2007; Hansen et al., 2009). More recent work adds nuance, suggesting that childlessness may be more strongly associated with social than with emotional loneliness. This implies that having children may increase opportunities for social interaction without necessarily fulfilling deeper emotional needs (Penning et al., 2022). Emotional loneliness denotes the perceived absence of close, intimate attachments, whereas social loneliness

refers to the perceived lack of a broader, satisfactory social network in terms of both size and quality (Weiss, 1973). Social loneliness is typically associated with structural aspects of social life—such as the presence of friends, companionship, and overall network size—while emotional loneliness is more closely related to the absence of emotional support (Lui & Rook, 2013; Wolters et al., 2023).

The age at which individuals transition into parenthood may significantly influence later-life outcomes. Developmental theories suggest that becoming a parent too early, before reaching sufficient emotional maturity, can create challenges in coping with the demands of childrearing (Marini, 1984). This early strain may lead to a cumulative build-up of negative emotions over the life course. However, empirical research exploring the long-term effects of “off-time” family transitions remains relatively limited. Early parenthood has frequently been associated with lower levels of psychological well-being in later years (Koropeckyj-Cox et al., 2007). In contrast, evidence regarding postponed parenthood is limited but suggests potential benefits: both fathers and mothers who delay parenthood tend to report better mental health (Mirowsky & Ross, 2002), while a study focusing only on women found lower well-being among early mothers, often linked to singlehood and poorer socioeconomic status (Koropeckyj-Cox et al., 2007). Furthermore, Liefbroer and Billari (2010) found little indication that late parenthood is subject to strong social penalties (Zoutewelle-Terovan & Liefbroer, 2018). Recent evidence on several European countries has shown a negative association between non-standardness of family histories (i.e. the extent an individual's family trajectory differs from that of a reference group, based on birth cohort, gender and country of residence) and wellbeing, especially among individuals with lower levels of education and based in Southern Europe (Arpino et al., 2023).

Aim of the Study

This study aims to examine how distinct patterns of partnership and parenthood transitions across the life course are associated with loneliness in later life among adults aged 61-66 in the United Kingdom. We use prospective data from the 1958 National Child Development Study (NCDS), combining information from Sweeps 0 (1958; age 0) to 10 (2020-2024; age 61-66). We reconstruct partnership and fertility histories throughout their life course from age 14 until age 55, and by implementing sequence and cluster analysis, we investigate whether belonging to a specific ‘family typology’ is associated with different loneliness dimensions (e.g. feeling lack of companionship, left out, isolated and lonely) after age 61. This research addresses significant gaps in the literature by adopting a holistic life course perspective rather than examining isolated transitions.

Specifically, we address the following research questions:

1. *What are the common life course trajectories of partnership and parenthood among adults in the UK?*
2. *How do these trajectories relate to feelings of loneliness at ages 61–66?*
3. *Does the timing and order of family transitions (e.g., early or late entry into partnership, delayed parenthood, or non-standard trajectories) influence the risk of loneliness in later life?*
4. *Do current social connections and family relationships explain (mediate) the link between earlier family trajectories and later-life loneliness?*
5. *Does maintaining regular contact with close friends buffer against loneliness differentially across family trajectory typologies?*

By integrating a life course perspective with sequence and cluster analysis, this study contributes to the literature in three ways. First, it moves beyond cross-sectional or single-event analyses by considering the cumulative interplay of family-life experiences over adulthood. Second, it leverages prospective cohort data, which allow for the inclusion of early-life and long-term confounding factors, reducing bias from retrospective recall. Finally, it provides evidence on how deviations from standard partnership and parenthood trajectories may heighten the risk of loneliness, offering insights for interventions aimed at promoting emotional well-being in older adults.

Data and Methods

Data

In this work we use data taken from the 1958 National Child Development Study. The NCDS started in 1958 to follow the lives of more than 17,000 people born in England, Scotland, and Wales in a single week in March 1958. Since 1958 respondents have been interviewed other ten times, when they were aged 7, 11, 16, 23, 33, 42, 46, 50, 55, 61-66. The study includes information on numerous domains, such as childhood health, educational attainment, economic and family circumstances, employment, unions and childbearing, physical and mental health. We used data collected in several sweeps to construct partnership and fertility histories (at ages 23, 33, 42, 46, 50, 55), information collected in childhood and adolescence on early-life health, socioeconomic conditions, and cognitive ability, and we investigated outcomes related to loneliness included in the very last sweep collected between 2020 and 2024, which was the first time loneliness was measured in the NCDS (except for the COVID-19 surveys). We focused on the sample of 8,405 respondents that has been interviewed in the most recent sweep, and we conducted the sequence and cluster

analysis on the 7,834 individuals who had data on partnership and fertility trajectories (up until age 55, i.e. 2013). Before the analysis, to handle missing data, we used multiple imputations with chained equations on all variables mentioned above generating 50 imputed datasets, except the outcome variables of loneliness. Our final sample includes 5,909 individuals.

Loneliness Measures

Loneliness collected at age 61-66 is the dependent variable of interest. Loneliness was measured using the 4-item UCLA Loneliness scale (ULS-4) (Hughes et al., 2004). Respondents were asked how often they felt a lack of companionship, left out, isolated from others, or lonely, with response options on a three-point Likert scale ('hardly ever', 'some of the time', or 'often'). Each component was dichotomized to separate those who answered 'hardly ever' (=0) from those who answered 'some of the time' or 'often' (=1), in line with the existing literature (Perissinotto et al., 2012). In the main analysis, we used the general ULS-4 index, summing the score of each of the four components, that ranges from 4 to 12, with higher scores indicating higher levels of loneliness. The analysis on individual components are available in the Appendix.

Family Trajectories

To study the role of family trajectories in determining loneliness at older ages, we reconstruct partnership and fertility histories between the ages of 14 and 55, combining information on living arrangements and childbearing collected prospectively and retrospectively in all the sweeps between age 23 and age 55. We categorize respondents based on four different states in terms of partnership status: single (S), cohabiting (C), married (M), and separated/divorced/widow (SDW). We also identify four states for parenthood transitions: childless, one child (1), two children (2), and three or more children (3). We combine partnership and parenthood states, so each respondent in each year can be in one of 16 (4x4) possible states.

Confounders, Mediators and Moderators

When investigating the association between family trajectories and loneliness in older age, it is necessary to take into account possible factors that can influence both decisions and behaviors around union formation, union dissolution and childbearing, and factors that might play a role also for feelings of loneliness. Hence, in our analyses we include information on family background and early-life health collected at age 0, 7, 11 and 16. Specifically, other than gender and ethnicity, we

consider birthweight, whether the respondent's mother smoked when pregnant, the number of hospital admissions before age 11, a standardized measure of cognitive ability at age 11 (i.e. a general ability test score consisting of 40 verbal and 40 nonverbal items), and behavioural scales to measure 'internalising' and 'externalising' at age 16, to take into account mental health during adolescence. As for parental background and socioeconomic status, we include overcrowding in the household (more than 1.5 persons per room) and housing amenities (lacking access to a bathroom, and/or cooking facilities, and/or hot water, vs. having access to all) at age 11, social class at birth (based on father's occupation, manual vs non-manual), parental years of education (either mother's or father's – whichever was higher if both available), parents' interest in the education of the respondent at age 11 and if parents divorced by age 16. These measures were all based on reports from respondents' parents. Given that feelings of loneliness can develop also at early ages and can have an impact on mental health and loneliness later in life, we also consider two indicators of closeness to the mother and closeness to the father during childhood (0 = not at all, 10 = very close), based on the respondents' retrospective account in the latest interview (2020-2024).

In a second phase of the analysis, we also consider a set of mediators related to *interpersonal relationships and social connections with kins*. We include a variable indicating whether the respondent has a partner at age 61-66, an indicator of closeness to the partner (very close/close vs not very close/not at all close), the frequency of contact with children (meeting in person: 'at least once per week' vs 'less than once per week/less than once per month/no children'; other forms of contact: 'at least once per week' vs 'less than once per week/less than once per month/no children'), number of grandchildren, the frequency of meetups in person with immediate family (any brothers or sisters, step-parents or cousins; 'at least once per week', 'at least once per year', 'less than once per year or never'). Finally, we investigate the role of having contact with friends as a moderator of the relationship between family trajectories and loneliness. We use an indicator of social interactions with friends, considering the frequency of meetups in person or other forms of contact with close friends ('at least once per week', 'less than once per week, but at least once per month', 'less than once per month or no friends').

Analytical Strategy

We implement sequence analysis in order to build partnership and fertility histories between the ages of 14 and 55. Respondents are categorized based on four different states in terms of partnership status – single (S), cohabiting (C), married (M), and separated/divorced/widow (SDW) - and on four

states in terms of parenthood – childless (0), one child (1), two children (2), and three or more children (3). Hence, each respondent in each year can be in one of 16 (4x4) possible states. In this way, the life course of an individual can be visualized as an ordered sequence of states, and it is possible to analyze timing of events, together with ordering and duration. We first build the pairwise dissimilarity matrix using optimal matching with costs based on transition rates, and then we implement an agglomerative Wards hierarchical clustering approach, in order to group individuals into family typologies. The optimal number of clusters has been determined based on the evaluation of cluster quality (i.e. using average silhouette width), the graphical inspection of the dendrogram and comparing different solutions with different number of clusters. After also qualitatively inspecting cluster medoids and sequence plots, among the solutions preferred by the various approaches, we favored the solution with the smallest number of clusters that yielded distinct, meaningful life-course patterns, i.e. 8 clusters. Sequence analysis was performed using the TraMineR package in R (Gabadinho et al. 2011).

After grouping respondents into family typologies, we use these typologies as the main independent variable in linear or logistic regression models to assess their association with loneliness at age 61-66. We estimate four specifications: an unadjusted model in which we do not include any control, just the variable representing the family typology (Model 1); an adjusted model including the confounders mentioned above (Model 2 = Model 1 + Confounders); a model which includes the confounders and the first set of mediators (Model 3 = Model 2 + Mediators); a last model including all the confounders and the interaction between family typology and contact with friends (Model 4 = Model 2 + Cluster*Frequency of contact with close friends).

As robustness checks, we also performed some additional analyses replicating Model 2 (i) including a variable indicating the level of education at age 23 (low, medium, high); (ii) excluding those who have been interviewed during the strictest phase of COVID-19 lockdown (i.e. March-June 2020); (iii) including household size at age 61-66, whether the respondent has ever been unemployed between January 1975 and December 2012, or has ever experienced the death of a child throughout the life course; (iv) separately by gender, (v) including the interaction between gender and family typologies. Main analyses are pooled across genders, as preliminary investigations revealed no significant gender heterogeneity in the relationship between family trajectories and loneliness (see the Appendix for additional analyses stratified by gender).

Finally, it is possible that it is not the whole family trajectory that is relevant for loneliness later in life, but some more specific transitions or isolated events. In order to understand the role of specific

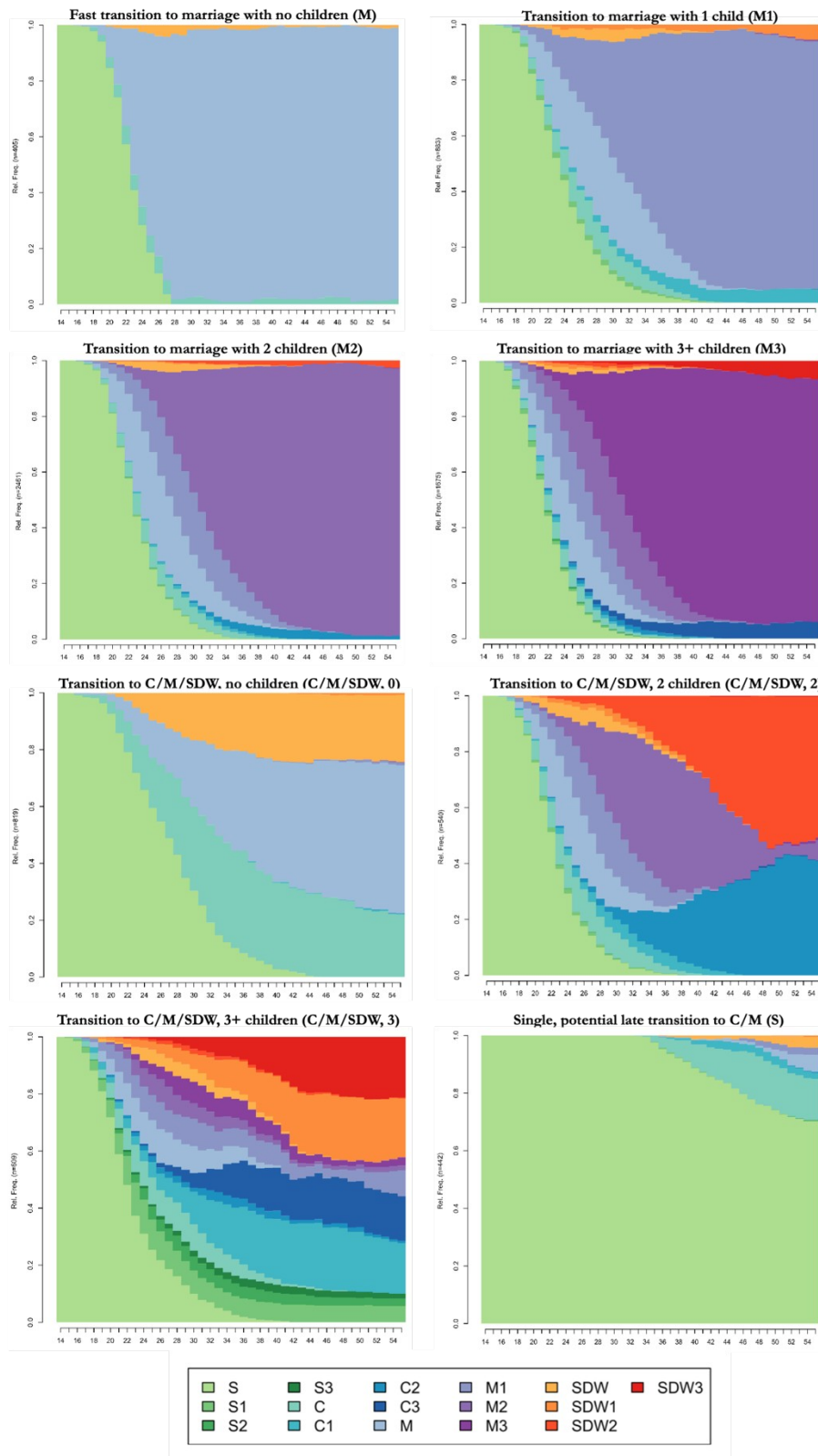
events and of their timing, we ran several models including the following variables, first one at a time and then all together in the same specification: ever cohabited, ever married, ever separated/divorced (if ever in a union), ever widowed (if ever in a union), ever had a child, number of cohabitations, number of marriages, age at first cohabitation (if any), age at first marriage (if any), time since last separation/divorce (if ever in a union), time since last widowhood (if ever in a union), number of children, age at first child (if any), age at last child (if any) by age 55.

Results

Sequence and Cluster Analysis

Based on several indicators of cluster quality (e.g. the average silhouette width, see Figure A1 in Appendix), the graphical inspection of the dendrogram (see Figure A2 in Appendix), and qualitatively inspecting cluster medoids and sequence plots, we identified 8 different family typologies. Figure 1 shows the sequence plots (for an example of 100 random sequences in each cluster see Figure A3 in Appendix) and Table 1 reports some descriptive statistics for each cluster (the descriptive statistics related to all the other variables in the analysis can be found in Table A1, in the Appendix). The first cluster (*Fast transition to marriage with no child*, 5.4% of the sample) is characterized by a quick and early transition from single to married, without having children throughout the life course. The second cluster (*Transition to marriage with 1 child*, 11.4% of the sample) is not only characterized by a quick transition to marriage, but also to parenthood, and it is stable over time. The third (*Transition to marriage with 2 children*, 32.5% of the sample) and the fourth clusters (*Transition to marriage with 3+ children*, 21.4% of the sample) are very similar to the second cluster, but differ in terms of parenthood transitions and parity. The third cluster is also the most prevalent cluster in our sample. The fifth cluster (*Transition to cohabitation, marriage, separation/divorce/widowhood, with no child*, 10.5% of the sample) is characterized by a transition from singlehood to cohabitation and then marriage. By age 55, 20% of the people in this cluster are separated/divorced/widowed and 20% is cohabiting. The sixth cluster (*Transition to cohabitation, marriage, separation/divorce/widowhood, with 2 children*, 7% of the sample) includes individuals who transition from singlehood to cohabitation, and a quick transition to two children. About 50% of them are separated/divorced/widow by age 55. The seventh cluster (*Transition to cohabitation, marriage, separation/divorce/widowhood, with 3+ children*, 6.7% of the sample) is very similar but it is characterized by higher parities. The eighth cluster (*Single, potential late transition to cohabitation/marriage*, 5.1% of the sample) consists of people who stay single for most of their life course, with only 25% of them transitioning into a union by age 55.

Figure 1.



Sequence plots

Table 1. Cluster Descriptive Statistics

	Clusters							S	#
	M	M1	M2	M3	Cohab/M/ SDW, 0 Chld	Cohab/M/ SDW, 2 Chld	Cohab/ M/ SDW, 3 Chld		
% Ever Cohabited, by Age 55	38.2	53.7	40.9	49.2	82.8	81.8	79.6	30.5	5,909
% Ever Married, by Age 55	100.	100.	99.9	99.9	78.5	89.3	69.5	11.6	5,909
% Ever Separated/Divorced, by Age 55	0	0	23.3	23.3	55.4	86.0	78.1	23.5	5,672
% Ever Widowed, by Age 55	15.0	27.8	19.3	28.3	3.2	2.7	1.4	2.0	5,672
% Ever Had a Child, by Age 55	3.4	3.7	2.8	2.7	100.	100.	100.	6.6	5,909
Number of Marriages, by Age 55 (%)	0.0	0	0	0	2.4	100.0	100.0	87.7	5,909
	0	0.0	0.0	0.1	0.1	21.2	10.4	7.1	5,909
	1	80.3	77.2	81.8	73.7	62.4	68.0	9.0	5,909
	2+	19.7	22.8	18.1	26.2	16.4	21.5	0.3	5,909
Number of Cohabitations, by Age 55								68.5	5,909
	0	56.7	40.0	54.0	45.9	13.8	15.0	25.5	5,909
	1	35.1	40.6	33.8	36.1	43.5	40.7	5.5	5,909
	2+	8.2	19.3	12.2	18.0	42.7	44.3	6.0	5,909
Age 1st Cohabitation (mean)	29.6	32.0	30.5	32.7	35.9	39.7	36.8	43.9	3,151
Age 1st Marriage (mean)	26.6	29.4	27.6	27.8	36.3	29.2	32.2	48.4	5,342
Time since Last Separation/Divorce (in years)	22.6	18.7	21.0	18.0	18.1	13.5	16.4	9.1	1,968
Time since Last Widowhood (in years)	8.8	10.7	10.0	14.0	10.0	15.8	15.8	2.8	161
Number of Children (mean), by Age 55	0.0	1.0	2.0	3.4	0.0	2.0	2.1	0.1	5,909
Age 1st Child (mean), if at least one child	-	30.5	27.9	25.3	46.0	27.5	27.8	42.2	4,700
Age Last Child (mean), if more than 1 child	-	50.6	31.2	33.2	50.8	31.5	34.4	51.8	3,780
% Observations (N = 5,909)	5.4	11.4	32.5	21.4	10.5	7.0	6.7	5.1	

Regressions Models

Table 2 reports the results of the regression models on the ULS-4 total score (full tables, including all of the confounders and mediators can be found in the Appendix). In the table we just report the coefficients of the variable representing family typologies, taking the cluster ‘Transition to *marriage with 2 children*’ as the reference category. The predicted scores of the loneliness index from the four specifications are reported in Figure 2.

Results show that respondents belonging to the third cluster, ‘Transition to *marriage with 2 children*’ – the most prevalent typology –, and to the first cluster, ‘Fast transition to *marriage with no children*’, are those reporting lower levels of loneliness. Once we account for confounders relative to childhood conditions and family background (Model 2), also the typology ‘Transition to *marriage with 1 child*’ doesn’t show any significant difference from the reference cluster. Respondents who face a family trajectory marked by stable marriage but higher parities (3+), longer times spent without a partner, in a cohabitation, or by separation/divorce do report higher levels of loneliness.

The set of mediators included in Model 3 - referred to relationship quality with the partner (if any) and to social interactions with children, grandchildren and other immediate family members - do mediate the association between family typologies and loneliness later in life. Union and fertility trajectories up to age 55 might influence levels of loneliness at age 66 indirectly, by affecting the quality of interpersonal relationships and the frequency of contact with children (if any), grandchildren (if any) and immediate family members (if any). Notably, when mediators related to current family relationships are included (Model 3), the coefficients for clusters involving partnership dissolution and childlessness (‘Transition to *cobabitation, marriage, separation/divorce/widowhood*’ groups) lose statistical significance. These results highlight the potential to ‘recover’ from specific adverse life course events. For instance, finding a partner even at an advanced age or maintaining a supportive social network can offset the detrimental effects on well-being stemming from earlier divorce, separation, or childlessness. This suggests that current relational resources may be more proximal determinants of loneliness than distant family trajectory patterns, particularly for those who experienced non-standard pathways.

Model 4 examines whether the frequency of contact with close friends moderates the relationship between family life course trajectories and loneliness. The main effects show that infrequent contact with friends (less than monthly or having no friends) is strongly associated with higher loneliness ($\beta=0.656$, $p<0.01$), while monthly contact shows a modest, non-significant increase ($\beta=0.160$). Importantly, when accounting for friend contact frequency, most family trajectory clusters retain

their elevated loneliness risk relative to the reference group (M2), particularly the ‘*Single, potential late transition to cohabitation/marriage*’ cluster ($\beta=0.811$, $p<0.01$) and the ‘*Transition to cohabitation, marriage, separation/divorce/widowhood, with 2 children*’ cluster ($\beta=0.515$, $p<0.01$). However, the interaction terms reveal limited evidence of moderation effects across most trajectory types. The one notable exception is for individuals in the ‘*Transition to cohabitation, marriage, separation/divorce/widowhood, with no child*’ cluster who have only monthly contact with friends ($\beta=0.419$, $p<0.05$). For this group, the combination of partnership instability, childlessness, and less frequent friend contact appears to compound loneliness risk, suggesting that friendship ties may be particularly crucial for those without children to buffer against relationship disruptions.

Table 2. ULS-4

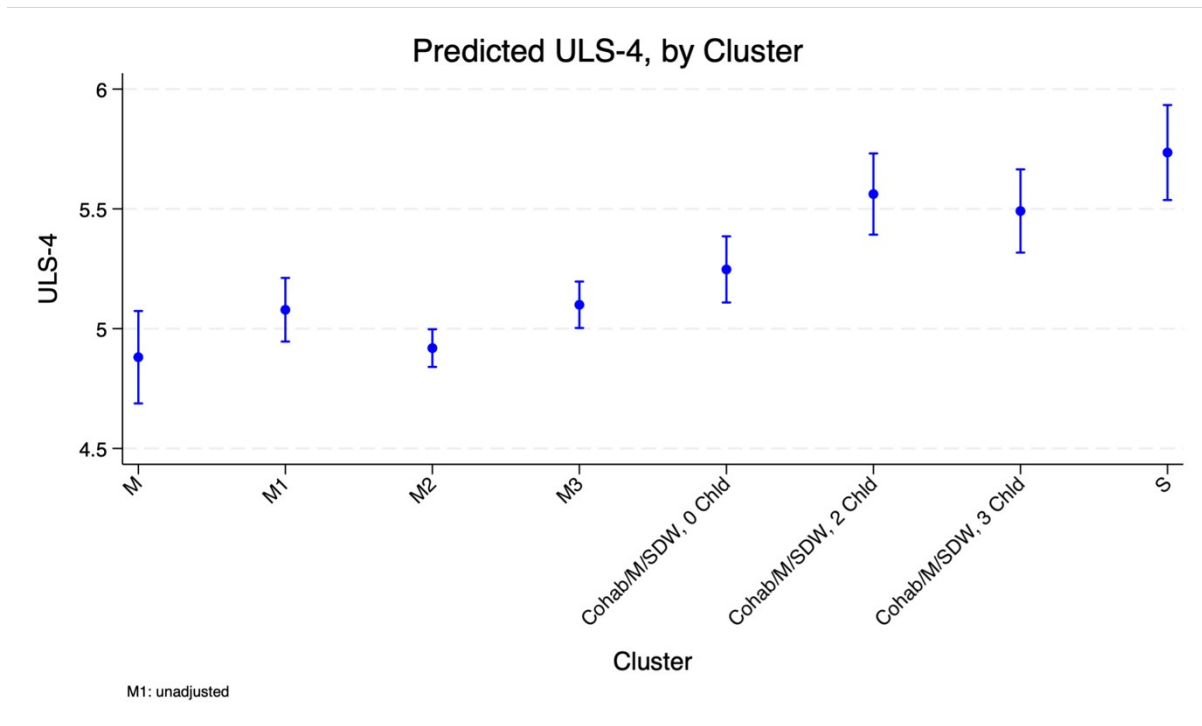
		M1 (no confounders)		M2 (M1 + background confounders)		M3 (M2 + mediators)		M4 (M2 + Cluster*Contact w/ Friends)
8 Clusters (Ref: M2)								
	M	-0.038 (0.106)		-0.046 (0.105)		-0.157 (0.113)		0.005 (0.172)
	M1	0.160 *		0.145 (0.078)		0.061 (0.075)		0.088 (0.134)
	M3	0.181 **		0.135 * (0.063)		0.090 (0.061)		0.111 (0.105)
	Cohab/M/SDW, 0 Chld	0.328 ** (0.081)		0.314 ** (0.080)		-0.098 (0.092)		0.143 (0.128)
	Cohab/M/SDW, 2 Chld	0.643 ** (0.095)		0.546 ** (0.094)		-0.057 (0.098)		0.515 ** (0.159)
	Cohab/M/SDW, 3 Chld	0.572 ** (0.097)		0.464 ** (0.096)		-0.155 (0.100)		0.372 * (0.164)
	S	0.816 ** (0.109)		0.826 ** (0.108)		0.050 (0.123)		0.811 ** (0.175)
Contact w/ Friends (Ref: At least weekly)								
	At least monthly							0.160 (0.090)
	Less often/no friends							0.656 ** (0.103)
Clusters*Contact w/ Friends (Ref: M2*At least weekly)								
	M # At least monthly							0.057 (0.240)
	M # Less often/no friends							-0.282 (0.267)
	M1 # At least monthly							0.142 (0.179)
	M1 # Less often/no friends							-0.008 (0.206)

M3 # At least monthly				0.004 (0.142)
M3 # Less often/no friends				0.157 (0.166)
Cohab/M/SDW, 0 Chld # At least monthly				0.419 * (0.182)
Cohab/M/SDW, 0 Chld # Less often/no friends				0.111 (0.204)
Cohab/M/SDW, 2 Chld # At least monthly				0.076 (0.217)
Cohab/M/SDW, 2 Chld # Less often/no friends				-0.037 (0.244)
Cohab/M/SDW, 3 Chld # At least monthly				0.133 (0.224)
Cohab/M/SDW, 3 Chld # Less often/no friends				0.079 (0.244)
S # At least monthly				0.060 (0.246)
S # Less often/no friends				-0.004 (0.274)
Constant	4.919 ** (0.040)	5.907 ** (0.326)	7.660 ** (0.619)	5.558 ** (0.327)
Number of observations	5909	5909	5909	5909

** p<.01, * p<.05

Figure 2. Predicted ULS-4 Scores

Model 1: no confounders included



Model 2: background confounders included

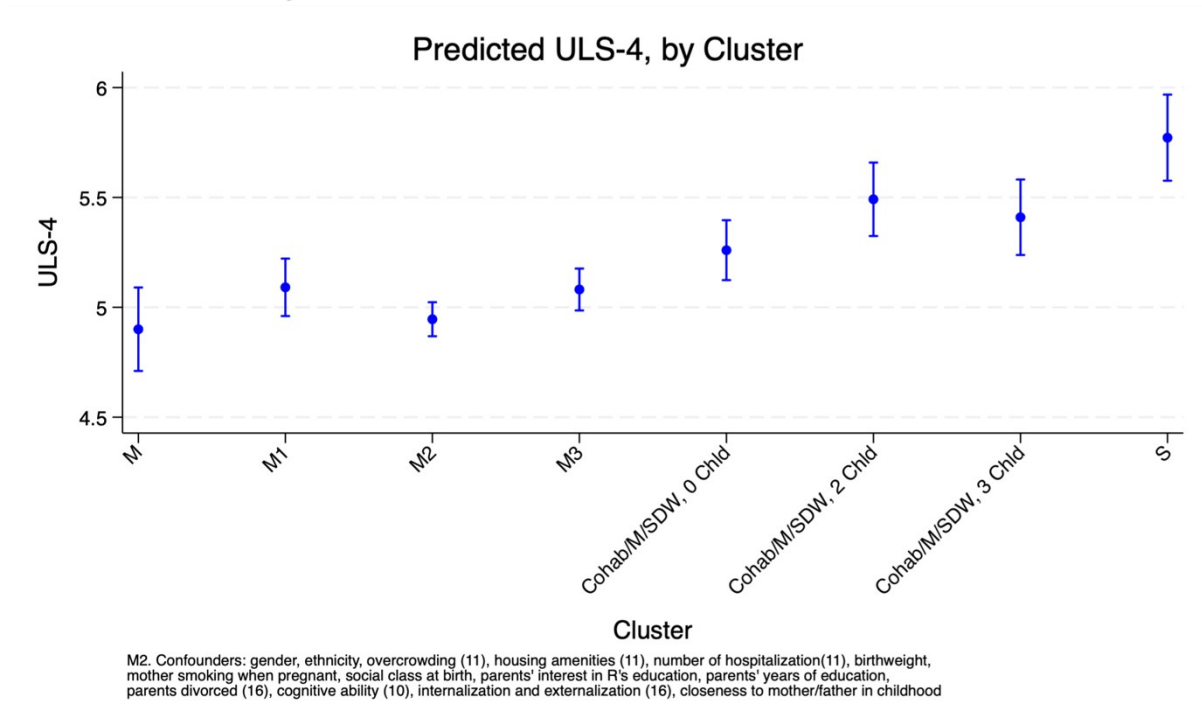
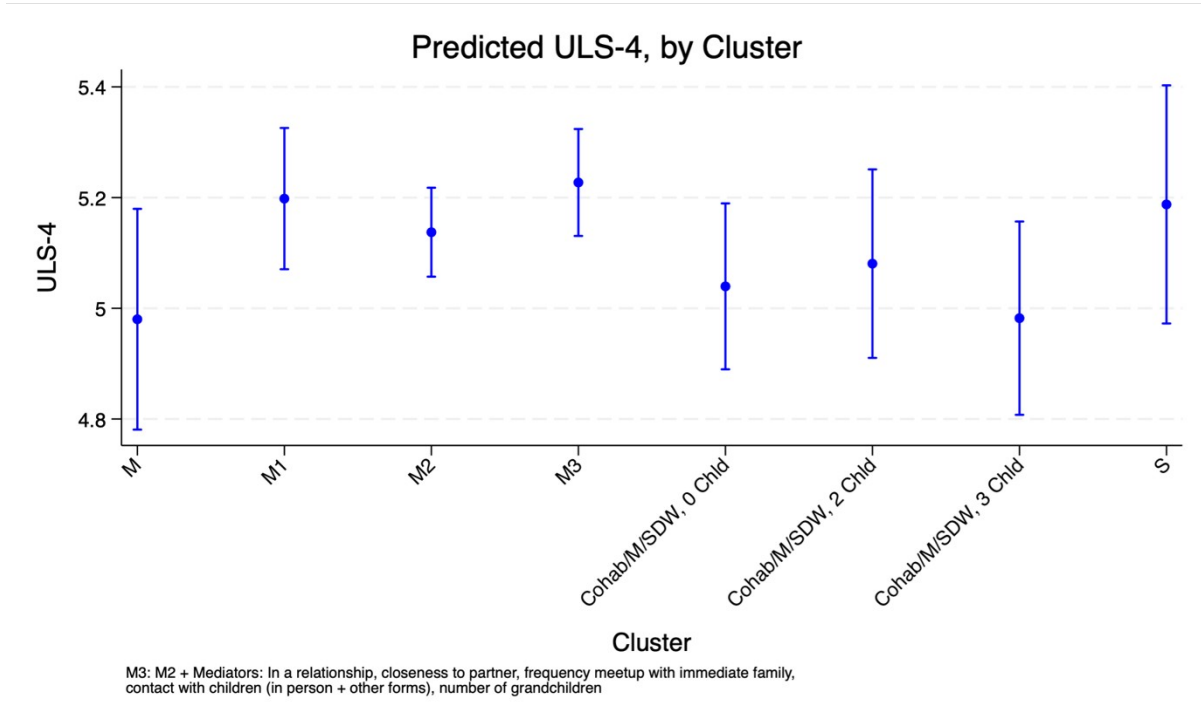
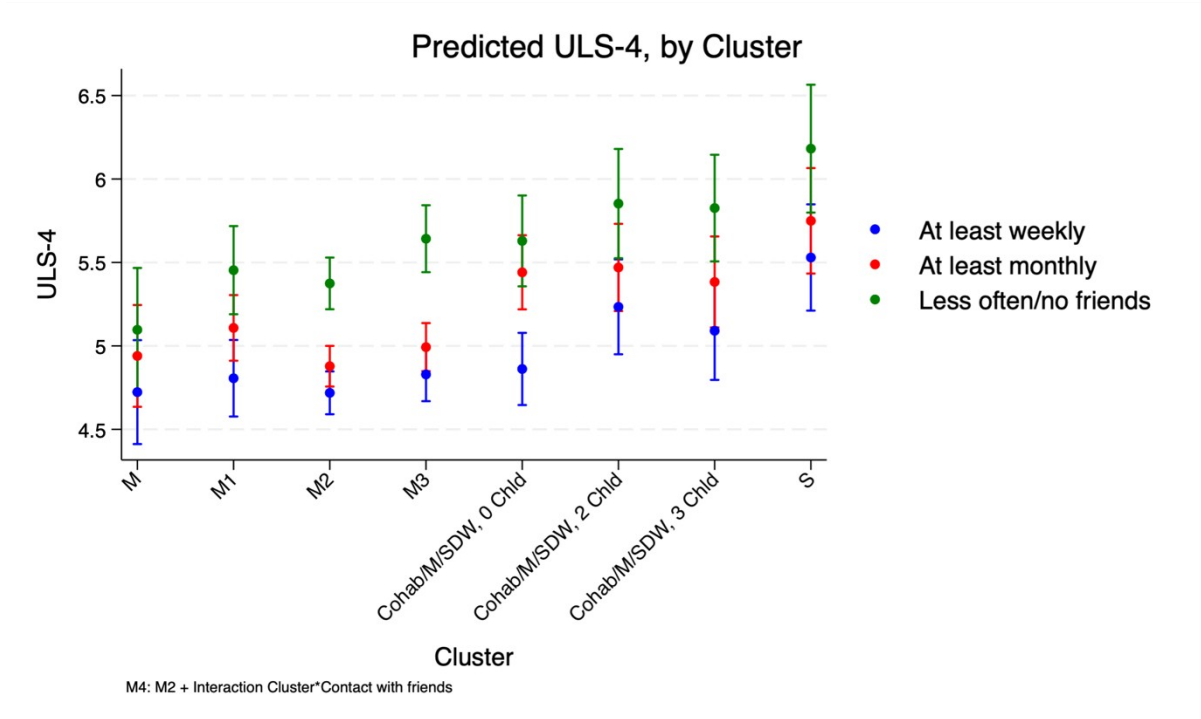


Figure 2. Predicted ULS-4 Scores (continued)

Model 3: Model 2 + Mediators on interpersonal relationships and contact with kins



Model 4: Model 2 + Clusters*Contact w/ friends



Robustness Checks

Table 3 reports the results of the additional analyses performed as robustness checks, replicating Model 2 (i) including a variable indicating the level of education at age 23 (low, medium, high); (ii) excluding those who have been interviewed during the strictest phase of COVID-19 lockdown (i.e. March-June 2020); (iii) including household size at age 61-66, whether the respondent has ever been unemployed between January 1975 and December 2012, or has ever experienced the death of a child throughout the life course; (iv) separately by gender, (v) including the interaction between gender and family typologies. Results seem to be robust to these additions and do not show notable differences compared to models presented in Table 2. There are also no significant differences between men and women (last column of Table 2), even though in the models stratified by gender, we find that the second and the third clusters (*‘Transition to marriage with 1 child’* and *‘Transition to marriage with 2 children’*) report a higher score of loneliness among women and not among men.

Finally, to investigate the role of specific events, we ran additional models including in Model 2 the following variables, first one at a time and then all together in the same specification: ever cohabited, ever married, ever separated/divorced (if ever in a union), ever widowed (if ever in a union), ever had a child, number of cohabitations, number of marriages, age at first cohabitation (if any), age at first marriage (if any), time since last separation/divorce (if ever in a union), time since last widowhood (if ever in a union), number of children, age at first child (if any), age at last child (if any) by age 55. Results are reported in Tables A7-A9 in the Appendix. Generally, the findings do not differ substantially from those from the main analysis in Model 2. When including all of these variables together, two clusters seem to retain a higher level of loneliness: *‘Single, potential late transition to cohabitation/marriage’* and *‘Transition to cohabitation, marriage, separation/divorce/widowhood, with 2 children’*.

Table 3. ULS-4, Robustness Checks

		M2 + Edu Level Age 23	M2 excluding those interviewe d 3- 6/2020	M2 + Ever Unemploye d (1975- 2012), Ever experience d death of a child, Household Size (Age 62)	M2 Men	M2 Women	M2 + Gender* Cluster
8 Clusters (Ref: M2)							
	M	-0.048 (0.105)	-0.046 (0.105)	-0.089 (0.103)	-0.033 (0.141)	-0.051 (0.154)	-0.044 (0.151)
	M1	0.145 (0.077)	0.145 (0.078)	0.112 (0.076)	0.043 (0.101)	0.266 * (0.118)	0.032 (0.109)
	M3	0.129 * (0.063)	0.135 * (0.063)	0.181 * (0.063)	0.058 (0.085)	0.193 * (0.091)	0.055 (0.092)
	Cohab/M/SDW, 0 Chld	0.316 * (0.080)	0.314 * (0.080)	0.164 * (0.080)	0.370 * (0.104)	0.251 * (0.123)	0.367 (0.111)
	Cohab/M/SDW, 2 Chld	0.542 * (0.094)	0.546 * (0.094)	0.409 * (0.093)	0.466 * (0.141)	0.586 * (0.128)	0.461 (0.151)
	Cohab/M/SDW, 3 Chld	0.453 * (0.096)	0.464 * (0.096)	0.343 * (0.095)	0.363 * (0.138)	0.525 * (0.135)	0.353 (0.147)
	S	0.828 * (0.107)	0.826 * (0.108)	0.575 * (0.107)	0.874 * (0.131)	0.735 * (0.179)	0.878 (0.140)
Gender (Ref: Male)							
	Female	0.309 * (0.048)	0.317 * (0.048)	0.290 * (0.047)			0.256 (0.080)
Ethnicity (Ref: Non-white)							
	White	-0.342 * (0.173)	-0.313 (0.173)	-0.486 * (0.171)	-0.215 (0.239)	-0.430 (0.252)	-0.313 (0.173)
Overcrowding (>1.5 ppl/room)							
	Yes	-0.060 (0.088)	-0.050 (0.088)	-0.056 (0.087)	0.020 (0.120)	-0.157 (0.133)	-0.052 (0.088)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)							
	Yes	-0.049 (0.087)	-0.040 (0.087)	-0.046 (0.086)	0.057 (0.120)	-0.111 (0.126)	-0.039 (0.087)

Number of Hospitalizations (Age 11)

	1	0.054 (0.054)	0.055 (0.054)	0.066 (0.053)	-0.034 (0.071)	0.134 (0.082)	0.056 (0.054)
	2	0.154 (0.088)	0.160 (0.088)	0.159 (0.086)	0.095 (0.110)	0.207 (0.138)	0.158 (0.088)
	3	-0.114 (0.151)	-0.105 (0.151)	-0.065 (0.149)	-0.140 (0.182)	-0.046 (0.259)	-0.105 (0.152)
	4	-0.057 (0.265)	-0.055 (0.265)	-0.064 (0.261)	0.159 (0.343)	-0.312 (0.414)	-0.054 (0.265)
	5	-0.233 (0.331)	-0.223 (0.332)	-0.259 (0.327)	-0.425 (0.432)	-0.090 (0.494)	-0.241 (0.332)
Birthweight (Grams)		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.002)	0.003 (0.002)	0.001 (0.001)
Mother smoking during pregnancy (Ref: No)	Yes	0.106 * (0.051)	0.112 * (0.051)	0.116 * (0.050)	0.105 (0.069)	0.118 (0.076)	0.114 (0.051)
Social Class at Birth (Ref: Non-manual)	Manual	-0.020 (0.058)	-0.008 (0.058)	-0.030 (0.057)	-0.007 (0.076)	-0.023 (0.084)	-0.009 (0.058)
Parents' Interest in R's Education (Ref: No)	Yes	-0.167 * (0.068)	-0.184 * (0.068)	-0.170 * (0.066)	-0.091 (0.091)	-0.284 * (0.102)	-0.186 (0.068)
Parents' Education (Yrs)		-0.001 (0.015)	-0.005 (0.015)	-0.006 (0.014)	0.024 (0.020)	-0.030 (0.021)	-0.005 (0.015)
Parents Divorced (by Age 16, Ref: No)	Yes	0.020 (0.112)	0.039 (0.112)	0.040 (0.110)	0.068 (0.154)	0.025 (0.158)	0.039 (0.112)
Closeness to Mother in Childhood (0-10)		-0.065 * (0.010)	-0.065 * (0.010)	-0.063 * (0.010)	-0.037 * (0.015)	-0.082 * (0.013)	-0.065 (0.010)
Closeness to Father in Childhood (0-10)		-0.042 * (0.009)	-0.042 * (0.009)	-0.037 * (0.009)	-0.044 * (0.013)	-0.042 * (0.013)	-0.043 (0.009)
Cognitive Ability Age 10 (z-score)		-0.046 (0.032)	-0.079 * (0.029)	-0.082 * (0.029)	-0.063 (0.038)	-0.093 * (0.044)	-0.077 (0.029)
Internalization Score (Age 16)		0.126 * (0.031)	0.122 * (0.031)	0.120 * (0.031)	0.109 * (0.045)	0.125 * (0.044)	0.124 (0.031)

Externalization Score (Age 16)	-0.025 (0.025)	-0.020 (0.025)	-0.024 (0.024)	-0.034 (0.035)	-0.006 (0.036)	-0.021 (0.025)						
Education Level (Age 23, Ref: Low Education)												
Medium Education	-0.171 (0.069)	*										
High Education	-0.236 (0.087)	*										
Ever Unemployed (1975-2012), Ref: No												
Yes			0.331 (0.046)	*								
Ever Experienced Death of a Child by Age 55 (Ref: No)												
Yes			-0.005 (0.136)									
Household Size (Age 62)				-0.317 (0.027)	*							
Clusters*Gender (Ref: Men, M2)												
M # Women						-0.003 (0.209)						
M1 # Women						0.231 (0.155)						
M3 # Women						0.151 (0.125)						
Cohab/M/SDW, 0 Chld # Women						-0.121 (0.160)						
Cohab/SDW, 2 Chld # Women						0.144 (0.193)						
Cohab/SDW, 3 Chld # Women						0.197 (0.194)						
S # Women						-0.154 (0.219)						
Constant	6.032 (0.330)	*	5.907 (0.326)	*	6.649 (0.329)	*	5.402 (0.437)	*	6.668 (0.475)	*	5.931 (0.328)	**
Number of observations	5909		5909		5909		2830		3079		5909	

** p<.01, * p<.05

Discussion

TBC

- Those with more standard trajectories (*‘Fast transition to marriage with no child’*, *‘Transition to marriage with 1 child’* and *‘Transition to marriage with 2 children’*) are better off.
- The groups that consistently shows higher levels of loneliness are *‘Transition to cohabitation, marriage, separation/divorce/widowhood, with 2 children’*, *‘Transition to cohabitation, marriage, separation/divorce/widowhood, with 3+ children’*, and *‘Single, potential late transition to cohabitation/marriage’*

Next Steps

- Update family histories to age 61-66 when available

References

- Antonucci, T. C., Ajrouch, K. J., & Birditt, K. S. (2014). The convoy model: Explaining social relations from a multidisciplinary perspective. *Gerontologist*, 54(1), 82–92.
- Arpino, B., Gumà, J., & Julià, A. (2023). Non-standard family histories and wellbeing at older ages. *Social Science & Medicine*, 338, 116350.
- Barreto, M., Victor, C., Hammond, C., Eccles, A., Richins, M. T., & Qualter, P. (2021). Loneliness around the world: Age, gender, and cultural differences in loneliness. *Personality and individual differences*, 169, 110066.
- Bengtson, V. L., Giarrusso, R., Silverstein, M., & Wang, H. (2000). Families and intergenerational relationships in aging societies. *Hallym International Journal of Aging*, 2(1), 3-10.
- Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *International journal of epidemiology*, 31(2), 285-293.
- Bernardi, L., Huinink, J., & Settersten Jr, R. A. (2019). The life course cube: A tool for studying lives. *Advances in life course research*, 41, 100258.
- Bures, R. M., Koropecj-Cox, T., & Loree, M. (2009). Childlessness, parenthood, and depressive symptoms among middle-aged and older adults. *Journal of Family Issues*, 30(5), 670-687.
- Byrne, A. (2000). Singular identities managing stigma, resisting voices. *Women's Studies Review*, 7, 13-24.
- Cacioppo, J. T., & Hawkley, L. C. (2009). Perceived social isolation and cognition. *Trends in cognitive sciences*, 13(10), 447-454.
- Cohen-Mansfield, J., Hazan, H., Lerman, Y., & Shalom, V. (2016). Correlates and predictors of loneliness in older-adults: a review of quantitative results informed by qualitative insights. *International psychogeriatrics*, 28(4), 557-576.
- Dahlberg, L., Andersson, L., McKee, K. J., & Lennartsson, C. (2015). Predictors of loneliness among older women and men in Sweden: A national longitudinal study. *Aging & mental health*, 19(5), 409-417.
- Dannefer, D. (2003). Cumulative advantage/disadvantage and the life course: Cross-fertilizing age and social science theory. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 58(6), S327-S337.
- de Jong Gierveld, J., Broese van Groenou, M., Hoogendoorn, A. W., & Smit, J. H. (2009). Quality of marriages in later life and emotional and social loneliness. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 64(4), 497-506.

- De Jong Gierveld, J., Van Tilburg, T. G., & Dykstra, P. (2018). Loneliness and social isolation. In *Cambridge Handbook of Personal Relationships, second edition*. Cambridge University Press.
- De Jong-Gierveld, J., & van Tilburg, T. G. (2006). A 6-item scale for overall, emotional, and social loneliness: Confirmatory tests on survey data. *Research on aging, 28*(5), 582-598.
- De Koning, J. L., Stathi, A., & Richards, S. (2017). Predictors of loneliness and different types of social isolation of rural-living older adults in the United Kingdom. *Ageing & Society, 37*(10), 2012-2043.
- Donovan, N. J., Wu, Q., Rentz, D. M., Sperling, R. A., Marshall, G. A., & Glymour, M. M. (2017). Loneliness, depression and cognitive function in older US adults. *International journal of geriatric psychiatry, 32*(5), 564-573.
- Dunbar, R. I. (2018). The anatomy of friendship. *Trends in cognitive sciences, 22*(1), 32-51.
- Dush, C. M. K., & Amato, P. R. (2005). Consequences of relationship status and quality for subjective well-being. *Journal of Social and Personal relationships, 22*(5), 607-627.
- Dykstra, P. A., & de Jong Gierveld, J. (2004). Gender and marital-history differences in emotional and social loneliness among Dutch older adults. *Canadian Journal on Aging/La revue canadienne du vieillissement, 23*(2), 141-155.
- Dykstra, P. A., Van Tilburg, T. G., & Gierveld, J. D. J. (2005). Changes in older adult loneliness: Results from a seven-year longitudinal study. *Research on aging, 27*(6), 725-747.
- Dykstra, P. A. (2006). Off the beaten track: Childlessness and social integration in late life. *Research on Aging, 28*(6), 749-767.
- Dykstra, P. A., & Hagestad, G. O. (2007). Childlessness and parenthood in two centuries: Different roads—different maps?. *Journal of Family Issues, 28*(11), 1518-1532.
- Dykstra, P. A., & Hagestad, G. O. (2007). Roads less taken: Developing a nuanced view of older adults without children. *Journal of family issues, 28*(10), 1275-1310.
- Dykstra, P. A., & Keizer, R. (2009). The wellbeing of childless men and fathers in mid-life. *Ageing & Society, 29*(8), 1227-1242.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin?. *The Gerontologist, 49*(3), 333-343.
- Gierveld, J. D. J., Van Tilburg, T. G., & Dykstra, P. (2018). Loneliness and social isolation. In *Cambridge Handbook of Personal Relationships, second edition*. Cambridge University Press.
- Grundy, E., & Read, S. (2012). Social contacts and receipt of help among older people in England: are there benefits of having more children?. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 67*(6), 742-754.

- Hansen, T., & Slagsvold, B. (2016). Late-life loneliness in 11 European countries: results from the generations and gender survey. *Social Indicators Research*, 129(1), 445-464.
- Hansen, T., Slagsvold, B., & Moum, T. (2009). Childlessness and psychological well-being in midlife and old age: An examination of parental status effects across a range of outcomes. *Social indicators research*, 94(2), 343-362.
- Härkönen, J. (2014). Birth order effects on educational attainment and educational transitions in West Germany. *European sociological review*, 30(2), 166-179.
- Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of behavioral medicine*, 40(2), 218-227.
- Hawkley, L. C., Buecker, S., Kaiser, T., & Luhmann, M. (2022). Loneliness from young adulthood to old age: Explaining age differences in loneliness. *International journal of behavioral development*, 46(1), 39-49.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, 359(1449), 1435-1446.
- Högnäs, R. S. (2020). Gray divorce and social and emotional loneliness. In *Divorce in Europe: New insights in trends, causes and consequences of relation break-ups* (pp. 147-165). Cham: Springer International Publishing.
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives on psychological science*, 10(2), 227-237.
- Houseknecht, S. K. (1987). Voluntary childlessness. In *Handbook of marriage and the family* (pp. 369-395). Boston, MA: Springer US.
- Hutchison, E. D. (2010). A life course perspective. *Dimensions of human behavior: The changing life course*, 4, 1-38.
- Jalovaara, M., Neyer, G., Andersson, G., Dahlberg, J., Dommermuth, L., Fallesen, P., & Lappegård, T. (2019). Education, gender, and cohort fertility in the Nordic countries. *European Journal of Population*, 35(3), 563-586.
- Kendig, H., Dykstra, P. A., van Gaalen, R. I., & Melkas, T. (2007). Health of aging parents and childless individuals. *Journal of Family Issues*, 28(11), 1457-1486.
- Koropecjy-Cox, T. (1998). Loneliness and depression in middle and old age: Are the childless more vulnerable?. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 53(6), S303-S312.
- Koropecjy-Cox, T., & Call, V. R. (2007). Characteristics of older childless persons and parents: Cross-national comparisons. *Journal of Family Issues*, 28(10), 1362-1414.
- Koropecjy-Cox, T., Pienta, A. M., & Brown, T. H. (2007). Women of the 1950s and the “normative” life course: The implications of childlessness, fertility timing, and marital status for

psychological well-being in late midlife. *The International Journal of Aging and Human Development*, 64(4), 299-330.

Kreyenfeld, M., & Konietzka, D. (2017). *Childlessness in Europe: Contexts, causes, and consequences* (p. 367). Springer Nature.

Lesthaeghe, R. (2014). The second demographic transition: A concise overview of its development. *Proceedings of the National Academy of Sciences*, 111(51), 18112-18115.

Liefbroer, A. C., & Billari, F. C. (2010). Bringing norms back in: A theoretical and empirical discussion of their importance for understanding demographic behaviour. *Population, space and place*, 16(4), 287-305.

Lynch, I., Morison, T., Macleod, C. I., Mijas, M., du Toit, R., & Seemanthini, S. (2018). From deviant choice to feminist issue: An historical analysis of scholarship on voluntary childlessness (1920–2013). In *Voluntary and involuntary childlessness: The joys of otherhood?* (pp. 11-47). Emerald Publishing Limited.

Liu, B. S., & Rook, K. S. (2013). Emotional and social loneliness in later life: Associations with positive versus negative social exchanges. *Journal of Social and Personal Relationships*, 30(6), 813-832.

Mair, C. A. (2019). Alternatives to aging alone? “Kinlessness” and the importance of friends across European contexts. *The Journals of Gerontology: Series B*, 74(8), 1416-1428.

Mäki, M., Hägglund, A. E., Rotkirch, A., Kulathinal, S., & Myrskylä, M. (2025). Stable marital histories predict happiness and health across educational groups. *European Journal of Population*, 41(1), 12.

Marini, M. M. (1984). Women's educational attainment and the timing of entry into parenthood. *American sociological review*, 491-511.

Mirowsky, J., & Ross, C. E. (2002). Depression, parenthood, and age at first birth. *Social science & medicine*, 54(8), 1281-1298.

Nicolaisen, M., & Thorsen, K. (2017). What are friends for? Friendships and loneliness over the lifespan—From 18 to 79 years. *The International Journal of Aging and Human Development*, 84(2), 126-158.

Ormel, J., Lindenberg, S., Steverink, N., & Verbrugge, L. M. (1999). Subjective well-being and social production functions. *Social indicators research*, 46(1), 61-90.

Pampel, F. C., & Rogers, R. G. (2004). Socioeconomic status, smoking, and health: a test of competing theories of cumulative advantage. *Journal of health and social behavior*, 45(3), 306-321.

Penning, M. J., Wu, Z., & Hou, F. (2024). Childlessness and social and emotional loneliness in middle and later life. *Ageing & Society*, 44(7), 1551-1578.

Perissinotto, C. M., Cenzer, I. S., & Covinsky, K. E. (2012). Loneliness in older persons: a predictor of functional decline and death. *Archives of internal medicine*, 172(14), 1078-1084.

- Perlman, D., & Peplau, L. A. (1981). Toward a social psychology of loneliness. *Personal relationships*, 3, 31-56.
- Peters, A., & Liefbroer, A. C. (1997). Beyond marital status: Partner history and well-being in old age. *Journal of Marriage and the Family*, 687-699.
- Pinquart, M., & Sorensen, S. (2001). Influences on loneliness in older adults: A meta-analysis. *Basic and applied social psychology*, 23(4), 245-266.
- Roberts, S. G., Dunbar, R. I., Pollet, T. V., & Kuppens, T. (2009). Exploring variation in active network size: Constraints and ego characteristics. *Social Networks*, 31(2), 138-146.
- Sakkeus, L., Schwanitz, K., Abuladze, L., & Rudissaar, U. (2023). Life-course Factors and Later Life Health in Eastern and Western Europe. *Comparative Population Studies-Zeitschrift für Bevölkerungswissenschaft*, 48, 231-260.
- Schoenmakers, E. C., van Tilburg, T. G., & Fokkema, T. (2012). Coping with loneliness: what do older adults suggest?. *Aging & Mental Health*, 16(3), 353-360.
- Stephens, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, 110(15), 5797-5801.
- Sundström, G., Fransson, E., Malmberg, B., & Davey, A. (2009). Loneliness among older Europeans. *European journal of ageing*, 6(4), 267-275.
- Surkalim, D. L., Luo, M., Eres, R., Gebel, K., van Buskirk, J., Bauman, A., & Ding, D. (2022). The prevalence of loneliness across 113 countries: systematic review and meta-analysis. *bmj*, 376.
- Tambellini, E., Danielsbacka, M., & Rotkirch, A. (2025). Both partnership history and current relationship quality are associated with life satisfaction in old age. *Research on Aging*, 47(3-4), 193-209.
- Thornton, A., & Young-DeMarco, L. (2001). Four decades of trends in attitudes toward family issues in the United States: The 1960s through the 1990s. *Journal of marriage and family*, 63(4), 1009-1037.
- Tosi, M., & Grundy, E. (2018). Returns home by children and changes in parents' well-being in Europe. *Social Science & Medicine*, 200, 99-106.
- van den Broek, T. (2017). Gender differences in the correlates of loneliness among Japanese persons aged 50–70. *Australasian Journal on Ageing*, 36(3), 234-237.
- van Tilburg, T. G., Aartsen, M. J., & van der Pas, S. (2015). Loneliness after divorce: A cohort comparison among Dutch young-old adults. *European Sociological Review*, 31(3), 243-252.

- Van Tilburg, T., Havens, B., & de Jong Gierveld, J. (2004). Loneliness among older adults in the Netherlands, Italy, and Canada: A multifaceted comparison. *Canadian Journal on Aging/La Revue canadienne du vieillissement*, 23(2), 169-180.
- Vikström, J., Bladh, M., Hammar, M., Marcusson, J., Wressle, E., & Sydsjö, G. (2011). The influences of childlessness on the psychological well-being and social network of the oldest old. *BMC geriatrics*, 11(1), 78.
- Vozikaki, M., Papadaki, A., Linardakis, M., & Philalithis, A. (2018). Loneliness among older European adults: Results from the survey of health, aging and retirement in Europe. *Journal of Public Health*, 26(6), 613-624.
- Weiss, R. (1975). *Loneliness: The experience of emotional and social isolation*. MIT press.
- Wolff, J. L., & Kasper, J. D. (2006). Caregivers of frail elders: Updating a national profile. *The Gerontologist*, 46(3), 344-356.
- Wolters, N. E., Mobach, L., Wuthrich, V. M., Vonk, P., Van der Heijde, C. M., Wiers, R. W., ... & Klein, A. M. (2023). Emotional and social loneliness and their unique links with social isolation, depression and anxiety. *Journal of Affective Disorders*, 329, 207-217.
- World Health Organization. (2021). *Advocacy brief: Social isolation and loneliness among older people*.
- Wrosch, C., & Freund, A. M. (2001). Self-regulation of normative and non-normative developmental challenges1. *Human Development*, 44(5), 264-283.
- Zhang, Z., & Hayward, M. D. (2001). Childlessness and the psychological well-being of older persons. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 56(5), S311-S320.
- Zoutewelle-Terovan, M., & Liefbroer, A. C. (2018). Swimming against the stream: Non-normative family transitions and loneliness in later life across 12 nations. *The Gerontologist*, 58(6), 1096-1108.
- Zoutewelle-Terovan, M., & Liefbroer, A. C. (2018). Timing of family formation and loneliness among older adults. *Demos: bulletin over bevolking en samenleving*, 34(5), 5-6.

Appendix

Figure A1. Average Silhouette Width

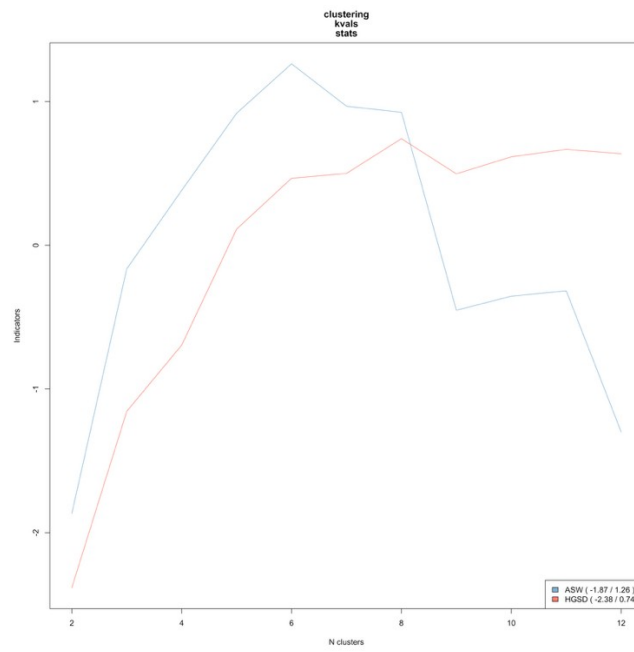


Figure A2. Dendrogram

Figure A3. Index Plots

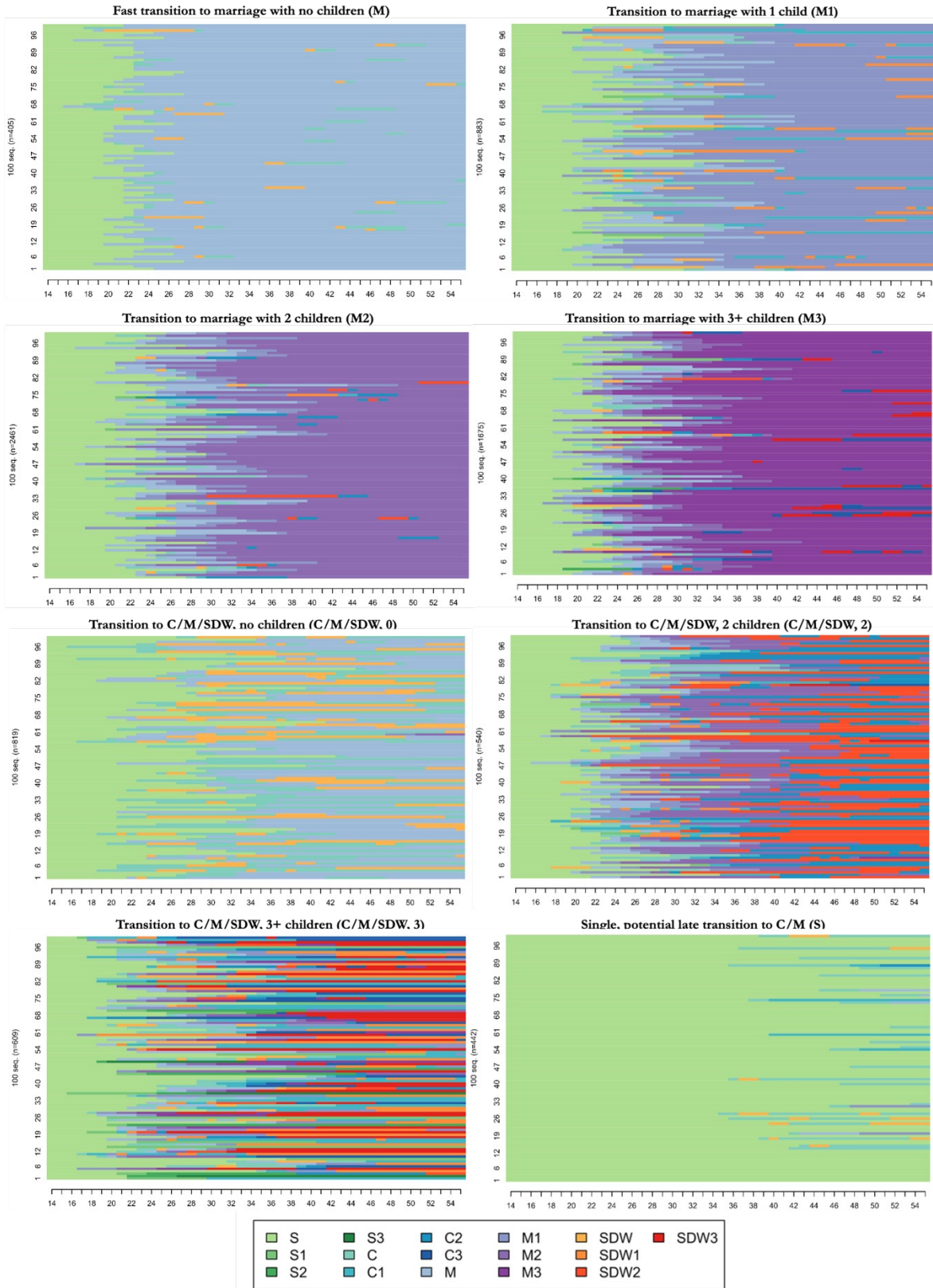


Table A1. Descriptive Statistics of the Variables used in the Analysis, by Cluster

	Clusters								#
	M	M1	M2	M3	Cohab/M / SDW, 0 Chld	Cohab/M/ SDW, 2 Chld	Cohab/M/ SDW, 3 Chld	S	
% Female	51.7	47.8	52.6	53.9	46.9	63.0	58.5	39.1	
% Ethnicity: White	98.1	98.5	98.7	97.5	99.2	97.1	97.8	96.9	
% Experienced									
Overcrowding (Age 11)	9.4	8.5	8.6	10.3	5.6	7.7	12.3	9.7	
% w/ Housing Amenities (Age 11)	8.5	8.4	8.6	9.0	5.9	10.0	10.2	9.8	
Number of Hospitalization (mean), by Age 11	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	
Birthweight (mean), in ounces	119.6	117.2	118.5	118.3	118.5	119.0	116.8	117.2	
% w/ Mother smoking during pregnancy	26.2	31.5	29.9	31.0	26.0	32.2	35.4	29.8	
% Social class at birth: Manual (father)	66.3	64.3	60.8	62.9	59.4	62.3	64.9	58.6	
% w/ Parents interested in their education (Age 11)	86.5	79.6	84.2	81.9	85.6	83.3	76.3	85.4	
Parental education (mean), years	11.3	11.5	11.5	11.5	11.8	11.5	11.5	11.9	5,909
% w/ Divorced parents, by Age 16	4.9	4.9	4.1	5.5	5.9	5.3	8.7	4.4	
Closeness to mother during childhood (mean)	7.9	7.8	7.8	7.6	7.7	7.5	7.4	7.9	
Closeness to father during childhood (mean)	7.2	6.9	7.1	7.0	6.7	6.7	6.8	6.9	
Cognitive ability (standardized)	0.24	0.25	0.35	0.22	0.40	0.32	0.15	0.29	
Internalizing score (mean)	0.01	-0.12	-0.14	-0.06	0.03	-0.03	0.02	0.08	
Externalizing score (mean)	-0.18	-0.24	-0.28	-0.10	-0.17	-0.06	0.10	-0.21	
Household size (mean, Age 62)	2.1	2.2	2.2	2.4	1.9	1.8	1.9	1.6	
% Ever unemployed (1975-2012)	29.0	39.7	33.4	32.1	44.5	39.0	43.6	49.2	
Education Level (%)									
Low	20.2	19.9	18.2	24.3	16.2	20.1	30.4	16.6	
Medium	59.5	57.6	56.6	53.8	55.9	60.3	47.9	58.3	
High	20.3	22.6	25.2	21.9	27.9	19.6	21.6	25.1	
% Ever experienced death of a child (if ever had a child), by Age 62									4,700
Contact/Meet up with friends (%)									
Weekly	36.4	32.2	35.8	34.7	38.6	34.1	33.2	36.8	
Yearly	37.9	43.6	39.7	43.0	36.8	40.4	38.5	37.7	
Less often/No friends	25.7	24.2	24.5	22.3	24.6	25.5	28.3	25.5	5,909
% in a Relationship, Age 62	90.9	85.6	91.3	83.9	61.6	31.2	31.6	26.5	
Closeness to Partner, Age 62 (% very close/close, if in a relationship)	96.5	94.4	94.3	95.1	96.7	94.7	94.8	97.4	4,397
% Meet Up with Children Weekly, Age 62	0.0	52.6	64.5	69.6	0.7	55.8	53.0	1.0	5,909
% Contact with Children Weekly, Age 62	0.0	66.7	74.1	76.6	1.2	64.8	65.6	1.5	
Number of Grandchildren (mean), Age 62	0.16	0.14	0.19	0.35	0.09	0.29	0.33	0.09	
Frequency Meeting w/ Family, Age 62 (%)									

Weekly	23.6	20.6	17.8	18.6	18.9	22.5	23.2	26.5
Yearly	65.4	68.1	71.1	69.8	68.5	67.9	63.7	61.9
Less often/Never	11.0	11.2	11.1	11.6	12.6	9.6	13.1	11.6
% Observations (N = 5,909)	5.4	11.4	32.5	21.4	10.5	7.0	6.7	5.1

Table A2. ULS-4

		M1 (no confounders)		M2 (M1 + background confounders)		M3 (M2 + 1st set of mediators)		M4 (M2 + Cluster*Contact w/ Friends)	
8 Clusters (Ref: M2)									
	M	-0.038 (0.106)		-0.046 (0.105)		-0.157 (0.113)		0.005 (0.172)	
	M1	0.160 * (0.079)		0.145 (0.078)		0.061 (0.075)		0.088 (0.134)	
	M3	0.181 ** (0.064)		0.135 * (0.063)		0.090 (0.061)		0.111 (0.105)	
	Cohab/M/SDW, 0 Chld	0.328 ** (0.081)		0.314 ** (0.080)		-0.098 (0.092)		0.143 (0.128)	
	Cohab/M/SDW, 2 Chld	0.643 ** (0.095)		0.546 ** (0.094)		-0.057 (0.098)		0.515 ** (0.159)	
	Cohab/M/SDW, 3 Chld	0.572 ** (0.097)		0.464 ** (0.096)		-0.155 (0.100)		0.372 * (0.164)	
	S	0.816 ** (0.109)		0.826 ** (0.108)		0.050 (0.123)		0.811 ** (0.175)	
Gender (Ref: Male)									
	Female			0.317 ** (0.048)		0.222 * (0.103)		0.372 ** (0.048)	
Ethnicity (Ref: Non-white)									
	White			-0.313 (0.173)		-0.213 (0.168)		-0.337 * (0.171)	
Overcrowding (>1.5 ppl/room)									
	Yes			-0.050 (0.088)		-0.032 (0.085)		-0.052 (0.087)	
Housing Amenities (bathroom, indoor wc, kitchen, hot water)									
	Yes			-0.040 (0.087)		-0.038 (0.085)		-0.036 (0.087)	
Number of Hospitalizations (Age 11)									
	1			0.055 (0.054)		0.066 (0.052)		0.051 (0.053)	
	2			0.160 (0.088)		0.142 (0.084)		0.162 (0.087)	
	3			-0.105 (0.151)		-0.051 (0.148)		-0.120 (0.150)	
	4			-0.055 (0.265)		-0.066 (0.258)		-0.036 (0.262)	
	5			-0.223 (0.332)		-0.239 (0.323)		-0.220 (0.328)	
Birthweight (Grams)									
				0.001 (0.001)		0.002 (0.001)		0.001 (0.001)	
Mother smoking during pregnancy (Ref: No)									
	Yes			0.112 * (0.051)		0.113 * (0.050)		0.118 * (0.051)	
Social Class at Birth (Ref: Non-manual)									
	Manual			-0.008 (0.058)		-0.007 (0.056)		-0.032 (0.057)	
Parents' Interest in R's Education (Ref: No)									

	Yes	-0.184 **	-0.163 *	-0.158 *
		(0.068)	(0.065)	(0.067)
Parents' Education (Yrs)		-0.005	-0.011	-0.002
		(0.015)	(0.014)	(0.014)
Parents Divorced (by Age 16, Ref: No)	Yes	0.039	0.019	0.049
		(0.112)	(0.110)	(0.111)
Closeness to Mother in Childhood (0-10)		-0.065 **	-0.059 **	-0.060 **
		(0.010)	(0.010)	(0.010)
Closeness to Father in Childhood (0-10)		-0.042 **	-0.034 **	-0.037 **
		(0.009)	(0.009)	(0.009)
Cognitive Ability Age 10 (z-score)		-0.079 **	-0.078 **	-0.069 *
		(0.029)	(0.029)	(0.029)
Internalization Score (Age 16)		0.122 **	0.120 **	0.100 **
		(0.031)	(0.030)	(0.031)
Externalization Score (Age 16)		-0.020	-0.021	-0.010
		(0.025)	(0.024)	(0.025)
In a Relationship (Age 62, Ref: No)	Yes		-0.866 **	
			(0.223)	
Closeness to Partner (Age 62, Ref: Not very close/Not at all)	Very close/Close		-1.025 *	
			(0.385)	
Meet up w/ Immediate Family (Age 62, Ref: At least weekly)	At least yearly		-0.033	
			(0.062)	
	Less than once per year/never		0.078	
			(0.089)	
Number of Grandchildren (Age 62, Ref: 0)	1		-0.112	
			(0.101)	
	2		-0.050	
			(0.134)	
	3		-0.497 *	
			(0.203)	
	4		-0.162	
			(0.164)	
Meet up w/ Children (Age 62, Ref: Less than weekly)	At least weekly		-0.155 **	
			(0.057)	
Contact w/ Children (Age 62, Ref: Less than weekly)	At least weekly		-0.022	
			(0.062)	
Contact w/ Friends (Ref: At least weekly)	At least monthly			0.160
				(0.090)
	Less often/no friends			0.656 **

Clusters*Contact w/ Friends (Ref: M2*At least weekly)					(0.103)
M # At least monthly					0.057 (0.240)
M # Less often/no friends					-0.282 (0.267)
M1 # At least monthly					0.142 (0.179)
M1 # Less often/no friends					-0.008 (0.206)
M3 # At least monthly					0.004 (0.142)
M3 # Less often/no friends					0.157 (0.166)
Cohab/M/SDW, 0 Chld # At least monthly					0.419 *
Cohab/M/SDW, 0 Chld # Less often/no friends					(0.182) 0.111 (0.204)
Cohab/M/SDW, 2 Chld # At least monthly					0.076 (0.217)
Cohab/M/SDW, 2 Chld # Less often/no friends					-0.037 (0.244)
Cohab/M/SDW, 3 Chld # At least monthly					0.133 (0.224)
Cohab/M/SDW, 3 Chld # Less often/no friends					0.079 (0.244)
S # At least monthly					0.060 (0.246)
S # Less often/no friends					-0.004 (0.274)
Constant	4.919 ** (0.040)	5.907 ** (0.326)	7.660 ** (0.619)	5.558 ** (0.327)	
Number of observations	5909	5909	5909	5909	

** p<.01, * p<.05

Table A3. Lack of Companionship

		M1 (no confounders)	M2 (M1 + background confounders)	M3 (M2 + 1st set of mediators)	M4 (M2 + Cluster*Contact w/ Friends)
8 Clusters (Ref: M2)					
	M	1.017 (0.139)	1.012 (0.140)	0.947 (0.149)	0.969 (0.247)
	M1	1.215 * (0.119)	1.218 * (0.121)	1.113 (0.115)	1.173 (0.220)
	M3	1.253 ** (0.100)	1.214 * (0.099)	1.116 (0.095)	1.177 (0.174)
	Cohab/M/SDW, 0 Chld	1.549 ** (0.150)	1.551 ** (0.153)	0.963 (0.120)	1.371 (0.241)
	Cohab/M/SDW, 2 Chld	2.173 ** (0.234)	2.037 ** (0.223)	0.974 (0.120)	2.213 ** (0.431)
	Cohab/M/SDW, 3 Chld	2.126 ** (0.225)	1.952 ** (0.212)	0.925 (0.113)	1.626 * (0.328)
	S	2.569 ** (0.303)	2.680 ** (0.324)	1.125 (0.170)	2.668 ** (0.560)
Gender (Ref: Male)	Female		1.445 ** (0.086)	1.289 (0.205)	1.510 ** (0.091)
Ethnicity (Ref: Non-white)	White		0.767 (0.145)	0.826 (0.165)	0.760 (0.144)
Overcrowding (>1.5 ppl/room)	Yes		0.996 (0.106)	1.004 (0.113)	0.991 (0.106)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)	Yes		0.945 (0.103)	0.927 (0.105)	0.955 (0.104)
Number of Hospitalizations (Age 11)	1		1.093 (0.073)	1.111 (0.077)	1.090 (0.073)
	2		1.285 * (0.134)	1.271 * (0.137)	1.293 * (0.136)
	3		0.780 (0.162)	0.840 (0.180)	0.768 (0.161)
	4		1.207 (0.384)	1.196 (0.399)	1.228 (0.395)
	5		0.596 (0.273)	0.594 (0.284)	0.592 (0.273)
Birthweight (Grams)			1.001 (0.002)	1.002 (0.002)	1.001 (0.002)
Mother smoking during pregnancy (Ref: No)	Yes		1.039 (0.066)	1.044 (0.069)	1.041 (0.066)
Social Class at Birth (Ref: Non-manual)	Manual		1.011 (0.075)	1.003 (0.077)	0.990 (0.074)
Parents' Interest in R's Education (Ref: No)	Yes		0.898 (0.073)	0.916 (0.078)	0.915 (0.075)
Parents' Education (Yrs)			1.003 (0.018)	0.996 (0.019)	1.005 (0.018)

Parents Divorced (by Age 16, Ref: No)	Yes	1.114 (0.139)	1.080 (0.144)	1.127 (0.141)	
Closeness to Mother in Childhood (0-10)		0.948 ** (0.012)	0.950 ** (0.012)	0.951 ** (0.012)	
Closeness to Father in Childhood (0-10)		0.964 ** (0.011)	0.971 * (0.012)	0.968 ** (0.011)	
Cognitive Ability Age 10 (z-score)		0.954 (0.034)	0.967 (0.036)	0.962 (0.035)	
Internalization Score (Age 16)		1.118 ** (0.042)	1.127 ** (0.045)	1.099 * (0.042)	
Externalization Score (Age 16)		0.965 (0.030)	0.955 (0.030)	0.971 (0.031)	
In a Relationship (Age 62, Ref: No)	Yes		0.341 ** (0.085)		
Closeness to Partner (Age 62, Ref: Not very close/Not at all)	Very close/Close		0.321 * (0.152)		
Meet up w/ Immediate Family (Age 62, Ref: At least weekly)	At least yearly		0.887 (0.074)		
	Less than once per year/never		1.013 (0.118)		
Number of Grandchildren (Age 62, Ref: 0)	1		0.892 (0.126)		
	2		1.027 (0.187)		
	3		0.727 (0.218)		
	4		0.848 (0.190)		
Meet up w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.909 (0.073)		
Contact w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.973 (0.086)		
Contact w/ Friends (Ref: At least weekly)	At least monthly			1.146 (0.150)	
	Less often/no friends			1.726 ** (0.240)	
Clusters*Contact w/ Friends (Ref: M2*At least weekly)	M # At least monthly			1.239 (0.422)	
	M # Less often/no friends			0.856 (0.320)	
	M1 # At least monthly			1.066 (0.269)	

M1 # Less often/no friends				1.051	
				(0.284)	
M3 # At least monthly				1.054	
				(0.210)	
M3 # Less often/no friends				1.049	
				(0.226)	
Cohab/M/SDW, 0 Chld # At least monthly				1.423	
				(0.344)	
Cohab/M/SDW, 0 Chld # Less often/no friends				0.997	
				(0.261)	
Cohab/M/SDW, 2 Chld # At least monthly				0.964	
				(0.256)	
Cohab/M/SDW, 2 Chld # Less often/no friends				0.777	
				(0.229)	
Cohab/M/SDW, 3 Chld # At least monthly				1.378	
				(0.378)	
Cohab/M/SDW, 3 Chld # Less often/no friends				1.174	
				(0.335)	
S # At least monthly				1.052	
				(0.306)	
S # Less often/no friends				0.994	
				(0.318)	
Constant	0.268	**	0.481	3.740	0.355
	(0.014)		(0.188)	(2.784)	(0.143)
Number of observations	6876		6876	6876	6876

OR; ** p<.01, * p<.05

Table A4. Feels Left Out

		M1 (no confounders)	M2 (M1 + background confounders)	M3 (M2 + 1st set of mediators)	M4 (M2 + Cluster*Contact w/ Friends)
8 Clusters (Ref: M2)					
	M	0.872 (0.129)	0.864 (0.129)	0.775 (0.128)	0.870 (0.252)
	M1	1.225 * (0.124)	1.219 (0.125)	1.144 (0.120)	1.170 (0.235)
	M3	1.257 ** (0.104)	1.213 * (0.102)	1.153 (0.099)	1.239 (0.195)
	Cohab/M/SDW, 0 Chld	1.409 ** (0.143)	1.401 ** (0.145)	0.991 (0.124)	1.162 (0.227)
	Cohab/M/SDW, 2 Chld	1.620 ** (0.186)	1.512 ** (0.177)	0.954 (0.122)	1.575 * (0.343)
	Cohab/M/SDW, 3 Chld	1.632 ** (0.184)	1.484 ** (0.171)	0.930 (0.118)	1.194 (0.274)
	S	1.805 ** (0.227)	1.847 ** (0.237)	1.025 (0.158)	1.857 ** (0.437)
Gender (Ref: Male)	Female		1.329 ** (0.083)	1.244 (0.153)	1.410 ** (0.090)
Ethnicity (Ref: Non-white)	White		0.872 (0.176)	0.940 (0.194)	0.863 (0.175)
Overcrowding (>1.5 ppl/room)	Yes		0.851 (0.096)	0.861 (0.099)	0.849 (0.097)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)	Yes		0.990 (0.109)	0.983 (0.110)	1.005 (0.112)
Number of Hospitalizations (Age 11)	1		1.110 (0.077)	1.118 (0.079)	1.108 (0.077)
	2		1.300 * (0.140)	1.284 * (0.141)	1.307 * (0.142)
	3		1.074 (0.211)	1.128 (0.223)	1.060 (0.209)
	4		0.911 (0.322)	0.906 (0.325)	0.934 (0.334)
	5		0.899 (0.393)	0.920 (0.409)	0.898 (0.394)
Birthweight (Grams)			1.000 (0.002)	1.000 (0.002)	0.999 (0.002)
Mother smoking during pregnancy (Ref: No)	Yes		1.016 (0.067)	1.018 (0.069)	1.016 (0.068)
Social Class at Birth (Ref: Non-manual)	Manual		0.942 (0.073)	0.943 (0.075)	0.913 (0.072)
Parents' Interest in R's Education (Ref: No)	Yes		0.855	0.856	0.877

		(0.073)	(0.073)	(0.075)
Parents' Education (Yrs)		0.978	0.971	0.981
		(0.019)	(0.020)	(0.019)
Parents Divorced (by Age 16, Ref: No)	Yes	0.962	0.949	0.977
		(0.129)	(0.131)	(0.132)
Closeness to Mother in Childhood (0-10)		0.938 **	0.941 **	0.941 **
		(0.012)	(0.012)	(0.012)
Closeness to Father in Childhood (0-10)		0.963 **	0.971 *	0.968 **
		(0.011)	(0.012)	(0.012)
Cognitive Ability Age 10 (z-score)		0.931	0.932	0.942
		(0.035)	(0.036)	(0.036)
Internalization Score (Age 16)		1.113 **	1.113 **	1.088 *
		(0.045)	(0.046)	(0.045)
Externalization Score (Age 16)		0.986	0.982	0.996
		(0.031)	(0.032)	(0.032)
In a Relationship (Age 62, Ref: No)	Yes		0.537 **	
			(0.109)	
Closeness to Partner (Age 62, Ref: Not very close/Not at all)	Very close/Close		0.425 *	
			(0.146)	
Meet up w/ Immediate Family (Age 62, Ref: At least weekly)	At least yearly		1.029	
			(0.088)	
	Less than once per year/never		1.169	
			(0.139)	
Number of Grandchildren (Age 62, Ref: 0)	1		0.952	
			(0.137)	
	2		1.140	
			(0.210)	
	3		0.916	
			(0.270)	
	4		0.933	
			(0.206)	
Meet up w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.849 *	
			(0.070)	
Contact w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.978	
			(0.085)	
Contact w/ Friends (Ref: At least weekly)	At least monthly			1.321 *
				(0.183)
	Less often/no friends			1.992 **
				(0.291)
Clusters*Contact w/ Friends (Ref: M2*At least weekly)				

	M # At least monthly			1.248 (0.471)
	M # Less often/no friends			0.700 (0.296)
	M1 # At least monthly			1.064 (0.281)
	M1 # Less often/no friends			1.064 (0.299)
	M3 # At least monthly			0.915 (0.190)
	M3 # Less often/no friends			1.069 (0.241)
	Cohab/M/SDW, 0 Chld # At least monthly			1.517 (0.393)
	Cohab/M/SDW, 0 Chld # Less often/no friends			1.135 (0.314)
	Cohab/M/SDW, 2 Chld # At least monthly			1.058 (0.308)
	Cohab/M/SDW, 2 Chld # Less often/no friends			0.786 (0.250)
	Cohab/M/SDW, 3 Chld # At least monthly			1.249 (0.378)
	Cohab/M/SDW, 3 Chld # Less often/no friends			1.407 (0.435)
	S # At least monthly			1.063 (0.339)
	S # Less often/no friends			0.947 (0.323)
Constant	0.237 **	0.780	2.955	0.515
	(0.013)	(0.330)	(1.876)	(0.222)
Number of observations	6874	6874	6874	6874

OR; ** p<.01, * p<.05

Table A5. Feels Isolated

		M1 (no confounders)	M2 (M1 + background confounders)	M3 (M2 + 1st set of mediators)	M4 (M2 + Cluster*Contact w/ Friends)
8 Clusters (Ref: M2)					
	M	1.032 (0.153)	1.027 (0.154)	0.860 (0.142)	0.959 (0.304)
	M1	1.310 ** (0.137)	1.296 * (0.137)	1.190 (0.129)	1.462 (0.315)
	M3	1.387 ** (0.118)	1.338 ** (0.116)	1.260 ** (0.112)	1.500 * (0.254)
	Cohab/M/SDW, 0 Chld	1.494 ** (0.157)	1.467 ** (0.157)	0.916 (0.118)	1.126 (0.250)
	Cohab/M/SDW, 2 Chld	1.880 ** (0.219)	1.766 ** (0.209)	1.013 (0.132)	1.731 * (0.411)
	Cohab/M/SDW, 3 Chld	1.751 ** (0.202)	1.572 ** (0.186)	0.887 (0.115)	1.465 (0.358)
	S	2.356 ** (0.294)	2.400 ** (0.307)	1.129 (0.173)	2.463 ** (0.597)
Gender (Ref: Male)	Female		1.239 ** (0.079)	1.166 (0.140)	1.344 ** (0.088)
Ethnicity (Ref: Non-white)	White		1.042 (0.220)	1.131 (0.246)	1.018 (0.218)
Overcrowding (>1.5 ppl/room)	Yes		1.011 (0.113)	1.037 (0.120)	1.006 (0.114)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)	Yes		0.963 (0.111)	0.954 (0.111)	0.982 (0.114)
Number of Hospitalizations (Age 11)	1		1.037 (0.074)	1.046 (0.076)	1.031 (0.075)
	2		1.198 (0.135)	1.180 (0.135)	1.211 (0.139)
	3		1.007 (0.200)	1.076 (0.217)	0.988 (0.198)
	4		0.901 (0.317)	0.890 (0.319)	0.938 (0.335)
	5		0.618 (0.308)	0.619 (0.319)	0.593 (0.299)
Birthweight (Grams)			1.002 (0.002)	1.003 (0.002)	1.002 (0.002)
Mother smoking during pregnancy (Ref: No)	Yes		1.085 (0.073)	1.094 (0.075)	1.095 (0.075)
Social Class at Birth (Ref: Non-manual)	Manual		0.944 (0.075)	0.942 (0.076)	0.907 (0.073)
Parents' Interest in R's Education (Ref: No)	Yes		0.824 * (0.071)	0.824 * (0.072)	0.847 (0.074)
Parents' Education (Yrs)			0.995 (0.019)	0.987 (0.020)	0.999 (0.019)

Parents Divorced (by Age 16, Ref: No)	Yes	1.003 (0.134)	0.987 (0.136)	1.023 (0.139)	
Closeness to Mother in Childhood (0-10)		0.937 ** (0.012)	0.940 ** (0.012)	0.942 ** (0.012)	
Closeness to Father in Childhood (0-10)		0.958 ** (0.012)	0.965 ** (0.013)	0.963 ** (0.012)	
Cognitive Ability Age 10 (z-score)		0.937 (0.036)	0.941 (0.037)	0.949 (0.037)	
Internalization Score (Age 16)		1.157 ** (0.048)	1.159 ** (0.049)	1.126 ** (0.048)	
Externalization Score (Age 16)		0.984 (0.032)	0.980 (0.032)	0.997 (0.033)	
In a Relationship (Age 62, Ref: No)	Yes		0.455 ** (0.086)		
Closeness to Partner (Age 62, Ref: Not very close/Not at all)	Very close/Close		0.454 * (0.154)		
Meet up w/ Immediate Family (Age 62, Ref: At least weekly)	At least yearly		1.039 (0.092)		
	Less than once per year/never		1.101 (0.133)		
Number of Grandchildren (Age 62, Ref: 0)	1		0.935 (0.139)		
	2		1.184 (0.220)		
	3		0.512 (0.188)		
	4		1.017 (0.229)		
Meet up w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.827 * (0.070)		
Contact w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.909 (0.082)		
Contact w/ Friends (Ref: At least weekly)	At least monthly			1.425 * (0.217)	
	Less often/no friends			2.850 ** (0.439)	
Clusters*Contact w/ Friends (Ref: M2*At least weekly)	M # At least monthly			1.300 (0.526)	
	M # Less often/no friends			0.888 (0.376)	
	M1 # At least monthly			1.017 (0.285)	

M1 # Less often/no friends				0.684	
				(0.204)	
M3 # At least monthly				0.888	
				(0.197)	
M3 # Less often/no friends				0.845	
				(0.196)	
Cohab/M/SDW, 0 Chld # At least monthly				1.753	*
				(0.501)	
Cohab/M/SDW, 0 Chld # Less often/no friends				1.225	
				(0.365)	
Cohab/M/SDW, 2 Chld # At least monthly				1.337	
				(0.411)	
Cohab/M/SDW, 2 Chld # Less often/no friends				0.719	
				(0.237)	
Cohab/M/SDW, 3 Chld # At least monthly				1.263	
				(0.403)	
Cohab/M/SDW, 3 Chld # Less often/no friends				0.886	
				(0.286)	
S # At least monthly				1.210	
				(0.391)	
S # Less often/no friends				0.802	
				(0.278)	
Constant	0.205	**	0.388	*	1.683
	(0.012)		(0.166)		(1.019)
Number of observations	6873		6873		6873
<hr/>					
OR; ** p<.01, * p<.05					

Table A6. Feels Lonely

		M1 (no confounders)	M2 (M1 + background confounders)	M3 (M2 + 1st set of mediators)	M4 (M2 + Cluster*Contact w/ Friends)
8 Clusters (Ref: M2)					
	M	1.111 (0.153)	1.094 (0.154)	0.963 (0.152)	1.443 (0.338)
	M1	1.262 * (0.127)	1.252 * (0.128)	1.137 (0.120)	1.059 (0.205)
	M3	1.243 ** (0.102)	1.173 (0.098)	1.110 (0.096)	1.130 (0.171)
	Cohab/M/SDW, 0 Chld	1.364 ** (0.139)	1.377 ** (0.144)	0.860 (0.110)	1.103 (0.205)
	Cohab/M/SDW, 2 Chld	2.153 ** (0.244)	1.982 ** (0.230)	1.046 (0.135)	2.762 ** (0.551)
	Cohab/M/SDW, 3 Chld	2.180 ** (0.252)	1.963 ** (0.233)	1.020 (0.135)	2.594 ** (0.535)
	S	2.480 ** (0.316)	2.607 ** (0.343)	1.150 (0.183)	3.371 ** (0.735)
Gender (Ref: Male)	Female		1.566 ** (0.098)	1.442 ** (0.164)	1.640 ** (0.104)
Ethnicity (Ref: Non-white)	White		0.802 (0.171)	0.874 (0.193)	0.775 (0.167)
Overcrowding (>1.5 ppl/room)	Yes		1.030 (0.117)	1.051 (0.124)	1.031 (0.118)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)	Yes		0.979 (0.107)	0.985 (0.111)	0.988 (0.109)
Number of Hospitalizations (Age 11)	1		0.964 (0.068)	0.975 (0.071)	0.958 (0.069)
	2		1.214 (0.136)	1.211 (0.137)	1.222 (0.138)
	3		0.753 (0.155)	0.797 (0.168)	0.746 (0.155)
	4		0.751 (0.281)	0.736 (0.280)	0.772 (0.291)
	5		0.942 (0.406)	0.915 (0.407)	0.946 (0.411)
Birthweight (Grams)			1.002 (0.002)	1.002 (0.002)	1.002 (0.002)
Mother smoking during pregnancy (Ref: No)	Yes		1.155 * (0.076)	1.166 * (0.079)	1.162 * (0.077)
Social Class at Birth (Ref: Non-manual)	Manual		1.044 (0.078)	1.053 (0.081)	1.026 (0.077)
Parents' Interest in R's Education (Ref: No)	Yes		0.904 (0.077)	0.926 (0.082)	0.924 (0.080)
Parents' Education (Yrs)			1.000 (0.020)	0.994 (0.020)	1.004 (0.020)

Parents Divorced (by Age 16, Ref: No)	Yes	1.081 (0.145)	1.060 (0.148)	1.094 (0.148)	
Closeness to Mother in Childhood (0-10)		0.959 ** (0.012)	0.962 ** (0.012)	0.963 ** (0.012)	**
Closeness to Father in Childhood (0-10)		0.953 ** (0.011)	0.957 ** (0.011)	0.955 ** (0.011)	**
Cognitive Ability Age 10 (z-score)		0.831 ** (0.031)	0.827 ** (0.032)	0.834 ** (0.032)	**
Internalization Score (Age 16)		1.142 ** (0.046)	1.148 ** (0.048)	1.124 ** (0.046)	**
Externalization Score (Age 16)		0.986 (0.032)	0.983 (0.033)	0.992 (0.033)	
In a Relationship (Age 62, Ref: No)	Yes		0.387 ** (0.073)		
Closeness to Partner (Age 62, Ref: Not very close/Not at all)	Very close/Close		0.445 * (0.150)		*
Meet up w/ Immediate Family (Age 62, Ref: At least weekly)	At least yearly		0.956 (0.078)		
	Less than once per year/never		1.002 (0.119)		
Number of Grandchildren (Age 62, Ref: 0)	1		0.946 (0.132)		
	2		0.974 (0.179)		
	3		0.555 (0.170)		
	4		0.776 (0.179)		
Meet up w/ Children (Age 62, Ref: Less than weekly)	At least weekly		0.797 ** (0.063)		**
Contact w/ Children (Age 62, Ref: Less than weekly)	At least weekly		1.022 (0.089)		
Contact w/ Friends (Ref: At least weekly)	At least monthly			1.226 (0.159)	
	Less often/no friends			1.870 ** (0.263)	**
Clusters*Contact w/ Friends (Ref: M2*At least weekly)	M # At least monthly			0.650 (0.216)	
	M # Less often/no friends			0.660 (0.233)	
	M1 # At least monthly			1.433 (0.357)	

M1 # Less often/no friends				1.030 (0.285)
M3 # At least monthly				1.025 (0.205)
M3 # Less often/no friends				1.137 (0.252)
Cohab/M/SDW, 0 Chld # At least monthly				1.636 *
Cohab/M/SDW, 0 Chld # Less often/no friends				(0.408) 1.176 (0.321)
Cohab/M/SDW, 2 Chld # At least monthly				0.652 (0.178)
Cohab/M/SDW, 2 Chld # Less often/no friends				0.537 *
Cohab/M/SDW, 3 Chld # At least monthly				(0.162) 0.713 (0.201)
Cohab/M/SDW, 3 Chld # Less often/no friends				0.574 (0.173)
S # At least monthly				0.818 (0.249)
S # Less often/no friends				0.526 (0.178)
Constant	0.322 **	0.540	2.877	0.389 *
	(0.017)	(0.228)	(1.819)	(0.168)
Number of observations	5909	5909	5909	5909

OR; ** p<.01, * p<.05

Table A7. ULS-4

		Ever Cohabited	Ever Married	Ever Separated/ Divorced	Ever Widowed	Ever had a Child	Number of Cohabitations	Number of Marriages
8 Clusters (Ref: M2)								
	M	-0.044 (0.105)	-0.046 (0.105)	-0.032 (0.104)	-0.049 (0.104)	0.022 (0.318)	-0.040 (0.105)	-0.048 (0.105)
	M1	0.139 (0.078)	0.145 (0.078)	0.119 (0.077)	0.140 (0.077)	0.145 (0.078)	0.135 (0.078)	0.138 (0.078)
	M3	0.131 * (0.063)	0.136 * (0.063)	0.108 (0.063)	0.136 * (0.063)	0.135 * (0.063)	0.127 * (0.063)	0.123 (0.063)
	Cohab/M/SDW, 0 Chld	0.295 ** (0.082)	0.278 * (0.083)	0.203 * (0.082)	0.311 ** (0.080)	0.380 (0.304)	0.273 ** (0.083)	0.274 ** (0.083)
	Cohab/M/SDW, 2 Chld	0.527 ** (0.096)	0.529 * (0.095)	0.339 ** (0.100)	0.548 ** (0.094)	0.546 ** (0.094)	0.502 ** (0.097)	0.520 ** (0.095)
	Cohab/M/SDW, 3 Chld	0.446 ** (0.098)	0.414 * (0.102)	0.302 ** (0.100)	0.473 ** (0.096)	0.464 ** (0.096)	0.422 ** (0.098)	0.404 ** (0.101)
	S	0.832 ** (0.108)	0.679 * (0.143)	0.863 ** (0.107)	0.835 ** (0.107)	0.890 ** (0.300)	0.837 ** (0.108)	0.676 ** (0.143)
Gender (Ref: Male)								
	Female	0.319 ** (0.048)	0.317 * (0.048)	0.314 ** (0.047)	0.303 ** (0.048)	0.317 ** (0.048)	0.321 ** (0.048)	0.317 ** (0.048)
Ethnicity (Ref: Non-white)								
	White	-0.313 (0.173)	-0.302 (0.173)	-0.322 (0.172)	-0.323 (0.173)	-0.312 (0.173)	-0.314 (0.173)	-0.306 (0.173)
Overcrowding (>1.5 ppl/room)								
	Yes	-0.048 (0.088)	-0.050 (0.088)	-0.038 (0.088)	-0.053 (0.088)	-0.050 (0.088)	-0.043 (0.088)	-0.046 (0.088)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)								
	Yes	-0.038 (0.088)	-0.040 (0.087)	-0.036 (0.087)	-0.035 (0.087)	-0.039 (0.088)	-0.037 (0.087)	-0.041 (0.087)
Number of Hospitalizations (Age 11)								
	1	0.054 (0.054)	0.055 (0.054)	0.058 (0.054)	0.054 (0.054)	0.055 (0.054)	0.053 (0.054)	0.057 (0.054)
	2	0.159 (0.088)	0.161 (0.088)	0.154 (0.088)	0.162 (0.088)	0.160 (0.088)	0.159 (0.088)	0.156 (0.088)
	3	-0.106 (0.151)	-0.102 (0.152)	-0.095 (0.151)	-0.109 (0.151)	-0.106 (0.152)	-0.099 (0.152)	-0.098 (0.152)
	4	-0.049 (0.265)	-0.062 (0.265)	-0.021 (0.264)	-0.054 (0.265)	-0.055 (0.265)	-0.039 (0.265)	-0.044 (0.265)
	5	-0.228 (0.332)	-0.219 (0.332)	-0.236 (0.332)	-0.211 (0.330)	-0.223 (0.332)	-0.228 (0.332)	-0.225 (0.332)
Birthweight (Ounces)		0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Mother smoking during pregnancy (Ref: No)								
	Yes	0.111 * (0.051)	0.110 * (0.051)	0.110 * (0.051)	0.116 * (0.051)	0.112 * (0.051)	0.108 * (0.051)	0.108 * (0.051)
Social Class at Birth (Ref: Non-manual)								
	Manual	-0.008 (0.058)	-0.009 (0.058)	-0.009 (0.058)	-0.008 (0.058)	-0.008 (0.058)	-0.009 (0.058)	-0.011 (0.058)
Parents' Interest in R's Education (Ref: No)								
	Yes	-0.184 ** (0.068)	-0.183 * (0.068)	-0.181 ** (0.068)	-0.182 ** (0.068)	-0.184 ** (0.068)	-0.186 ** (0.068)	-0.182 ** (0.068)
Parents' Education (Yrs)		-0.006 (0.015)	-0.006 (0.015)	-0.006 (0.014)	-0.005 (0.014)	-0.005 (0.015)	-0.006 (0.015)	-0.006 (0.015)
Parents Divorced (by Age 16, Ref: No)								
	Yes	0.037	0.041	0.035	0.032	0.039	0.037	0.043

	(0.112)		(0.112)	*	(0.111)		(0.112)		(0.112)		(0.112)			
Closeness to Mother in Childhood (0-10)	-0.065	**	-0.065	*	-0.063	**	-0.065	**	-0.065	**	-0.064	**	-0.064	**
	(0.010)		(0.010)		(0.010)		(0.010)		(0.010)		(0.010)		(0.010)	
Closeness to Father in Childhood (0-10)	-0.042	**	-0.042	*	-0.040	**	-0.042	**	-0.042	**	-0.041	**	-0.041	**
	(0.009)		(0.009)		(0.009)		(0.009)		(0.009)		(0.009)		(0.009)	
Cognitive Ability Age 10 (z-score)	-0.079	**	-0.079	*	-0.077	**	-0.078	**	-0.079	**	-0.078	**	-0.078	**
	(0.029)		(0.029)		(0.029)		(0.029)		(0.029)		(0.029)		(0.029)	
Internalization Score (Age 16)	0.122	**	0.123	*	0.120	**	0.124	**	0.123	**	0.123	**	0.122	**
	(0.031)		(0.031)		(0.031)		(0.031)		(0.031)		(0.031)		(0.031)	
Externalization Score (Age 16)	-0.020		-0.020		-0.020		-0.021		-0.020		-0.021		-0.020	
	(0.025)		(0.025)		(0.025)		(0.025)		(0.025)		(0.025)		(0.025)	
Ever... (by age 55, Ref: No)						*								
Yes	0.048		-0.167		0.314	*	0.523	**	0.068					
	(0.048)		(0.107)		(0.054)		(0.139)		(0.300)					
Number of...(Ref: 0)														
1									0.006				-0.204	
									(0.052)				(0.108)	
2+									0.138	*			-0.043	
									(0.065)				(0.117)	
Constant	5.889	**	6.067	*	5.870	**	5.900	**	5.838	**	5.894	**	6.072	**
	(0.326)		(0.342)		(0.324)		(0.325)		(0.448)		(0.326)		(0.341)	
Number of observations	5909		5909		5909		5909		5909		5909		5909	

** p<.01, * p<.05

Table A8. ULS-4

		Age at 1st Cohabitation	Age at 1st Marriage	Time since last separation/divorce	Time since last widowhood	Number of Children	Age at 1st Child	Age at Last Child
8 Clusters (Ref: M2)								
	M	-0.045 (0.105)	-0.041 (0.105)	-0.044 (0.105)	-0.046 (0.105)	0.183 (0.138)	-0.044 (0.105)	-0.057 (0.105)
	M1	0.139 (0.078)	0.137 (0.078)	0.140 (0.078)	0.142 (0.078)	0.259 (0.089)	0.156 (0.079)	0.120 (0.079)
	M3	0.129 (0.063)	0.134 (0.063)	0.131 (0.063)	0.133 (0.063)	-0.021 (0.088)	0.126 (0.064)	0.119 (0.064)
	Cohab/M/SDW, 0 Chld	0.283 (0.082)	0.280 (0.082)	0.293 (0.081)	0.313 (0.080)	0.540 (0.119)	0.322 (0.081)	0.287 (0.082)
	Cohab/M/SDW, 2 Chld	0.501 (0.098)	0.538 (0.094)	0.520 (0.095)	0.542 (0.094)	0.544 (0.094)	0.546 (0.094)	0.541 (0.094)
	Cohab/M/SDW, 3 Chld	0.429 (0.099)	0.446 (0.097)	0.437 (0.098)	0.465 (0.096)	0.459 (0.096)	0.466 (0.096)	0.434 (0.098)
	S	0.779 (0.111)	0.798 (0.109)	0.841 (0.108)	0.830 (0.108)	1.047 (0.138)	0.835 (0.108)	0.796 (0.109)
Gender (Ref: Male)								
	Female	0.323 (0.048)	0.327 (0.048)	0.315 (0.048)	0.311 (0.048)	0.318 (0.048)	0.307 (0.049)	0.337 (0.049)
Ethnicity (Ref: Non-white)								
	White	-0.319 (0.173)	-0.314 (0.173)	-0.314 (0.173)	-0.316 (0.173)	-0.309 (0.173)	-0.313 (0.173)	-0.295 (0.173)
Overcrowding (>1.5 ppl/room)								
	Yes	-0.044 (0.088)	-0.045 (0.088)	-0.046 (0.088)	-0.051 (0.088)	-0.054 (0.088)	-0.053 (0.088)	-0.046 (0.088)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)								
	Yes	-0.038 (0.088)	-0.037 (0.088)	-0.039 (0.087)	-0.038 (0.088)	-0.044 (0.088)	-0.042 (0.087)	-0.036 (0.088)
Number of Hospitalizations (Age 11)								
	1	0.056 (0.054)	0.056 (0.054)	0.054 (0.054)	0.056 (0.054)	0.059 (0.054)	0.056 (0.054)	0.055 (0.054)
	2	0.157 (0.088)	0.158 (0.088)	0.158 (0.088)	0.160 (0.088)	0.162 (0.088)	0.160 (0.088)	0.160 (0.088)
	3	-0.099 (0.152)	-0.108 (0.152)	-0.104 (0.151)	-0.107 (0.152)	-0.109 (0.151)	-0.105 (0.151)	-0.106 (0.151)
	4	-0.041 (0.265)	-0.040 (0.265)	-0.048 (0.265)	-0.059 (0.265)	-0.052 (0.265)	-0.056 (0.265)	-0.052 (0.265)
	5	-0.231 (0.332)	-0.231 (0.332)	-0.227 (0.332)	-0.218 (0.332)	-0.211 (0.332)	-0.222 (0.332)	-0.220 (0.332)
	Birthweight (Ounces)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Mother smoking during pregnancy (Ref: No)								
	Yes	0.113 (0.051)	0.113 (0.051)	0.111 (0.051)	0.113 (0.051)	0.112 (0.051)	0.111 (0.051)	0.115 (0.051)
Social Class at Birth (Ref: Non-manual)								
	Manual	-0.009 (0.058)	-0.004 (0.058)	-0.010 (0.058)	-0.009 (0.058)	-0.005 (0.058)	-0.011 (0.058)	-0.001 (0.058)
Parents' Interest in R's Education (Ref: No)								
	Yes	-0.185 (0.068)	-0.185 (0.068)	-0.182 (0.068)	-0.183 (0.068)	-0.183 (0.068)	-0.181 (0.068)	-0.187 (0.068)
	Parents' Education (Yrs)	-0.005 (0.015)	-0.006 (0.015)	-0.005 (0.015)	-0.006 (0.015)	-0.005 (0.015)	-0.004 (0.015)	-0.007 (0.015)
Parents Divorced (by Age 16, Ref: No)								

	Yes	0.038 (0.112)	0.042 (0.112)	0.039 (0.112)	0.037 (0.112)	0.034 (0.112)	0.037 (0.112)	0.043 (0.111)
Closeness to Mother in Childhood (0-10)		-0.065 ** (0.010)	-0.065 ** (0.010)	-0.065 * (0.010)	-0.065 * (0.010)	-0.064 * (0.010)	-0.065 * (0.010)	-0.065 ** (0.010)
Closeness to Father in Childhood (0-10)		-0.042 ** (0.009)	-0.041 ** (0.009)	-0.042 * (0.009)	-0.042 * (0.009)	-0.042 * (0.009)	-0.042 * (0.009)	-0.042 ** (0.009)
Cognitive Ability Age 10 (z- score)		-0.077 ** (0.029)	-0.079 ** (0.029)	-0.079 * (0.029)	-0.078 * (0.029)	-0.076 * (0.029)	-0.075 * (0.030)	-0.083 ** (0.029)
Internalization Score (Age 16)		0.122 ** (0.031)	0.122 ** (0.031)	0.122 * (0.031)	0.122 * (0.031)	0.124 * (0.031)	0.124 * (0.031)	0.119 ** (0.031)
Externalization Score (Age 16)		-0.019 (0.025)	-0.020 (0.025)	-0.020 (0.025)	-0.020 (0.025)	-0.021 (0.025)	-0.022 (0.025)	-0.017 (0.025)
Age at... (by age 55, Ref: No)		0.005	0.005				-0.004	0.007
Yes		(0.003)	(0.003)				(0.005)	(0.005)
Time since...				0.004	0.018			
Number of Children				(0.002)	(0.009)			
						0.114	*	
						(0.045)		
Constant		5.777 ** (0.338)	5.775 ** (0.334)	5.892 * (0.326)	5.911 * (0.326)	5.671 * (0.338)	6.008 * (0.349)	5.672 ** (0.358)
Number of observations		5909	5909	5909	5909	5909	5909	5909

** p<.01, * p<.05

Table A9. ULS-4

		All Quantum/Timing Variables
8 Clusters (Ref: M2)		
	M	0.091 (0.329)
	M1	0.177 (0.094)
	M3	-0.054 (0.088)
	Cohab/M/SDW, 0 Chld	0.290 (0.318)
	Cohab/M/SDW, 2 Chld	0.294 ** (0.105)
	Cohab/M/SDW, 3 Chld	0.201 (0.110)
	S	0.756 * (0.321)
Gender (Ref: Male)	Female	0.308 ** (0.050)
Ethnicity (Ref: Non-white)	White	-0.280 (0.173)
Overcrowding (>1.5 ppl/room)	Yes	-0.055 (0.088)
Housing Amenities (bathroom, indoor wc, kitchen, hot water)	Yes	-0.037 (0.087)
Number of Hospitalizations (Age 11)	1	0.067 (0.054)
	2	0.161 (0.088)
	3	-0.095 (0.151)
	4	-0.029 (0.264)
	5	-0.188 (0.331)
Birthweight (Ounces)		0.001 (0.001)
Mother smoking during pregnancy (Ref: No)	Yes	0.113 * (0.051)
Social Class at Birth (Ref: Non-manual)	Manual	0.002 (0.057)
Parents' Interest in R's Education (Ref: No)	Yes	-0.175 ** (0.068)
Parents' Education (Yrs)		-0.006 (0.015)
Parents Divorced (by Age 16, Ref: No)		

	Yes	0.026 (0.111)	
Closeness to Mother in Childhood (0-10)		-0.063 (0.010)	**
Closeness to Father in Childhood (0-10)		-0.041 (0.009)	**
Cognitive Ability Age 10 (z-score)		-0.069 (0.030)	*
Internalization Score (Age 16)		0.122 (0.031)	**
Externalization Score (Age 16)		-0.021 (0.025)	
Ever Cohabited (by age 55, Ref: No)	Yes	0.022 (0.113)	
Ever Married (by age 55, Ref: No)	Yes	-0.004 (0.580)	
Ever had a Child (by age 55, Ref: No)		-0.003 (0.314)	
Ever Separated/Divorced (by age 55, Ref: No)			*
	Yes	0.540 (0.083)	*
Ever Widow (by age 55, Ref: No)			*
	Yes	0.747 (0.205)	*
Number of Marriages (Ref: 0)			
	1	-0.246 (0.583)	
	2+	-0.192 (0.593)	
Number of Cohabitations (Ref: 0)			
	1	-0.072 (0.113)	
	2+	-0.080 (0.137)	
Age at 1st Cohabitation		-0.002 (0.004)	
Age at 1st Marriage		0.000 (0.004)	
Time since last separation/divorce		-0.013 (0.004)	*
Time since last widowhood		-0.017 (0.013)	*
Number of Children		0.073 (0.049)	
Age at 1st Child		-0.014 (0.008)	
Age at Last Child		0.015 (0.008)	
Constant		5.906 (0.475)	**

Number of observations	5909
------------------------	------

** p<.01, * p<.05